16	.0	.0	64.0	72.0	85.3	80.0
32	.0	.0	128.0	96.0	85.3	100.0
48	.0	.0	96.0	86.4	76.8	92.3
64	16.0	64.0	85.3	72.0	93.1	94.1

DTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	2.0	.0	.0	10.7	16.7
16	.0	.0	64.0	72.0	64.0	66.7
32	.0	.0	64.0	96.0	85.3	80.0
48	.0	48.0	96.0	86.4	76.8	75.0
64	.0	64.0	85.3	82.3	73.1	84.2

DTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	32.0	50.0
16	.0	.0	64.0	72.0	85.3	100.0
32	.0	32.0	64.0	96.0	102.4	100.0
48	.0	.0	96.0	86.4	76.8	92.3
64	.0	64.0	64.0	96.0	113.8	88.9

DTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	18.0	16.0	12.5
16	.0	.0	32.0	72.0	85.3	57.1
32	.0	.0	128.0	96.0	64.0	88.9
48	.0	48.0	96.0	86.4	85.3	92.3
64	.0	64.0	128.0	96.0	85.3	100.0

*** Speed of DTRSM in megaflops ***
with LDA = 513

DTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	20.5	.0	.0	.0
48	.0	23.0	.0	.0	92.2	57.6
64	.0	41.0	81.9	122.9	81.9	102.4

DTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

N	50	100	200	300	400	500

16	4.0	.0	64.0	72.0	128.0	133.3
32	.0	32.0	128.0	144.0	128.0	133.3
48	.0	.0	192.0	144.0	128.0	150.0
64	.0	.0	128.0	115.2	146.3	145.5

DTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	18.0	16.0	25.0
16	.0	16.0	64.0	72.0	85.3	80.0
32	.0	.0	128.0	72.0	128.0	100.0
48	.0	.0	192.0	144.0	109.7	109.1
64	.0	64.0	128.0	115.2	113.8	133.3

DTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	50.0
16	.0	.0	.0	144.0	128.0	200.0
32	.0	.0	128.0	144.0	170.7	160.0
48	.0	.0	192.0	144.0	192.0	120.0
64	.0	.0	128.0	192.0	128.0	145.5

DTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	8.0	18.0	32.0	25.0
16	4.0	.0	64.0	72.0	85.3	100.0
32	8.0	.0	128.0	96.0	128.0	114.3
48	.0	.0	96.0	86.4	128.0	133.3
64	16.0	.0	128.0	96.0	146.3	133.3

*** Speed of DTRSM in megaflops ***
with LDA = 513

DTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	.0	51.2
48	.0	.0	.0	69.1	92.2	115.2
64	.0	.0	.0	61.4	163.8	204.8

DTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

N	50	100	200	300	400	500

M						
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	5.1	.0	.0	30.7	41.0	51.2
48	.0	23.0	.0	69.1	92.2	115.2
64	.0	[illegible]	81.9	122.9	81.9	102.4

DTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.2	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	20.5	.0	41.0	51.2
48	.0	23.0	.0	.0	92.2	115.2
64	20.5	20.5	81.9	122.9	163.8	51.2

DTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	10.2	.0
32	.0	10.2	.0	30.7	.0	.0
48	.0	.0	.0	69.1	92.2	57.6
64	.0	41.0	81.9	122.9	163.8	51.2

DTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	50.0
16	4.0	.0	64.0	72.0	256.0	57.1
32	.0	32.0	128.0	96.0	85.3	100.0
48	12.0	.0	64.0	86.4	109.7	100.0
64	.0	64.0	85.3	96.0	93.1	84.2

DTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	2.0	4.0	9.0	16.0	16.7
16	.0	.0	64.0	72.0	64.0	66.7
32	.0	.0	128.0	72.0	85.3	66.7
48	.0	24.0	48.0	72.0	85.3	92.3
64	.0	32.0	85.3	96.0	85.3	84.2

DTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500

M						
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	7.7	.0	.0
32	.0	.0	20.5	.0	41.0	.0
48	.0	23.0	.0	69.1	92.2	.0
64	20.5	.0	81.9	122.9	163.8	204.8

DTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	7.7	.0	.0
32	.0	.0	.0	.0	41.0	.0
48	11.5	.0	46.1	69.1	.0	115.2
64	.0	.0	41.0	122.9	81.9	204.8

DTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	5.1	.0	.0	.0
32	.0	.0	.0	.0	41.0	.0
48	.0	23.0	.0	69.1	92.2	115.2
64	.0	41.0	.0	122.9	163.8	102.4

DTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	32.0	50.0
16	.0	.0	64.0	144.0	85.3	200.0
32	8.0	.0	128.0	144.0	170.7	160.0
48	.0	48.0	96.0	86.4	128.0	150.0
64	.0	32.0	128.0	192.0	204.8	133.3

DTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	9.0	32.0	25.0
16	.0	16.0	64.0	72.0	85.3	80.0
32	.0	.0	128.0	288.0	102.4	114.3
48	.0	.0	192.0	144.0	128.0	120.0
64	.0	64.0	85.3	115.2	170.7	133.3

DTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500

2	.0	.0	.0	.0	32.0	50.0
16	.0	.0	64.0	144.0	64.0	100.0
32	.0	.0	128.0	96.0	102.4	80.0
48	.0	.0	96.0	86.4	85.3	85.7
64	.0	64.0	85.3	115.2	113.8	94.1

DTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	8.0	18.0	32.0	12.5
16	.0	.0	32.0	72.0	64.0	80.0
32	.0	.0	64.0	72.0	73.1	100.0
48	12.0	.0	96.0	72.0	85.3	85.7
64	.0	64.0	85.3	72.0	102.4	94.1

End of tests
Total time used = 58.74 seconds
LAPACK VERSION 1.1, released March 31, 1993

BLAS timing, DOUBLE PRECISION data, N small

The following parameter values will be used:

M:	50	100	200	300	400	500
N:	2	16	32	48	64	
K:	50	100	200	300	400	500
INCX:	1					
LDA:	513					

The minimum time a subroutine will be timed = .000 seconds

>>>>> Timing data <<<<<

*** Speed of DGEMM in megaflops ***
with LDA = 513

DGEMM with TRANSA = 'N', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	.0	.0	24.0	.0
100	.0	.0	.0	.0	64.0
200	.0	32.0	64.0	96.0	128.0
300	.0	.0	48.0	72.0	96.0
400	8.0	64.0	64.0	96.0	85.3
500	.0	80.0	80.0	80.0	106.7

K = 100

M \ N	2	16	32	48	64

2	.0	.0	.0	.0	.0	50.0
16	.0	16.0	.0	144.0	128.0	100.0
32	.0	.0	128.0	288.0	102.4	133.3
48	.0	.0	96.0	108.0	128.0	150.0
64	.0	.0	128.0	115.2	146.3	145.5

DTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	18.0	16.0	25.0
16	.0	16.0	64.0	72.0	85.3	80.0
32	.0	.0	128.0	96.0	102.4	114.3
48	.0	48.0	96.0	108.0	128.0	120.0
64	8.0	.0	128.0	115.2	113.8	123.1

End of tests
Total time used = 43.06 seconds
LAPACK VERSION 2.0, released September 30, 1994

BLAS timing, DOUBLE PRECISION data, N small

The following parameter values will be used:

M:	50	100	200	300	400	500
N:	2	16	32	48	64	
K:	50	100	200	300	400	500
INCX:	1					
LDA:	513					

The minimum time a subroutine will be timed = .000 seconds

>>>>> Timing data <<<<<

*** Speed of DGEMM in megaflops ***
with LDA = 513

DGEMM with TRANSA = 'N', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	2.0	.0	.0	48.0	.0
200	.0	.0	64.0	96.0	128.0
300	.0	48.0	96.0	144.0	96.0
400	.0	64.0	128.0	192.0	256.0
500	.0	80.0	80.0	120.0	106.7

K = 100

M \ N	2	16	32	48	64

M					
50	.0	16.0	.0	48.0	.0
100	4.0	.0	64.0	48.0	128.0
200	.0	64.0	64.0	96.0	85.3
300	12.0	48.0	96.0	96.0	96.0
400	.0	64.0	85.3	76.8	85.3
500	20.0	160.0	64.0	68.6	91.4

K = 200

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	128.0
100	8.0	64.0	64.0	96.0	128.0
200	.0	128.0	85.3	76.8	73.1
300	24.0	96.0	96.0	96.0	96.0
400	32.0	85.3	73.1	109.7	93.1
500	20.0	80.0	91.4	87.3	85.3

K = 300

M \ N	2	16	32	48	64
50	6.0	48.0	96.0	144.0	192.0
100	.0	48.0	96.0	96.0	76.8
200	.0	64.0	96.0	96.0	85.3
300	36.0	96.0	72.0	86.4	96.0
400	48.0	76.8	96.0	88.6	80.8
500	30.0	80.0	87.3	84.7	91.4

K = 400

M \ N	2	16	32	48	64
50	8.0	64.0	64.0	96.0	85.3
100	16.0	64.0	64.0	96.0	73.1
200	32.0	64.0	102.4	76.8	73.1
300	48.0	64.0	69.8	88.6	90.4
400	32.0	73.1	73.1	85.3	81.9
500	40.0	64.0	85.3	80.0	85.3

K = 500

M \ N	2	16	32	48	64
50	.0	80.0	80.0	80.0	80.0
100	.0	80.0	80.0	80.0	91.4
200	40.0	53.3	91.4	87.3	85.3
300	30.0	68.6	73.8	90.0	91.4
400	26.7	71.1	75.3	80.0	88.3
500	33.3	80.0	84.2	77.4	78.0

M					
50	.0	16.0	.0	.0	.0
100	.0	32.0	.0	.0	.0
200	.0	64.0	128.0	96.0	128.0
300	.0	96.0	192.0	144.0	128.0
400	16.0	128.0	128.0	192.0	128.0
500	.0	160.0	160.0	160.0	128.0

K = 200

M \ N	2	16	32	48	64
50	.0	.0	.0	96.0	128.0
100	8.0	64.0	128.0	192.0	128.0
200	.0	128.0	85.3	128.0	128.0
300	.0	192.0	128.0	115.2	128.0
400	32.0	128.0	128.0	153.6	102.4
500	40.0	80.0	160.0	120.0	128.0

K = 300

M \ N	2	16	32	48	64
50	6.0	.0	.0	144.0	96.0
100	.0	.0	64.0	288.0	128.0
200	24.0	192.0	192.0	144.0	128.0
300	36.0	96.0	144.0	123.4	164.6
400	24.0	96.0	128.0	144.0	128.0
500	30.0	160.0	120.0	120.0	137.1

K = 400

M \ N	2	16	32	48	64
50	.0	64.0	64.0	192.0	128.0
100	.0	.0	85.3	128.0	128.0
200	.0	85.3	128.0	153.6	113.8
300	48.0	96.0	153.6	128.0	118.2
400	64.0	128.0	128.0	128.0	120.5
500	80.0	106.7	116.4	160.0	142.2

K = 500

M \ N	2	16	32	48	64
50	.0	80.0	80.0	120.0	160.0
100	.0	53.3	106.7	160.0	128.0
200	40.0	106.7	106.7	137.1	142.2
300	60.0	96.0	106.7	160.0	147.7
400	40.0	106.7	116.4	128.0	128.0
500	50.0	133.3	123.1	133.3	145.5

DGEMM with TRANSA = 'N', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	48.0	64.0
200	.0	32.0	.0	96.0	64.0
300	.0	24.0	96.0	72.0	96.0
400	.0	.0	128.0	96.0	85.3
500	.0	.0	160.0	80.0	106.7

K = 100

M \ N	2	16	32	48	64
50	.0	.0	32.0	.0	64.0
100	.0	32.0	64.0	96.0	128.0
200	.0	64.0	128.0	64.0	128.0
300	.0	96.0	96.0	96.0	96.0
400	16.0	42.7	85.3	128.0	85.3
500	.0	80.0	80.0	120.0	106.7

K = 200

M \ N	2	16	32	48	64
50	4.0	.0	.0	96.0	128.0
100	.0	64.0	64.0	96.0	128.0
200	.0	64.0	85.3	96.0	128.0
300	.0	64.0	96.0	96.0	109.7
400	32.0	85.3	102.4	85.3	93.1
500	20.0	80.0	91.4	106.7	91.4

K = 300

M \ N	2	16	32	48	64
50	.0	.0	96.0	72.0	96.0
100	12.0	48.0	96.0	96.0	96.0
200	24.0	96.0	76.8	96.0	109.7
300	.0	96.0	96.0	86.4	104.7
400	24.0	76.8	96.0	104.7	102.4
500	20.0	80.0	80.0	102.9	96.0

K = 400

M \ N	2	16	32	48	64
50	.0	64.0	64.0	64.0	85.3

DGEMM with TRANSA = 'N', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	.0	.0	24.0	.0
100	.0	.0	32.0	.0	64.0
200	.0	32.0	.0	.0	128.0
300	6.0	.0	96.0	144.0	192.0
400	8.0	.0	128.0	192.0	128.0
500	.0	80.0	160.0	120.0	160.0

K = 100

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	32.0	.0	.0	128.0
200	.0	64.0	128.0	96.0	128.0
300	12.0	96.0	96.0	144.0	128.0
400	16.0	128.0	128.0	128.0	128.0
500	.0	160.0	320.0	120.0	160.0

K = 200

M \ N	2	16	32	48	64
50	4.0	.0	64.0	.0	128.0
100	.0	64.0	128.0	192.0	128.0
200	.0	128.0	64.0	128.0	170.7
300	24.0	192.0	128.0	144.0	109.7
400	32.0	128.0	85.3	153.6	146.3
500	40.0	80.0	128.0	137.1	116.4

K = 300

M \ N	2	16	32	48	64
50	.0	48.0	96.0	72.0	96.0
100	.0	96.0	96.0	96.0	128.0
200	24.0	96.0	128.0	115.2	153.6
300	36.0	144.0	115.2	123.4	128.0
400	24.0	128.0	128.0	128.0	153.6
500	30.0	120.0	120.0	144.0	137.1

K = 400

M \ N	2	16	32	48	64
50	.0	64.0	64.0	64.0	128.0

100	16.0	64.0	128.0	128.0	73.1
200	32.0	128.0	102.4	96.0	93.1
300	48.0	96.0	96.0	104.7	109.7
400	32.0	102.4	102.4	96.0	85.3
500	40.0	91.4	91.4	87.3	94.8

K = 500

M \ N	2	16	32	48	64
50	10.0	40.0	160.0	120.0	53.3
100	.0	80.0	80.0	96.0	80.0
200	40.0	80.0	80.0	96.0	91.4
300	30.0	80.0	96.0	90.0	91.4
400	26.7	80.0	85.3	101.1	98.5
500	25.0	88.9	94.1	100.0	97.0

DGEMM with TRANSA = 'T', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	.0	16.0	.0	.0
100	.0	.0	32.0	.0	64.0
200	.0	.0	64.0	96.0	128.0
300	.0	48.0	48.0	72.0	96.0
400	8.0	32.0	64.0	96.0	85.3
500	.0	80.0	80.0	80.0	80.0

K = 100

M \ N	2	16	32	48	64
50	.0	.0	.0	48.0	64.0
100	.0	.0	.0	96.0	64.0
200	.0	64.0	128.0	96.0	128.0
300	.0	48.0	96.0	144.0	96.0
400	.0	64.0	85.3	96.0	85.3
500	20.0	53.3	106.7	80.0	91.4

K = 200

M \ N	2	16	32	48	64
50	.0	32.0	64.0	96.0	64.0
100	.0	64.0	128.0	64.0	128.0
200	.0	64.0	85.3	96.0	128.0
300	.0	64.0	64.0	96.0	85.3
400	.0	64.0	85.3	85.3	93.1
500	40.0	64.0	80.0	120.0	85.3

100	.0	.0	128.0	96.0	128.0
200	.0	128.0	128.0	128.0	128.0
300	48.0	96.0	128.0	128.0	128.0
400	32.0	128.0	146.3	128.0	136.5
500	40.0	128.0	142.2	147.7	150.6

K = 500

M \ N	2	16	32	48	64
50	.0	.0	160.0	240.0	106.7
100	20.0	80.0	106.7	160.0	106.7
200	40.0	106.7	128.0	137.1	128.0
300	30.0	120.0	120.0	120.0	147.7
400	80.0	128.0	128.0	112.9	142.2
500	50.0	114.3	145.5	141.2	145.5

DGEMM with TRANSA = 'T', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	.0	.0	24.0	.0
100	.0	.0	32.0	.0	64.0
200	.0	32.0	.0	.0	128.0
300	6.0	.0	96.0	144.0	192.0
400	.0	64.0	128.0	96.0	128.0
500	10.0	80.0	160.0	80.0	320.0

K = 100

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	64.0
100	.0	32.0	.0	96.0	64.0
200	.0	32.0	64.0	96.0	128.0
300	.0	96.0	96.0	96.0	128.0
400	.0	128.0	128.0	128.0	170.7
500	.0	53.3	106.7	96.0	160.0

K = 200

M \ N	2	16	32	48	64
50	.0	32.0	.0	96.0	128.0
100	.0	64.0	64.0	96.0	128.0
200	16.0	64.0	128.0	128.0	85.3
300	.0	48.0	96.0	144.0	192.0
400	32.0	64.0	170.7	128.0	113.8
500	40.0	106.7	128.0	160.0	142.2

K = 300

M \ N	2	16	32	48	64
50	.0	.0	96.0	72.0	64.0
100	12.0	96.0	64.0	96.0	128.0
200	24.0	64.0	76.8	82.3	69.8
300	.0	57.6	82.3	78.5	82.3
400	48.0	54.9	109.7	88.6	85.3
500	60.0	68.6	80.0	90.0	87.3

K = 400

M \ N	2	16	32	48	64
50	.0	64.0	64.0	96.0	85.3
100	.0	42.7	85.3	76.8	73.1
200	.0	64.0	85.3	85.3	93.1
300	.0	64.0	76.8	96.0	85.3
400	64.0	64.0	85.3	96.0	85.3
500	40.0	58.2	85.3	87.3	94.8

K = 500

M \ N	2	16	32	48	64
50	.0	40.0	80.0	120.0	106.7
100	20.0	40.0	80.0	96.0	91.4
200	40.0	64.0	91.4	96.0	98.5
300	60.0	68.6	87.3	84.7	101.1
400	80.0	64.0	85.3	96.0	88.3
500	50.0	66.7	88.9	88.9	88.9

DGEMM with TRANSA = 'T', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	.0	.0	24.0	.0
100	.0	16.0	.0	.0	64.0
200	.0	32.0	64.0	96.0	128.0
300	6.0	48.0	96.0	144.0	192.0
400	.0	64.0	128.0	96.0	128.0
500	.0	40.0	80.0	120.0	106.7

K = 100

M \ N	2	16	32	48	64
50	.0	.0	32.0	.0	.0

K = 300

M \ N	2	16	32	48	64
50	.0	48.0	96.0	144.0	192.0
100	.0	96.0	192.0	144.0	96.0
200	.0	64.0	128.0	115.2	153.6
300	.0	72.0	115.2	144.0	128.0
400	.0	64.0	192.0	164.6	118.2
500	.0	60.0	120.0	144.0	147.7

K = 400

M \ N	2	16	32	48	64
50	.0	64.0	128.0	192.0	128.0
100	16.0	128.0	128.0	192.0	128.0
200	32.0	64.0	128.0	109.7	146.3
300	48.0	76.8	96.0	128.0	170.7
400	64.0	85.3	128.0	128.0	128.0
500	80.0	71.1	128.0	128.0	134.7

K = 500

M \ N	2	16	32	48	64
50	.0	80.0	160.0	120.0	160.0
100	20.0	80.0	106.7	120.0	128.0
200	.0	80.0	106.7	120.0	182.9
300	60.0	80.0	120.0	130.9	137.1
400	80.0	71.1	116.4	160.0	134.7
500	50.0	72.7	123.1	150.0	145.5

DGEMM with TRANSA = 'T', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	8.0	.0	.0	.0
100	2.0	.0	.0	.0	.0
200	4.0	.0	64.0	96.0	128.0
300	.0	48.0	48.0	144.0	96.0
400	.0	64.0	128.0	192.0	256.0
500	.0	80.0	80.0	80.0	160.0

K = 100

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0

100	.0	32.0	64.0	96.0	64.0
200	.0	.0	128.0	96.0	85.3
300	.0	96.0	192.0	96.0	96.0
400	.0	.0	85.3	128.0	85.3
500	20.0	53.3	80.0	96.0	128.0

K = 200

M \ N	2	16	32	48	64
50	.0	32.0	64.0	96.0	128.0
100	8.0	64.0	64.0	96.0	85.3
200	.0	42.7	128.0	96.0	102.4
300	.0	48.0	96.0	115.2	109.7
400	32.0	85.3	85.3	96.0	102.4
500	.0	64.0	106.7	106.7	91.4

K = 300

M \ N	2	16	32	48	64
50	.0	48.0	96.0	72.0	96.0
100	.0	48.0	96.0	96.0	96.0
200	.0	64.0	96.0	96.0	109.7
300	36.0	57.6	96.0	96.0	104.7
400	48.0	54.9	96.0	115.2	102.4
500	30.0	60.0	87.3	110.8	106.7

K = 400

M \ N	2	16	32	48	64
50	.0	64.0	64.0	64.0	128.0
100	16.0	42.7	64.0	128.0	85.3
200	.0	64.0	102.4	96.0	102.4
300	.0	76.8	109.7	96.0	90.4
400	32.0	56.9	93.1	96.0	93.1
500	80.0	64.0	91.4	96.0	102.4

K = 500

M \ N	2	16	32	48	64
50	.0	80.0	80.0	80.0	106.7
100	.0	53.3	80.0	96.0	91.4
200	.0	64.0	80.0	87.3	91.4
300	60.0	68.6	96.0	96.0	83.5
400	.0	71.1	91.4	101.1	116.4
500	33.3	57.1	106.7	92.3	100.0

*** Speed of DSYMM in megaflops ***

100	.0	32.0	64.0	96.0	128.0
200	.0	64.0	128.0	96.0	128.0
300	.0	48.0	96.0	144.0	128.0
400	.0	64.0	128.0	192.0	128.0
500	.0	53.3	106.7	120.0	160.0

K = 200

M \ N	2	16	32	48	64
50	.0	32.0	.0	.0	128.0
100	.0	64.0	128.0	192.0	256.0
200	.0	64.0	128.0	128.0	170.7
300	.0	64.0	128.0	115.2	192.0
400	.0	85.3	102.4	153.6	128.0
500	.0	64.0	160.0	120.0	128.0

K = 300

M \ N	2	16	32	48	64
50	.0	.0	.0	144.0	96.0
100	.0	96.0	96.0	96.0	192.0
200	.0	96.0	128.0	144.0	85.3
300	.0	72.0	144.0	123.4	128.0
400	.0	76.8	128.0	115.2	118.2
500	60.0	60.0	120.0	180.0	128.0

K = 400

M \ N	2	16	32	48	64
50	.0	64.0	128.0	96.0	128.0
100	.0	64.0	128.0	128.0	128.0
200	32.0	85.3	128.0	128.0	128.0
300	.0	64.0	128.0	128.0	139.6
400	.0	73.1	170.7	139.6	146.3
500	80.0	80.0	128.0	120.0	128.0

K = 500

M \ N	2	16	32	48	64
50	.0	80.0	80.0	120.0	80.0
100	20.0	80.0	106.7	96.0	128.0
200	.0	64.0	128.0	137.1	128.0
300	.0	80.0	120.0	130.9	128.0
400	80.0	71.1	116.4	120.0	128.0
500	50.0	66.7	133.3	141.2	139.1

*** Speed of DSYMM in megaflops ***

with LDA = 513

DSYMM with SIDE = 'L', UPLO = 'U'

M \ N	2	16	32	48	64
50	.0	8.0	.0	.0	32.0
100	.0	32.0	64.0	48.0	64.0
200	16.0	64.0	64.0	64.0	85.3
300	36.0	57.6	64.0	86.4	82.3
400	32.0	64.0	64.0	73.1	75.9
500	33.3	57.1	80.0	88.9	84.2

DSYMM with SIDE = 'L', UPLO = 'L'

M \ N	2	16	32	48	64
50	.0	.0	.0	24.0	.0
100	4.0	.0	64.0	96.0	42.7
200	16.0	64.0	64.0	24.0	85.3
300	18.0	57.6	82.3	86.4	88.6
400	32.0	56.9	78.8	90.4	85.3
500	25.0	61.5	80.0	80.0	88.9

DSYMM with SIDE = 'R', UPLO = 'U'

M \ N	2	16	32	48	64
50	.0	.0	.0	23.0	.0
100	.0	.0	.0	46.1	81.9
200	.0	.0	41.0	92.2	81.9
300	.0	.0	61.4	69.1	81.9
400	.0	.0	81.9	92.2	65.5
500	.0	.0	102.4	115.2	81.9

DSYMM with SIDE = 'R', UPLO = 'L'

M \ N	2	16	32	48	64
50	.0	.0	.0	23.0	41.0
100	.0	.0	20.5	46.1	81.9
200	.0	10.2	.0	92.2	81.9
300	.0	.0	61.4	138.2	81.9
400	.0	20.5	81.9	61.4	81.9
500	.0	.0	102.4	76.8	68.3

*** Speed of DTRMM in megaflops ***
with LDA = 513

DTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

N	2	16	32	48	64

with LDA = 513

DSYMM with SIDE = 'L', UPLO = 'U'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	64.0	96.0	128.0
200	16.0	128.0	85.3	96.0	128.0
300	36.0	96.0	115.2	123.4	144.0
400	32.0	73.1	113.8	109.7	136.5
500	33.3	88.9	106.7	114.3	123.1

DSYMM with SIDE = 'L', UPLO = 'L'

M \ N	2	16	32	48	64
50	.0	.0	.0	24.0	.0
100	.0	32.0	.0	.0	128.0
200	.0	128.0	128.0	128.0	128.0
300	36.0	96.0	115.2	144.0	144.0
400	32.0	73.1	128.0	102.4	136.5
500	50.0	80.0	114.3	150.0	123.1

DSYMM with SIDE = 'R', UPLO = 'U'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	41.0
100	.0	.0	.0	46.1	81.9
200	.0	.0	.0	.0	163.8
300	.0	.0	61.4	138.2	245.8
400	.0	.0	81.9	92.2	163.8
500	.0	.0	102.4	230.4	136.5

DSYMM with SIDE = 'R', UPLO = 'L'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	41.0
100	.0	.0	.0	46.1	81.9
200	.0	.0	41.0	92.2	81.9
300	.0	.0	.0	138.2	81.9
400	.0	.0	.0	184.3	109.2
500	.0	.0	.0	230.4	136.5

*** Speed of DTRMM in megaflops ***
with LDA = 513

DTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

N	2	16	32	48	64

M					
50	.0	.0	.0	.0	.0
100	2.0	.0	32.0	.0	64.0
200	.0	64.0	64.0	64.0	85.3
300	18.0	72.0	96.0	86.4	96.0
400	32.0	64.0	56.9	128.0	93.1
500	50.0	80.0	72.7	80.0	72.7

DTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	48.0	64.0
200	.0	64.0	64.0	96.0	85.3
300	.0	144.0	96.0	86.4	96.0
400	32.0	51.2	102.4	85.3	85.3
500	50.0	57.1	80.0	92.3	84.2

DTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	4.0	.0	.0	.0
100	.0	16.0	.0	48.0	64.0
200	.0	64.0	64.0	64.0	85.3
300	18.0	72.0	72.0	86.4	82.3
400	16.0	64.0	85.3	96.0	102.4
500	25.0	66.7	100.0	85.7	88.9

DTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	16.0
100	.0	.0	32.0	48.0	.0
200	.0	.0	64.0	64.0	128.0
300	.0	72.0	72.0	86.4	82.3
400	32.0	85.3	85.3	85.3	93.1
500	50.0	66.7	80.0	85.7	80.0

DTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	20.5
100	.0	.0	.0	.0	.0
200	.0	.0	.0	46.1	81.9
300	.0	.0	30.7	69.1	122.9
400	.0	.0	41.0	46.1	81.9
500	.0	.0	51.2	57.6	68.3

M					
50	.0	.0	.0	.0	.0
100	.0	.0	.0	.0	.0
200	.0	.0	128.0	.0	256.0
300	.0	72.0	72.0	216.0	144.0
400	32.0	85.3	102.4	109.7	146.3
500	16.7	133.3	114.3	150.0	106.7

DTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	48.0	.0
200	8.0	64.0	128.0	96.0	128.0
300	18.0	48.0	96.0	144.0	115.2
400	32.0	85.3	128.0	109.7	170.7
500	.0	80.0	114.3	133.3	145.5

DTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	2.0	.0	.0	48.0	.0
200	8.0	64.0	128.0	192.0	85.3
300	9.0	72.0	144.0	108.0	144.0
400	32.0	128.0	170.7	109.7	170.7
500	50.0	100.0	114.3	133.3	160.0

DTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	16.0
100	.0	.0	.0	48.0	.0
200	.0	64.0	128.0	96.0	85.3
300	.0	72.0	144.0	108.0	144.0
400	32.0	64.0	128.0	128.0	128.0
500	50.0	80.0	114.3	120.0	133.3

DTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	.0	.0
200	.0	.0	20.5	.0	81.9
300	.0	.0	.0	69.1	122.9
400	.0	.0	.0	92.2	163.8
500	.0	12.8	.0	57.6	102.4

DTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	20.5
100	.0	.0	.0	.0	41.0
200	.0	.0	20.5	.0	81.9
300	.0	.0	.0	.0	122.9
400	.0	.0	.0	92.2	163.8
500	.0	.0	51.2	.0	102.4

DTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	.0	.0
200	.0	.0	20.5	.0	81.9
300	.0	.0	.0	69.1	61.4
400	.0	.0	41.0	92.2	81.9
500	.0	.0	51.2	115.2	102.4

DTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	10.2	.0	41.0
200	.0	.0	.0	46.1	41.0
300	.0	.0	.0	.0	122.9
400	.0	.0	41.0	92.2	81.9
500	.0	.0	51.2	57.6	102.4

*** Speed of DTRSM in megaflops ***
with LDA = 513

DTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	32.0	48.0	64.0
200	.0	64.0	128.0	64.0	85.3
300	18.0	72.0	96.0	216.0	96.0
400	32.0	51.2	73.1	69.8	85.3
500	25.0	66.7	80.0	92.3	106.7

DTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64

DTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	10.2	.0	.0
200	.0	.0	20.5	.0	.0
300	.0	7.7	.0	69.1	122.9
400	.0	.0	41.0	.0	163.8
500	.0	12.8	.0	115.2	204.8

DTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	.0	.0
200	.0	.0	.0	.0	81.9
300	.0	.0	.0	69.1	61.4
400	.0	.0	.0	.0	81.9
500	.0	.0	51.2	115.2	204.8

DTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	10.2	.0	.0
200	.0	.0	20.5	46.1	.0
300	.0	.0	.0	.0	61.4
400	.0	.0	.0	92.2	81.9
500	.0	.0	.0	115.2	102.4

*** Speed of DTRSM in megaflops ***
with LDA = 513

DTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	48.0	.0
200	.0	64.0	128.0	192.0	128.0
300	.0	144.0	144.0	108.0	144.0
400	32.0	85.3	128.0	109.7	146.3
500	50.0	133.3	133.3	133.3	133.3

DTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64

50	.0	.0	.0	.0	.0
100	.0	.0	32.0	48.0	.0
200	.0	64.0	128.0	96.0	85.3
300	18.0	72.0	72.0	86.4	82.3
400	32.0	64.0	73.1	54.9	102.4
500	50.0	57.1	80.0	85.7	94.1

DTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	12.0	.0
100	.0	.0	32.0	.0	.0
200	.0	64.0	64.0	96.0	85.3
300	18.0	72.0	72.0	86.4	52.4
400	16.0	36.6	73.1	85.3	85.3
500	16.7	80.0	88.9	80.0	88.9

DTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	.0	64.0
200	.0	64.0	64.0	96.0	85.3
300	.0	72.0	96.0	72.0	96.0
400	.0	64.0	85.3	85.3	85.3
500	50.0	66.7	100.0	100.0	80.0

DTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	20.5
100	.0	.0	10.2	.0	41.0
200	.0	.0	.0	46.1	81.9
300	.0	.0	30.7	69.1	122.9
400	.0	.0	41.0	92.2	163.8
500	.0	.0	25.6	.0	68.3

DTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	23.0	.0
200	.0	.0	20.5	46.1	81.9
300	.0	.0	30.7	34.6	122.9
400	.0	10.2	.0	92.2	81.9
500	.0	12.8	51.2	115.2	204.8

50	.0	.0	.0	.0	.0
100	.0	.0	.0	48.0	.0
200	8.0	64.0	128.0	96.0	128.0
300	.0	72.0	144.0	216.0	115.2
400	32.0	128.0	128.0	153.6	128.0
500	50.0	100.0	133.3	150.0	160.0

DTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	8.0	.0	.0
100	.0	.0	32.0	.0	64.0
200	.0	64.0	128.0	.0	128.0
300	.0	72.0	96.0	108.0	144.0
400	.0	256.0	170.7	153.6	170.7
500	50.0	133.3	160.0	133.3	145.5

DTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	48.0	.0
200	8.0	64.0	128.0	96.0	128.0
300	18.0	144.0	96.0	144.0	144.0
400	32.0	64.0	170.7	153.6	146.3
500	50.0	80.0	133.3	133.3	133.3

DTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	.0	.0
200	.0	.0	.0	46.1	81.9
300	.0	.0	.0	69.1	122.9
400	.0	.0	.0	92.2	163.8
500	.0	.0	.0	57.6	204.8

DTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	20.5
100	.0	.0	.0	.0	.0
200	.0	.0	.0	.0	.0
300	.0	.0	30.7	69.1	122.9
400	.0	.0	41.0	.0	163.8
500	.0	.0	51.2	115.2	102.4

DTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	20.5
100	.0	.0	10.2	.0	41.0
200	.0	.0	.0	23.0	.0
300	.0	.0	.0	69.1	61.4
400	.0	.0	41.0	92.2	163.8
500	.0	12.8	25.6	115.2	68.3

DTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	2.6	.0	.0	41.0
200	.0	.0	.0	.0	81.9
300	.0	.0	.0	69.1	122.9
400	.0	10.2	.0	92.2	163.8
500	.0	12.8	51.2	115.2	68.3

End of tests
Total time used = 58.97 seconds

LAPACK VERSION 1.1, released March 31, 1993

BLAS timing, COMPLEX*16 data, K small

M:	50	100	200	300	400	500
N:	50	100	200	300	400	500
K:	2	16	32	48	64	
INCX:	1					
LDA:	513					

The minimum time a subroutine will be timed = .000 seconds

>>>>> Timing data <<<<<

*** Speed of ZGEMV in megaflops ***

DTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	.0	.0	.0
200	.0	.0	20.5	.0	81.9
300	.0	.0	.0	.0	122.9
400	.0	.0	.0	92.2	81.9
500	.0	.0	51.2	115.2	102.4

DTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	.0	.0
100	.0	.0	10.2	.0	.0
200	.0	.0	20.5	.0	81.9
300	.0	.0	30.7	.0	122.9
400	.0	.0	.0	92.2	81.9
500	.0	.0	51.2	115.2	102.4

End of tests
Total time used = 42.48 seconds

LAPACK VERSION 2.0, released September 30, 1994

BLAS timing, COMPLEX*16 data, K small

M:	50	100	200	300	400	500
N:	50	100	200	300	400	500
K:	2	16	32	48	64	
INCX:	1					
LDA:	513					

The minimum time a subroutine will be timed = .000 seconds

>>>>> Timing data <<<<<

*** Speed of ZGEMV in megaflops ***

with LDA = 513 and INCX = INCY = 1

ZGEMV with TRANS = 'N'

M \ N	50	100	200	300	400	500
50	.0	.0	8.0	.0	.0	.0
100	4.1	.0	.0	24.1	32.1	40.1
200	8.1	16.1	.0	48.1	64.1	26.7
300	.0	.0	24.1	36.1	32.1	40.1
400	.0	32.2	64.2	48.1	42.7	32.0
500	20.3	40.3	40.2	60.2	40.1	40.1

ZGEMV with TRANS = 'T'

M \ N	50	100	200	300	400	500
50	.0	4.0	.0	.0	.0	20.0
100	.0	8.1	16.1	24.1	16.0	20.0
200	.0	.0	16.1	24.1	32.1	40.1
300	.0	12.1	48.2	24.1	32.1	30.0
400	.0	32.2	32.1	48.1	42.7	32.0
500	10.2	40.3	40.2	30.1	32.1	33.4

ZGEMV with TRANS = 'C'

M \ N	50	100	200	300	400	500
50	.0	.0	.0	.0	.0	20.0
100	.0	8.1	16.1	.0	32.1	40.1
200	.0	16.1	32.1	48.1	64.1	26.7
300	12.2	24.2	48.2	36.1	32.1	60.1
400	.0	32.2	64.2	48.1	64.1	22.9
500	.0	40.3	26.8	30.1	32.1	28.6

*** Speed of ZGBMV in megaflops ***
with LDA = 513 and INCX = INCY = 1

ZGBMV with TRANS = 'N', M = N and KL = KU = K

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	2.4
16	.0	.0	5.2	.0	.0	.0
32	.0	.0	.0	.0	20.3	8.5
48	.0	6.0	.0	21.6	14.7	.0
64	.0	7.1	17.5	.0	38.3	24.3

ZGBMV with TRANS = 'T', M = N and KL = KU = K

K \ N	50	100	200	300	400	500

with LDA = 513 and INCX = INCY = 1

ZGEMV with TRANS = 'N'

M \ N	50	100	200	300	400	500
50	.0	.0	.0	12.0	16.0	20.0
100	.0	.0	.0	24.1	32.1	40.1
200	.0	.0	.0	48.1	64.1	80.1
300	12.2	.0	48.2	72.2	32.1	40.1
400	.0	32.2	64.2	32.1	42.7	53.4
500	.0	40.3	80.3	60.2	53.4	50.1

ZGEMV with TRANS = 'T'

M \ N	50	100	200	300	400	500
50	.0	.0	.0	12.0	.0	20.0
100	.0	8.1	.0	24.1	.0	40.1
200	.0	16.1	32.1	48.1	.0	26.7
300	.0	24.2	48.2	36.1	.0	60.1
400	8.1	32.2	32.1	48.1	64.1	53.4
500	20.3	.0	40.2	40.1	53.4	40.1

ZGEMV with TRANS = 'C'

M \ N	50	100	200	300	400	500
50	.0	.0	.0	.0	.0	.0
100	.0	.0	16.1	24.1	.0	.0
200	.0	.0	32.1	48.1	64.1	40.1
300	.0	24.2	48.2	36.1	48.1	40.1
400	.0	32.2	32.1	32.1	42.7	53.4
500	20.3	40.3	80.3	40.1	53.4	40.1

*** Speed of ZGBMV in megaflops ***
with LDA = 513 and INCX = INCY = 1

ZGBMV with TRANS = 'N', M = N and KL = KU = K

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	1.1	.0	.0	7.9	.0	.0
32	.0	.0	.0	.0	.0	25.6
48	.0	.0	.0	10.8	.0	37.3
64	.0	7.1	.0	27.9	.0	.0

ZGBMV with TRANS = 'T', M = N and KL = KU = K

K \ N	50	100	200	300	400	500

2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	13.4
32	.0	.0	.0	.0	.0	25.6
48	.0	.0	.0	.0	29.5	37.3
64	.0	.0	17.5	.0	38.3	24.3

ZGBMV with TRANS = 'C', M = N and KL = KU = K

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	13.4
32	.0	.0	.0	.0	10.1	25.6
48	.0	6.0	.0	21.6	29.5	18.7
64	.0	.0	17.5	27.9	38.3	24.3

*** Speed of ZHEMV in megaflops ***
with LDA = 513 and INCX = INCY = 1

ZHEMV with UPLO = 'U'

N	50	100	200	300	400	500
	.0	.0	32.1	36.1	42.7	50.1

ZHEMV with UPLO = 'L'

N	50	100	200	300	400	500
	.0	.0	32.1	36.1	42.7	50.1

*** Speed of ZHBMV in megaflops ***
with LDA = 513 and INCX = INCY = 1

ZHBMV with UPLO = 'U'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	.0	25.5
48	.0	.0	.0	.0	29.4	.0
64	.0	.0	17.4	27.8	38.2	48.6

ZHBMV with UPLO = 'L'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	14.9	.0	.0

2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	.0	25.6
48	.0	.0	.0	.0	.0	37.3
64	.0	.0	17.5	27.9	38.3	48.7

ZGBMV with TRANS = 'C', M = N and KL = KU = K

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	.0	25.6
48	.0	.0	13.8	21.6	.0	37.3
64	.0	.0	17.5	27.9	38.3	48.7

*** Speed of ZHEMV in megaflops ***
with LDA = 513 and INCX = INCY = 1

ZHEMV with UPLO = 'U'

N	50	100	200	300	400	500
	.0	.0	32.1	72.2	64.1	66.8

ZHEMV with UPLO = 'L'

N	50	100	200	300	400	500
	.0	.0	32.1	72.2	128.2	66.8

*** Speed of ZHBMV in megaflops ***
with LDA = 513 and INCX = INCY = 1

ZHBMV with UPLO = 'U'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	5.2	.0	.0	.0
32	.0	.0	.0	.0	.0	.0
48	.0	.0	.0	.0	.0	37.2
64	.0	.0	.0	.0	.0	48.6

ZHBMV with UPLO = 'L'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	9.7	.0	.0	25.5

```
    48       .0      .0    13.8    21.6    29.4      .0
    64       .0      .0      .0      .0      .0      .0

*** Speed of ZHPMV  in megaflops ***
    with INCX = INCY =      1

ZHPMV  with UPLO = 'U'

        N    50     100     200     300     400     500

             .0      .0    32.1    72.2   128.2    50.1


ZHPMV  with UPLO = 'L'

        N    50     100     200     300     400     500

             .0      .0      .0      .0    64.1    33.4

*** Speed of ZTRMV  in megaflops ***
    with LDA =   513 and INCX =      1

ZTRMV  with UPLO = 'U', TRANS = 'N'

        N    50     100     200     300     400     500

             .0      .0      .0    36.1    32.0    50.1


ZTRMV  with UPLO = 'U', TRANS = 'T'

        N    50     100     200     300     400     500

            1.0      .0    16.0    36.1    32.0    33.4


ZTRMV  with UPLO = 'U', TRANS = 'C'

        N    50     100     200     300     400     500

             .0      .0    16.0    36.1    32.0    33.4


ZTRMV  with UPLO = 'L', TRANS = 'N'

        N    50     100     200     300     400     500

             .0      .0      .0    36.1    32.0    33.4


ZTRMV  with UPLO = 'L', TRANS = 'T'

        N    50     100     200     300     400     500
```

```
    48       .0      .0    13.8      .0    29.4    37.2
    64       .0      .0      .0    27.8    38.2    48.6

*** Speed of ZHPMV  in megaflops ***
    with INCX = INCY =      1

ZHPMV  with UPLO = 'U'

        N    50     100     200     300     400     500

            2.0      .0    32.1      .0    64.1    66.8


ZHPMV  with UPLO = 'L'

        N    50     100     200     300     400     500

             .0      .0    32.1    72.2   128.2    66.8

*** Speed of ZTRMV  in megaflops ***
    with LDA =   513 and INCX =      1

ZTRMV  with UPLO = 'U', TRANS = 'N'

        N    50     100     200     300     400     500

             .0      .0    16.0      .0    32.0   100.1


ZTRMV  with UPLO = 'U', TRANS = 'T'

        N    50     100     200     300     400     500

             .0      .0    16.0    36.1    64.1    50.1


ZTRMV  with UPLO = 'U', TRANS = 'C'

        N    50     100     200     300     400     500

             .0      .0    16.0    36.1    64.1    50.1


ZTRMV  with UPLO = 'L', TRANS = 'N'

        N    50     100     200     300     400     500

             .0      .0    16.0    18.0    64.1   100.1


ZTRMV  with UPLO = 'L', TRANS = 'T'

        N    50     100     200     300     400     500
```

	.0	.0	.0	36.1	21.4	33.4

ZTRMV with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500
	1.0	4.0	.0	36.1	32.0	33.4

*** Speed of ZTBMV in megaflops ***
with LDA = 513 and INCX = 1

ZTBMV with UPLO = 'U', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	10.1	12.7
48	.0	.0	.0	.0	14.7	18.6
64	.0	.0	.0	.0	.0	.0

ZTBMV with UPLO = 'U', TRANS = 'T'

N / K	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	6.6
32	.0	.0	.0	.0	10.1	12.7
48	.0	.0	.0	10.8	14.7	18.6
64	.0	.0	8.7	13.9	19.1	24.2

ZTBMV with UPLO = 'U', TRANS = 'C'

N / K	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	10.1	12.7
48	.0	.0	.0	.0	.0	18.6
64	.0	.0	8.7	13.9	19.1	.0

ZTBMV with UPLO = 'L', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	.0	.0	.0	.9	.0
16	.0	.0	2.6	.0	.0	6.6
32	.9	.0	.0	.0	.0	.0
48	.0	.0	.0	10.8	14.7	18.6
64	.0	.0	.0	13.9	19.1	.0

	.0	.0	16.0	.0	64.1	33.4

ZTRMV with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	16.0	.0	32.0	33.4

*** Speed of ZTBMV in megaflops ***
with LDA = 513 and INCX = 1

ZTBMV with UPLO = 'U', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	10.1	.0
48	.0	.0	.0	.0	.0	.0
64	.0	.0	.0	.0	.0	.0

ZTBMV with UPLO = 'U', TRANS = 'T'

N / K	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	1.1
16	.0	.0	.0	.0	5.3	.0
32	.0	.0	.0	.0	.0	12.7
48	.0	.0	.0	.0	.0	18.6
64	.0	.0	.0	.0	.0	.0

ZTBMV with UPLO = 'U', TRANS = 'C'

N / K	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	1.1
16	.0	.0	.0	.0	5.3	.0
32	.0	.0	4.8	.0	10.1	.0
48	.0	.0	.0	.0	14.7	9.3
64	.0	.0	.0	.0	.0	24.2

ZTBMV with UPLO = 'L', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	5.3	.0
32	.0	.0	.0	.0	.0	.0
48	.0	.0	6.9	.0	14.7	.0
64	.0	.0	.0	.0	.0	.0

ZTBMV with UPLO = 'L', TRANS = 'T'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	.0	.0
48	.0	.0	.0	.0	.0	.0
64	.0	.0	.0	.0	.0	24.2

ZTBMV with UPLO = 'L', TRANS = 'C'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	.0	.0
48	.0	.0	.0	.0	.0	18.6
64	.0	.0	.0	13.9	.0	24.2

*** Speed of ZTPMV in megaflops ***
with INCX = 1

ZTPMV with UPLO = 'U', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	32.0	33.4

ZTPMV with UPLO = 'U', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	32.0	25.0

ZTPMV with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	64.1	33.4

ZTPMV with UPLO = 'L', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	16.0	.0	64.1	50.1

ZTPMV with UPLO = 'L', TRANS = 'T'

ZTBMV with UPLO = 'L', TRANS = 'T'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	5.3	.0
32	.0	.0	.0	.0	.0	.0
48	.0	.0	.0	.0	.0	18.6
64	.0	.0	8.7	.0	.0	24.2

ZTBMV with UPLO = 'L', TRANS = 'C'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	1.1
16	.0	.0	.0	.0	5.3	.0
32	.0	.0	4.8	.0	10.1	.0
48	.0	.0	.0	10.8	.0	18.6
64	.0	.0	.0	.0	.0	24.2

*** Speed of ZTPMV in megaflops ***
with INCX = 1

ZTPMV with UPLO = 'U', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	.0	.0	64.1	50.1

ZTPMV with UPLO = 'U', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	32.0	50.1

ZTPMV with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	16.0	18.0	32.0	50.1

ZTPMV with UPLO = 'L', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	64.1	33.4

ZTPMV with UPLO = 'L', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	32.0	50.1

ZTPMV with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	32.0	25.0

*** Speed of ZTRSV in megaflops ***
with LDA = 513 and INCX = 1

ZTRSV with UPLO = 'U', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	16.0	.0	64.1	50.1

ZTRSV with UPLO = 'U', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	21.4	25.0

ZTRSV with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	16.0	18.0	64.1	50.1

ZTRSV with UPLO = 'L', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	64.1	50.1

ZTRSV with UPLO = 'L', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	32.0	50.1

ZTRSV with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	16.0	.0	64.1	16.7

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	21.4	50.1

ZTPMV with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	32.0	33.4

*** Speed of ZTRSV in megaflops ***
with LDA = 513 and INCX = 1

ZTRSV with UPLO = 'U', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	16.0	.0	64.1	33.4

ZTRSV with UPLO = 'U', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	64.1	25.0

ZTRSV with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	16.0	.0	64.1	100.1

ZTRSV with UPLO = 'L', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	64.1	50.1

ZTRSV with UPLO = 'L', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	64.1	50.1

ZTRSV with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	64.1	50.1

*** Speed of ZTBSV in megaflops ***
with LDA = 513 and INCX = 1

ZTBSV with UPLO = 'U', TRANS = 'N'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	5.3	.0
32	.9	.0	.0	.0	10.1	12.7
48	.0	.0	.0	.0	.0	.0
64	.0	.0	.0	.0	.0	24.2

ZTBSV with UPLO = 'U', TRANS = 'T'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	1.1
16	.0	.0	.0	3.9	.0	.0
32	.0	.0	.0	.0	.0	.0
48	1.0	.0	.0	.0	.0	.0
64	.0	.0	.0	.0	19.1	24.2

ZTBSV with UPLO = 'U', TRANS = 'C'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	2.6	.0	5.3	6.6
32	.0	.0	.0	.0	.0	.0
48	1.0	.0	.0	.0	.0	18.6
64	.0	.0	.0	.0	19.1	24.2

ZTBSV with UPLO = 'L', TRANS = 'N'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	3.9	.0	.0
32	.0	.0	.0	.0	.0	.0
48	.0	.0	.0	.0	.0	.0
64	.0	.0	.0	.0	19.1	24.2

ZTBSV with UPLO = 'L', TRANS = 'T'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	1.1
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	7.4	.0	.0
48	.0	.0	.0	.0	.0	18.6

*** Speed of ZTBSV in megaflops ***
with LDA = 513 and INCX = 1

ZTBSV with UPLO = 'U', TRANS = 'N'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	2.2	.0	.0	.0	.0
48	.0	.0	.0	10.8	.0	.0
64	.0	.0	.0	13.9	19.1	24.2

ZTBSV with UPLO = 'U', TRANS = 'T'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	5.3	.0
32	.0	.0	.0	.0	10.1	.0
48	.0	3.0	.0	10.8	.0	.0
64	.0	.0	.0	13.9	19.1	24.2

ZTBSV with UPLO = 'U', TRANS = 'C'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	.0	.0	.0	.0	12.7
48	.0	.0	.0	.0	14.7	9.3
64	.0	.0	.0	.0	.0	24.2

ZTBSV with UPLO = 'L', TRANS = 'N'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	2.2	.0	.0	.0	12.7
48	.0	.0	.0	.0	14.7	18.6
64	.0	.0	.0	.0	19.1	.0

ZTBSV with UPLO = 'L', TRANS = 'T'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	5.3	.0
32	.0	.0	.0	.0	10.1	.0
48	.0	.0	.0	.0	.0	.0

64	.0	.0	8.7	13.9	19.1	.0

ZTBSV with UPLO = 'L', TRANS = 'C'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0
32	.0	2.2	.0	7.4	.0	12.7
48	.0	.0	.0	.0	.0	18.6
64	.0	.0	.0	13.9	19.1	24.2

*** Speed of ZTPSV in megaflops ***
with INCX = 1

ZTPSV with UPLO = 'U', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	32.0	50.1

ZTPSV with UPLO = 'U', TRANS = 'T'

N	50	100	200	300	400	500
	1.0	.0	.0	.0	32.0	33.4

ZTPSV with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	64.1	25.0

ZTPSV with UPLO = 'L', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	64.1	33.4

ZTPSV with UPLO = 'L', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	32.0	33.4

ZTPSV with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500

64	.0	3.5	.0	13.9	19.1	24.2

ZTBSV with UPLO = 'L', TRANS = 'C'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	3.9	.0	.0
32	.0	.0	.0	.0	.0	12.7
48	.0	.0	.0	.0	14.7	18.6
64	.0	.0	8.7	.0	19.1	24.2

*** Speed of ZTPSV in megaflops ***
with INCX = 1

ZTPSV with UPLO = 'U', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	.0	.0	64.1	50.1

ZTPSV with UPLO = 'U', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	16.0	18.0	64.1	50.1

ZTPSV with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	64.1	50.1

ZTPSV with UPLO = 'L', TRANS = 'N'

N	50	100	200	300	400	500
	.0	.0	16.0	36.1	32.0	100.1

ZTPSV with UPLO = 'L', TRANS = 'T'

N	50	100	200	300	400	500
	.0	.0	.0	36.1	32.0	50.1

ZTPSV with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500

```
          .0      .0      .0    36.1    32.0    33.4
```

*** Speed of ZGERU in megaflops ***
with LDA = 513 and INCX = INCY = 1

ZGERU

M \ N	50	100	200	300	400	500
50	.0	.0	.0	12.0	.0	.0
100	.0	.0	.0	24.1	32.1	40.1
200	.0	.0	32.1	48.1	64.1	40.1
300	.0	24.1	48.1	36.1	48.1	40.1
400	16.0	.0	64.1	48.1	42.7	40.1
500	20.0	40.1	80.1	120.2	53.4	66.8

*** Speed of ZGERC in megaflops ***
with LDA = 513 and INCX = 1

ZGERC

M \ N	50	100	200	300	400	500
50	.0	.0	.0	12.0	16.0	.0
100	.0	.0	16.1	.0	32.1	40.1
200	.0	.0	32.1	48.1	64.1	40.1
300	12.0	24.1	48.1	36.1	48.1	60.1
400	.0	32.1	64.1	48.1	42.7	40.1
500	20.0	40.1	40.1	40.1	40.1	50.1

*** Speed of ZHER in megaflops ***
with LDA = 513 and INCX = 1

ZHER with UPLO = 'U'

N	50	100	200	300	400	500
	.0	4.1	.0	.0	32.2	33.5

ZHER with UPLO = 'L'

N	50	100	200	300	400	500
	.0	.0	.0	36.3	32.2	33.5

*** Speed of ZHPR in megaflops ***
with INCX = INCY = 1

ZHPR with UPLO = 'U'

N	50	100	200	300	400	500

```
          .0      .0    16.0    36.1    64.1    50.1
```

*** Speed of ZGERU in megaflops ***
with LDA = 513 and INCX = INCY = 1

ZGERU

M \ N	50	100	200	300	400	500
50	.0	.0	8.0	.0	.0	.0
100	4.0	.0	16.1	24.1	.0	40.1
200	.0	.0	16.1	48.1	21.4	40.1
300	.0	.0	48.1	72.2	48.1	60.1
400	16.0	32.1	64.1	48.1	42.7	53.4
500	20.0	.0	40.1	60.1	53.4	66.8

*** Speed of ZGERC in megaflops ***
with LDA = 513 and INCX = 1

ZGERC

M \ N	50	100	200	300	400	500
50	.0	.0	.0	.0	.0	.0
100	.0	.0	.0	24.1	32.1	40.1
200	8.0	.0	32.1	48.1	32.1	80.1
300	.0	.0	48.1	72.2	96.2	40.1
400	.0	.0	64.1	96.2	32.1	53.4
500	.0	40.1	80.1	60.1	80.1	66.8

*** Speed of ZHER in megaflops ***
with LDA = 513 and INCX =

ZHER with UPLO = 'U'

N	50	100	200	300	400	500
	.0	.0	.0	.0	64.4	50.3

ZHER with UPLO = 'L'

N	50	100	200	300	400	500
	.0	.0	16.2	.0	64.4	33.5

*** Speed of ZHPR in megaflops ***
with INCX = INCY = 1

ZHPR with UPLO = 'U'

N	50	100	200	300	400	500

```
           .0      .0    16.2    36.3    64.4    50.3

ZHPR   with UPLO = 'L'

       N   50     100     200     300     400     500

           .0      .0    16.2    36.3    32.2    50.3

*** Speed of ZHER2  in megaflops ***
    with LDA =   513 and INCX = INCY =     1

ZHER2  with UPLO = 'U'

       N   50     100     200     300     400     500

           .0     8.2    32.4    72.6    42.9    67.0

ZHER2  with UPLO = 'L'

       N   50     100     200     300     400     500

           .0     8.2    32.4    72.6    64.4    67.0

*** Speed of ZHPR2  in megaflops ***
    with INCX =     1

ZHPR2  with UPLO = 'U'

       N   50     100     200     300     400     500

           .0     8.2    32.4    36.3    42.9    67.0

ZHPR2  with UPLO = 'L'

       N   50     100     200     300     400     500

           .0      .0      .0    36.3    42.9    50.3

*** Speed of ZSYMV  in megaflops ***
    with LDA =   513 and INCX =     1

ZSYMV  with UPLO = 'U'

       N   50     100     200     300     400     500

           .0      .0    32.1    72.2    42.7    50.1

ZSYMV  with UPLO = 'L'
```

```
           .0      .0      .0    36.3    32.2    50.3

ZHPR   with UPLO = 'L'

       N   50     100     200     300     400     500

           .0      .0    16.2      .0    64.4    50.3

*** Speed of ZHER2  in megaflops ***
    with LDA =   513 and INCX = INCY =     1

ZHER2  with UPLO = 'U'

       N   50     100     200     300     400     500

           .0      .0    32.4      .0   128.8   100.5

ZHER2  with UPLO = 'L'

       N   50     100     200     300     400     500

           .0      .0    32.4    72.6    42.9    67.0

*** Speed of ZHPR2  in megaflops ***
    with INCX =     1

ZHPR2  with UPLO = 'U'

       N   50     100     200     300     400     500

           .0      .0      .0    72.6   128.8   100.5

ZHPR2  with UPLO = 'L'

       N   50     100     200     300     400     500

           .0      .0    32.4    72.6    64.4    50.3

*** Speed of ZSYMV  in megaflops ***
    with LDA =   513 and INCX =     1

ZSYMV  with UPLO = 'U'

       N   50     100     200     300     400     500

           .0      .0      .0    72.2   128.2   100.2

ZSYMV  with UPLO = 'L'
```

```
        N    50     100     200     300     400     500

             .0      .0    32.1    72.2    64.1    50.1


*** Speed of ZSYR   in megaflops ***
    with LDA =   513 and INCX =     1

ZSYR   with UPLO = 'U'

        N    50     100     200     300     400     500

             .0      .0      .0    36.3    64.4    50.3


ZSYR   with UPLO = 'L'

        N    50     100     200     300     400     500

             .0      .0      .0    36.3    64.4    50.3


*** Speed of ZSPMV  in megaflops ***
    with INCX =     1

ZSPMV  with UPLO = 'U'

        N    50     100     200     300     400     500

             .0     8.1    32.1    72.2    42.7    66.8


ZSPMV  with UPLO = 'L'

        N    50     100     200     300     400     500

             .0      .0    32.1    36.1    42.7    50.1


*** Speed of ZSPR   in megaflops ***
    with INCX =     1

ZSPR   with UPLO = 'U'

        N    50     100     200     300     400     500

             .0      .0    16.2      .0    64.4    50.3


ZSPR   with UPLO = 'L'

        N    50     100     200     300     400     500

             .0      .0      .0    36.3    64.4    33.5
```

```
        N    50     100     200     300     400     500

             .0      .0    32.1      .0   128.2   100.2


*** Speed of ZSYR   in megaflops ***
    with LDA =   513 and INCX =     1

ZSYR   with UPLO = 'U'

        N    50     100     200     300     400     500

             .0      .0      .0      .0    32.2    50.3


ZSYR   with UPLO = 'L'

        N    50     100     200     300     400     500

             .0      .0    16.2      .0    64.4   100.5


*** Speed of ZSPMV  in megaflops ***
    with INCX =     1

ZSPMV  with UPLO = 'U'

        N    50     100     200     300     400     500

             .0      .0    32.1      .0   128.2   100.2


ZSPMV  with UPLO = 'L'

        N    50     100     200     300     400     500

             .0      .0    32.1      .0    64.1   100.2


*** Speed of ZSPR   in megaflops ***
    with INCX =     1

ZSPR   with UPLO = 'U'

        N    50     100     200     300     400     500

             .0      .0    16.2      .0    64.4    50.3


ZSPR   with UPLO = 'L'

        N    50     100     200     300     400     500

             .0      .0    16.2      .0    64.4   100.5
```

*** Speed of ZGEMM in megaflops ***
with LDA = 513

ZGEMM with TRANSA = 'N', TRANSB = 'N'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	.0	24.0	.0	40.0
100	.0	.0	.0	48.0	64.0	40.0
200	.0	32.0	64.0	48.0	42.7	40.0
300	.0	48.0	32.0	48.0	64.0	48.0
400	32.0	64.0	42.7	48.0	42.7	45.7
500	40.0	40.0	53.3	48.0	40.0	50.0

K = 16

M \ N	50	100	200	300	400	500
50	32.0	32.0	42.7	38.4	42.7	40.0
100	64.0	42.7	42.7	38.4	42.7	37.6
200	32.0	42.7	39.4	40.4	41.0	37.6
300	27.4	38.4	40.4	42.7	41.5	40.0
400	42.7	39.4	39.4	37.5	38.6	42.7
500	40.0	37.6	40.0	46.8	41.3	40.0

K = 32

M \ N	50	100	200	300	400	500
50	32.0	25.6	21.3	42.7	36.6	49.2
100	32.0	36.6	34.1	36.6	37.9	40.0
200	36.6	39.4	35.3	42.7	40.2	39.4
300	48.0	45.2	40.4	40.4	41.0	41.3
400	42.7	44.5	43.6	41.5	39.4	37.4
500	33.7	42.7	42.7	40.0	40.0	41.8

K = 48

M \ N	50	100	200	300	400	500
50	32.0	38.4	38.4	36.0	36.6	38.4
100	38.4	42.7	38.4	42.7	39.4	39.2
200	34.9	38.4	45.2	39.7	36.6	37.6
300	41.1	41.1	41.9	41.6	39.4	43.6
400	42.7	38.4	39.9	41.9	39.6	40.4
500	41.7	40.0	39.6	38.9	40.9	41.2

K = 64

*** Speed of ZGEMM in megaflops ***
with LDA = 513

ZGEMM with TRANSA = 'N', TRANSB = 'N'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	16.0	24.0	32.0	.0
100	.0	.0	.0	48.0	64.0	40.0
200	.0	.0	32.0	96.0	42.7	40.0
300	.0	48.0	48.0	48.0	48.0	60.0
400	.0	.0	42.7	48.0	64.0	53.3
500	40.0	80.0	53.3	80.0	64.0	57.1

K = 16

M \ N	50	100	200	300	400	500
50	32.0	64.0	42.7	48.0	51.2	53.3
100	32.0	64.0	51.2	42.7	64.0	58.2
200	64.0	64.0	73.1	54.9	60.2	55.7
300	64.0	48.0	59.1	54.9	53.0	58.2
400	64.0	56.9	56.9	54.9	55.4	53.3
500	53.3	58.2	58.2	53.3	55.7	59.3

K = 32

M \ N	50	100	200	300	400	500
50	32.0	42.7	51.2	64.0	56.9	53.3
100	128.0	64.0	51.2	64.0	53.9	58.2
200	51.2	56.9	60.2	51.2	56.9	56.9
300	64.0	59.1	56.9	56.2	59.1	60.0
400	64.0	56.9	60.2	58.0	57.7	56.9
500	58.2	55.7	56.9	56.5	60.2	57.7

K = 48

M \ N	50	100	200	300	400	500
50	48.0	64.0	48.0	57.6	59.1	53.3
100	64.0	42.7	54.9	64.0	56.9	50.5
200	48.0	45.2	53.0	59.1	58.0	59.1
300	64.0	60.6	54.9	60.6	55.5	57.0
400	59.1	64.0	58.0	57.6	55.4	57.3
500	68.6	51.9	58.2	58.8	58.2	59.3

K = 64

M \ N	50	100	200	300	400	500
50	42.7	42.7	36.6	42.7	36.6	36.6
100	36.6	39.4	37.9	38.4	40.2	40.0
200	42.7	37.9	39.4	38.9	39.8	39.7
300	38.4	41.5	39.9	40.4	41.0	40.6
400	41.0	37.2	38.6	39.4	40.0	39.1
500	40.0	38.8	41.6	40.0	40.5	38.7

ZGEMM with TRANSA = 'N', TRANSB = 'T'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	.0	.0	32.0	40.0
100	.0	16.0	32.0	48.0	64.0	40.0
200	16.0	32.0	64.0	48.0	42.7	40.0
300	.0	48.0	24.0	28.8	48.0	40.0
400	32.0	64.0	32.0	27.4	36.6	45.7
500	40.0	80.0	40.0	48.0	45.7	40.0

K = 16

M \ N	50	100	200	300	400	500
50	.0	32.0	42.7	38.4	36.6	40.0
100	64.0	42.7	42.7	38.4	36.6	40.0
200	42.7	36.6	34.1	38.4	39.4	44.1
300	38.4	48.0	38.4	34.9	40.4	37.6
400	42.7	42.7	39.4	41.5	41.0	36.6
500	40.0	42.7	42.7	40.9	42.0	43.2

K = 32

M \ N	50	100	200	300	400	500
50	32.0	32.0	32.0	48.0	36.6	35.6
100	64.0	36.6	32.0	42.7	39.4	38.8
200	42.7	36.6	42.7	40.4	41.0	40.6
300	38.4	38.4	40.4	40.4	40.4	40.0
400	39.4	41.0	41.0	41.0	41.4	38.8
500	42.7	38.8	37.6	43.1	39.1	40.5

K = 48

M \ N	50	100	200	300	400	500
50	32.0	38.4	32.0	33.9	33.4	34.3
100	32.0	34.9	38.4	32.9	36.6	36.9
200	38.4	42.7	37.5	36.0	37.0	40.0
300	36.0	42.7	41.1	39.7	42.3	40.6

M \ N	50	100	200	300	400	500
50	64.0	51.2	56.9	51.2	51.2	58.2
100	51.2	56.9	53.9	56.9	53.9	59.5
200	56.9	64.0	55.4	56.9	57.7	57.5
300	51.2	59.1	56.9	56.9	58.0	57.3
400	56.9	58.5	56.1	56.4	56.5	58.2
500	58.2	55.7	56.3	55.3	58.5	57.4

ZGEMM with TRANSA = 'N', TRANSB = 'T'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	.0	24.0	32.0	.0
100	.0	.0	32.0	48.0	32.0	80.0
200	.0	.0	64.0	32.0	64.0	53.3
300	.0	48.0	48.0	48.0	48.0	60.0
400	32.0	.0	64.0	64.0	51.2	64.0
500	.0	40.0	53.3	60.0	53.3	57.1

K = 16

M \ N	50	100	200	300	400	500
50	32.0	64.0	32.0	48.0	42.7	53.3
100	64.0	64.0	64.0	54.9	56.9	53.3
200	64.0	51.2	56.9	59.1	51.2	53.3
300	48.0	54.9	59.1	54.9	53.0	56.5
400	51.2	56.9	56.9	59.1	56.9	58.2
500	64.0	64.0	61.0	56.5	55.7	58.2

K = 32

M \ N	50	100	200	300	400	500
50	64.0	42.7	64.0	48.0	56.9	58.2
100	42.7	64.0	51.2	54.9	56.9	58.2
200	51.2	51.2	60.2	59.1	60.2	58.2
300	76.8	51.2	53.0	67.8	58.0	58.2
400	64.0	60.2	60.2	58.0	57.7	61.0
500	64.0	58.2	54.5	58.2	57.5	58.7

K = 48

M \ N	50	100	200	300	400	500
50	96.0	48.0	54.9	52.4	54.9	56.5
100	48.0	48.0	54.9	57.6	61.4	53.3
200	42.7	54.9	53.0	59.1	59.1	58.2
300	72.0	57.6	53.6	54.0	59.1	58.8

400	42.7	36.6	41.0	40.1	39.9	38.8
500	40.0	38.4	39.2	41.1	38.8	37.2

K = 64

M \ N	50	100	200	300	400	500
50	42.7	36.6	34.1	34.9	35.3	32.8
100	36.6	36.6	39.4	38.4	34.1	36.6
200	36.6	37.9	41.0	38.4	37.9	39.7
300	36.6	39.4	42.1	39.4	39.4	37.3
400	44.5	41.0	40.2	41.0	41.4	40.0
500	44.1	40.0	39.1	40.2	39.7	39.1

ZGEMM with TRANSA = 'N', TRANSB = 'C'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	.0	24.0	32.0	40.0
100	.0	16.0	32.0	48.0	64.0	40.0
200	16.0	32.0	64.0	32.0	42.7	53.3
300	.0	48.0	48.0	48.0	64.0	48.0
400	32.0	64.0	42.7	38.4	42.7	45.7
500	40.0	40.0	32.0	48.0	53.3	40.0

K = 16

M \ N	50	100	200	300	400	500
50	32.0	64.0	42.7	38.4	36.6	35.6
100	32.0	42.7	51.2	38.4	46.5	35.6
200	32.0	36.6	39.4	38.4	39.4	40.0
300	38.4	42.7	40.4	41.1	39.4	35.6
400	42.7	39.4	39.4	46.5	38.6	37.6
500	40.0	35.6	35.6	37.6	41.3	40.0

K = 32

M \ N	50	100	200	300	400	500
50	64.0	42.7	36.6	38.4	42.7	40.0
100	42.7	36.6	36.6	38.4	39.4	37.6
200	36.6	36.6	37.9	38.4	40.2	38.8
300	34.9	38.4	38.4	39.7	39.9	39.2
400	36.6	35.3	41.0	39.4	39.8	39.7
500	42.7	36.6	37.6	38.0	41.3	39.0

K = 48

400	59.1	56.9	58.0	58.3	59.1	57.7
500	60.0	56.5	57.3	57.6	56.9	57.8

K = 64

M \ N	50	100	200	300	400	500
50	64.0	51.2	51.2	51.2	68.3	55.7
100	64.0	46.5	53.9	53.0	55.4	58.2
200	56.9	51.2	56.9	53.9	58.5	56.9
300	64.0	56.9	55.9	59.1	58.0	58.6
400	53.9	58.5	56.9	56.9	56.5	58.9
500	61.0	54.5	58.2	60.0	56.9	59.5

ZGEMM with TRANSA = 'N', TRANSB = 'C'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	16.0	24.0	32.0	40.0
100	.0	16.0	16.0	48.0	64.0	.0
200	.0	32.0	64.0	96.0	64.0	80.0
300	.0	.0	96.0	72.0	64.0	60.0
400	32.0	64.0	42.7	64.0	64.0	53.3
500	40.0	80.0	53.3	80.0	64.0	66.7

K = 16

M \ N	50	100	200	300	400	500
50	32.0	64.0	64.0	64.0	51.2	45.7
100	64.0	64.0	64.0	54.9	56.9	53.3
200	64.0	64.0	56.9	59.1	56.9	61.0
300	64.0	64.0	54.9	57.6	59.1	60.0
400	64.0	56.9	60.2	56.9	58.5	58.2
500	53.3	53.3	53.3	56.5	59.5	56.1

K = 32

M \ N	50	100	200	300	400	500
50	64.0	42.7	51.2	54.9	51.2	53.3
100	42.7	51.2	56.9	54.9	53.9	55.7
200	64.0	51.2	56.9	59.1	56.9	56.9
300	54.9	54.9	56.9	59.1	55.9	57.3
400	56.9	56.9	55.4	55.9	53.9	54.5
500	58.2	55.7	58.2	55.7	55.1	57.7

K = 48

M \ N	50	100	200	300	400	500
50	48.0	38.4	38.4	33.9	32.0	32.0
100	38.4	32.0	34.9	37.2	37.5	36.9
200	38.4	38.4	37.5	39.1	39.4	37.6
300	48.0	36.0	37.2	40.2	40.1	40.0
400	40.4	38.4	37.9	37.5	39.9	39.0
500	41.7	40.9	39.6	40.3	40.4	40.0

K = 64

M \ N	50	100	200	300	400	500
50	42.7	36.6	34.1	30.7	31.0	35.6
100	32.0	36.6	37.9	37.5	33.6	35.1
200	39.4	36.6	36.6	37.5	38.6	38.5
300	33.4	37.5	38.4	38.7	37.0	37.1
400	37.9	40.2	37.9	36.6	43.1	41.0
500	41.3	41.3	42.7	41.1	43.2	40.1

ZGEMM with TRANSA = 'T', TRANSB = 'N'

K = 2

M \ N	50	100	200	300	400	500
50	.0	8.0	16.0	12.0	16.0	20.0
100	.0	16.0	10.7	12.0	16.0	13.3
200	8.0	10.7	10.7	10.7	10.7	10.7
300	8.0	12.0	10.7	11.1	10.1	10.4
400	10.7	9.1	10.7	9.6	9.1	9.7
500	10.0	8.9	11.4	9.6	9.1	9.5

K = 16

M \ N	50	100	200	300	400	500
50	32.0	32.0	32.0	32.0	32.0	32.0
100	32.0	32.0	25.6	24.0	26.9	29.1
200	25.6	25.6	28.4	26.5	23.8	27.8
300	24.0	29.5	24.8	25.6	27.9	27.0
400	28.4	26.9	26.3	26.9	27.7	25.9
500	21.3	26.7	27.8	28.7	27.5	27.1

K = 32

M \ N	50	100	200	300	400	500
50	21.3	42.7	32.0	32.0	32.0	30.5
100	18.3	32.0	24.4	32.0	29.3	30.5
200	36.6	30.1	31.0	30.1	31.0	31.6
300	29.5	30.7	31.3	29.2	29.8	30.5

M \ N	50	100	200	300	400	500
50	32.0	48.0	48.0	52.4	51.2	53.3
100	48.0	64.0	54.9	60.6	54.9	56.5
200	64.0	59.1	56.9	56.2	53.9	56.5
300	64.0	57.6	59.1	55.7	58.3	58.2
400	59.1	56.9	55.9	59.1	57.4	58.2
500	64.0	61.9	57.3	56.5	61.4	59.6

K = 64

M \ N	50	100	200	300	400	500
50	64.0	64.0	64.0	64.0	60.2	58.2
100	51.2	51.2	60.2	64.0	60.2	59.5
200	56.9	68.3	53.9	61.4	58.5	55.7
300	59.1	56.9	59.1	58.3	55.9	56.9
400	60.2	58.5	57.7	59.7	59.4	58.9
500	51.2	59.5	58.2	58.2	57.2	59.3

ZGEMM with TRANSA = 'T', TRANSB = 'N'

K = 2

M \ N	50	100	200	300	400	500
50	.0	8.0	.0	24.0	32.0	20.0
100	.0	16.0	16.0	24.0	32.0	26.7
200	16.0	32.0	32.0	32.0	32.0	26.7
300	24.0	24.0	24.0	28.8	32.0	30.0
400	32.0	32.0	32.0	27.4	32.0	26.7
500	13.3	26.7	26.7	26.7	29.1	26.7

K = 16

M \ N	50	100	200	300	400	500
50	32.0	21.3	32.0	38.4	51.2	32.0
100	64.0	42.7	36.6	38.4	34.1	37.6
200	42.7	36.6	42.7	42.7	41.0	42.7
300	38.4	42.7	38.4	39.7	39.4	41.7
400	42.7	39.4	39.4	38.4	37.2	39.4
500	35.6	40.0	37.6	37.6	38.8	37.6

K = 32

M \ N	50	100	200	300	400	500
50	64.0	42.7	42.7	42.7	42.7	40.0
100	42.7	51.2	42.7	38.4	41.0	42.7
200	42.7	42.7	44.5	42.7	41.8	42.0
300	42.7	42.7	40.4	41.9	41.5	42.2

400	32.0	30.1	30.6	32.3	29.5	29.1
500	32.0	30.5	28.8	29.5	29.6	29.1

K = 48

M \ N	50	100	200	300	400	500
50	48.0	32.0	38.4	28.8	32.0	34.3
100	32.0	32.0	32.0	30.3	30.7	29.5
200	29.5	33.4	32.0	32.5	34.1	32.8
300	32.0	36.0	29.5	31.7	30.9	31.3
400	32.0	31.3	31.7	33.2	32.0	30.5
500	30.0	31.5	32.0	31.1	32.4	32.5

K = 64

M \ N	50	100	200	300	400	500
50	42.7	32.0	34.1	30.7	32.0	35.6
100	32.0	34.1	30.1	32.7	32.5	31.6
200	32.0	33.0	32.0	32.0	31.0	33.0
300	29.5	32.0	29.8	31.6	29.8	33.1
400	34.1	32.0	33.0	32.2	33.0	32.6
500	30.5	30.8	32.8	33.1	31.4	31.8

ZGEMM with TRANSA = 'T', TRANSB = 'T'

K = 2

M \ N	50	100	200	300	400	500
50	4.0	8.0	16.0	12.0	16.0	13.3
100	.0	16.0	16.0	16.0	12.8	16.0
200	8.0	8.0	9.1	9.6	9.1	9.4
300	12.0	12.0	9.6	8.5	10.7	8.3
400	10.7	9.1	10.7	8.7	9.1	8.9
500	10.0	8.9	10.0	9.6	8.9	9.3

K = 16

M \ N	50	100	200	300	400	500
50	16.0	16.0	16.0	16.0	15.1	16.0
100	21.3	16.0	17.1	16.0	15.5	16.4
200	16.0	15.1	14.6	15.7	16.3	16.4
300	17.5	16.7	16.7	16.7	17.1	15.7
400	16.0	16.0	15.3	15.5	16.0	15.8
500	16.8	15.6	15.6	15.5	16.2	15.8

K = 32

400	46.5	37.9	35.3	38.9	35.9	41.0
500	42.7	40.0	37.6	40.0	38.8	40.0

K = 48

M \ N	50	100	200	300	400	500
50	32.0	38.4	34.9	41.1	45.2	40.0
100	48.0	38.4	40.4	44.3	42.7	44.7
200	34.9	42.7	42.7	47.0	42.1	42.7
300	41.1	41.1	43.5	43.2	43.1	42.0
400	45.2	43.9	43.3	43.1	42.4	43.4
500	41.7	43.6	42.2	43.0	42.9	42.3

K = 64

M \ N	50	100	200	300	400	500
50	42.7	51.2	39.4	45.2	41.0	42.7
100	64.0	39.4	46.5	43.9	43.6	44.9
200	46.5	44.5	44.5	43.3	42.2	44.1
300	40.4	41.5	42.7	43.1	42.7	42.7
400	44.5	41.0	42.2	42.4	43.6	42.3
500	42.7	38.8	42.0	42.0	42.8	42.1

ZGEMM with TRANSA = 'T', TRANSB = 'T'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	.0	.0	32.0	40.0
100	.0	.0	16.0	24.0	32.0	26.7
200	16.0	32.0	32.0	32.0	32.0	32.0
300	.0	24.0	24.0	36.0	32.0	30.0
400	32.0	32.0	32.0	27.4	28.4	26.7
500	40.0	26.7	26.7	24.0	26.7	28.6

K = 16

M \ N	50	100	200	300	400	500
50	32.0	64.0	42.7	38.4	32.0	35.6
100	64.0	32.0	42.7	42.7	39.4	40.0
200	42.7	42.7	39.4	38.4	39.4	38.8
300	38.4	34.9	40.4	38.4	37.5	38.4
400	36.6	36.6	39.4	39.4	38.6	38.2
500	40.0	35.6	38.8	38.4	38.8	37.6

K = 32

M \ N	50	100	200	300	400	500
50	12.8	18.3	16.0	16.0	16.0	16.8
100	16.0	15.1	16.0	15.7	16.0	14.9
200	16.0	16.5	14.8	15.8	16.4	16.3
300	20.2	15.4	15.7	15.3	16.3	15.5
400	16.5	16.3	16.4	16.0	15.6	15.4
500	16.4	16.0	16.6	15.9	16.8	15.9

K = 48

M \ N	50	100	200	300	400	500
50	12.0	14.8	14.8	14.4	15.7	14.1
100	13.7	14.8	14.8	15.0	15.1	15.1
200	13.7	14.5	15.1	14.9	15.7	14.8
300	14.8	14.2	14.7	15.0	14.9	14.8
400	14.5	14.1	14.5	15.0	15.2	15.0
500	13.7	13.6	15.1	15.5	15.1	15.0

K = 64

M \ N	50	100	200	300	400	500
50	14.2	13.5	13.8	14.5	14.0	14.9
100	13.5	13.8	14.6	14.4	14.6	14.5
200	13.8	14.0	14.1	13.8	14.0	14.1
300	14.5	14.5	14.6	14.7	14.5	14.0
400	14.4	14.2	15.1	14.6	14.8	15.2
500	13.9	14.0	14.9	15.2	14.5	14.8

ZGEMM with TRANSA = 'T', TRANSB = 'C'

K = 2

M \ N	50	100	200	300	400	500
50	4.0	.0	16.0	12.0	16.0	10.0
100	8.0	16.0	16.0	24.0	12.8	13.3
200	8.0	10.7	9.1	10.7	10.7	11.4
300	12.0	9.6	9.6	10.3	10.1	10.4
400	8.0	12.8	9.1	10.1	10.2	10.0
500	10.0	10.0	10.0	10.0	10.7	10.3

K = 16

M \ N	50	100	200	300	400	500
50	16.0	16.0	18.3	17.5	19.7	18.8
100	12.8	16.0	17.1	16.7	16.0	17.8
200	21.3	18.3	16.5	17.5	17.7	15.6
300	14.8	15.4	15.1	15.4	15.1	15.6

M \ N	50	100	200	300	400	500
50	64.0	42.7	42.7	38.4	46.5	40.0
100	32.0	42.7	42.7	40.4	41.0	40.0
200	36.6	46.5	41.0	41.5	39.4	42.0
300	42.7	40.4	39.4	42.7	39.9	40.9
400	42.7	42.7	41.8	39.9	39.4	40.6
500	45.7	37.6	38.8	39.6	41.0	40.3

K = 48

M \ N	50	100	200	300	400	500
50	48.0	38.4	38.4	44.3	42.7	45.7
100	38.4	42.7	42.7	44.3	46.5	43.6
200	42.7	45.2	41.5	42.7	43.9	43.6
300	44.3	41.1	41.9	43.7	43.9	43.6
400	42.7	40.4	45.2	40.8	43.6	41.3
500	43.6	44.7	42.2	43.0	42.7	41.4

K = 64

M \ N	50	100	200	300	400	500
50	32.0	42.7	39.4	40.4	42.7	45.7
100	42.7	51.2	42.7	43.9	44.5	43.4
200	51.2	39.4	42.7	44.5	42.7	42.3
300	45.2	40.4	43.9	41.9	42.4	42.0
400	42.7	44.5	41.0	43.0	42.9	41.6
500	45.7	42.7	44.5	44.1	43.6	43.0

ZGEMM with TRANSA = 'T', TRANSB = 'C'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	.0	.0	32.0	40.0
100	8.0	.0	32.0	24.0	32.0	40.0
200	.0	32.0	21.3	32.0	25.6	26.7
300	24.0	24.0	24.0	28.8	32.0	30.0
400	32.0	32.0	25.6	27.4	32.0	26.7
500	40.0	26.7	26.7	30.0	26.7	28.6

K = 16

M \ N	50	100	200	300	400	500
50	32.0	32.0	42.7	38.4	36.6	45.7
100	64.0	42.7	32.0	38.4	39.4	40.0
200	42.7	42.7	39.4	38.4	36.6	40.0
300	48.0	38.4	38.4	38.4	37.5	38.4

400	16.0	16.0	15.8	15.8	15.8	15.8
500	16.0	16.0	15.1	15.0	15.0	16.3

K = 32

M \ N	50	100	200	300	400	500
50	16.0	16.0	17.1	16.0	17.7	16.4
100	18.3	16.0	18.3	16.0	15.8	14.7
200	14.2	13.8	14.2	13.8	14.0	15.9
300	16.0	16.0	15.8	15.9	15.4	16.4
400	15.5	18.0	18.3	17.3	15.7	16.1
500	15.2	16.6	16.2	16.3	16.0	15.8

K = 48

M \ N	50	100	200	300	400	500
50	13.7	12.0	13.7	14.4	14.5	14.1
100	13.7	14.2	14.0	14.4	14.4	15.0
200	14.8	14.0	14.5	14.2	14.1	14.0
300	13.4	14.8	14.5	15.0	15.2	14.6
400	14.2	13.8	14.4	15.0	14.8	14.4
500	13.9	14.3	14.5	14.4	15.0	15.0

K = 64

M \ N	50	100	200	300	400	500
50	12.8	14.2	13.8	14.2	15.1	14.5
100	12.8	13.5	13.8	14.6	14.4	14.3
200	13.8	14.8	14.9	14.6	14.2	14.5
300	14.2	14.1	14.3	14.3	14.4	14.5
400	14.2	14.9	14.5	14.6	14.5	14.6
500	14.9	14.5	13.8	14.4	15.1	14.3

ZGEMM with TRANSA = 'C', TRANSB = 'N'

K = 2

M \ N	50	100	200	300	400	500
50	4.0	.0	16.0	12.0	16.0	13.3
100	.0	16.0	16.0	16.0	12.8	13.3
200	16.0	16.0	9.1	9.6	10.7	10.0
300	8.0	8.0	9.6	9.0	10.1	9.6
400	10.7	9.1	9.1	8.7	8.8	8.9
500	6.7	8.9	10.0	9.6	9.1	9.5

K = 16

400	42.7	36.6	39.4	39.4	39.4	38.8
500	40.0	37.6	35.6	38.4	38.8	38.6

K = 32

M \ N	50	100	200	300	400	500
50	64.0	42.7	42.7	54.9	46.5	42.7
100	42.7	36.6	42.7	45.2	39.4	41.3
200	51.2	42.7	42.7	43.9	41.0	43.4
300	48.0	40.4	41.5	40.4	41.0	42.7
400	46.5	42.7	41.8	41.0	42.2	41.6
500	37.6	40.0	40.0	40.0	40.0	40.0

K = 48

M \ N	50	100	200	300	400	500
50	48.0	48.0	42.7	41.1	42.7	41.7
100	48.0	48.0	40.4	42.7	42.7	40.9
200	38.4	42.7	42.7	41.1	42.1	42.2
300	41.1	41.1	41.1	42.7	41.5	40.9
400	42.7	40.4	41.5	40.8	40.7	41.7
500	43.6	40.0	39.2	41.4	41.7	41.6

K = 64

M \ N	50	100	200	300	400	500
50	42.7	36.6	39.4	42.7	42.7	41.3
100	42.7	46.5	44.5	43.9	44.5	42.7
200	42.7	46.5	44.5	45.2	43.6	43.8
300	42.7	41.5	45.2	43.1	43.9	43.1
400	42.7	42.7	44.0	43.9	43.1	43.0
500	44.1	39.4	42.0	41.3	42.0	41.8

ZGEMM with TRANSA = 'C', TRANSB = 'N'

K = 2

M \ N	50	100	200	300	400	500
50	.0	8.0	.0	24.0	32.0	40.0
100	.0	16.0	32.0	24.0	32.0	26.7
200	16.0	32.0	32.0	32.0	42.7	32.0
300	24.0	48.0	24.0	28.8	27.4	30.0
400	32.0	32.0	25.6	27.4	28.4	29.1
500	40.0	26.7	32.0	26.7	26.7	28.6

K = 16

M \ N	50	100	200	300	400	500
50	32.0	64.0	25.6	32.0	28.4	29.1
100	21.3	42.7	28.4	29.5	28.4	29.1
200	25.6	25.6	26.9	26.5	27.7	25.6
300	24.0	24.0	25.6	26.8	26.5	25.3
400	23.3	25.6	23.8	24.8	24.4	24.6
500	32.0	26.7	26.7	26.3	26.7	24.8

K = 32

M \ N	50	100	200	300	400	500
50	32.0	42.7	36.6	32.0	32.0	33.7
100	32.0	28.4	30.1	30.7	31.0	33.7
200	28.4	30.1	30.1	28.4	29.3	29.8
300	27.4	29.5	29.5	28.1	30.4	29.5
400	28.4	31.0	30.6	30.4	29.9	30.5
500	32.0	30.5	31.6	29.5	30.7	30.5

K = 48

M \ N	50	100	200	300	400	500
50	32.0	32.0	38.4	33.9	33.4	32.0
100	27.4	32.0	32.0	33.9	31.3	33.1
200	34.9	34.9	36.6	31.1	34.9	33.7
300	32.0	29.5	32.0	32.0	31.8	31.3
400	30.7	31.3	32.3	31.8	31.0	31.3
500	33.1	32.0	32.8	32.2	32.1	31.2

K = 64

M \ N	50	100	200	300	400	500
50	32.0	28.4	30.1	32.0	31.0	31.2
100	36.6	34.1	35.3	34.9	33.0	33.2
200	30.1	29.3	32.5	31.7	31.3	32.0
300	33.4	32.0	32.3	31.6	31.8	33.2
400	33.0	33.0	32.3	32.7	32.3	32.0
500	32.8	33.2	32.8	34.8	33.2	32.8

ZGEMM with TRANSA = 'C', TRANSB = 'T'

K = 2

M \ N	50	100	200	300	400	500
50	.0	.0	8.0	12.0	16.0	13.3
100	.0	16.0	10.7	9.6	12.8	13.3
200	8.0	8.0	9.1	9.6	8.5	9.4
300	8.0	9.6	8.7	9.0	9.1	8.9

M \ N	50	100	200	300	400	500
50	32.0	32.0	42.7	38.4	36.6	40.0
100	64.0	42.7	36.6	38.4	36.6	40.0
200	32.0	28.4	39.4	42.7	39.4	40.0
300	38.4	38.4	38.4	39.7	37.5	40.0
400	42.7	39.4	37.9	38.4	38.6	38.8
500	40.0	35.6	38.8	36.9	38.2	37.2

K = 32

M \ N	50	100	200	300	400	500
50	64.0	42.7	36.6	38.4	42.7	40.0
100	42.7	42.7	42.7	42.7	39.4	40.0
200	36.6	42.7	44.5	40.4	41.8	40.6
300	42.7	42.7	40.4	41.1	41.0	40.4
400	39.4	41.0	41.8	41.5	41.8	41.0
500	40.0	40.0	39.4	40.4	39.7	40.3

K = 48

M \ N	50	100	200	300	400	500
50	48.0	48.0	42.7	41.1	38.4	43.6
100	48.0	38.4	38.4	42.7	41.5	40.0
200	42.7	42.7	42.7	41.9	39.9	40.4
300	41.1	41.1	40.4	39.3	40.8	42.4
400	36.6	41.5	41.0	40.8	41.0	40.9
500	40.0	37.6	40.4	40.6	40.2	40.3

K = 64

M \ N	50	100	200	300	400	500
50	42.7	42.7	39.4	48.0	42.7	42.7
100	42.7	42.7	41.0	43.9	43.6	42.7
200	39.4	41.0	41.8	43.3	41.4	41.3
300	45.2	40.4	42.1	43.1	41.5	41.7
400	41.0	42.7	42.2	41.8	42.4	42.0
500	40.0	42.0	42.0	41.7	41.0	41.0

ZGEMM with TRANSA = 'C', TRANSB = 'T'

K = 2

M \ N	50	100	200	300	400	500
50	.0	8.0	16.0	24.0	32.0	40.0
100	.0	16.0	32.0	16.0	32.0	26.7
200	.0	32.0	32.0	32.0	25.6	32.0
300	24.0	24.0	32.0	24.0	27.4	26.7

400	8.0	8.0	8.5	8.3	8.3	8.4
500	8.0	8.9	8.9	8.3	8.6	8.5

K = 16

M \ N	50	100	200	300	400	500
50	10.7	16.0	16.0	16.0	15.1	14.5
100	16.0	16.0	15.1	14.8	14.2	14.2
200	12.8	14.2	14.2	14.5	14.2	14.1
300	14.8	13.7	14.5	14.0	14.1	14.2
400	15.1	14.2	13.3	14.0	13.7	14.1
500	13.3	14.2	13.9	14.3	14.4	14.5

K = 32

M \ N	50	100	200	300	400	500
50	12.8	14.2	15.1	14.8	15.5	15.2
100	14.2	16.0	13.8	14.8	14.4	14.9
200	13.5	13.8	15.1	14.4	14.3	14.8
300	14.8	14.8	15.4	15.2	14.3	13.8
400	14.6	14.4	14.5	14.0	15.1	15.9
500	13.9	13.6	14.1	14.9	14.3	14.6

K = 48

M \ N	50	100	200	300	400	500
50	13.7	12.8	13.2	14.0	13.7	13.3
100	12.0	13.2	13.5	13.4	13.4	13.2
200	12.4	13.7	13.6	13.4	14.4	13.7
300	13.1	13.1	13.6	13.7	13.8	13.7
400	13.5	14.1	14.0	13.7	13.8	13.7
500	13.3	13.0	13.0	13.4	13.1	13.6

K = 64

M \ N	50	100	200	300	400	500
50	14.2	12.8	12.8	13.0	13.7	13.6
100	12.8	10.9	13.7	13.4	13.1	12.8
200	12.8	13.3	12.9	13.1	13.5	13.1
300	12.8	13.4	12.7	12.9	13.5	13.7
400	13.1	13.2	13.5	13.6	13.7	13.4
500	12.9	12.7	13.8	13.9	13.4	13.6

ZGEMM with TRANSA = 'C', TRANSB = 'C'

K = 2

400	10.7	21.3	25.6	27.4	28.4	29.1
500	20.0	26.7	32.0	30.0	24.6	25.0

K = 16

M \ N	50	100	200	300	400	500
50	32.0	32.0	42.7	38.4	42.7	35.6
100	32.0	42.7	32.0	34.9	36.6	37.6
200	42.7	42.7	36.6	38.4	41.0	40.0
300	32.0	34.9	40.4	38.4	34.9	36.2
400	42.7	32.0	35.3	39.4	38.6	37.1
500	35.6	37.6	35.6	36.2	38.8	36.8

K = 32

M \ N	50	100	200	300	400	500
50	32.0	42.7	36.6	38.4	39.4	40.0
100	42.7	42.7	51.2	42.7	37.9	40.0
200	42.7	42.7	44.5	41.5	41.8	41.3
300	38.4	42.7	40.4	41.1	40.4	40.9
400	39.4	44.5	39.4	40.4	41.4	40.3
500	42.7	37.6	40.6	41.3	41.0	40.5

K = 48

M \ N	50	100	200	300	400	500
50	48.0	48.0	48.0	44.3	45.2	40.0
100	32.0	42.7	45.2	42.7	43.9	42.7
200	42.7	48.0	40.4	41.9	41.0	41.7
300	41.1	41.1	40.4	41.6	40.8	41.4
400	42.7	38.4	41.5	41.1	41.2	41.3
500	41.7	40.0	40.9	40.3	41.5	41.4

K = 64

M \ N	50	100	200	300	400	500
50	42.7	42.7	46.5	45.2	42.7	40.0
100	36.6	46.5	41.0	42.7	42.7	43.4
200	39.4	46.5	43.6	40.4	43.1	43.8
300	42.7	43.9	43.3	43.9	43.0	42.4
400	41.0	44.5	41.8	41.8	42.0	41.6
500	41.3	42.7	41.6	41.1	41.5	43.4

ZGEMM with TRANSA = 'C', TRANSB = 'C'

K = 2

M \ N	50	100	200	300	400	500
50	.0	8.0	8.0	12.0	32.0	13.3
100	.0	16.0	10.7	16.0	10.7	11.4
200	8.0	16.0	9.1	8.0	10.7	9.4
300	12.0	8.0	8.7	9.6	9.1	9.2
400	8.0	8.0	8.5	8.7	8.8	8.6
500	10.0	8.9	8.9	8.6	8.9	8.7

K = 16

M \ N	50	100	200	300	400	500
50	16.0	16.0	12.8	14.8	16.0	16.8
100	16.0	18.3	16.0	16.0	16.0	14.9
200	14.2	13.5	16.5	14.8	14.8	15.1
300	16.0	14.8	16.3	15.6	16.2	16.4
400	17.1	16.0	17.1	14.8	15.1	15.8
500	15.2	15.2	15.2	14.4	14.6	13.6

K = 32

M \ N	50	100	200	300	400	500
50	16.0	16.0	12.8	13.7	13.1	14.5
100	16.0	18.3	14.6	15.4	15.5	15.1
200	16.0	16.0	15.5	14.4	16.3	16.2
300	15.4	16.3	16.2	15.8	16.0	16.8
400	16.0	16.3	15.4	15.0	15.4	16.9
500	17.3	17.1	16.8	17.0	16.0	15.7

K = 48

M \ N	50	100	200	300	400	500
50	13.7	13.7	15.4	14.8	13.7	14.5
100	12.8	13.7	14.0	15.0	15.2	14.3
200	13.7	14.0	14.6	14.5	14.5	14.5
300	14.0	14.2	14.6	14.3	14.2	14.3
400	14.0	14.1	14.3	14.3	14.7	14.6
500	13.9	13.9	14.6	14.7	14.7	14.5

K = 64

M \ N	50	100	200	300	400	500
50	11.6	13.5	14.2	14.0	14.6	14.2
100	14.2	14.2	13.7	13.7	14.4	13.5
200	13.5	13.1	13.6	13.9	14.2	14.3
300	14.2	14.6	14.0	14.5	14.3	14.2
400	13.7	14.1	14.2	14.4	14.8	14.7
500	14.2	14.8	14.5	14.6	14.5	14.6

M \ N	50	100	200	300	400	500
50	.0	.0	.0	24.0	32.0	40.0
100	8.0	.0	32.0	48.0	32.0	20.0
200	16.0	32.0	32.0	24.0	32.0	32.0
300	24.0	24.0	32.0	28.8	27.4	30.0
400	16.0	21.3	25.6	32.0	25.6	29.1
500	40.0	20.0	26.7	30.0	24.6	28.6

K = 16

M \ N	50	100	200	300	400	500
50	32.0	32.0	42.7	38.4	42.7	45.7
100	64.0	42.7	42.7	38.4	34.1	37.6
200	25.6	42.7	39.4	38.4	32.0	23.3
300	32.0	34.9	38.4	38.4	37.5	38.4
400	36.6	36.6	37.9	38.4	36.6	37.1
500	35.6	37.6	37.6	36.9	38.2	36.8

K = 32

M \ N	50	100	200	300	400	500
50	32.0	42.7	42.7	38.4	42.7	40.0
100	42.7	51.2	39.4	40.4	41.0	40.0
200	36.6	39.4	42.7	40.4	41.0	40.0
300	42.7	38.4	36.6	39.1	39.4	40.9
400	36.6	42.7	38.6	39.9	39.8	38.5
500	40.0	38.8	40.0	39.2	38.5	38.1

K = 48

M \ N	50	100	200	300	400	500
50	48.0	38.4	42.7	41.1	40.4	38.4
100	38.4	38.4	38.4	42.7	42.7	41.7
200	42.7	40.4	39.4	39.7	39.4	41.3
300	38.4	37.2	42.7	42.1	40.4	42.4
400	42.7	40.4	42.1	41.1	43.0	42.7
500	43.6	40.0	42.7	40.9	41.7	41.2

K = 64

M \ N	50	100	200	300	400	500
50	42.7	36.6	42.7	42.7	42.7	42.7
100	42.7	39.4	44.5	41.5	41.0	43.4
200	42.7	39.4	43.6	41.5	41.4	42.0
300	40.4	41.5	42.7	40.4	42.4	41.5
400	42.7	41.0	39.8	40.7	41.2	41.3
500	44.1	40.6	42.3	41.7	41.1	40.5

*** Speed of ZHEMM in megaflops ***
with LDA = 513

ZHEMM with SIDE = 'L', UPLO = 'U'

M \ N	50	100	200	300	400	500
50	25.0	50.0	44.4	42.9	47.1	43.5
100	44.4	50.0	48.5	45.3	45.1	43.0
200	45.7	55.2	45.7	49.2	47.8	47.3
300	48.6	46.2	46.3	49.0	48.5	46.8
400	51.2	49.6	49.2	49.0	50.3	50.3
500	49.5	49.5	48.5	48.5	48.5	49.8

ZHEMM with SIDE = 'L', UPLO = 'L'

M \ N	50	100	200	300	400	500
50	50.0	40.0	50.0	46.2	47.1	45.5
100	44.4	47.1	48.5	45.3	43.2	46.5
200	48.5	48.5	46.0	48.5	46.9	48.5
300	48.6	50.0	49.3	48.3	49.2	49.2
400	48.5	48.9	49.3	48.1	48.3	48.3
500	48.8	48.5	51.9	51.4	49.9	49.0

ZHEMM with SIDE = 'R', UPLO = 'U'

M \ N	50	100	200	300	400	500
50	50.0	33.3	32.7	35.0	32.7	33.2
100	33.3	38.1	38.6	38.5	37.9	39.6
200	36.4	39.0	37.2	39.3	38.7	38.6
300	35.3	41.4	39.0	38.9	39.4	39.1
400	44.4	38.1	39.5	39.1	38.7	39.9
500	41.7	43.5	40.9	40.4	40.6	40.3

ZHEMM with SIDE = 'R', UPLO = 'L'

M \ N	50	100	200	300	400	500
50	50.0	36.4	34.0	33.6	33.7	35.6
100	40.0	38.1	37.6	37.5	38.7	37.5
200	40.0	37.2	35.2	38.0	38.7	38.5
300	40.0	40.0	40.0	39.1	38.6	38.6
400	42.1	40.0	40.1	41.3	39.5	41.6
500	38.5	38.1	40.8	39.7	40.3	40.0

*** Speed of ZSYMM in megaflops ***
with LDA = 513

*** Speed of ZHEMM in megaflops ***
with LDA = 513

ZHEMM with SIDE = 'L', UPLO = 'U'

M \ N	50	100	200	300	400	500
50	100.0	100.0	66.7	66.7	72.7	71.4
100	66.7	66.7	66.7	72.7	72.7	71.4
200	80.0	72.7	73.6	73.8	74.4	73.4
300	69.2	73.5	73.1	73.2	73.3	72.7
400	71.9	74.0	73.8	72.5	73.2	73.9
500	75.2	75.8	76.3	75.3	72.8	74.3

ZHEMM with SIDE = 'L', UPLO = 'L'

M \ N	50	100	200	300	400	500
50	100.0	66.7	66.7	75.0	72.7	76.9
100	80.0	80.0	80.0	72.7	74.4	75.5
200	76.2	80.0	77.1	75.6	76.6	74.4
300	76.6	75.8	76.6	77.1	78.3	76.3
400	79.0	78.0	77.3	75.7	75.0	74.8
500	74.1	76.0	76.8	75.9	76.6	76.4

ZHEMM with SIDE = 'R', UPLO = 'U'

M \ N	50	100	200	300	400	500
50	50.0	57.1	57.1	50.0	51.6	49.3
100	40.0	61.5	50.8	54.5	54.5	54.1
200	57.1	53.3	58.7	58.8	57.7	57.4
300	60.0	57.1	57.8	57.8	57.5	58.4
400	53.3	62.7	59.0	58.3	57.3	57.9
500	52.6	56.3	57.6	58.0	59.2	57.5

ZHEMM with SIDE = 'R', UPLO = 'L'

M \ N	50	100	200	300	400	500
50	100.0	57.1	55.2	55.4	51.6	50.5
100	50.0	53.3	56.1	53.3	54.7	53.9
200	57.1	59.3	56.6	57.4	56.9	56.0
300	60.0	57.1	56.8	57.3	57.8	57.6
400	57.1	59.3	57.9	56.6	57.9	58.4
500	58.8	56.3	60.2	58.4	58.5	58.5

*** Speed of ZSYMM in megaflops ***
with LDA = 513

ZSYMM with SIDE = 'L', UPLO = 'U'

M \ N	50	100	200	300	400	500
50	50.0	50.0	44.4	42.9	50.0	45.5
100	44.4	47.1	45.7	48.0	45.7	47.6
200	45.7	49.2	49.2	49.7	49.2	49.8
300	48.6	48.3	48.6	48.4	49.6	48.8
400	49.2	50.0	49.1	48.1	49.9	48.3
500	49.3	49.1	50.2	50.5	49.3	50.0

ZSYMM with SIDE = 'L', UPLO = 'L'

M \ N	50	100	200	300	400	500
50	50.0	50.0	44.4	46.2	44.4	47.6
100	57.1	50.0	47.1	50.0	48.5	50.0
200	50.0	47.8	46.7	48.5	51.4	50.8
300	50.0	48.6	48.5	49.0	49.1	48.2
400	44.8	49.8	53.7	49.6	49.2	47.4
500	50.3	49.0	48.5	49.8	51.4	50.0

ZSYMM with SIDE = 'R', UPLO = 'U'

M \ N	50	100	200	300	400	500
50	50.0	36.4	34.0	34.3	33.2	34.5
100	40.0	38.1	37.6	37.1	36.5	36.8
200	36.4	37.2	38.3	38.5	38.4	39.2
300	42.9	37.5	39.5	39.7	38.6	39.8
400	40.0	39.0	39.3	39.4	40.3	40.0
500	41.7	39.6	39.7	40.8	40.6	40.3

ZSYMM with SIDE = 'R', UPLO = 'L'

M \ N	50	100	200	300	400	500
50	25.0	33.3	34.0	34.0	34.0	33.9
100	50.0	40.0	38.1	36.5	36.7	36.6
200	36.4	39.0	38.8	38.4	38.8	38.5
300	37.5	38.7	39.0	38.8	40.7	38.9
400	38.1	38.1	40.6	39.7	40.1	39.4
500	40.0	39.2	39.0	40.3	39.9	39.9

*** Speed of ZHERK in megaflops ***
with LDA = 513

ZHERK with UPLO = 'U', TRANS = 'N'

K \ N	50	100	200	300	400	500
2	.0	.0	.0	36.1	42.8	50.1

ZSYMM with SIDE = 'L', UPLO = 'U'

M \ N	50	100	200	300	400	500
50	100.0	66.7	57.1	75.0	66.7	62.5
100	66.7	66.7	69.6	66.7	68.1	69.0
200	69.6	65.3	69.6	71.1	67.4	68.1
300	70.6	68.6	68.9	68.8	68.9	68.2
400	68.1	68.8	67.5	66.3	68.5	69.6
500	70.4	70.9	70.7	70.6	70.4	69.4

ZSYMM with SIDE = 'L', UPLO = 'L'

M \ N	50	100	200	300	400	500
50	50.0	66.7	80.0	66.7	61.5	66.7
100	80.0	72.7	66.7	68.6	71.1	66.7
200	69.6	68.1	69.6	68.6	69.2	70.2
300	69.2	70.6	69.6	69.2	70.6	69.5
400	68.1	68.8	68.8	70.1	70.0	70.9
500	69.9	70.7	70.8	69.4	69.3	69.3

ZSYMM with SIDE = 'R', UPLO = 'U'

M \ N	50	100	200	300	400	500
50	50.0	57.1	55.2	53.7	50.4	51.3
100	66.7	53.3	56.1	55.8	53.3	52.6
200	57.1	53.3	57.1	56.0	55.7	55.4
300	60.0	58.5	56.8	56.5	56.4	56.6
400	57.1	56.1	56.1	56.4	56.4	56.0
500	55.6	58.0	57.1	56.8	57.6	57.8

ZSYMM with SIDE = 'R', UPLO = 'L'

M \ N	50	100	200	300	400	500
50	50.0	57.1	53.3	53.7	50.0	48.8
100	66.7	53.3	56.1	52.9	52.5	53.1
200	57.1	59.3	55.7	54.5	54.5	54.7
300	60.0	57.1	54.9	56.1	54.9	55.6
400	57.1	56.1	56.9	56.1	57.0	56.8
500	58.8	58.0	57.3	57.1	57.3	57.6

*** Speed of ZHERK in megaflops ***
with LDA = 513

ZHERK with UPLO = 'U', TRANS = 'N'

K \ N	50	100	200	300	400	500
2	.0	8.1	.0	36.1	64.2	50.1

16	.0	64.6	42.9	41.3	41.1	41.1
32	32.6	43.1	39.6	41.3	39.5	40.6
48	49.0	48.5	36.8	41.3	41.1	40.1
64	65.3	36.9	41.2	40.6	41.1	41.1

ZHERK with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500
K						
2	.0	8.1	10.7	12.0	10.7	8.7
16	16.3	32.3	25.7	24.1	28.5	25.4
32	32.6	21.5	30.3	28.9	29.8	30.0
48	49.0	32.3	33.6	31.0	31.1	31.9
64	32.6	32.3	34.3	32.6	31.8	31.9

ZHERK with UPLO = 'L', TRANS = 'N'

N	50	100	200	300	400	500
K						
2	.0	8.1	32.2	36.1	64.2	40.1
16	.0	64.6	42.9	38.5	41.1	40.1
32	32.6	32.3	34.3	38.5	39.5	40.6
48	49.0	38.8	38.6	38.5	41.6	39.7
64	32.6	36.9	38.1	40.6	40.3	41.1

ZHERK with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500
K						
2	2.0	.0	10.7	10.3	9.2	9.5
16	16.3	32.3	28.6	25.1	25.7	26.7
32	32.6	21.5	34.3	32.1	29.8	30.0
48	49.0	32.3	33.6	31.5	31.7	31.9
64	32.6	28.7	33.2	33.0	33.1	33.6

*** Speed of ZHER2K in megaflops ***
with LDA = 513

ZHER2K with UPLO = 'U', TRANS = 'N'

N	50	100	200	300	400	500
K						
2	.0	.0	32.0	48.0	51.2	50.0
16	32.0	42.7	42.7	46.1	46.5	47.1
32	64.0	51.2	44.5	47.0	46.0	46.7
48	32.0	48.0	46.5	44.9	44.8	46.2
64	42.7	39.4	43.6	44.7	45.3	45.6

ZHER2K with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500

16	.0	32.3	51.5	57.8	54.0	55.3
32	32.6	64.6	46.8	55.0	54.0	58.3
48	49.0	97.0	59.4	54.2	50.5	54.7
64	65.3	51.7	54.2	57.8	54.7	57.3

ZHERK with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500
K						
2	.0	.0	32.2	36.1	25.7	28.6
16	16.3	64.6	42.9	38.5	38.0	39.1
32	32.6	32.3	39.6	41.3	40.3	41.1
48	24.5	48.5	42.9	42.3	43.4	41.8
64	32.6	43.1	44.7	42.8	42.8	42.5

ZHERK with UPLO = 'L', TRANS = 'N'

N	50	100	200	300	400	500
K						
2	.0	.0	.0	72.2	42.8	66.8
16	.0	64.6	51.5	57.8	51.3	55.3
32	.0	64.6	51.5	52.5	57.0	53.4
48	49.0	48.5	55.1	55.9	58.1	55.3
64	65.3	51.7	54.2	56.4	54.7	56.3

ZHERK with UPLO = 'L', TRANS = 'C'

N	50	100	200	300	400	500
K						
2	.0	.0	32.2	36.1	25.7	25.1
16	.0	64.6	42.9	36.1	41.1	37.3
32	32.6	43.1	42.9	41.3	41.9	41.1
48	49.0	38.8	45.4	41.3	41.6	42.2
64	65.3	51.7	42.9	42.8	42.8	43.0

*** Speed of ZHER2K in megaflops ***
with LDA = 513

ZHER2K with UPLO = 'U', TRANS = 'N'

N	50	100	200	300	400	500
K						
2	.0	16.0	64.0	72.0	85.4	100.0
16	.0	64.0	64.0	60.6	64.0	60.4
32	64.0	64.0	60.2	62.3	63.0	63.4
48	48.0	64.0	61.4	61.7	63.3	60.8
64	64.0	56.9	64.0	64.0	63.0	62.7

ZHER2K with UPLO = 'U', TRANS = 'C'

N	50	100	200	300	400	500

K						
2	.0	5.3	9.1	9.6	9.1	9.5
16	32.0	25.6	28.4	27.4	26.9	27.6
32	32.0	32.0	32.0	31.6	31.8	32.0
48	32.0	34.9	31.3	32.9	33.6	32.8
64	32.0	39.4	34.7	34.4	33.0	33.3

ZHER2K with UPLO = 'L', TRANS = 'N'

N K	50	100	200	300	400	500
2	.0	.0	64.0	36.0	51.2	50.0
16	32.0	42.7	46.5	48.0	46.5	45.7
32	64.0	42.7	44.5	44.3	48.2	47.8
48	32.0	48.0	43.9	46.1	45.5	47.8
64	42.7	39.4	43.6	46.1	43.8	45.7

ZHER2K with UPLO = 'L', TRANS = 'C'

N K	50	100	200	300	400	500
2	.0	8.0	9.1	9.0	9.1	10.3
16	32.0	32.0	23.3	25.0	26.6	28.1
32	32.0	25.6	31.0	30.7	31.5	31.5
48	32.0	32.0	33.4	32.6	33.4	33.2
64	32.0	34.1	33.6	33.9	34.4	33.9

*** Speed of ZSYRK in megaflops ***
with LDA = 513

ZSYRK with UPLO = 'U', TRANS = 'N'

N K	50	100	200	300	400	500
2	.0	.0	32.2	.0	64.2	66.8
16	.0	32.3	36.8	38.5	39.5	39.1
32	32.6	32.3	39.6	41.3	40.3	40.1
48	49.0	32.3	38.6	39.4	40.5	40.4
64	32.6	43.1	38.1	40.6	39.9	40.8

ZSYRK with UPLO = 'U', TRANS = 'T'

N K	50	100	200	300	400	500
2	.0	.0	10.7	12.0	10.7	9.5
16	.0	21.5	28.6	28.9	27.7	26.7
32	32.6	32.3	32.2	32.1	31.1	31.4
48	49.0	32.3	32.2	32.7	31.7	32.5
64	32.6	32.3	33.2	32.1	33.1	32.1

ZSYRK with UPLO = 'L', TRANS = 'N'

K						
2	.0	.0	32.0	28.8	19.7	17.4
16	32.0	32.0	46.5	41.1	42.7	41.6
32	64.0	42.7	48.8	46.1	47.1	45.7
48	48.0	48.0	49.5	48.0	48.4	48.2
64	42.7	46.5	50.0	50.6	48.2	48.5

ZHER2K with UPLO = 'L', TRANS = 'N'

N K	50	100	200	300	400	500
2	.0	.0	.0	144.1	128.0	100.0
16	32.0	64.0	64.0	67.8	64.0	66.7
32	64.0	64.0	64.0	67.8	67.1	68.8
48	96.0	64.0	66.8	66.5	66.1	66.2
64	64.0	64.0	68.3	65.8	67.1	66.0

ZHER2K with UPLO = 'L', TRANS = 'C'

N K	50	100	200	300	400	500
2	.0	.0	32.0	20.6	19.7	17.4
16	.0	64.0	51.2	41.1	44.5	42.1
32	64.0	64.0	48.8	48.0	48.2	47.4
48	48.0	48.0	51.2	48.7	49.2	48.5
64	42.7	56.9	52.5	51.8	50.9	50.6

*** Speed of ZSYRK in megaflops ***
with LDA = 513

ZSYRK with UPLO = 'U', TRANS = 'N'

N K	50	100	200	300	400	500
2	.0	.0	.0	72.2	64.2	50.1
16	.0	64.6	51.5	57.8	60.4	59.4
32	.0	64.6	57.2	60.8	55.5	58.3
48	49.0	48.5	55.1	57.8	58.1	58.7
64	65.3	51.7	60.5	56.4	59.5	59.4

ZSYRK with UPLO = 'U', TRANS = 'T'

N K	50	100	200	300	400	500
2	.0	.0	32.2	24.1	25.7	28.6
16	16.3	64.6	42.9	36.1	30.2	39.1
32	32.6	43.1	46.8	37.3	44.6	42.2
48	49.0	48.5	45.4	43.3	44.6	42.2
64	65.3	36.9	49.0	43.6	42.8	45.5

ZSYRK with UPLO = 'L', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	.0	.0	36.1	42.8	50.1
16	16.3	64.6	42.9	36.1	38.0	37.3
32	32.6	32.3	32.2	39.9	41.9	39.1
48	49.0	32.3	38.6	40.3	41.1	40.1
64	32.6	36.9	41.2	39.2	40.3	40.3

ZSYRK with UPLO = 'L', TRANS = 'T'

N / K	50	100	200	300	400	500
2	.0	8.1	16.1	9.0	9.2	10.0
16	16.3	21.5	25.7	26.3	27.0	27.2
32	32.6	32.3	30.3	32.1	30.6	30.0
48	24.5	32.3	30.9	31.0	30.2	31.4
64	32.6	28.7	31.2	32.1	30.2	32.2

*** Speed of ZSYR2K in megaflops ***
with LDA = 513

ZSYR2K with UPLO = 'U', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	.0	64.0	48.0	64.0	57.2
16	32.0	64.0	46.5	50.1	47.6	48.5
32	32.0	51.2	44.5	49.0	48.2	47.4
48	32.0	42.7	48.0	47.3	45.9	46.4
64	42.7	42.7	45.5	46.5	46.5	48.9

ZSYR2K with UPLO = 'U', TRANS = 'T'

N / K	50	100	200	300	400	500
2	.0	16.0	10.7	10.3	11.1	10.0
16	32.0	32.0	30.1	28.8	26.9	27.8
32	32.0	36.6	32.0	32.5	32.5	33.0
48	32.0	32.0	32.7	33.2	33.8	33.9
64	42.7	32.0	35.9	34.6	34.9	34.0

ZSYR2K with UPLO = 'L', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	.0	64.0	48.0	51.2	44.5
16	32.0	42.7	42.7	50.1	46.5	48.5
32	32.0	51.2	46.5	49.0	50.0	49.6
48	48.0	42.7	46.5	48.0	47.6	48.5
64	42.7	46.5	46.5	47.0	47.1	48.9

N / K	50	100	200	300	400	500
2	.0	.0	32.2	72.2	64.2	66.8
16	.0	32.3	51.5	52.5	51.3	55.3
32	32.6	129.3	57.2	60.8	58.7	59.4
48	49.0	64.6	64.3	61.9	61.6	59.4
64	32.6	64.6	57.2	60.8	60.4	64.8

ZSYRK with UPLO = 'L', TRANS = 'T'

N / K	50	100	200	300	400	500
2	.0	8.1	32.2	24.1	25.7	25.1
16	16.3	64.6	51.5	38.5	46.7	37.3
32	32.6	43.1	34.3	39.9	44.6	43.3
48	49.0	48.5	48.2	43.3	44.0	44.9
64	32.6	43.1	49.0	47.2	43.7	43.3

*** Speed of ZSYR2K in megaflops ***
with LDA = 513

ZSYR2K with UPLO = 'U', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	16.0	64.0	48.0	85.4	57.2
16	32.0	64.0	56.9	54.9	55.4	54.2
32	32.0	64.0	51.2	54.9	55.4	54.2
48	48.0	54.9	53.0	52.4	53.0	55.2
64	32.0	56.9	53.9	54.2	55.0	55.4

ZSYR2K with UPLO = 'U', TRANS = 'T'

N / K	50	100	200	300	400	500
2	.0	.0	64.0	28.8	23.3	20.0
16	32.0	64.0	56.9	50.1	47.6	46.4
32	64.0	51.2	53.9	52.4	52.5	50.8
48	48.0	48.0	59.1	54.0	54.9	53.3
64	42.7	56.9	55.4	56.9	55.0	54.2

ZSYR2K with UPLO = 'L', TRANS = 'N'

N / K	50	100	200	300	400	500
2	.0	.0	64.0	72.0	85.4	80.0
16	.0	42.7	56.9	52.4	55.4	56.1
32	64.0	51.2	56.9	56.2	56.9	56.6
48	32.0	48.0	59.1	56.7	56.4	54.9
64	64.0	51.2	52.5	54.2	55.0	55.4

ZSYR2K with UPLO = 'L', TRANS = 'T'

N / K	50	100	200	300	400	500
2	4.0	16.0	10.7	11.1	9.5	11.1
16	32.0	32.0	28.4	26.2	27.7	29.4
32	32.0	36.6	32.0	30.7	33.0	33.5
48	32.0	34.9	34.9	35.3	33.0	33.2
64	32.0	32.0	34.1	34.6	34.0	34.3

*** Speed of ZTRMM in megaflops ***
with LDA = 513

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

N / M	50	100	200	300	400	500
50	50.5	33.7	28.9	37.9	40.4	36.1
100	33.5	33.5	36.5	37.7	40.2	37.9
200	38.2	40.1	38.7	38.5	38.4	38.0
300	37.6	38.8	38.4	39.1	39.6	38.5
400	39.1	39.3	40.3	41.0	39.4	39.4
500	38.8	40.2	39.9	39.3	39.0	40.6

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

N / M	50	100	200	300	400	500
50	50.5	25.3	33.7	33.7	31.1	31.6
100	28.7	33.5	30.9	33.5	32.8	34.1
200	30.8	33.4	34.1	33.9	34.3	34.7
300	34.0	34.7	34.7	34.1	34.3	34.2
400	34.5	34.5	34.4	34.3	34.3	34.1
500	33.6	34.2	34.2	35.1	34.1	34.2

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

N / M	50	100	200	300	400	500
50	50.5	33.7	28.9	30.3	28.9	29.7
100	33.5	33.5	32.2	32.6	34.2	32.4
200	36.5	34.1	34.1	33.9	34.3	34.7
300	34.0	34.3	35.4	35.8	35.1	34.4
400	35.2	33.0	34.8	34.6	35.1	35.4
500	34.8	34.5	34.9	35.1	34.1	35.5

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

N / M	50	100	200	300	400	500
50	.0	50.5	28.9	60.6	36.7	36.1

ZSYR2K with UPLO = 'L', TRANS = 'T'

N / K	50	100	200	300	400	500
2	.0	16.0	32.0	20.6	18.3	17.4
16	.0	42.7	51.2	50.1	46.5	44.4
32	64.0	51.2	53.9	51.2	52.5	50.8
48	48.0	48.0	56.9	56.7	54.4	53.3
64	64.0	56.9	56.9	54.9	53.9	54.5

*** Speed of ZTRMM in megaflops ***
with LDA = 513

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

N / M	50	100	200	300	400	500
50	50.5	50.5	50.5	50.5	50.5	50.5
100	50.3	50.3	57.4	57.4	55.4	52.9
200	57.3	53.5	53.5	53.5	55.8	54.2
300	54.6	54.6	54.6	55.2	55.5	55.0
400	56.2	54.3	55.2	55.2	54.3	54.1
500	56.9	55.6	55.3	54.3	54.7	54.8

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

N / M	50	100	200	300	400	500
50	50.5	33.7	40.4	37.9	40.4	42.1
100	67.0	40.2	47.3	43.1	42.3	44.7
200	50.1	42.2	45.8	45.4	45.5	45.3
300	45.1	46.2	46.2	46.6	45.6	46.0
400	45.8	45.8	46.3	45.3	45.8	46.0
500	45.9	46.6	45.7	45.3	45.3	45.0

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

N / M	50	100	200	300	400	500
50	25.3	33.7	33.7	50.5	40.4	38.8
100	33.5	33.5	42.3	37.7	42.3	42.8
200	42.2	42.2	43.4	42.6	41.4	43.4
300	41.9	43.4	43.4	43.6	43.1	43.2
400	43.3	43.6	43.0	43.1	42.7	43.2
500	44.3	42.6	43.3	42.9	43.6	43.9

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

N / M	50	100	200	300	400	500
50	50.5	50.5	67.3	50.5	50.5	56.1

100	50.3	26.8	33.5	32.6	31.5	33.0
200	36.5	32.1	32.4	38.2	38.2	38.4
300	38.4	39.2	38.6	39.1	40.5	41.3
400	39.6	39.1	38.6	39.2	40.1	41.5
500	40.4	40.9	39.8	38.6	39.6	39.9

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	20.2	33.7	33.7	26.9	33.7
100	33.5	28.7	33.5	33.5	33.5	31.9
200	34.9	34.1	34.1	33.9	34.7	33.6
300	34.0	34.3	34.5	33.9	34.6	34.6
400	34.5	34.6	34.5	34.5	35.2	34.5
500	35.5	34.5	34.1	35.9	35.7	35.0

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	25.3	28.9	30.3	26.9	29.7
100	33.5	36.5	30.9	31.7	31.5	31.9
200	32.1	33.4	34.1	33.4	33.9	34.6
300	34.7	34.3	33.9	33.3	34.5	33.8
400	35.2	34.3	34.2	34.8	34.4	35.2
500	35.0	34.6	35.1	35.0	34.5	35.8

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	25.3	40.2	36.5	38.4	39.1	37.4
100	50.5	44.7	38.2	39.2	39.8	39.6
200	40.4	40.2	39.6	39.6	39.8	38.6
300	37.9	40.2	39.8	39.6	40.2	40.4
400	44.9	40.2	40.6	40.6	41.1	40.9
500	45.9	39.4	40.5	40.2	40.8	40.6

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	40.2	40.1	34.7	38.1	37.1
100	33.7	36.5	37.3	39.2	38.6	38.9
200	40.4	44.7	40.6	39.2	41.1	40.2
300	33.7	40.2	43.7	41.3	41.0	41.8
400	40.4	43.5	43.4	41.3	41.7	41.9
500	42.1	41.0	41.1	41.3	40.9	41.1

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

100	67.0	50.3	50.3	52.4	53.6	54.3
200	57.3	57.3	57.3	56.6	55.8	56.9
300	58.2	57.2	55.1	56.1	56.6	56.9
400	58.3	56.2	56.7	55.9	56.6	56.7
500	55.6	56.9	57.0	56.3	56.6	56.9

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	25.3	33.7	40.4	43.3	44.9	45.9
100	40.2	40.2	47.3	41.6	43.5	43.7
200	42.2	44.6	47.9	43.4	44.6	44.3
300	47.4	48.7	44.5	45.3	44.7	44.5
400	45.1	45.1	44.5	44.4	44.9	45.3
500	44.3	47.2	46.3	45.4	45.1	45.0

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	50.5	40.4	37.9	40.4	42.1
100	50.3	40.2	42.3	44.7	42.3	42.8
200	44.6	44.6	43.9	43.7	43.6	43.4
300	44.0	44.5	43.4	43.6	43.2	43.2
400	43.3	43.0	43.6	42.9	43.5	43.5
500	43.5	44.1	44.1	44.1	44.7	43.1

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	50.5	50.3	53.5	56.3	55.2	55.0
100	50.5	57.4	53.5	55.5	55.2	55.6
200	67.3	53.6	57.3	55.5	54.8	56.9
300	50.5	54.8	56.6	57.2	57.0	56.1
400	67.3	57.4	56.8	57.0	57.6	57.5
500	56.1	54.3	56.1	57.6	57.3	57.5

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	40.2	53.5	47.4	49.3	48.6
100	50.5	50.3	51.7	52.3	51.3	51.3
200	67.3	53.6	53.5	52.6	52.5	52.5
300	60.6	52.4	54.1	54.4	52.4	53.2
400	50.5	51.9	52.6	53.6	52.8	53.4
500	50.5	54.3	54.9	55.0	54.8	53.8

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	33.5	36.5	36.1	35.2	36.8
100	33.7	36.5	38.2	38.0	38.6	39.1
200	40.4	40.2	39.1	40.1	40.7	40.9
300	43.3	43.1	41.1	41.6	41.3	41.3
400	50.5	44.7	41.9	41.2	40.9	41.5
500	38.8	41.0	41.1	41.5	41.9	41.5

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	25.3	40.2	34.9	38.4	37.7	37.6
100	33.7	40.2	39.1	38.8	38.8	40.0
200	40.4	40.2	39.1	39.4	39.2	39.5
300	43.3	40.2	40.4	40.2	40.1	39.7
400	36.7	41.2	40.6	39.4	40.1	40.7
500	42.1	37.9	41.6	41.1	41.2	41.0

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	25.3	33.5	36.5	35.4	36.8	36.0
100	50.5	36.5	41.1	38.8	39.1	39.7
200	50.5	40.2	41.1	40.7	40.6	40.9
300	37.9	44.7	41.1	40.4	42.5	41.5
400	50.5	43.5	41.1	41.4	42.0	41.2
500	42.1	41.9	41.6	41.4	41.8	41.7

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	40.2	34.9	36.1	35.6	35.2
100	50.5	36.5	38.2	39.2	37.7	39.6
200	40.4	40.2	42.8	40.1	40.4	40.4
300	43.3	41.6	41.5	42.3	42.8	42.7
400	44.9	43.5	41.9	42.3	42.4	42.0
500	42.1	43.7	42.2	42.7	42.7	42.4

*** Speed of ZTRSM in megaflops ***
with LDA = 513

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	25.3	25.3	50.5	27.5	31.1	29.7
100	28.7	36.5	33.5	34.5	35.7	34.7

M \ N	50	100	200	300	400	500
50	50.5	50.3	53.5	53.0	50.1	50.1
100	50.5	57.4	51.7	53.8	50.5	51.9
200	50.5	53.6	52.6	55.1	54.3	54.0
300	50.5	46.4	56.0	52.8	53.8	53.4
400	50.5	53.6	53.9	54.0	52.6	53.5
500	45.9	52.9	54.9	54.3	53.6	52.9

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	50.5	50.3	61.7	53.0	54.3	53.8
100	50.5	50.3	55.3	57.2	56.2	55.9
200	67.3	53.6	56.3	56.8	57.2	56.2
300	60.6	60.3	58.0	58.2	58.4	57.2
400	50.5	57.4	58.3	57.2	57.6	57.4
500	56.1	57.4	56.5	56.9	57.8	58.1

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	50.3	53.5	48.7	50.9	49.1
100	50.5	57.4	53.5	56.3	52.1	51.6
200	67.3	53.6	54.4	54.2	53.6	53.1
300	50.5	57.4	54.7	54.4	54.3	53.1
400	57.7	55.4	54.4	55.1	54.8	54.2
500	63.1	50.3	54.9	55.1	54.1	52.7

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	50.3	57.3	51.5	47.8	47.7
100	50.5	44.7	51.7	53.0	51.3	50.8
200	50.5	50.3	54.4	53.4	52.1	52.8
300	50.5	57.4	54.1	54.4	54.2	52.3
400	57.7	55.4	53.9	53.8	53.4	53.4
500	50.5	54.3	54.2	54.1	53.8	53.5

*** Speed of ZTRSM in megaflops ***
with LDA = 513

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	50.5	101.0	40.4	43.3	36.7	38.8
100	40.2	50.3	44.7	43.1	45.9	47.9

200	38.2	36.5	37.3	36.5	38.0	37.8
300	38.4	39.2	38.4	38.4	38.9	38.2
400	37.7	38.6	39.0	39.2	39.0	39.2
500	40.4	39.6	39.8	39.3	38.8	38.9

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	25.3	25.3	28.9	27.5	26.9	26.6
100	33.5	30.9	30.9	30.9	31.5	30.9
200	33.4	32.7	34.5	33.7	32.1	32.7
300	33.4	34.0	33.9	33.7	33.3	33.5
400	33.7	35.0	34.6	34.5	34.5	35.0
500	35.8	36.1	35.4	35.4	35.0	34.9

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	25.3	25.3	25.3	27.5	26.9	28.1
100	33.5	30.9	29.8	30.9	29.8	29.6
200	32.1	31.5	33.4	32.1	33.1	31.8
300	32.2	31.9	33.5	32.6	33.9	33.7
400	34.8	35.0	34.5	35.0	35.4	34.9
500	34.5	34.6	34.2	35.1	34.8	35.1

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	25.3	20.2	28.9	27.5	31.1	28.1
100	28.7	30.9	35.0	34.5	33.5	31.9
200	36.5	38.2	35.6	38.5	37.5	36.6
300	37.6	38.0	38.6	37.8	38.2	37.3
400	40.1	39.3	39.1	38.4	37.3	38.0
500	38.2	37.5	38.3	38.7	39.5	39.5

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	16.8	25.3	28.9	27.5	26.9	25.3
100	28.7	30.9	30.9	30.2	32.2	28.3
200	34.9	31.5	30.8	31.5	32.1	33.3
300	35.4	34.0	34.7	35.6	35.9	34.7
400	35.2	34.8	34.6	34.8	34.1	34.3
500	35.2	35.1	35.2	34.9	35.2	35.1

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

200	53.5	48.6	50.1	51.2	50.1	50.4
300	51.5	52.3	51.9	51.5	51.0	51.5
400	52.5	51.7	52.3	52.1	51.7	51.8
500	52.7	52.7	52.5	53.0	53.2	53.4

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	50.5	50.5	37.9	36.7	42.1
100	40.2	44.7	42.3	40.2	39.2	40.2
200	40.1	44.6	45.8	45.4	43.6	44.3
300	47.4	46.2	46.5	43.6	45.2	44.3
400	42.7	43.6	44.7	44.7	44.3	44.7
500	44.7	44.5	44.5	45.3	45.1	45.4

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	25.3	33.7	33.7	33.7	33.7	36.1
100	40.2	50.3	42.3	41.6	40.2	39.4
200	42.2	41.1	42.8	43.4	43.4	42.7
300	42.9	42.9	42.2	43.3	43.6	42.9
400	42.7	43.6	43.3	43.1	43.1	43.4
500	43.5	43.3	43.6	43.1	43.7	43.6

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	25.3	50.5	40.4	43.3	36.7	38.8
100	40.2	50.3	47.3	46.4	48.7	47.9
200	50.1	50.1	51.7	50.7	51.3	51.7
300	54.6	52.3	50.8	52.0	51.9	53.2
400	52.5	51.7	51.7	51.8	51.4	51.9
500	51.6	52.4	52.5	53.1	52.4	52.6

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	33.7	33.7	37.9	40.4	36.1
100	40.2	36.5	40.2	41.6	40.2	41.0
200	47.2	44.6	45.8	44.6	43.9	43.8
300	44.0	45.6	43.7	44.9	45.2	44.9
400	45.1	46.1	45.4	45.9	44.8	45.2
500	45.9	44.9	45.8	45.0	45.2	44.6

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	25.3	28.9	27.5	28.9	26.6
100	28.7	30.9	30.9	28.7	29.2	29.1
200	33.4	32.1	32.4	32.7	32.4	32.5
300	34.0	32.5	33.1	33.7	33.5	34.0
400	35.2	34.1	34.1	34.6	34.5	34.6
500	35.0	34.3	34.9	34.8	34.3	34.6

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	.0	33.5	36.5	37.6	36.4	37.4
100	33.7	36.5	40.1	38.8	38.4	38.5
200	50.5	38.3	41.7	41.4	41.3	40.0
300	43.3	41.6	39.8	41.4	40.4	40.6
400	40.4	42.3	41.1	41.2	41.4	41.4
500	38.8	41.9	41.1	41.6	42.6	42.3

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	40.2	36.5	39.2	36.8	37.4
100	50.5	44.7	42.2	42.4	39.8	40.5
200	40.4	44.7	42.2	41.9	40.7	40.9
300	43.3	41.6	41.1	41.0	41.0	43.1
400	50.5	40.2	42.5	41.8	42.0	41.6
500	42.1	41.9	41.3	40.6	41.4	40.4

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	40.2	36.5	34.7	35.6	34.5
100	50.5	44.7	40.1	40.1	40.1	39.6
200	40.4	40.2	41.1	41.2	41.6	41.4
300	43.3	44.7	43.4	41.4	41.4	41.7
400	50.5	43.5	42.8	41.8	41.3	41.9
500	42.1	43.7	42.2	43.3	43.5	42.5

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	50.5	40.2	36.5	36.8	37.7	37.6
100	33.7	36.5	40.1	39.6	39.3	38.8
200	50.5	40.2	40.6	40.3	40.3	40.8
300	37.9	40.2	40.8	41.9	41.7	41.5
400	40.4	42.3	42.5	41.9	41.3	41.1
500	38.8	42.8	40.7	41.6	40.6	40.4

M \ N	50	100	200	300	400	500
50	50.5	33.7	40.4	37.9	36.7	33.7
100	33.5	33.5	40.2	38.9	39.2	41.0
200	42.2	41.1	42.2	41.1	41.9	42.4
300	41.9	42.9	42.2	42.8	43.1	42.5
400	43.3	43.0	43.0	43.4	43.0	42.7
500	41.7	43.1	43.6	42.9	42.7	43.1

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	50.5	50.3	61.7	53.0	54.3	54.4
100	50.5	50.3	59.4	58.2	56.2	55.6
200	50.5	57.4	57.3	56.8	57.7	56.7
300	50.5	60.3	56.6	58.2	57.2	57.8
400	57.7	59.6	58.3	56.6	57.9	56.6
500	63.1	55.8	57.3	57.4	56.8	56.1

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	50.3	47.2	53.0	47.1	48.6
100	50.5	57.4	53.5	52.3	49.7	51.6
200	50.5	50.3	54.4	52.6	52.1	52.0
300	60.6	54.8	54.1	54.1	53.1	53.2
400	50.5	55.4	53.9	54.4	54.3	54.6
500	63.1	55.8	54.6	55.1	55.6	55.2

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	40.2	44.6	53.0	51.7	51.1
100	101.0	40.2	61.7	51.5	52.5	52.7
200	50.5	53.6	56.3	55.5	54.5	53.4
300	60.6	52.4	56.0	53.8	53.4	53.5
400	67.3	55.4	54.8	54.4	53.7	53.5
500	56.1	55.8	53.5	54.8	54.0	54.0

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
50	50.5	50.3	50.1	53.0	54.3	53.8
100	50.5	57.4	57.3	55.5	57.2	55.6
200	40.4	61.8	55.3	55.9	56.0	56.7
300	50.5	52.4	56.6	56.3	55.9	56.0
400	50.5	59.6	56.8	56.3	58.0	57.2
500	56.1	57.4	58.1	56.9	57.1	57.8

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	40.2	38.2	37.6	36.8	37.1
100	33.7	36.5	40.1	40.1	39.8	40.0
200	40.4	40.2	41.1	41.7	41.6	41.4
300	50.5	43.1	41.8	41.3	42.4	41.7
400	40.4	40.2	41.1	41.7	41.4	42.5
500	36.1	45.7	43.4	43.1	43.0	42.2

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	40.2	36.5	37.6	37.3	36.5
100	50.5	40.2	38.2	39.2	38.8	39.4
200	33.7	40.2	40.1	40.7	40.6	40.0
300	50.5	43.1	41.8	41.1	41.8	41.8
400	40.4	45.9	42.2	41.9	41.8	41.7
500	45.9	42.8	41.8	42.5	43.3	42.8

End of tests
Total time used = 5008.02 seconds

LAPACK VERSION 1.1, released March 31, 1993

BLAS timing, COMPLEX*16 data, M small

M:	2	16	32	48	64	
N:	50	100	200	300	400	500
K:	50	100	200	300	400	500
INCX:	1					
LDA:	513					

The minimum time a subroutine will be timed = .000 seconds

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
50	50.5	33.5	44.6	51.5	50.9	47.7
100	50.5	44.7	55.3	50.1	51.7	51.9
200	67.3	50.3	52.6	53.4	52.5	52.0
300	60.6	50.3	51.2	51.5	51.7	52.5
400	50.5	55.4	52.6	53.4	53.4	53.4
500	50.5	55.8	52.8	54.6	53.4	54.5

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
50	50.5	40.2	44.6	54.6	43.3	48.1
100	50.5	50.3	47.2	52.3	51.7	50.1
200	50.5	53.6	50.9	52.6	51.7	50.7
300	50.5	52.4	53.5	51.0	52.2	52.8
400	57.7	55.4	54.8	54.2	54.0	53.8
500	50.5	54.3	53.8	53.0	54.2	54.4

End of tests
Total time used = 3340.45 seconds

LAPACK VERSION 2.0, released September 30, 1994

BLAS timing, COMPLEX*16 data, M small

M:	2	16	32	48	64	
N:	50	100	200	300	400	500
K:	50	100	200	300	400	500
INCX:	1					
LDA:	513					

The minimum time a subroutine will be timed = .000 seconds

>>>>> Timing data <<<<<

*** Speed of ZGEMM in megaflops ***
with LDA = 513

ZGEMM with TRANSA = 'N', TRANSB = 'N'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	16.0	24.0	16.0	13.3
16	32.0	32.0	32.0	32.0	32.0	40.0
32	32.0	32.0	42.7	42.7	39.4	33.7
48	32.0	38.4	38.4	36.0	38.4	35.6
64	64.0	42.7	36.6	38.4	39.4	37.6

K = 100

M \ N	50	100	200	300	400	500
2	.0	16.0	16.0	16.0	16.0	16.0
16	32.0	32.0	36.6	34.9	36.6	33.7
32	42.7	36.6	34.1	34.9	36.6	32.8
48	38.4	29.5	36.6	36.0	34.9	38.4
64	36.6	36.6	34.1	41.5	37.9	40.0

K = 200

M \ N	50	100	200	300	400	500
2	16.0	10.7	12.8	10.7	11.6	11.4
16	25.6	28.4	30.1	28.4	33.0	31.2
32	36.6	36.6	35.3	37.5	36.6	36.6
48	34.9	36.6	32.7	36.6	36.6	36.2
64	39.4	42.7	36.6	38.4	39.4	37.9

K = 300

M \ N	50	100	200	300	400	500
2	8.0	9.6	9.6	10.3	9.1	13.3
16	32.0	29.5	30.7	32.0	29.5	28.2
32	32.0	33.4	32.7	33.4	34.9	34.9
48	38.4	29.5	35.4	37.2	35.2	35.8
64	38.4	34.9	36.1	37.8	36.8	35.7

K = 400

>>>>> Timing data <<<<<

*** Speed of ZGEMM in megaflops ***
with LDA = 513

ZGEMM with TRANSA = 'N', TRANSB = 'N'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	16.0	24.0	.0	40.0
16	.0	32.0	42.7	48.0	51.2	45.7
32	64.0	64.0	51.2	54.9	51.2	58.2
48	48.0	64.0	54.9	52.4	54.9	53.3
64	64.0	64.0	64.0	54.9	53.9	55.7

K = 100

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	24.0	32.0	40.0
16	32.0	64.0	51.2	54.9	42.7	53.3
32	64.0	42.7	51.2	54.9	51.2	49.2
48	64.0	54.9	54.9	54.9	54.9	53.3
64	64.0	64.0	60.2	59.1	58.5	56.9

K = 200

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	48.0	42.7	32.0
16	42.7	64.0	51.2	51.2	51.2	47.4
32	51.2	51.2	60.2	54.9	55.4	48.3
48	48.0	59.1	48.0	50.1	59.1	52.6
64	64.0	53.9	52.5	56.9	58.5	56.3

K = 300

M \ N	50	100	200	300	400	500
2	24.0	24.0	32.0	36.0	32.0	34.3
16	48.0	48.0	48.0	48.0	46.5	48.0
32	48.0	54.9	48.0	53.6	52.1	54.1
48	52.4	60.6	54.9	57.6	54.2	54.3
64	54.9	53.0	52.1	55.5	53.9	54.1

K = 400

M \ N	50	100	200	300	400	500
2	10.7	8.0	12.8	13.7	10.7	11.0
16	32.0	36.6	29.3	28.4	30.1	29.1
32	34.1	33.0	35.3	34.9	35.9	35.3
48	38.4	35.7	37.5	37.5	36.8	35.9
64	41.0	38.6	35.9	36.8	36.4	37.2

K = 500

M \ N	50	100	200	300	400	500
2	10.0	10.0	10.0	9.6	12.3	10.5
16	32.0	32.0	31.2	28.7	30.1	31.4
32	33.7	32.8	35.6	36.6	35.1	34.2
48	34.3	36.2	35.6	36.9	36.4	35.0
64	36.6	36.6	38.8	39.2	37.2	38.0

ZGEMM with TRANSA = 'N', TRANSB = 'T'

K = 50

M \ N	50	100	200	300	400	500
2	.0	8.0	16.0	12.0	10.7	13.3
16	16.0	32.0	21.3	24.0	25.6	26.7
32	32.0	32.0	36.6	32.0	34.1	29.1
48	32.0	38.4	32.0	33.9	29.5	30.0
64	32.0	32.0	36.6	34.9	36.6	33.7

K = 100

M \ N	50	100	200	300	400	500
2	8.0	8.0	10.7	6.9	8.0	8.0
16	32.0	32.0	25.6	24.0	24.4	22.9
32	42.7	32.0	30.1	28.4	31.0	27.8
48	32.0	38.4	32.0	32.0	34.1	32.0
64	36.6	34.1	35.3	32.7	35.9	33.2

K = 200

M \ N	50	100	200	300	400	500
2	8.0	5.3	7.1	7.4	8.0	6.4
16	32.0	25.6	24.4	26.5	25.6	26.1
32	28.4	32.0	27.7	30.7	33.0	32.0
48	34.9	34.9	35.7	32.9	36.6	34.9
64	34.1	36.6	35.9	38.4	37.9	39.1

K = 300

M \ N	50	100	200	300	400	500
2	32.0	64.0	32.0	48.0	36.6	35.6
16	51.2	51.2	48.8	45.2	46.5	46.5
32	51.2	51.2	50.0	52.1	50.0	51.7
48	59.1	51.2	53.9	53.0	53.4	55.3
64	56.9	53.9	56.9	55.4	56.1	55.1

K = 500

M \ N	50	100	200	300	400	500
2	40.0	26.7	40.0	40.0	35.6	33.3
16	64.0	49.2	42.7	43.6	50.2	45.7
32	58.2	53.3	53.3	55.7	52.2	52.0
48	56.5	58.2	54.1	56.5	56.1	55.2
64	55.7	59.5	55.1	58.2	56.0	54.0

ZGEMM with TRANSA = 'N', TRANSB = 'T'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	.0	24.0	32.0	20.0
16	.0	64.0	42.7	38.4	42.7	64.0
32	32.0	42.7	51.2	54.9	46.5	58.2
48	48.0	48.0	48.0	48.0	59.1	56.5
64	42.7	64.0	56.9	51.2	56.9	55.7

K = 100

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	24.0	32.0	26.7
16	32.0	42.7	42.7	48.0	46.5	45.7
32	64.0	64.0	51.2	51.2	53.9	53.3
48	48.0	64.0	51.2	54.9	51.2	54.9
64	51.2	56.9	53.9	53.0	56.9	54.5

K = 200

M \ N	50	100	200	300	400	500
2	16.0	16.0	16.0	16.0	21.3	22.9
16	64.0	42.7	42.7	42.7	44.5	44.1
32	51.2	51.2	39.4	49.5	52.5	42.7
48	34.9	30.7	53.0	50.1	53.9	51.2
64	39.4	48.8	50.0	50.4	49.3	53.3

K = 300

M \ N	50	100	200	300	400	500
2	8.0	6.9	6.4	7.6	8.0	7.1
16	24.0	25.6	28.4	25.6	25.2	25.6
32	29.5	32.0	31.3	30.7	32.0	32.0
48	32.0	33.9	33.9	32.0	34.4	32.7
64	34.9	34.1	37.9	33.9	34.9	35.2

K = 400

M \ N	50	100	200	300	400	500
2	6.4	7.1	6.7	6.9	7.1	6.8
16	21.3	25.6	24.4	22.6	24.7	24.4
32	30.1	29.3	33.0	30.7	30.6	31.0
48	33.4	32.7	33.8	33.4	34.1	35.1
64	39.4	39.4	37.2	34.1	34.4	35.7

K = 500

M \ N	50	100	200	300	400	500
2	6.7	7.3	7.3	7.3	7.3	6.8
16	22.9	24.6	25.1	25.3	26.4	26.0
32	32.0	32.0	30.5	31.0	31.2	31.8
48	34.3	34.3	34.3	35.3	34.3	32.2
64	35.6	36.6	35.3	35.2	36.2	34.7

ZGEMM with TRANSA = 'N', TRANSB = 'C'

K = 50

M \ N	50	100	200	300	400	500
2	.0	8.0	8.0	6.0	8.0	10.0
16	32.0	16.0	21.3	27.4	32.0	29.1
32	32.0	32.0	32.0	34.9	34.1	35.6
48	32.0	38.4	32.0	26.2	34.9	34.3
64	42.7	36.6	36.6	38.4	34.1	36.6

K = 100

M \ N	50	100	200	300	400	500
2	8.0	8.0	8.0	8.0	8.0	8.0
16	21.3	25.6	25.6	27.4	25.6	25.6
32	32.0	28.4	34.1	32.0	32.0	29.1
48	27.4	32.0	33.4	32.0	34.1	33.7
64	32.0	34.1	32.0	36.6	35.3	35.6

M \ N	50	100	200	300	400	500
2	12.0	12.0	12.0	16.0	13.7	12.6
16	38.4	48.0	36.6	38.4	41.5	38.4
32	42.7	48.0	48.0	45.2	45.9	45.7
48	57.6	48.0	52.4	50.1	50.6	49.2
64	54.9	53.0	52.1	50.6	51.2	51.2

K = 400

M \ N	50	100	200	300	400	500
2	10.7	12.8	11.6	12.0	10.2	10.0
16	32.0	42.7	36.6	38.4	35.9	38.2
32	51.2	46.5	44.5	44.5	45.5	44.9
48	45.2	46.5	47.3	50.1	49.5	50.5
64	53.9	48.8	53.2	52.1	51.8	50.9

K = 500

M \ N	50	100	200	300	400	500
2	10.0	10.0	10.0	9.2	10.3	9.8
16	35.6	40.0	37.6	36.2	39.4	36.0
32	49.2	42.7	46.5	45.2	45.7	44.8
48	50.5	45.7	54.1	48.0	49.9	49.5
64	58.2	51.2	52.8	52.2	52.0	51.6

ZGEMM with TRANSA = 'N', TRANSB = 'C'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	32.0	40.0
16	.0	32.0	42.7	48.0	51.2	53.3
32	32.0	64.0	64.0	48.0	51.2	53.3
48	48.0	48.0	54.9	57.6	54.9	56.5
64	64.0	51.2	51.2	54.9	60.2	55.7

K = 100

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	48.0	32.0	26.7
16	32.0	42.7	42.7	48.0	46.5	49.2
32	42.7	51.2	51.2	54.9	53.9	55.7
48	48.0	48.0	54.9	57.6	54.9	54.9
64	51.2	64.0	56.9	56.9	55.4	56.9

K = 200

M \ N	50	100	200	300	400	500
2	5.3	6.4	7.1	5.3	6.7	6.7
16	18.3	36.6	28.4	24.8	23.8	24.2
32	32.0	28.4	34.1	31.3	29.3	28.4
48	34.9	36.6	32.0	33.4	33.8	36.2
64	34.1	36.6	39.4	38.4	37.2	34.8

K = 300

M \ N	50	100	200	300	400	500
2	6.0	6.9	7.4	7.6	6.9	7.5
16	24.0	25.6	26.5	25.6	26.9	27.0
32	27.4	29.5	30.7	32.5	31.3	31.2
48	32.0	32.0	30.3	33.6	34.9	32.7
64	36.6	36.6	33.8	34.4	32.3	33.2

K = 400

M \ N	50	100	200	300	400	500
2	6.4	6.4	7.1	7.4	6.9	7.3
16	28.4	24.4	22.8	27.4	26.9	27.2
32	34.1	36.6	34.1	33.0	35.0	32.2
48	34.9	34.1	34.9	33.6	33.4	33.0
64	35.3	32.5	31.5	32.0	35.9	34.2

K = 500

M \ N	50	100	200	300	400	500
2	8.0	7.3	7.0	6.9	7.4	7.1
16	22.9	29.1	24.6	24.0	27.2	27.1
32	30.5	32.0	32.0	32.5	29.9	30.9
48	36.9	36.2	34.0	35.1	33.4	34.7
64	32.8	34.6	33.7	35.9	36.4	36.1

ZGEMM with TRANSA = 'T', TRANSB = 'N'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	.0	24.0	32.0	40.0
16	32.0	32.0	42.7	32.0	36.6	40.0
32	32.0	42.7	32.0	34.9	36.6	30.5
48	32.0	32.0	32.0	33.9	32.0	29.1
64	32.0	25.6	36.6	32.0	36.6	30.5

K = 200

M \ N	50	100	200	300	400	500
2	16.0	16.0	21.3	16.0	21.3	20.0
16	42.7	42.7	42.7	42.7	42.7	45.7
32	51.2	56.9	46.5	48.0	52.5	49.2
48	54.9	48.0	51.2	54.9	53.0	54.9
64	51.2	48.8	53.9	51.2	54.6	52.8

K = 300

M \ N	50	100	200	300	400	500
2	12.0	12.0	13.7	14.4	14.8	12.6
16	38.4	38.4	42.7	38.4	39.4	40.9
32	48.0	51.2	49.5	47.0	48.0	46.3
48	57.6	50.1	52.4	50.1	51.8	50.1
64	51.2	53.0	52.1	51.2	50.8	50.5

K = 400

M \ N	50	100	200	300	400	500
2	10.7	10.7	10.7	10.1	10.2	10.3
16	42.7	36.6	39.4	37.5	36.6	36.6
32	42.7	44.5	43.6	42.1	45.0	44.9
48	51.2	46.5	48.0	49.5	49.2	47.7
64	51.2	52.5	50.6	49.5	50.3	51.2

K = 500

M \ N	50	100	200	300	400	500
2	10.0	11.4	9.4	10.0	9.7	10.3
16	35.6	37.6	34.6	36.2	36.1	37.6
32	45.7	44.1	46.5	45.7	45.3	44.1
48	53.3	49.2	48.0	48.4	48.9	48.0
64	53.3	51.2	51.2	51.2	52.0	50.8

ZGEMM with TRANSA = 'T', TRANSB = 'N'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	.0	24.0	32.0	40.0
16	.0	64.0	42.7	38.4	51.2	40.0
32	32.0	42.7	42.7	42.7	39.4	45.7
48	32.0	48.0	42.7	44.3	42.7	45.7
64	42.7	42.7	42.7	45.2	41.0	42.7

K = 100

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	24.0	21.3	26.7
16	32.0	32.0	42.7	48.0	34.1	33.7
32	25.6	28.4	36.6	29.5	33.0	33.7
48	32.0	24.0	38.4	31.1	34.1	33.7
64	36.6	32.0	35.3	34.1	32.0	34.1

K = 200

M \ N	50	100	200	300	400	500
2	16.0	32.0	32.0	48.0	42.7	32.0
16	42.7	32.0	36.6	34.9	34.1	34.6
32	36.6	36.6	33.0	33.4	32.5	34.1
48	32.0	30.7	38.4	34.9	32.7	33.4
64	39.4	35.3	33.6	35.3	34.7	35.6

K = 300

M \ N	50	100	200	300	400	500
2	24.0	24.0	48.0	36.0	38.4	40.0
16	38.4	34.9	36.6	34.9	34.9	40.0
32	34.9	33.4	33.4	38.4	34.5	36.9
48	41.1	38.4	37.2	36.4	37.2	36.7
64	36.6	36.6	37.5	36.9	35.9	35.1

K = 400

M \ N	50	100	200	300	400	500
2	32.0	32.0	42.7	38.4	42.7	40.0
16	36.6	34.1	33.0	34.9	33.6	35.6
32	34.1	34.1	35.3	34.9	35.6	32.4
48	36.6	33.4	33.4	34.6	35.3	35.9
64	35.3	34.1	34.7	35.5	34.9	34.8

K = 500

M \ N	50	100	200	300	400	500
2	40.0	40.0	32.0	34.3	45.7	36.4
16	35.6	35.6	36.6	34.9	33.7	33.3
32	35.6	30.5	32.4	38.4	33.9	34.2
48	33.1	32.0	35.2	36.2	37.1	35.8
64	32.8	34.1	33.9	35.1	34.8	35.3

K = 100

M \ N	50	100	200	300	400	500
2	.0	16.0	32.0	48.0	32.0	80.0
16	32.0	42.7	42.7	42.7	42.7	45.7
32	42.7	42.7	46.5	45.2	42.7	42.7
48	48.0	38.4	42.7	44.3	45.2	43.6
64	36.6	42.7	42.7	43.9	44.5	44.9

K = 200

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	48.0	42.7	53.3
16	64.0	42.7	46.5	42.7	46.5	42.7
32	42.7	42.7	44.5	43.9	43.6	44.9
48	42.7	40.4	43.9	44.3	43.9	44.7
64	42.7	46.5	44.5	43.9	43.6	43.4

K = 300

M \ N	50	100	200	300	400	500
2	24.0	48.0	96.0	48.0	48.0	48.0
16	48.0	42.7	48.0	42.7	43.9	45.7
32	42.7	45.2	45.2	43.5	45.2	42.7
48	41.1	42.7	43.5	44.9	44.3	44.3
64	42.7	43.9	44.5	45.2	44.5	45.4

K = 400

M \ N	50	100	200	300	400	500
2	32.0	64.0	42.7	64.0	51.2	53.3
16	42.7	51.2	48.8	45.2	45.5	45.7
32	46.5	46.5	45.5	45.9	46.0	46.1
48	48.0	42.7	46.5	45.6	46.5	46.3
64	46.5	47.6	46.5	46.2	46.3	45.5

K = 500

M \ N	50	100	200	300	400	500
2	40.0	40.0	32.0	48.0	64.0	44.4
16	64.0	53.3	44.1	43.6	48.3	45.1
32	45.7	45.7	43.4	44.7	46.5	44.8
48	48.0	45.7	44.7	45.4	44.7	45.1
64	49.2	46.5	44.9	43.9	44.5	46.4

ZGEMM with TRANSA = 'T', TRANSB = 'T'

K = 50

M \ N	50	100	200	300	400	500
2	.0	8.0	16.0	8.0	16.0	20.0
16	16.0	12.8	14.2	17.5	15.1	15.2
32	12.8	14.2	15.1	15.4	15.5	15.2
48	13.7	14.8	15.4	15.2	15.1	15.5
64	14.2	14.2	15.1	14.8	15.8	16.0

K = 100

M \ N	50	100	200	300	400	500
2	8.0	16.0	5.3	5.3	9.1	10.0
16	8.0	9.8	8.8	8.7	9.0	8.6
32	7.5	10.7	8.8	8.6	8.5	8.6
48	7.7	8.7	8.6	8.5	8.9	8.7
64	7.8	9.8	9.1	8.9	9.1	8.6

K = 200

M \ N	50	100	200	300	400	500
2	8.0	8.0	7.1	8.0	8.0	9.4
16	8.5	8.5	8.0	8.2	8.3	8.3
32	8.3	8.8	8.5	8.5	8.4	8.1
48	8.0	8.3	8.0	8.2	8.4	8.1
64	8.1	8.7	8.0	8.2	8.0	8.0

K = 300

M \ N	50	100	200	300	400	500
2	8.0	8.0	8.0	6.9	7.7	7.7
16	7.7	7.5	8.1	7.2	8.0	7.8
32	7.1	7.8	8.0	7.7	7.9	7.6
48	8.0	7.4	7.9	7.9	7.9	7.9
64	7.6	7.8	7.9	7.9	8.0	8.1

K = 400

M \ N	50	100	200	300	400	500
2	8.0	8.0	8.0	8.0	8.3	7.4
16	7.5	7.4	7.2	7.8	7.5	7.3
32	7.1	7.9	7.5	7.8	8.0	7.7
48	7.2	7.5	7.2	7.6	7.8	7.8
64	7.8	7.6	7.6	7.7	7.4	7.6

ZGEMM with TRANSA = 'T', TRANSB = 'T'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	.0	24.0	32.0	40.0
16	32.0	32.0	42.7	48.0	51.2	40.0
32	32.0	42.7	51.2	42.7	51.2	42.7
48	48.0	48.0	42.7	52.4	40.4	45.7
64	128.0	51.2	46.5	40.4	46.5	40.0

K = 100

M \ N	50	100	200	300	400	500
2	.0	.0	.0	48.0	64.0	40.0
16	64.0	64.0	51.2	48.0	51.2	42.7
32	42.7	42.7	51.2	45.2	42.7	45.7
48	48.0	42.7	45.2	44.3	46.5	45.7
64	42.7	46.5	44.5	45.2	44.5	44.9

K = 200

M \ N	50	100	200	300	400	500
2	.0	.0	64.0	48.0	64.0	53.3
16	42.7	42.7	46.5	42.7	42.7	45.7
32	51.2	42.7	44.5	43.9	46.5	44.9
48	42.7	45.2	45.2	45.2	43.9	45.7
64	46.5	44.5	45.5	44.5	45.5	44.5

K = 300

M \ N	50	100	200	300	400	500
2	24.0	48.0	48.0	48.0	48.0	48.0
16	38.4	42.7	42.7	41.1	45.2	44.7
32	38.4	40.4	43.9	43.5	43.9	42.2
48	48.0	44.3	42.7	44.3	44.7	43.6
64	42.7	45.2	42.7	43.9	43.6	43.4

K = 400

M \ N	50	100	200	300	400	500
2	32.0	64.0	64.0	38.4	42.7	45.7
16	42.7	39.4	42.7	40.4	41.8	41.3
32	39.4	42.7	41.0	42.1	41.4	42.0
48	40.4	41.5	41.0	43.1	42.4	42.0
64	41.0	41.0	42.2	40.7	42.2	42.3

K = 500

M \ N	50	100	200	300	400	500
2	8.0	7.3	7.6	7.7	7.6	7.8
16	7.6	7.0	7.4	7.3	7.6	7.6
32	7.7	7.6	7.6	7.6	7.5	7.6
48	7.5	7.7	7.6	7.5	7.8	7.5
64	7.2	7.5	7.5	7.5	7.4	7.5

ZGEMM with TRANSA = 'T', TRANSB = 'C'

K = 50

M \ N	50	100	200	300	400	500
2	4.0	.0	16.0	12.0	32.0	13.3
16	10.7	16.0	16.0	14.8	15.1	14.5
32	12.8	12.8	14.2	16.7	14.6	16.0
48	12.0	16.0	13.2	14.8	15.4	15.0
64	14.2	16.0	15.5	14.8	16.5	16.4

K = 100

M \ N	50	100	200	300	400	500
2	8.0	8.0	10.7	8.0	10.7	10.0
16	7.1	9.8	9.5	8.9	9.5	8.2
32	9.1	9.1	9.5	8.8	9.1	8.3
48	7.7	9.8	8.5	7.9	8.8	8.6
64	7.5	9.3	8.7	8.3	8.9	8.3

K = 200

M \ N	50	100	200	300	400	500
2	16.0	8.0	7.1	7.4	8.5	8.0
16	8.0	8.3	8.3	8.0	7.9	8.1
32	8.3	8.1	7.8	8.0	8.1	7.8
48	8.2	8.4	8.7	8.1	8.1	8.0
64	8.1	8.3	8.0	8.1	8.2	8.1

K = 300

M \ N	50	100	200	300	400	500
2	8.0	8.0	8.0	8.0	8.3	8.0
16	8.0	7.8	7.9	7.8	8.0	8.1
32	7.4	7.5	7.6	7.8	7.8	8.4
48	7.6	7.8	8.1	7.8	7.8	7.8
64	7.4	7.5	7.7	7.7	7.9	7.9

K = 500

M \ N	50	100	200	300	400	500
2	40.0	40.0	53.3	40.0	40.0	33.3
16	40.0	40.0	37.6	38.4	40.6	42.1
32	40.0	40.0	39.4	40.4	40.0	39.0
48	41.7	42.7	40.0	41.1	40.2	40.0
64	40.0	40.6	40.6	40.4	41.0	39.5

ZGEMM with TRANSA = 'T', TRANSB = 'C'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	.0	24.0	32.0	.0
16	.0	32.0	32.0	48.0	42.7	35.6
32	64.0	42.7	42.7	38.4	46.5	42.7
48	48.0	48.0	42.7	44.3	45.2	41.7
64	42.7	42.7	46.5	42.7	42.7	44.1

K = 100

M \ N	50	100	200	300	400	500
2	.0	.0	16.0	48.0	64.0	40.0
16	32.0	42.7	42.7	38.4	42.7	40.0
32	42.7	42.7	39.4	45.2	42.7	44.1
48	38.4	38.4	48.0	42.7	46.5	43.6
64	42.7	42.7	46.5	43.9	43.6	44.9

K = 200

M \ N	50	100	200	300	400	500
2	.0	32.0	32.0	48.0	64.0	53.3
16	32.0	42.7	42.7	40.4	41.0	41.3
32	42.7	42.7	42.7	43.9	42.7	43.4
48	48.0	42.7	42.7	43.5	43.3	43.6
64	39.4	44.5	41.8	43.9	41.4	44.5

K = 300

M \ N	50	100	200	300	400	500
2	24.0	48.0	48.0	48.0	48.0	60.0
16	38.4	48.0	38.4	42.7	42.7	43.6
32	42.7	45.2	42.7	41.9	42.1	45.2
48	52.4	46.1	41.1	42.1	43.5	42.7
64	45.2	42.7	41.5	42.7	41.8	42.2

K = 400

M \ N	50	100	200	300	400	500
2	6.4	8.0	7.5	7.7	7.3	7.3
16	7.3	7.5	7.6	8.0	8.0	7.9
32	8.0	8.0	7.7	7.4	7.5	7.7
48	7.5	7.3	7.5	7.7	7.6	7.6
64	7.6	7.5	7.5	7.6	7.3	7.5

K = 500

M \ N	50	100	200	300	400	500
2	8.0	7.3	7.6	7.5	7.8	8.0
16	7.0	7.3	7.6	7.3	7.2	7.5
32	7.7	7.9	8.2	7.8	7.7	7.6
48	7.7	7.6	7.5	7.7	7.5	7.7
64	7.5	7.5	7.5	7.6	7.9	7.4

ZGEMM with TRANSA = 'C', TRANSB = 'N'

K = 50

M \ N	50	100	200	300	400	500
2	.0	8.0	16.0	24.0	.0	20.0
16	32.0	32.0	32.0	32.0	32.0	29.1
32	32.0	32.0	32.0	32.0	34.1	33.7
48	24.0	38.4	32.0	30.3	32.0	34.3
64	42.7	32.0	34.1	33.4	32.0	33.7

K = 100

M \ N	50	100	200	300	400	500
2	.0	16.0	32.0	48.0	32.0	40.0
16	32.0	32.0	36.6	34.9	34.1	33.7
32	32.0	32.0	34.1	34.9	32.0	35.6
48	32.0	34.9	33.4	33.9	34.1	33.7
64	36.6	34.1	35.3	34.9	34.7	34.6

K = 200

M \ N	50	100	200	300	400	500
2	.0	32.0	32.0	32.0	42.7	40.0
16	42.7	36.6	36.6	36.6	34.1	34.6
32	42.7	34.1	33.0	34.1	34.7	35.1
48	34.9	36.6	34.9	33.9	34.5	35.2

K = 400

M \ N	50	100	200	300	400	500
2	32.0	64.0	42.7	48.0	42.7	53.3
16	36.6	42.7	39.4	41.5	41.0	41.3
32	36.6	42.7	41.8	39.9	41.0	40.0
48	40.4	43.9	39.9	40.4	40.2	40.9
64	42.7	40.2	42.2	42.4	41.4	41.6

K = 500

M \ N	50	100	200	300	400	500
2	40.0	40.0	40.0	48.0	45.7	44.4
16	40.0	37.6	38.8	40.0	38.2	39.0
32	37.6	38.8	38.8	39.6	40.6	39.0
48	40.0	38.4	40.0	38.7	40.4	39.3
64	42.7	39.4	41.6	39.4	38.2	39.6

ZGEMM with TRANSA = 'C', TRANSB = 'N'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	32.0	40.0
16	32.0	32.0	42.7	38.4	36.6	40.0
32	64.0	42.7	42.7	42.7	46.5	42.7
48	48.0	38.4	42.7	44.3	42.7	40.0
64	42.7	36.6	42.7	40.4	41.0	44.1

K = 100

M \ N	50	100	200	300	400	500
2	.0	16.0	32.0	48.0	32.0	80.0
16	64.0	42.7	42.7	42.7	39.4	45.7
32	64.0	36.6	46.5	45.2	44.5	41.3
48	48.0	38.4	42.7	46.1	42.7	43.6
64	51.2	42.7	44.5	43.9	42.7	42.7

K = 200

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	96.0	64.0	53.3
16	32.0	42.7	46.5	42.7	44.5	44.1
32	42.7	42.7	44.5	46.5	44.5	44.9
48	48.0	42.7	43.9	46.1	43.9	47.4

64	30.1	33.0	33.6	34.9	35.6	35.1

K = 300

M \ N	50	100	200	300	400	500
2	24.0	24.0	32.0	48.0	38.4	30.0
16	32.0	38.4	34.9	36.0	31.3	34.3
32	34.9	33.4	36.6	36.0	35.7	35.6
48	33.9	36.0	36.6	35.3	35.2	35.8
64	34.9	35.7	33.8	34.9	35.5	37.1

K = 400

M \ N	50	100	200	300	400	500
2	32.0	32.0	42.7	48.0	36.6	29.1
16	28.4	34.1	39.4	34.9	34.1	36.6
32	34.1	35.3	35.3	34.9	35.3	33.7
48	38.4	35.7	36.1	34.6	35.9	35.7
64	37.9	37.9	36.9	37.7	34.9	36.6

K = 500

M \ N	50	100	200	300	400	500
2	40.0	40.0	32.0	40.0	40.0	36.4
16	35.6	35.6	33.7	34.9	35.6	35.2
32	33.7	38.8	36.6	37.3	34.8	35.0
48	38.4	36.2	34.0	34.7	34.1	33.9
64	34.6	33.7	34.6	34.8	34.7	36.7

ZGEMM with TRANSA = 'C', TRANSB = 'T'

K = 50

M \ N	50	100	200	300	400	500
2	.0	8.0	16.0	24.0	32.0	20.0
16	16.0	12.8	12.8	16.0	15.1	12.8
32	21.3	14.2	15.1	16.7	13.8	16.0
48	16.0	13.7	15.4	16.5	14.2	13.2
64	16.0	14.2	14.2	14.2	15.3	14.2

K = 100

M \ N	50	100	200	300	400	500
2	8.0	16.0	10.7	8.0	9.1	6.7
16	9.1	8.5	8.3	8.0	8.5	8.2
32	7.5	8.5	8.7	8.3	8.8	8.1

64	42.7	44.5	47.6	43.9	45.0	45.7

K = 300

M \ N	50	100	200	300	400	500
2	24.0	48.0	48.0	48.0	48.0	60.0
16	64.0	42.7	45.2	46.1	43.9	46.8
32	38.4	51.2	39.4	47.0	46.5	37.3
48	44.3	44.3	42.7	44.3	43.9	45.0
64	45.2	42.7	44.5	44.3	44.5	46.0

K = 400

M \ N	50	100	200	300	400	500
2	32.0	64.0	42.7	64.0	64.0	64.0
16	36.6	46.5	42.7	45.2	46.5	43.4
32	39.4	46.5	41.8	45.2	44.0	44.5
48	42.7	45.2	47.3	45.2	43.0	45.4
64	48.8	47.6	46.0	47.6	46.0	45.7

K = 500

M \ N	50	100	200	300	400	500
2	40.0	.0	53.3	60.0	53.3	50.0
16	45.7	45.7	44.1	43.6	44.9	45.1
32	45.7	42.7	44.1	44.7	43.4	44.1
48	43.6	40.9	43.6	44.0	42.7	44.0
64	44.1	42.0	43.8	46.3	43.9	43.8

ZGEMM with TRANSA = 'C', TRANSB = 'T'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	.0	24.0	.0	40.0
16	.0	64.0	42.7	48.0	36.6	40.0
32	21.3	42.7	51.2	38.4	46.5	45.7
48	32.0	38.4	42.7	44.3	42.7	43.6
64	42.7	42.7	42.7	40.4	42.7	41.3

K = 100

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	48.0	64.0	40.0
16	64.0	42.7	36.6	48.0	42.7	42.7
32	32.0	42.7	39.4	38.4	46.5	42.7

48	6.9	8.7	8.2	7.9	8.6	8.1
64	7.1	8.8	8.5	7.9	8.6	8.4

K = 200

M \ N	50	100	200	300	400	500
2	8.0	8.0	9.1	8.0	8.0	8.4
16	8.0	7.8	8.1	7.9	7.8	7.8
32	8.0	8.3	7.7	7.9	7.8	7.8
48	8.0	8.1	7.6	7.9	7.9	7.6
64	7.9	8.0	7.6	7.5	7.5	7.6

K = 300

M \ N	50	100	200	300	400	500
2	8.0	8.0	8.0	7.2	8.0	7.5
16	7.1	7.7	7.6	7.6	7.7	7.5
32	9.1	8.3	7.5	7.7	7.5	7.7
48	7.3	7.4	7.1	7.5	7.7	7.5
64	7.5	8.0	7.7	7.4	7.6	7.6

K = 400

M \ N	50	100	200	300	400	500
2	6.4	8.0	7.5	7.4	7.5	7.8
16	7.8	7.6	7.6	7.4	7.4	7.3
32	7.8	7.4	7.4	7.3	7.3	7.4
48	7.5	7.5	7.5	7.4	7.2	7.3
64	7.6	7.3	7.3	7.5	7.4	7.4

K = 500

M \ N	50	100	200	300	400	500
2	8.0	6.7	7.6	7.5	7.3	7.8
16	7.6	7.8	7.4	7.2	7.4	7.5
32	7.3	7.5	7.3	7.2	7.5	7.4
48	7.1	7.4	7.5	7.5	7.3	7.4
64	7.4	7.4	7.5	7.3	7.3	7.4

ZGEMM with TRANSA = 'C', TRANSB = 'C'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	16.0	24.0	32.0	20.0
16	10.7	21.3	18.3	17.5	17.1	14.5

48	38.4	48.0	42.7	41.1	46.5	41.7
64	36.6	39.4	42.7	43.9	43.6	45.7

K = 200

M \ N	50	100	200	300	400	500
2	.0	.0	64.0	48.0	42.7	80.0
16	42.7	42.7	42.7	48.0	44.5	44.1
32	42.7	39.4	44.5	45.2	42.7	45.7
48	48.0	45.2	45.2	40.4	44.5	44.1
64	42.7	39.4	45.5	42.7	43.1	43.0

K = 300

M \ N	50	100	200	300	400	500
2	24.0	48.0	48.0	48.0	48.0	48.0
16	38.4	34.9	38.4	39.7	45.2	40.9
32	42.7	42.7	41.5	43.5	42.7	42.7
48	41.1	44.3	42.7	43.7	43.1	42.4
64	45.2	46.5	42.7	43.5	44.2	43.4

K = 400

M \ N	50	100	200	300	400	500
2	32.0	.0	42.7	38.4	51.2	40.0
16	42.7	46.5	41.0	45.2	41.8	42.7
32	39.4	41.0	41.0	41.5	41.4	40.6
48	45.2	39.4	40.4	40.4	42.7	42.4
64	41.0	42.7	42.2	42.4	42.2	42.7

K = 500

M \ N	50	100	200	300	400	500
2	40.0	80.0	40.0	48.0	40.0	50.0
16	40.0	37.6	40.0	40.9	38.8	39.5
32	40.0	40.0	40.0	40.4	40.0	40.8
48	43.6	40.0	39.6	39.4	40.4	41.0
64	40.0	39.4	39.7	40.4	39.2	39.5

ZGEMM with TRANSA = 'C', TRANSB = 'C'

K = 50

M \ N	50	100	200	300	400	500
2	.0	.0	16.0	.0	32.0	40.0
16	32.0	64.0	42.7	38.4	51.2	40.0

32	12.8	12.8	15.1	14.8	14.6	14.9
48	13.7	14.8	14.8	15.6	14.8	15.2
64	14.2	16.0	15.5	16.0	15.1	14.5

K = 100

M \ N	50	100	200	300	400	500
2	8.0	8.0	8.0	8.0	9.1	11.4
16	8.0	9.1	9.1	8.7	9.1	8.8
32	7.1	9.1	8.8	8.5	8.5	9.1
48	7.7	9.6	9.1	8.5	8.6	8.8
64	7.8	8.8	8.9	8.3	9.1	8.9

K = 200

M \ N	50	100	200	300	400	500
2	8.0	8.0	9.1	8.0	8.5	8.4
16	8.5	8.8	8.0	8.1	8.5	8.7
32	8.3	8.4	7.8	8.3	8.2	8.2
48	8.2	8.3	8.2	8.2	8.1	8.0
64	8.8	8.8	8.6	8.2	7.8	8.2

K = 300

M \ N	50	100	200	300	400	500
2	8.0	9.6	8.7	8.0	8.3	7.7
16	7.7	8.0	8.2	8.1	8.2	7.9
32	7.5	7.8	7.9	7.8	8.1	7.8
48	7.8	7.9	8.2	7.9	7.9	7.9
64	7.5	8.3	7.7	8.2	8.0	7.8

K = 400

M \ N	50	100	200	300	400	500
2	8.0	8.0	7.5	7.7	8.3	7.6
16	7.8	7.9	7.8	7.6	7.4	7.6
32	7.1	7.1	7.3	7.8	7.6	7.4
48	7.6	7.7	8.0	7.7	7.6	7.5
64	7.2	7.2	7.7	7.9	7.8	7.6

K = 500

M \ N	50	100	200	300	400	500
2	8.0	7.3	7.3	8.3	7.6	7.5
16	8.0	7.6	7.8	7.7	7.5	7.6
32	7.5	7.8	7.8	7.7	7.5	7.3

32	32.0	42.7	42.7	38.4	36.6	40.0
48	48.0	38.4	38.4	41.1	45.2	41.7
64	42.7	42.7	42.7	45.2	41.0	41.3

K = 100

M \ N	50	100	200	300	400	500
2	.0	16.0	32.0	48.0	64.0	80.0
16	32.0	64.0	42.7	42.7	42.7	45.7
32	42.7	36.6	46.5	42.7	39.4	41.3
48	48.0	48.0	45.2	44.3	41.5	41.7
64	42.7	42.7	42.7	43.9	43.6	42.7

K = 200

M \ N	50	100	200	300	400	500
2	.0	.0	32.0	48.0	42.7	40.0
16	42.7	42.7	46.5	38.4	41.0	41.3
32	51.2	42.7	41.0	43.9	42.7	42.7
48	42.7	45.2	45.2	41.1	42.1	42.7
64	42.7	42.7	43.6	43.3	43.6	42.7

K = 300

M \ N	50	100	200	300	400	500
2	24.0	48.0	48.0	28.8	48.0	48.0
16	38.4	42.7	42.7	44.3	41.5	44.7
32	42.7	42.7	40.4	42.7	43.3	40.9
48	41.1	39.7	41.1	43.7	43.1	42.0
64	42.7	42.7	41.0	43.1	41.5	41.5

K = 400

M \ N	50	100	200	300	400	500
2	32.0	64.0	42.7	38.4	36.6	45.7
16	36.6	39.4	37.9	39.4	40.2	40.6
32	39.4	41.0	40.2	42.7	41.4	42.3
48	40.4	40.4	39.9	39.7	39.9	40.6
64	39.4	43.6	40.2	41.2	40.6	40.5

K = 500

M \ N	50	100	200	300	400	500
2	40.0	26.7	40.0	40.0	35.6	44.4
16	40.0	40.0	37.6	39.2	37.1	37.2
32	42.7	38.8	36.6	38.4	37.1	39.5

48	7.4	7.2	7.7	7.5	7.9	7.6
64	7.6	7.7	7.4	7.7	7.5	7.4

*** Speed of ZHEMM in megaflops ***
with LDA = 513

ZHEMM with SIDE = 'L', UPLO = 'U'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	1.3	.0
16	.0	20.5	41.0	20.5	41.0	51.2
32	41.0	81.9	32.8	41.0	41.0	58.5
48	46.1	36.9	41.0	42.5	41.0	46.1
64	54.6	46.8	43.7	44.7	46.8	45.5

ZHEMM with SIDE = 'L', UPLO = 'L'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	1.3	1.6
16	.0	20.5	41.0	30.7	41.0	51.2
32	41.0	41.0	54.6	41.0	46.8	45.5
48	46.1	46.1	46.1	42.5	52.7	43.9
64	54.6	54.6	43.7	46.8	45.2	46.8

ZHEMM with SIDE = 'R', UPLO = 'U'

M \ N	50	100	200	300	400	500
2	4.0	8.0	9.1	8.5	8.5	8.9
16	32.0	32.0	23.3	26.8	26.9	27.6
32	32.0	32.0	30.1	32.9	32.5	33.0
48	32.0	38.4	34.1	35.3	35.3	35.0
64	32.0	36.6	35.3	36.9	36.4	36.0

ZHEMM with SIDE = 'R', UPLO = 'L'

M \ N	50	100	200	300	400	500
2	.0	8.0	5.8	8.5	8.3	8.2
16	32.0	32.0	26.9	26.8	26.3	26.9
32	32.0	32.0	33.0	33.9	32.3	33.0
48	48.0	32.0	34.1	35.3	34.1	35.0
64	32.0	36.6	35.3	36.9	36.2	37.0

*** Speed of ZSYMM in megaflops ***
with LDA = 513

ZSYMM with SIDE = 'L', UPLO = 'U'

48	36.9	40.9	38.8	38.9	39.0	38.9
64	41.3	38.2	39.1	39.6	40.0	39.5

*** Speed of ZHEMM in megaflops ***
with LDA = 513

ZHEMM with SIDE = 'L', UPLO = 'U'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	81.9	102.4
32	41.0	.0	163.8	81.9	81.9	68.3
48	46.1	46.1	73.7	69.1	81.9	61.4
64	81.9	54.6	81.9	70.2	69.0	71.2

ZHEMM with SIDE = 'L', UPLO = 'L'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	20.5	41.0	61.4	81.9	102.4
32	41.0	81.9	81.9	81.9	65.5	68.3
48	46.1	92.2	92.2	79.0	73.7	70.9
64	41.0	65.5	65.5	65.5	65.5	71.2

ZHEMM with SIDE = 'R', UPLO = 'U'

M \ N	50	100	200	300	400	500
2	.0	16.0	21.3	20.6	14.2	14.3
16	32.0	42.7	51.2	48.0	41.8	40.5
32	64.0	42.7	56.9	54.9	48.2	48.5
48	96.0	54.9	56.9	55.7	52.1	50.0
64	64.0	51.2	48.8	53.6	54.6	52.7

ZHEMM with SIDE = 'R', UPLO = 'L'

M \ N	50	100	200	300	400	500
2	.0	16.0	32.0	20.6	16.0	13.3
16	32.0	64.0	46.5	44.3	41.8	40.0
32	64.0	64.0	51.2	51.2	48.2	47.4
48	96.0	54.9	59.1	53.2	51.2	51.9
64	42.7	56.9	55.4	56.9	53.2	53.6

*** Speed of ZSYMM in megaflops ***
with LDA = 513

ZSYMM with SIDE = 'L', UPLO = 'U'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	1.0	.0	.0
16	.0	20.5	41.0	30.7	41.0	51.2
32	41.0	41.0	32.8	41.0	46.8	41.0
48	46.1	36.9	36.9	39.5	41.0	40.1
64	54.6	41.0	46.8	44.7	42.3	43.1

ZSYMM with SIDE = 'L', UPLO = 'L'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	1.3	.0
16	.0	20.5	20.5	30.7	27.3	34.1
32	41.0	41.0	32.8	41.0	41.0	45.5
48	46.1	46.1	46.1	36.9	41.0	38.4
64	54.6	36.4	46.8	46.8	46.8	48.2

ZSYMM with SIDE = 'R', UPLO = 'U'

M \ N	50	100	200	300	400	500
2	4.0	8.0	9.1	8.0	8.5	7.7
16	32.0	25.6	26.9	29.5	26.6	25.0
32	32.0	28.4	27.7	31.6	32.0	31.8
48	48.0	38.4	32.7	35.3	36.4	35.7
64	42.7	32.0	35.9	36.0	35.9	36.5

ZSYMM with SIDE = 'R', UPLO = 'L'

M \ N	50	100	200	300	400	500
2	4.0	8.0	8.0	9.0	7.5	8.3
16	32.0	42.7	30.1	27.4	28.4	28.3
32	32.0	36.6	35.3	32.5	33.0	32.0
48	48.0	38.4	35.7	34.9	35.5	36.2
64	64.0	39.4	37.2	36.3	35.6	37.6

*** Speed of ZTRMM in megaflops ***
with LDA = 513

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	5.3	.0	21.1	31.7	42.2	26.4
32	20.8	41.6	41.6	41.6	41.6	34.7
48	46.6	46.6	37.2	31.0	37.2	35.8
64	41.3	33.0	36.7	35.4	36.7	35.9

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	30.7	81.9	102.4
32	41.0	41.0	81.9	49.2	81.9	58.5
48	46.1	46.1	61.4	69.1	61.4	61.4
64	81.9	65.5	72.8	61.4	72.8	65.5

ZSYMM with SIDE = 'L', UPLO = 'L'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	20.5	41.0	61.4	81.9	102.4
32	41.0	81.9	81.9	61.4	65.5	68.3
48	92.2	61.4	61.4	69.1	67.0	61.4
64	81.9	65.5	65.5	65.5	62.4	68.3

ZSYMM with SIDE = 'R', UPLO = 'U'

M \ N	50	100	200	300	400	500
2	.0	16.0	32.0	24.0	16.0	13.3
16	32.0	42.7	46.5	46.1	41.0	39.5
32	64.0	51.2	53.9	49.0	48.2	45.1
48	48.0	54.9	53.0	51.6	48.4	50.0
64	64.0	51.2	55.4	53.0	50.9	50.8

ZSYMM with SIDE = 'R', UPLO = 'L'

M \ N	50	100	200	300	400	500
2	.0	16.0	32.0	28.8	17.1	13.3
16	32.0	64.0	56.9	44.3	41.0	38.6
32	32.0	51.2	56.9	47.0	50.0	46.0
48	48.0	64.0	56.9	48.7	53.0	48.7
64	64.0	51.2	52.5	51.2	51.2	51.2

*** Speed of ZTRMM in megaflops ***
with LDA = 513

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	5.3	.0	.0	.0	42.2	52.8
32	.0	41.6	27.7	62.4	55.5	34.7
48	46.6	46.6	46.6	55.9	62.1	51.7
64	82.6	41.3	47.2	45.0	47.2	48.6

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.4	.0	.0	.0
16	.0	10.6	21.1	15.8	42.2	26.4
32	20.8	41.6	27.7	41.6	27.7	29.7
48	46.6	31.0	31.0	34.9	28.7	27.4
64	41.3	33.0	30.0	33.0	33.0	31.8

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.6	.0	.0
16	.0	10.6	21.1	31.7	21.1	26.4
32	20.8	41.6	27.7	31.2	27.7	29.7
48	46.6	31.0	31.0	27.9	31.0	29.1
64	41.3	33.0	30.0	33.0	30.0	30.6

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	21.1	31.7	21.1	52.8
32	20.8	41.6	41.6	41.6	27.7	34.7
48	46.6	31.0	37.2	34.9	33.9	35.8
64	82.6	33.0	36.7	35.4	36.7	35.9

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.4	.0	.0	.0
16	.0	.0	21.1	15.8	42.2	26.4
32	.0	41.6	27.7	31.2	33.3	34.7
48	23.3	46.6	31.0	31.0	33.9	31.0
64	27.5	33.0	33.0	33.0	31.5	31.8

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	1.0
16	.0	.0	21.1	.0	21.1	26.4
32	20.8	20.8	27.7	31.2	27.7	34.7
48	23.3	31.0	37.2	34.9	31.0	33.3
64	27.5	33.0	30.0	31.0	31.5	30.6

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	5.3	.0	.0	.0	42.2	52.8
32	20.8	41.6	27.7	62.4	41.6	34.7
48	46.6	46.6	37.2	46.6	41.4	38.8
64	41.3	33.0	36.7	45.0	38.9	39.3

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.8	.0
16	.0	.0	21.1	31.7	21.1	52.8
32	20.8	41.6	83.2	31.2	33.3	41.6
48	46.6	46.6	31.0	34.9	53.2	38.8
64	41.3	33.0	36.7	35.4	41.3	39.3

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	5.3	.0	.0	.0	42.2	.0
32	20.8	41.6	41.6	62.4	55.5	41.6
48	46.6	93.1	62.1	46.6	46.6	46.6
64	82.6	55.0	47.2	55.0	55.0	51.6

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	5.3	.0	21.1	.0	42.2	52.8
32	20.8	41.6	27.7	41.6	33.3	41.6
48	46.6	31.0	46.6	34.9	37.2	35.8
64	41.3	41.3	47.2	41.3	38.9	43.5

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	21.1	.0	42.2	52.8
32	20.8	41.6	41.6	41.6	41.6	41.6
48	46.6	31.0	46.6	34.9	41.4	38.8
64	41.3	41.3	36.7	45.0	44.0	41.3

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	8.0	10.7	12.0	10.7	11.1
16	16.2	32.2	28.5	30.4	29.3	29.7
32	.0	42.9	39.5	33.9	35.4	35.2
48	24.2	38.6	33.5	33.9	33.8	33.4
64	32.3	36.8	34.2	36.1	36.6	38.1

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	2.0	.0	10.7	10.3	9.9	9.5
16	.0	32.2	28.5	30.4	27.7	28.6
32	32.3	32.2	34.2	31.2	33.6	31.4
48	48.5	32.2	35.0	33.3	35.4	35.6
64	32.3	42.9	39.5	37.2	39.1	39.8

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	8.0	16.0	8.0	9.9	10.0
16	16.2	32.2	32.1	36.1	29.3	29.7
32	32.3	32.2	34.2	35.0	33.6	33.0
48	48.5	32.2	36.7	36.1	35.0	34.1
64	32.3	36.8	42.8	37.2	36.6	35.6

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	8.0	10.7	12.0	10.7	10.5
16	16.2	32.2	36.7	27.5	28.5	28.6
32	.0	42.9	32.1	33.9	32.5	34.1
48	48.5	32.2	35.0	33.9	33.1	34.6
64	64.6	36.8	38.0	37.2	36.3	37.5

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	16.0	10.3	9.9	9.5
16	.0	21.4	32.1	28.8	28.5	30.2
32	32.3	32.2	34.2	35.0	34.8	38.1
48	48.5	48.2	45.3	42.2	41.6	38.7
64	32.3	36.8	39.5	39.1	38.7	38.6

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	8.0	32.1	24.0	32.0	33.4
16	.0	64.3	51.3	52.5	54.0	45.8
32	32.3	64.3	46.7	52.5	51.3	50.8
48	.0	64.3	51.3	52.5	52.1	54.0
64	32.3	51.5	57.0	53.7	55.4	54.3

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	32.1	36.1	32.0	25.0
16	16.2	64.3	36.7	44.4	42.7	41.1
32	32.3	42.9	42.8	50.2	44.6	46.4
48	48.5	48.2	48.1	48.1	48.8	48.0
64	64.6	51.5	51.3	50.2	49.4	48.5

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	32.1	24.0	25.6	25.0
16	16.2	64.3	42.8	41.2	39.4	39.1
32	32.3	42.9	42.8	46.2	44.6	44.5
48	48.5	48.2	45.3	48.1	48.1	47.6
64	64.6	42.9	46.7	47.1	48.8	47.5

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	24.0	32.0	33.4
16	.0	64.3	51.3	48.1	44.6	48.5
32	32.3	42.9	51.3	48.1	51.3	50.1
48	48.5	48.2	59.2	49.5	49.6	53.4
64	32.3	51.5	48.9	52.5	50.0	51.7

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	32.1	36.1	32.0	28.6
16	16.2	64.3	51.3	38.5	39.4	38.1
32	.0	42.9	42.8	46.2	46.6	42.1
48	48.5	48.2	48.1	48.1	48.8	48.5
64	64.6	51.5	48.9	50.2	49.4	50.4

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	8.0	10.7	10.3	9.9	9.1
16	8.1	32.2	32.1	32.1	31.1	28.1
32	.0	64.3	51.3	35.0	35.4	35.2
48	48.5	38.6	36.7	39.3	35.8	35.1
64	64.6	42.9	36.7	36.6	37.6	38.1

*** Speed of ZTRSM in megaflops ***
with LDA = 513

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.4	.0	.0	.0
16	.0	10.6	21.1	15.8	14.1	26.4
32	20.8	20.8	27.7	31.2	23.8	29.7
48	46.6	23.3	31.0	31.0	33.9	31.0
64	27.5	33.0	36.7	31.0	33.0	33.0

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.8	1.0
16	.0	10.6	21.1	15.8	21.1	17.6
32	10.4	20.8	27.7	25.0	20.8	26.0
48	46.6	23.3	26.6	25.4	28.7	27.4
64	20.6	27.5	30.0	29.1	31.5	28.5

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	10.6	21.1	15.8	21.1	26.4
32	20.8	20.8	27.7	17.8	27.7	26.0
48	46.6	31.0	23.3	25.4	28.7	27.4
64	27.5	27.5	36.7	24.8	28.7	27.5

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.2	.0	.0	.8	.0
16	5.3	.0	21.1	31.7	21.1	26.4
32	.0	20.8	20.8	25.0	23.8	26.0
48	23.3	23.3	31.0	23.3	28.7	29.1
64	41.3	33.0	27.5	29.1	33.0	35.9

M \ N	50	100	200	300	400	500
2	.0	.0	32.1	24.0	25.6	25.0
16	.0	64.3	42.8	44.4	41.0	41.1
32	.0	42.9	39.5	48.1	46.6	47.1
48	.0	48.2	51.3	49.5	49.6	48.5
64	64.6	51.5	48.9	50.2	50.6	48.5

*** Speed of ZTRSM in megaflops ***
with LDA = 513

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	31.7	21.1	26.4
32	20.8	41.6	27.7	41.6	33.3	34.7
48	46.6	46.6	46.6	34.9	37.2	42.3
64	41.3	41.3	41.3	41.3	38.9	43.5

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.6	.0	.0
16	.0	10.6	.0	31.7	42.2	52.8
32	20.8	20.8	27.7	41.6	33.3	34.7
48	46.6	46.6	37.2	34.9	33.9	33.3
64	41.3	41.3	41.3	38.1	38.9	43.5

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.8	1.0
16	.0	.0	21.1	15.8	42.2	26.4
32	20.8	41.6	27.7	31.2	33.3	34.7
48	46.6	23.3	46.6	34.9	37.2	35.8
64	41.3	41.3	36.7	41.3	34.8	37.5

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	31.7	42.2	26.4
32	20.8	41.6	41.6	31.2	33.3	34.7
48	46.6	31.0	37.2	39.9	41.4	35.8
64	41.3	41.3	41.3	35.4	44.0	41.3

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.6	.0	.5
16	.0	10.6	21.1	15.8	21.1	17.6
32	20.8	41.6	41.6	25.0	23.8	23.1
48	23.3	23.3	26.6	25.4	26.6	25.9
64	27.5	27.5	30.0	29.1	28.7	28.5

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.6	.0	.0
16	5.3	.0	21.1	15.8	14.1	13.2
32	20.8	20.8	27.7	25.0	23.8	23.1
48	23.3	18.6	23.3	27.9	26.6	23.3
64	27.5	27.5	33.0	26.1	27.5	25.8

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	10.7	9.0	9.9	11.1
16	16.2	21.4	32.1	32.1	29.3	30.2
32	32.3	42.9	34.2	35.0	34.2	35.2
48	48.5	38.6	38.5	37.6	36.6	37.5
64	64.6	36.8	39.5	40.5	38.7	38.1

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	10.7	10.3	10.7	10.5
16	8.1	32.2	28.5	28.8	30.2	30.2
32	32.3	42.9	36.7	36.1	37.3	36.0
48	24.2	48.2	38.5	38.5	39.9	39.7
64	64.6	42.9	42.8	40.5	38.3	36.4

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	8.0	10.7	9.0	9.9	10.5
16	.0	32.2	32.1	32.1	27.7	29.1
32	32.3	32.2	36.7	33.9	34.2	34.4
48	48.5	38.6	35.0	35.3	37.5	35.9
64	32.3	32.2	36.7	36.6	39.1	37.0

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	10.6	.0	31.7	42.2	26.4
32	20.8	41.6	41.6	41.6	41.6	29.7
48	46.6	46.6	37.2	31.0	33.9	46.6
64	27.5	33.0	47.2	38.1	41.3	39.3

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	.0	.0	.0	.0
16	.0	.0	21.1	15.8	21.1	26.4
32	20.8	20.8	41.6	41.6	27.7	34.7
48	46.6	46.6	31.0	34.9	33.9	33.3
64	41.3	41.3	36.7	41.3	34.8	39.3

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	.0	.0	32.1	72.1	32.0	33.4
16	.0	64.3	36.7	48.1	44.6	48.5
32	32.3	42.9	57.0	54.9	50.0	52.5
48	48.5	64.3	51.3	54.1	54.0	54.0
64	64.6	64.3	57.0	57.7	55.4	55.2

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	.0	32.1	36.1	42.7	25.0
16	.0	32.2	42.8	48.1	41.0	42.1
32	32.3	42.9	42.8	50.2	46.6	46.4
48	24.2	48.2	48.1	52.5	48.1	49.0
64	64.6	64.3	54.0	54.9	51.9	48.9

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	16.0	24.0	25.6	33.4
16	16.2	64.3	51.3	44.4	41.0	40.0
32	.0	64.3	46.7	46.2	47.7	47.1
48	48.5	48.2	51.3	49.5	49.6	49.5
64	64.6	64.3	48.9	49.1	48.8	49.7

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	50	100	200	300	400	500
2	2.0	.0	16.0	10.3	10.7	11.1
16	16.2	32.2	32.1	28.8	30.2	29.1
32	32.3	42.9	30.2	32.1	32.5	32.0
48	24.2	38.6	33.5	35.3	36.6	35.3
64	64.6	42.9	39.5	38.5	37.6	37.7

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	.0	8.0	10.7	10.3	9.9	9.5
16	.0	21.4	28.5	27.5	28.5	28.1
32	32.3	32.2	34.2	33.0	33.6	33.4
48	24.2	38.6	36.7	34.6	34.6	35.6
64	32.3	36.8	38.0	35.0	36.0	35.2

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	8.0	10.7	7.2	9.9	9.1
16	16.2	32.2	32.1	30.4	28.5	29.1
32	32.3	32.2	39.5	33.0	33.1	32.7
48	24.2	32.2	36.7	35.3	35.4	34.1
64	32.3	42.9	34.2	36.6	37.3	37.9

End of tests
Total time used = 2328.92 seconds

M \ N	50	100	200	300	400	500
2	.0	.0	32.1	36.1	32.0	40.0
16	16.2	64.3	51.3	44.4	42.7	47.1
32	32.3	42.9	42.8	50.2	50.0	51.7
48	48.5	48.2	51.3	57.7	50.4	51.1
64	64.6	51.5	57.0	53.7	54.0	55.7

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	50	100	200	300	400	500
2	2.0	.0	32.1	36.1	32.0	33.4
16	16.2	64.3	42.8	44.4	41.0	41.1
32	32.3	42.9	46.7	48.1	48.8	47.1
48	48.5	48.2	45.3	50.9	49.6	48.0
64	64.6	51.5	51.3	50.2	50.6	50.8

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	50	100	200	300	400	500
2	.0	.0	32.1	36.1	32.0	28.6
16	16.2	64.3	42.8	52.5	46.6	39.1
32	.0	42.9	51.3	48.1	48.8	47.1
48	48.5	64.3	51.3	49.5	51.3	49.5
64	32.3	51.5	46.7	49.1	48.8	52.5

End of tests
Total time used = 826.80 seconds

LAPACK VERSION 1.1, released March 31, 1993

BLAS timing, COMPLEX*16 data, N small

M:	50	100	200	300	400	500
N:	2	16	32	48	64	
K:	50	100	200	300	400	500
INCX:	1					
LDA:	513					

The minimum time a subroutine will be timed = .000 seconds

>>>>> Timing data <<<<<

*** Speed of ZGEMM in megaflops ***
with LDA = 513

ZGEMM with TRANSA = 'N', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	32.0	32.0	32.0
100	.0	32.0	32.0	38.4	32.0
200	16.0	32.0	42.7	34.9	46.5
300	24.0	38.4	42.7	41.1	40.4
400	32.0	36.6	39.4	48.0	42.7
500	40.0	45.7	37.6	41.7	41.3

LAPACK VERSION 2.0, released September 30, 1994

BLAS timing, COMPLEX*16 data, N small

M:	50	100	200	300	400	500
N:	2	16	32	48	64	
K:	50	100	200	300	400	500
INCX:	1					
LDA:	513					

The minimum time a subroutine will be timed = .000 seconds

>>>>> Timing data <<<<<

*** Speed of ZGEMM in megaflops ***
with LDA = 513

ZGEMM with TRANSA = 'N', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	32.0	48.0	64.0
100	8.0	64.0	64.0	64.0	51.2
200	.0	42.7	64.0	64.0	56.9
300	.0	64.0	54.9	52.4	59.1
400	.0	64.0	56.9	51.2	51.2
500	.0	45.7	49.2	60.0	64.0

K = 100

M \ N	2	16	32	48	64
50	.0	21.3	32.0	48.0	28.4
100	.0	32.0	42.7	48.0	39.4
200	32.0	42.7	46.5	38.4	41.0
300	24.0	34.9	38.4	39.7	45.2
400	32.0	42.7	33.0	41.5	40.2
500	80.0	40.0	37.6	40.9	41.3

K = 200

M \ N	2	16	32	48	64
50	16.0	42.7	36.6	32.0	39.4
100	32.0	28.4	42.7	38.4	37.9
200	64.0	39.4	36.6	40.4	37.9
300	32.0	38.4	40.4	37.8	39.4
400	42.7	39.4	39.4	38.4	36.6
500	53.3	41.3	39.4	41.3	40.6

K = 300

M \ N	2	16	32	48	64
50	.0	38.4	38.4	41.1	36.6
100	.0	42.7	42.7	44.3	42.7
200	48.0	42.7	48.0	44.3	39.9
300	48.0	38.4	41.1	38.0	40.1
400	48.0	43.9	37.5	39.7	37.2
500	40.0	36.2	40.0	37.4	40.9

K = 400

M \ N	2	16	32	48	.64
50	32.0	36.6	39.4	36.6	35.3
100	32.0	39.4	37.9	39.4	41.8
200	42.7	41.0	40.2	40.4	39.8
300	38.4	38.4	41.5	43.1	39.9
400	36.6	39.4	40.6	41.0	39.0
500	35.6	39.4	39.1	40.4	40.8

K = 500

M \ N	2	16	32	48	64
50	20.0	40.0	37.6	38.4	34.6
100	80.0	42.7	38.8	40.0	37.1

K = 100

M \ N	2	16	32	48	64
50	.0	64.0	64.0	64.0	64.0
100	.0	64.0	51.2	48.0	56.9
200	32.0	85.3	51.2	64.0	68.3
300	.0	64.0	69.8	60.6	54.9
400	64.0	64.0	60.2	54.9	62.1
500	80.0	58.2	58.2	58.2	54.5

K = 200

M \ N	2	16	32	48	64
50	.0	42.7	51.2	54.9	56.9
100	.0	85.3	56.9	51.2	60.2
200	64.0	64.0	56.9	61.4	64.0
300	48.0	59.1	61.4	57.6	55.9
400	128.0	64.0	56.9	58.0	58.1
500	53.3	64.0	55.7	60.0	60.2

K = 300

M \ N	2	16	32	48	64
50	.0	64.0	54.9	57.6	48.0
100	48.0	64.0	48.0	57.6	59.1
200	96.0	54.9	56.9	52.4	53.9
300	72.0	54.9	60.6	55.7	56.9
400	96.0	59.1	56.9	56.2	54.9
500	48.0	54.9	57.3	56.5	58.2

K = 400

M \ N	2	16	32	48	64
50	.0	51.2	46.5	48.0	56.9
100	32.0	56.9	56.9	56.9	60.2
200	64.0	53.9	56.9	54.9	56.1
300	64.0	54.9	58.0	55.5	55.9
400	51.2	56.9	55.4	55.9	53.2
500	53.3	55.7	57.5	58.6	57.2

K = 500

M \ N	2	16	32	48	64
50	40.0	64.0	58.2	56.5	55.7
100	80.0	53.3	51.2	58.2	52.2

200	32.0	38.8	39.4	37.3	39.7
300	40.0	40.9	36.9	38.7	41.3
400	53.3	42.0	39.4	41.1	39.4
500	40.0	41.6	40.8	38.4	39.9

ZGEMM with TRANSA = 'N', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	32.0	32.0	21.3
100	.0	64.0	42.7	38.4	42.7
200	16.0	42.7	36.6	42.7	39.4
300	.0	48.0	38.4	41.1	36.6
400	32.0	36.6	56.9	42.7	35.3
500	40.0	45.7	37.6	41.7	40.0

K = 100

M \ N	2	16	32	48	64
50	.0	64.0	42.7	38.4	32.0
100	.0	21.3	42.7	38.4	36.6
200	32.0	42.7	34.1	33.4	37.9
300	24.0	48.0	36.6	48.0	34.9
400	32.0	39.4	36.6	36.6	41.0
500	80.0	40.0	41.3	40.0	40.0

K = 200

M \ N	2	16	32	48	64
50	.0	32.0	32.0	38.4	34.1
100	32.0	42.7	39.4	36.6	37.9
200	32.0	42.7	39.4	40.4	42.7
300	48.0	40.4	37.5	38.4	39.9
400	64.0	39.4	40.2	39.9	40.6
500	53.3	40.0	43.4	42.7	40.6

K = 300

M \ N	2	16	32	48	64
50	12.0	38.4	34.9	33.9	32.0
100	48.0	32.0	32.0	39.7	39.4
200	48.0	40.4	37.5	41.1	39.9
300	36.0	41.1	37.8	38.0	39.7
400	27.4	37.5	37.0	39.7	40.7
500	48.0	40.9	40.0	40.6	40.9

200	53.3	55.7	54.5	56.5	58.2
300	48.0	56.5	54.9	60.0	56.1
400	53.3	64.0	61.7	57.7	57.5
500	66.7	57.1	56.1	59.3	59.3

ZGEMM with TRANSA = 'N', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	64.0	32.0	64.0
100	.0	32.0	42.7	48.0	64.0
200	.0	42.7	51.2	64.0	51.2
300	24.0	48.0	48.0	57.6	54.9
400	32.0	51.2	56.9	54.9	60.2
500	.0	53.3	64.0	60.0	61.0

K = 100

M \ N	2	16	32	48	64
50	.0	64.0	64.0	48.0	64.0
100	.0	32.0	51.2	54.9	51.2
200	32.0	64.0	46.5	59.1	51.2
300	48.0	64.0	59.1	57.6	59.1
400	64.0	56.9	56.9	54.9	53.9
500	80.0	58.2	58.2	58.2	56.9

K = 200

M \ N	2	16	32	48	64
50	.0	42.7	64.0	48.0	51.2
100	32.0	51.2	56.9	54.9	56.9
200	64.0	51.2	53.9	59.1	56.9
300	48.0	59.1	53.0	52.4	56.9
400	64.0	56.9	55.4	54.9	57.7
500	53.3	58.2	59.5	57.3	56.9

K = 300

M \ N	2	16	32	48	64
50	.0	64.0	42.7	52.4	48.0
100	48.0	48.0	59.1	50.1	53.0
200	96.0	51.2	59.1	53.6	52.1
300	48.0	54.9	57.6	59.6	59.8
400	64.0	54.9	54.9	53.0	56.9
500	80.0	58.2	57.3	57.6	59.1

K = 400

M \ N	2	16	32	48	64
50	32.0	32.0	34.1	33.4	36.6
100	32.0	42.7	35.3	34.9	37.2
200	42.7	37.9	39.4	39.4	39.4
300	38.4	40.4	42.1	39.1	40.2
400	42.7	38.6	39.8	39.4	40.2
500	35.6	40.6	40.3	38.8	40.0

K = 500

M \ N	2	16	32	48	64
50	20.0	32.0	35.6	33.1	34.6
100	40.0	37.6	36.6	34.3	37.6
200	40.0	38.8	38.2	34.3	38.5
300	34.3	39.2	39.2	38.1	40.4
400	40.0	38.8	42.0	41.5	40.5
500	44.4	39.5	35.8	40.9	39.9

ZGEMM with TRANSA = 'N', TRANSB = 'C'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	32.0	32.0	32.0
100	.0	64.0	42.7	38.4	32.0
200	.0	32.0	36.6	42.7	34.1
300	24.0	38.4	38.4	36.0	34.9
400	32.0	36.6	46.5	36.6	41.0
500	20.0	40.0	35.6	43.6	38.8

K = 100

M \ N	2	16	32	48	64
50	8.0	21.3	42.7	38.4	32.0
100	16.0	32.0	42.7	34.9	36.6
200	32.0	42.7	42.7	38.4	41.0
300	48.0	42.7	38.4	36.0	37.5
400	16.0	39.4	42.7	34.9	35.3
500	26.7	35.6	35.6	35.6	33.2

K = 200

M \ N	2	16	32	48	64
50	.0	42.7	28.4	32.0	34.1
100	32.0	36.6	36.6	36.6	36.6

K = 400

M \ N	2	16	32	48	64
50	32.0	42.7	51.2	48.0	48.8
100	32.0	46.5	51.2	54.9	55.4
200	42.7	60.2	56.9	55.9	55.4
300	64.0	59.1	53.9	56.9	59.7
400	51.2	56.9	56.9	59.1	57.3
500	64.0	59.5	56.9	57.7	57.2

K = 500

M \ N	2	16	32	48	64
50	40.0	64.0	45.7	48.0	42.7
100	80.0	49.2	53.3	51.9	52.2
200	53.3	53.3	56.9	61.0	54.5
300	60.0	58.2	58.2	58.2	57.3
400	53.3	58.2	58.9	55.7	54.8
500	50.0	60.4	59.3	58.9	58.4

ZGEMM with TRANSA = 'N', TRANSB = 'C'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	64.0	48.0	64.0
100	.0	64.0	64.0	96.0	51.2
200	.0	64.0	51.2	54.9	56.9
300	24.0	48.0	54.9	57.6	64.0
400	.0	64.0	56.9	59.1	60.2
500	.0	64.0	53.3	56.5	61.0

K = 100

M \ N	2	16	32	48	64
50	.0	64.0	64.0	48.0	42.7
100	.0	42.7	51.2	54.9	51.2
200	32.0	64.0	64.0	64.0	60.2
300	48.0	54.9	59.1	54.9	56.9
400	64.0	64.0	53.9	59.1	58.5
500	40.0	58.2	53.3	56.5	58.2

K = 200

M \ N	2	16	32	48	64
50	.0	64.0	51.2	42.7	51.2
100	.0	51.2	56.9	64.0	53.9

200	32.0	36.6	41.0	37.5	40.2
300	32.0	36.6	40.4	39.1	40.4
400	32.0	39.4	41.8	41.0	39.8
500	40.0	37.6	40.0	38.0	37.4

K = 300

M \ N	2	16	32	48	64
50	.0	32.0	32.0	28.8	30.7
100	48.0	48.0	34.9	34.9	39.4
200	96.0	42.7	40.4	37.8	37.9
300	48.0	38.4	41.1	38.0	40.1
400	48.0	40.4	41.0	40.4	41.0
500	48.0	41.7	42.2	45.4	42.0

K = 400

M \ N	2	16	32	48	64
50	32.0	32.0	34.1	32.0	32.0
100	64.0	42.7	39.4	38.4	35.9
200	32.0	42.7	37.9	42.1	39.0
300	38.4	38.4	37.9	37.8	39.9
400	51.2	36.6	40.6	39.9	39.6
500	45.7	41.3	40.6	39.8	39.5

K = 500

M \ N	2	16	32	48	64
50	40.0	35.6	32.0	35.6	36.6
100	40.0	33.7	36.6	37.6	38.2
200	40.0	36.6	40.0	39.6	38.8
300	40.0	39.2	39.6	39.5	40.2
400	40.0	40.6	41.3	41.7	41.0
500	44.4	39.0	39.3	40.2	41.4

ZGEMM with TRANSA = 'T', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	32.0	32.0	32.0
100	.0	32.0	42.7	27.4	28.4
200	16.0	32.0	32.0	32.0	34.1
300	24.0	32.0	32.0	33.9	32.0
400	32.0	32.0	30.1	33.4	34.1
500	40.0	29.1	32.0	32.0	33.7

200	64.0	56.9	53.9	54.9	56.9
300	48.0	59.1	56.9	59.1	58.0
400	64.0	53.9	58.5	59.1	60.2
500	53.3	58.2	55.7	58.2	59.5

K = 300

M \ N	2	16	32	48	64
50	24.0	48.0	54.9	48.0	51.2
100	.0	54.9	54.9	50.1	46.5
200	48.0	59.1	56.9	57.6	56.9
300	144.0	57.6	56.2	54.9	58.3
400	48.0	61.4	59.1	56.9	58.0
500	48.0	60.0	58.2	57.0	58.2

K = 400

M \ N	2	16	32	48	64
50	32.0	64.0	51.2	48.0	46.5
100	64.0	51.2	56.9	51.2	55.4
200	64.0	56.9	56.9	58.0	56.9
300	64.0	56.9	58.0	54.2	57.4
400	42.7	58.5	58.5	56.4	59.4
500	80.0	61.0	56.9	60.5	58.5

K = 500

M \ N	2	16	32	48	64
50	.0	53.3	49.2	48.0	47.4
100	80.0	53.3	53.3	56.5	52.2
200	40.0	55.7	56.9	56.5	55.7
300	60.0	58.2	56.5	58.2	54.5
400	53.3	58.2	58.2	56.9	59.5
500	57.1\	59.3	57.1	57.1	57.7

ZGEMM with TRANSA = 'T', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	32.0	96.0	42.7
100	8.0	64.0	42.7	38.4	42.7
200	.0	42.7	42.7	48.0	46.5
300	.0	48.0	48.0	48.0	40.4
400	32.0	51.2	42.7	45.2	44.5
500	20.0	45.7	45.7	43.6	40.0

K = 100

M \ N	2	16	32	48	64
50	.0	64.0	42.7	32.0	42.7
100	.0	32.0	42.7	34.9	30.1
200	32.0	36.6	32.0	30.7	35.3
300	24.0	29.5	30.7	31.1	32.7
400	32.0	30.1	29.3	29.5	31.0
500	26.7	32.0	31.2	33.7	35.1

K = 200

M \ N	2	16	32	48	64
50	.0	32.0	36.6	34.9	28.4
100	16.0	42.7	36.6	34.9	34.1
200	32.0	39.4	37.9	39.4	41.0
300	24.0	42.7	41.5	36.0	35.7
400	42.7	35.3	35.3	36.1	33.6
500	26.7	34.6	37.1	36.6	36.1

K = 300

M \ N	2	16	32	48	64
50	24.0	38.4	34.9	30.3	34.9
100	48.0	48.0	38.4	38.4	36.6
200	48.0	34.9	34.1	34.4	33.0
300	36.0	34.9	32.0	33.6	36.0
400	32.0	37.5	36.6	38.1	34.7
500	40.0	32.5	32.5	36.5	35.7

K = 400

M \ N	2	16	32	48	64
50	32.0	36.6	36.6	33.4	36.6
100	32.0	34.1	34.1	35.7	34.1
200	42.7	35.3	34.7	34.1	36.6
300	38.4	37.5	38.4	34.9	34.9
400	32.0	35.3	35.6	33.6	35.3
500	35.6	36.1	33.9	34.6	35.2

K = 500

M \ N	2	16	32	48	64
50	40.0	35.6	37.6	38.4	40.0
100	80.0	35.6	34.6	36.9	35.1
200	40.0	35.6	32.8	35.9	34.1
300	40.0	37.6	35.6	33.9	35.6

K = 100

M \ N	2	16	32	48	64
50	.0	32.0	42.7	64.0	51.2
100	.0	42.7	42.7	48.0	46.5
200	32.0	42.7	42.7	45.2	51.2
300	24.0	48.0	45.2	46.1	42.7
400	32.0	39.4	44.5	45.2	42.7
500	40.0	42.7	44.1	45.7	43.4

K = 200

M \ N	2	16	32	48	64
50	.0	42.7	42.7	42.7	42.7
100	.0	51.2	42.7	48.0	46.5
200	64.0	51.2	46.5	45.2	44.5
300	32.0	45.2	49.5	44.3	44.5
400	42.7	44.5	44.5	47.3	44.5
500	53.3	42.7	43.4	44.1	44.5

K = 300

M \ N	2	16	32	48	64
50	24.0	38.4	54.9	44.3	48.0
100	48.0	48.0	45.2	42.7	48.0
200	48.0	45.2	46.5	45.2	45.2
300	48.0	46.1	42.7	36.4	43.9
400	48.0	45.2	43.3	43.1	44.8
500	60.0	45.7	44.7	44.0	45.2

K = 400

M \ N	2	16	32	48	64
50	32.0	42.7	42.7	45.2	42.7
100	32.0	51.2	42.7	42.7	46.5
200	42.7	46.5	44.5	45.2	45.0
300	48.0	46.5	45.2	44.3	43.9
400	36.6	43.6	45.0	42.1	44.5
500	45.7	42.7	44.9	45.4	45.5

K = 500

M \ N	2	16	32	48	64
50	40.0	45.7	49.2	45.7	44.1
100	40.0	40.0	42.7	42.7	43.4
200	53.3	45.7	45.7	42.7	43.8
300	34.3	48.0	45.2	43.3	45.2

400	35.6	34.1	35.1	35.4	33.4
500	36.4	35.6	35.8	35.3	35.6

ZGEMM with TRANSA = 'T', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	16.0	12.8	13.7	14.2
100	.0	12.8	14.2	13.7	14.2
200	16.0	12.8	14.2	14.2	16.0
300	8.0	13.7	14.8	14.8	15.7
400	10.7	14.2	15.5	15.1	15.1
500	13.3	14.5	14.5	14.5	15.8

K = 100

M \ N	2	16	32	48	64
50	8.0	8.0	7.5	7.4	7.5
100	8.0	6.4	7.1	7.7	7.6
200	6.4	7.8	7.3	7.4	8.4
300	6.9	8.0	7.6	7.7	8.0
400	7.1	7.3	7.4	7.4	7.4
500	7.3	7.8	7.5	7.5	8.1

K = 200

M \ N	2	16	32	48	64
50	8.0	9.1	8.8	8.0	7.5
100	8.0	9.1	8.5	7.9	8.2
200	9.1	8.1	8.1	8.7	8.8
300	9.6	8.2	8.9	8.3	7.8
400	8.5	8.8	9.0	8.1	8.0
500	8.9	8.6	8.5	8.1	8.1

K = 300

M \ N	2	16	32	48	64
50	8.0	7.7	8.3	7.8	7.6
100	6.9	7.0	7.7	7.5	7.6
200	6.9	7.3	7.5	7.5	7.6
300	7.2	7.9	7.9	7.8	7.7
400	7.7	7.3	7.7	7.8	7.7
500	7.5	8.0	7.7	7.5	7.7

K = 400

400	45.7	45.7	44.5	43.9	44.9
500	44.4	43.8	45.1	45.1	44.6

ZGEMM with TRANSA = 'T', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	64.0	48.0	42.7
100	.0	64.0	42.7	48.0	42.7
200	.0	42.7	42.7	42.7	51.2
300	.0	48.0	42.7	44.3	36.6
400	16.0	36.6	46.5	45.2	39.4
500	40.0	45.7	40.0	43.6	42.7

K = 100

M \ N	2	16	32	48	64
50	.0	32.0	64.0	38.4	42.7
100	.0	42.7	42.7	38.4	46.5
200	.0	51.2	46.5	42.7	46.5
300	48.0	38.4	45.2	42.7	42.7
400	64.0	42.7	41.0	45.2	42.7
500	40.0	42.7	42.7	45.7	44.9

K = 200

M \ N	2	16	32	48	64
50	.0	64.0	51.2	48.0	46.5
100	32.0	42.7	39.4	36.6	42.7
200	32.0	51.2	44.5	43.9	42.7
300	48.0	45.2	42.7	44.3	43.9
400	32.0	39.4	39.4	43.9	45.0
500	53.3	42.7	42.7	43.1	42.3

K = 300

M \ N	2	16	32	48	64
50	.0	38.4	38.4	48.0	45.2
100	48.0	42.7	42.7	44.3	39.4
200	48.0	34.9	39.4	40.4	44.5
300	48.0	39.7	43.5	44.3	42.3
400	38.4	43.9	46.5	40.8	43.6
500	40.0	38.4	43.1	43.3	43.6

K = 400

M \ N	2	16	32	48	64
50	6.4	7.5	7.5	7.5	7.3
100	7.1	7.4	7.7	7.6	7.7
200	8.0	7.5	7.6	7.5	7.6
300	7.7	7.5	7.5	7.4	7.7
400	7.3	7.5	7.6	7.5	7.5
500	7.4	7.4	7.1	7.6	7.5

K = 500

M \ N	2	16	32	48	64
50	8.0	7.6	7.6	7.6	7.4
100	7.3	7.4	7.4	7.4	7.4
200	7.6	7.4	7.5	7.4	7.5
300	7.5	7.6	7.6	7.3	7.5
400	7.6	7.5	7.5	7.3	7.2
500	8.2	7.2	7.7	7.6	7.5

ZGEMM with TRANSA = 'T', TRANSB = 'C'

K = 50

M \ N	2	16	32	48	64
50	4.0	10.7	12.8	13.7	14.2
100	8.0	12.8	16.0	16.0	15.1
200	16.0	12.8	16.0	14.2	15.1
300	12.0	16.0	14.8	15.2	15.4
400	16.0	14.2	14.6	16.0	15.3
500	20.0	16.8	15.2	15.2	15.6

K = 100

M \ N	2	16	32	48	64
50	8.0	7.1	9.1	8.0	8.5
100	16.0	7.1	7.5	8.2	8.7
200	8.0	8.5	8.3	8.3	8.1
300	6.9	7.5	7.5	7.6	7.9
400	8.0	8.1	7.6	7.6	7.9
500	8.9	7.6	7.6	7.8	7.9

K = 200

M \ N	2	16	32	48	64
50	8.0	8.5	8.0	8.2	7.9
100	10.7	8.8	8.3	7.9	7.9
200	8.0	8.8	8.3	8.1	7.9
300	9.6	8.6	8.3	7.9	7.9

M \ N	2	16	32	48	64
50	32.0	51.2	39.4	42.7	39.4
100	64.0	42.7	42.7	40.4	40.2
200	42.7	28.4	45.5	42.7	42.2
300	38.4	42.7	42.1	43.9	41.5
400	42.7	41.8	42.2	41.5	40.6
500	53.3	43.4	40.3	42.9	41.3

K = 500

M \ N	2	16	32	48	64
50	40.0	40.0	42.7	40.0	41.3
100	26.7	42.7	40.0	39.2	40.0
200	40.0	44.1	43.4	42.2	41.0
300	40.0	40.9	39.6	40.0	40.0
400	35.6	39.4	39.4	39.0	39.4
500	33.3	40.0	38.6	38.6	38.8

ZGEMM with TRANSA = 'T', TRANSB = 'C'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	64.0	32.0	64.0
100	.0	64.0	42.7	48.0	36.6
200	16.0	42.7	42.7	38.4	51.2
300	24.0	38.4	34.9	48.0	45.2
400	32.0	51.2	42.7	40.4	42.7
500	40.0	40.0	45.7	36.9	38.8

K = 100

M \ N	2	16	32	48	64
50	.0	32.0	32.0	38.4	36.6
100	.0	42.7	51.2	54.9	39.4
200	32.0	42.7	36.6	42.7	41.0
300	48.0	42.7	40.4	44.3	41.5
400	64.0	42.7	44.5	43.9	42.7
500	26.7	45.7	44.1	41.7	40.6

K = 200

M \ N	2	16	32	48	64
50	16.0	64.0	51.2	34.9	42.7
100	32.0	42.7	42.7	45.2	44.5
200	64.0	42.7	41.0	42.7	43.6
300	48.0	45.2	42.7	41.9	43.3

400	8.0	8.7	8.4	8.0	7.6
500	8.9	8.4	7.9	8.0	7.8

K = 300

M \ N	2	16	32	48	64
50	8.0	7.1	7.7	7.4	8.0
100	8.0	7.5	7.8	7.5	7.5
200	7.4	7.8	7.6	7.4	7.5
300	7.2	7.5	7.4	7.4	7.5
400	7.7	7.5	7.5	7.4	7.5
500	6.9	7.3	7.5	7.6	7.3

K = 400

M \ N	2	16	32	48	64
50	8.0	7.3	7.3	7.3	7.3
100	6.4	7.8	7.4	7.6	7.5
200	8.0	7.5	7.2	6.9	7.5
300	8.3	8.0	7.6	7.4	7.6
400	7.8	7.1	7.3	7.4	7.7
500	7.3	7.7	7.4	7.4	7.5

K = 500

M \ N	2	16	32	48	64
50	8.0	7.6	7.7	7.3	7.0
100	7.3	7.8	7.4	7.4	7.4
200	7.6	7.0	7.2	7.2	7.4
300	6.9	7.0	7.7	7.4	7.3
400	7.4	7.4	7.4	7.3	7.0
500	7.4	7.6	7.7	7.9	7.5

ZGEMM with TRANSA = 'C', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	32.0	32.0	32.0
100	8.0	32.0	32.0	38.4	64.0
200	16.0	25.6	36.6	29.5	30.1
300	24.0	32.0	29.5	32.0	33.4
400	32.0	32.0	30.1	33.4	33.0
500	40.0	29.1	32.0	31.0	31.2

K = 100

400	32.0	41.0	43.6	42.1	41.8
500	53.3	44.1	42.0	44.1	41.3

K = 300

M \ N	2	16	32	48	64
50	.0	48.0	38.4	48.0	45.2
100	48.0	42.7	45.2	46.1	42.7
200	48.0	45.2	42.7	44.3	43.9
300	72.0	39.7	43.5	42.7	41.9
400	48.0	41.5	42.7	41.5	41.5
500	40.0	41.7	44.1	44.0	41.3

K = 400

M \ N	2	16	32	48	64
50	32.0	36.6	36.6	38.4	44.5
100	64.0	42.7	42.7	41.5	37.2
200	42.7	39.4	44.5	41.0	41.0
300	38.4	42.7	41.5	41.1	37.2
400	36.6	43.6	42.2	41.5	41.6
500	35.6	42.0	42.0	42.0	39.7

K = 500

M \ N	2	16	32	48	64
50	40.0	45.7	40.0	40.0	38.8
100	40.0	40.0	40.0	40.9	42.0
200	40.0	38.8	38.8	40.0	39.7
300	40.0	40.0	41.3	39.2	40.2
400	40.0	38.8	40.6	39.6	40.3
500	33.3	40.5	39.3	41.2	39.3

ZGEMM with TRANSA = 'C', TRANSB = 'N'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	64.0	48.0	42.7
100	.0	32.0	42.7	48.0	42.7
200	.0	42.7	42.7	42.7	46.5
300	24.0	38.4	38.4	41.1	40.4
400	32.0	42.7	42.7	45.2	37.9
500	40.0	40.0	40.0	43.6	40.0

K = 100

M \ N	2	16	32	48	64
50	.0	64.0	42.7	32.0	36.6
100	16.0	32.0	32.0	32.0	34.1
200	32.0	32.0	32.0	34.9	36.6
300	48.0	32.0	34.9	32.9	32.7
400	64.0	34.1	37.9	33.4	32.0
500	40.0	33.7	32.0	34.9	33.2

K = 200

M \ N	2	16	32	48	64
50	16.0	42.7	36.6	34.9	36.6
100	32.0	32.0	34.1	34.9	34.1
200	32.0	39.4	31.0	30.1	30.1
300	32.0	26.5	32.0	34.4	34.9
400	42.7	35.3	35.3	35.3	35.6
500	40.0	36.6	35.6	34.3	36.1

K = 300

M \ N	2	16	32	48	64
50	.0	38.4	38.4	33.9	34.9
100	24.0	34.9	34.9	38.4	34.9
200	24.0	36.6	36.6	35.4	37.0
300	48.0	36.0	37.2	37.2	36.3
400	38.4	35.7	35.7	34.9	35.7
500	40.0	34.3	34.9	35.3	34.8

K = 400

M \ N	2	16	32	48	64
50	32.0	42.7	36.6	36.6	35.3
100	32.0	34.1	35.3	35.7	34.1
200	42.7	35.3	34.7	35.3	35.3
300	27.4	35.7	34.5	35.4	34.1
400	36.6	34.1	33.9	34.5	35.0
500	32.0	33.7	33.9	35.1	34.9

K = 500

M \ N	2	16	32	48	64
50	40.0	35.6	35.6	34.3	34.6
100	40.0	33.7	36.6	34.3	34.1
200	26.7	33.7	34.1	33.4	33.7
300	34.3	34.3	34.6	34.5	35.6
400	35.6	35.1	34.8	34.9	35.8
500	36.4	39.0	40.3	35.8	35.7

M \ N	2	16	32	48	64
50	.0	64.0	42.7	38.4	42.7
100	.0	42.7	36.6	38.4	39.4
200	32.0	42.7	42.7	42.7	48.8
300	48.0	48.0	40.4	41.1	40.4
400	12.8	46.5	48.8	43.9	44.5
500	40.0	37.6	42.7	42.7	40.0

K = 200

M \ N	2	16	32	48	64
50	.0	42.7	36.6	42.7	42.7
100	.0	51.2	42.7	42.7	42.7
200	32.0	46.5	42.7	43.9	42.7
300	48.0	42.7	41.5	40.4	42.7
400	42.7	44.5	41.0	43.3	43.6
500	40.0	47.4	42.7	43.1	41.6

K = 300

M \ N	2	16	32	48	64
50	24.0	48.0	38.4	38.4	45.2
100	48.0	48.0	45.2	39.7	39.4
200	48.0	42.7	45.2	46.1	44.5
300	36.0	42.7	44.3	42.1	43.5
400	48.0	45.2	43.3	43.1	43.6
500	48.0	44.7	44.7	43.3	43.1

K = 400

M \ N	2	16	32	48	64
50	32.0	36.6	42.7	40.4	44.5
100	32.0	51.2	42.7	45.2	44.5
200	32.0	42.7	42.7	42.7	43.6
300	27.4	39.4	43.9	42.7	44.2
400	36.6	41.8	42.2	43.6	43.8
500	40.0	44.9	43.4	42.9	43.4

K = 500

M \ N	2	16	32	48	64
50	40.0	45.7	45.7	43.6	42.7
100	40.0	42.7	44.1	43.6	43.4
200	53.3	44.1	43.4	45.2	44.9
300	40.0	43.6	43.1	43.6	42.7
400	45.7	44.1	44.5	43.9	43.9
500	44.4	42.7	44.4	44.9	43.4

ZGEMM with TRANSA = 'C', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	10.7	12.8	13.7	12.8
100	.0	16.0	11.6	12.8	12.8
200	16.0	14.2	14.2	13.2	13.8
300	12.0	13.7	13.2	13.7	13.7
400	16.0	14.2	13.5	14.0	13.7
500	13.3	13.3	13.6	14.1	13.5

K = 100

M \ N	2	16	32	48	64
50	8.0	8.0	7.1	7.4	8.5
100	8.0	7.5	8.0	7.8	8.0
200	10.7	7.3	7.2	7.3	7.6
300	8.0	7.4	7.4	7.3	7.6
400	8.0	7.5	7.5	7.3	7.6
500	7.3	7.4	7.3	7.1	7.5

K = 200

M \ N	2	16	32	48	64
50	16.0	9.1	8.5	8.0	7.8
100	8.0	8.0	8.1	7.5	7.2
200	9.1	7.9	8.3	8.1	8.1
300	8.7	8.4	8.3	7.9	7.6
400	8.5	8.5	8.0	8.2	8.0
500	8.4	8.0	8.1	7.9	8.3

K = 300

M \ N	2	16	32	48	64
50	8.0	7.4	7.4	7.4	7.8
100	6.9	8.0	7.5	7.2	7.5
200	7.4	7.3	7.3	7.3	7.4
300	7.6	7.4	7.4	7.6	7.2
400	7.1	7.1	7.4	7.2	7.5
500	7.5	7.3	7.3	7.2	7.4

K = 400

M \ N	2	16	32	48	64

ZGEMM with TRANSA = 'C', TRANSB = 'T'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	64.0	48.0	42.7
100	.0	64.0	42.7	32.0	42.7
200	16.0	42.7	42.7	38.4	39.4
300	24.0	38.4	42.7	41.1	40.4
400	32.0	51.2	42.7	40.4	42.7
500	40.0	40.0	40.0	40.0	40.0

K = 100

M \ N	2	16	32	48	64
50	.0	32.0	64.0	38.4	42.7
100	16.0	42.7	51.2	42.7	46.5
200	32.0	42.7	39.4	48.0	42.7
300	48.0	42.7	45.2	41.1	42.7
400	64.0	42.7	41.0	41.5	43.6
500	40.0	45.7	44.1	44.7	42.0

K = 200

M \ N	2	16	32	48	64
50	.0	42.7	51.2	42.7	36.6
100	32.0	42.7	46.5	45.2	44.5
200	32.0	46.5	42.7	41.5	44.5
300	48.0	45.2	41.5	45.2	43.3
400	42.7	44.5	43.6	40.4	39.8
500	53.3	45.7	44.1	44.1	43.0

K = 300

M \ N	2	16	32	48	64
50	24.0	38.4	42.7	44.3	40.4
100	24.0	42.7	48.0	44.3	43.9
200	48.0	45.2	42.7	45.2	41.5
300	36.0	39.7	43.5	41.6	44.3
400	38.4	41.5	45.2	38.7	42.1
500	48.0	41.7	40.9	43.3	41.5

K = 400

M \ N	2	16	32	48	64

50	8.0	7.8	7.5	7.3	7.4
100	7.1	7.5	7.5	7.5	7.5
200	8.0	7.2	7.0	7.6	7.5
300	7.1	7.3	7.3	7.3	7.2
400	7.3	7.4	7.0	6.9	7.4
500	7.4	7.6	7.4	7.3	7.3

K = 500

M \ N	2	16	32	48	64
50	8.0	7.4	7.6	7.4	7.5
100	8.0	7.0	7.4	7.1	7.0
200	7.6	7.2	7.4	7.2	7.3
300	6.9	7.2	7.3	7.5	7.3
400	7.1	7.0	7.3	7.3	7.3
500	7.5	7.6	7.5	7.1	7.2

ZGEMM with TRANSA = 'C', TRANSB = 'C'

K = 50

M \ N	2	16	32	48	64
50	.0	16.0	12.8	13.7	14.2
100	8.0	16.0	16.0	14.8	14.2
200	16.0	14.2	14.2	14.8	14.6
300	12.0	13.7	12.8	13.1	14.8
400	10.7	12.8	15.1	13.7	14.6
500	13.3	14.5	14.5	13.9	14.2

K = 100

M \ N	2	16	32	48	64
50	8.0	7.1	8.0	7.7	7.8
100	8.0	7.1	6.6	6.6	6.2
200	4.0	6.0	7.8	8.0	8.0
300	9.6	7.5	7.9	7.9	8.0
400	8.0	7.8	8.1	7.6	7.9
500	8.0	8.0	7.7	7.7	7.9

K = 200

M \ N	2	16	32	48	64
50	16.0	9.1	9.5	8.3	7.9
100	8.0	8.5	8.5	8.3	8.1
200	9.1	8.8	8.5	8.2	8.1
300	8.7	8.7	8.3	8.2	8.0
400	9.1	9.1	8.6	8.4	7.9
500	8.4	8.7	8.9	8.3	8.2

50	32.0	42.7	42.7	40.4	41.0
100	64.0	42.7	41.0	43.9	42.7
200	42.7	46.5	41.8	42.7	41.8
300	38.4	40.4	41.0	41.1	41.2
400	42.7	41.8	42.2	42.4	40.2
500	40.0	44.1	43.8	42.7	42.5

K = 500

M \ N	2	16	32	48	64
50	40.0	40.0	35.6	41.7	42.7
100	40.0	45.7	38.8	38.4	41.3
200	40.0	42.7	40.0	40.4	40.6
300	40.0	40.9	40.9	37.9	40.6
400	45.7	41.3	40.0	39.2	41.1
500	44.4	41.0	39.5	39.3	39.6

ZGEMM with TRANSA = 'C', TRANSB = 'C'

K = 50

M \ N	2	16	32	48	64
50	.0	32.0	64.0	48.0	42.7
100	.0	64.0	32.0	48.0	42.7
200	.0	42.7	42.7	38.4	39.4
300	.0	48.0	42.7	44.3	40.4
400	32.0	42.7	36.6	38.4	41.0
500	40.0	35.6	35.6	38.4	37.6

K = 100

M \ N	2	16	32	48	64
50	.0	32.0	42.7	32.0	36.6
100	.0	42.7	42.7	38.4	39.4
200	32.0	51.2	36.6	42.7	37.9
300	.0	42.7	42.7	39.7	42.7
400	32.0	46.5	42.7	39.4	41.0
500	40.0	37.6	40.0	40.9	40.0

K = 200

M \ N	2	16	32	48	64
50	16.0	42.7	36.6	42.7	42.7
100	32.0	36.6	51.2	40.4	44.5
200	32.0	36.6	39.4	42.7	43.6
300	48.0	42.7	39.4	41.1	40.4
400	42.7	44.5	39.4	38.9	42.2
500	40.0	40.0	40.6	41.3	42.3

K = 300

M \ N	2	16	32	48	64
50	8.0	8.0	8.3	7.2	7.8
100	8.0	7.7	7.3	7.1	7.5
200	8.7	7.8	8.0	7.8	7.8
300	7.2	8.2	7.7	7.5	7.6
400	7.4	7.5	7.7	7.3	7.6
500	7.3	7.1	7.7	7.6	7.5

K = 400

M \ N	2	16	32	48	64
50	8.0	7.5	7.1	7.5	7.7
100	7.1	7.9	7.9	7.4	7.3
200	7.1	7.7	7.7	7.4	7.4
300	7.7	7.4	7.6	7.5	7.9
400	7.3	7.4	7.3	7.6	8.0
500	7.8	7.6	7.5	7.7	7.6

K = 500

M \ N	2	16	32	48	64
50	8.0	7.0	7.6	7.5	7.8
100	7.3	8.0	8.0	7.5	7.5
200	8.0	7.7	7.5	7.6	7.7
300	7.5	7.7	7.9	7.5	7.6
400	7.3	7.2	7.5	7.7	7.7
500	7.3	7.4	7.6	7.6	7.6

*** Speed of ZHEMM in megaflops ***
with LDA = 513

ZHEMM with SIDE = 'L', UPLO = 'U'

M \ N	2	16	32	48	64
50	.0	32.0	0	48.0	64.0
100	.0	42.7	42.7	54.9	46.5
200	64.0	56.9	46.5	51.2	48.8
300	48.0	48.0	47.0	53.2	49.0
400	51.2	47.6	49.3	49.5	50.9
500	57.1	46.4	50.8	50.8	48.9

ZHEMM with SIDE = 'L', UPLO = 'L'

N	2	16	32	48	64

K = 300

M \ N	2	16	32	48	64
50	24.0	38.4	42.7	41.1	42.7
100	24.0	42.7	45.2	44.3	42.7
200	48.0	40.4	34.9	39.1	42.7
300	48.0	41.1	41.9	41.1	40.4
400	48.0	43.9	41.5	42.7	42.4
500	48.0	44.7	42.2	42.4	42.0

K = 400

M \ N	2	16	32	48	64
50	32.0	42.7	39.4	42.7	44.5
100	64.0	36.6	39.4	43.9	41.0
200	42.7	41.0	41.8	41.5	40.2
300	48.0	41.5	39.9	41.1	42.4
400	51.2	41.8	40.2	42.1	40.8
500	40.0	42.7	40.0	41.7	40.3

K = 500

M \ N	2	16	32	48	64
50	40.0	35.6	40.0	36.9	40.0
100	40.0	40.0	40.0	40.9	40.6
200	32.0	37.6	41.3	41.7	38.5
300	40.0	41.7	40.9	39.5	40.0
400	40.0	41.3	38.5	40.6	38.8
500	40.0	37.6	37.6	39.3	38.3

*** Speed of ZHEMM in megaflops ***
with LDA = 513

ZHEMM with SIDE = 'L', UPLO = 'U'

M \ N	2	16	32	48	64
50	.0	.0	64.0	48.0	64.0
100	16.0	64.0	64.0	76.8	73.1
200	.0	73.1	64.0	73.1	66.1
300	72.0	72.0	69.8	75.1	72.0
400	85.3	75.9	69.4	71.4	73.8
500	80.0	76.2	73.6	73.3	71.9

ZHEMM with SIDE = 'L', UPLO = 'L'

N	2	16	32	48	64

M					
50	.0	32.0	64.0	48.0	64.0
100	.0	42.7	42.7	42.7	46.5
200	64.0	56.9	51.2	49.5	48.8
300	48.0	50.1	51.2	49.4	49.5
400	51.2	51.2	49.3	50.8	48.8
500	50.0	49.2	48.5	49.2	50.4

ZHEMM with SIDE = 'R', UPLO = 'U'

N	2	16	32	48	64
M					
50	.0	.0	41.0	46.1	32.8
100	.0	20.5	41.0	36.9	41.0
200	.0	20.5	41.0	41.0	38.6
300	.0	30.7	35.1	36.9	37.8
400	.0	41.0	41.0	38.8	39.7
500	.0	34.1	41.0	40.1	40.0

ZHEMM with SIDE = 'R', UPLO = 'L'

N	2	16	32	48	64
M					
50	.0	.0	20.5	46.1	27.3
100	.0	20.5	41.0	36.9	46.8
200	.0	41.0	41.0	46.1	38.6
300	.0	30.7	41.0	42.5	36.4
400	.0	27.3	32.8	38.8	48.5
500	.0	102.4	41.0	40.1	40.0

*** Speed of ZSYMM in megaflops ***
with LDA = 513

ZSYMM with SIDE = 'L', UPLO = 'U'

N	2	16	32	48	64
M					
50	.0	32.0	32.0	96.0	42.7
100	16.0	42.7	36.6	42.7	42.7
200	64.0	51.2	48.8	49.5	51.2
300	48.0	50.1	50.1	51.6	49.5
400	128.0	51.2	52.5	49.5	50.0
500	50.0	50.0	49.2	48.5	50.8

ZSYMM with SIDE = 'L', UPLO = 'L'

N	2	16	32	48	64
M					
50	.0	.0	32.0	32.0	42.7
100	.0	64.0	64.0	48.0	42.7
200	64.0	56.9	51.2	51.2	51.2
300	48.0	52.4	51.2	50.8	49.0

M					
50	.0	.0	.0	96.0	64.0
100	.0	64.0	64.0	76.8	85.3
200	64.0	102.4	73.1	85.3	75.9
300	72.0	72.0	82.3	80.4	78.1
400	85.3	75.9	71.9	74.9	73.8
500	66.7	76.2	76.2	76.8	75.3

ZHEMM with SIDE = 'R', UPLO = 'U'

N	2	16	32	48	64
M					
50	.0	.0	41.0	46.1	54.6
100	.0	.0	41.0	61.4	46.8
200	.0	41.0	41.0	61.4	59.6
300	.0	61.4	81.9	55.3	57.8
400	.0	81.9	54.6	61.4	54.6
500	.0	51.2	58.5	51.2	60.7

ZHEMM with SIDE = 'R', UPLO = 'L'

N	2	16	32	48	64
M					
50	.0	.0	41.0	30.7	54.6
100	.0	.0	81.9	61.4	65.5
200	.0	41.0	54.6	52.7	54.6
300	.0	61.4	49.2	61.4	61.4
400	.0	81.9	46.8	56.7	54.6
500	.0	102.4	58.5	54.2	54.6

*** Speed of ZSYMM in megaflops ***
with LDA = 513

ZSYMM with SIDE = 'L', UPLO = 'U'

N	2	16	32	48	64
M					
50	.0	32.0	64.0	96.0	64.0
100	.0	64.0	85.3	64.0	64.0
200	64.0	73.1	73.1	59.1	75.9
300	72.0	57.6	72.0	67.8	66.8
400	85.3	70.6	69.4	70.6	68.8
500	66.7	69.6	71.1	67.6	69.6

ZSYMM with SIDE = 'L', UPLO = 'L'

N	2	16	32	48	64
M					
50	.0	.0	64.0	96.0	64.0
100	.0	128.0	85.3	76.8	73.1
200	64.0	73.1	73.1	69.8	68.3
300	72.0	67.8	69.8	66.5	70.9

400	64.0	45.5	47.1	48.4	48.8
500	50.0	49.2	49.6	49.5	48.1

ZSYMM with SIDE = 'R', UPLO = 'U'

M \ N	2	16	32	48	64
50	.0	10.2	41.0	30.7	32.8
100	.0	.0	41.0	36.9	36.4
200	.0	41.0	32.8	36.9	41.0
300	.0	61.4	49.2	42.5	37.8
400	1.3	41.0	41.0	43.4	38.6
500	1.6	51.2	41.0	41.9	41.0

ZSYMM with SIDE = 'R', UPLO = 'L'

M \ N	2	16	32	48	64
50	.0	.0	41.0	46.1	41.0
100	.0	20.5	41.0	46.1	36.4
200	.0	41.0	41.0	41.0	41.0
300	.0	61.4	35.1	39.5	44.7
400	.0	41.0	54.6	41.0	43.7
500	.0	51.2	45.5	48.5	42.0

*** Speed of ZTRMM in megaflops ***
with LDA = 513

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	32.3	24.2	64.6
100	8.0	64.3	42.9	38.6	42.9
200	.0	36.7	36.7	48.1	41.1
300	36.1	36.1	37.2	37.6	39.1
400	32.0	41.0	41.8	40.5	41.8
500	40.0	41.1	39.1	40.0	39.3

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	16.2	.0	24.2	32.3
100	.0	32.2	32.2	32.2	32.2
200	32.1	36.7	32.1	33.5	33.1
300	36.1	33.9	35.0	33.3	35.0
400	32.0	35.4	32.5	35.4	33.1
500	28.6	34.8	32.0	35.1	36.6

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

400	64.0	70.6	70.6	66.1	70.0
500	57.1	71.1	68.8	70.1	69.9

ZSYMM with SIDE = 'R', UPLO = 'U'

M \ N	2	16	32	48	64
50	.0	.0	41.0	46.1	54.6
100	.0	.0	81.9	61.4	54.6
200	.0	41.0	54.6	52.7	59.6
300	.0	61.4	61.4	55.3	54.6
400	.0	41.0	46.8	61.4	59.6
500	.0	51.2	58.5	54.2	58.5

ZSYMM with SIDE = 'R', UPLO = 'L'

M \ N	2	16	32	48	64
50	.0	.0	41.0	46.1	41.0
100	.0	.0	81.9	61.4	54.6
200	.0	.0	54.6	61.4	50.4
300	.0	61.4	61.4	61.4	57.8
400	.0	81.9	65.5	61.4	59.6
500	.0	51.2	58.5	54.2	58.5

*** Speed of ZTRMM in megaflops ***
with LDA = 513

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	48.5	64.6
100	8.0	64.3	42.9	64.3	51.5
200	32.1	42.8	57.0	59.2	57.0
300	72.1	57.7	54.9	52.5	57.7
400	42.7	54.0	54.0	55.9	56.2
500	66.7	57.2	55.2	53.4	55.2

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	32.3	48.5	32.3
100	.0	21.4	42.9	48.2	42.9
200	32.1	51.3	51.3	42.8	41.1
300	36.1	44.4	44.4	46.8	46.2
400	64.1	39.4	47.7	45.2	44.1
500	66.7	43.3	45.8	45.3	44.2

ZTRMM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	32.3	24.2	32.3
100	.0	32.2	32.2	38.6	36.8
200	32.1	36.7	30.2	29.6	35.4
300	36.1	33.9	37.2	36.1	36.1
400	32.0	35.4	34.2	33.8	34.8
500	40.0	33.4	36.0	35.3	34.4

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	32.3	24.2	32.3
100	.0	32.2	32.2	32.2	36.8
200	32.1	36.7	36.7	40.5	39.5
300	24.0	36.1	38.5	37.6	35.0
400	42.7	36.6	38.0	38.9	38.3
500	33.4	37.2	37.2	37.2	38.4

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	32.3	48.5	32.3
100	8.0	32.2	32.2	32.2	32.2
200	32.1	32.1	34.2	33.5	31.1
300	36.1	36.1	35.0	32.7	33.4
400	32.0	34.2	34.8	35.4	35.1
500	40.0	34.8	36.0	36.4	36.4

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	32.3	48.5	21.5
100	.0	32.2	32.2	27.6	32.2
200	32.1	36.7	30.2	33.5	36.7
300	36.1	36.1	36.1	35.3	36.6
400	32.0	38.0	34.2	36.2	34.8
500	50.1	34.1	34.4	34.1	35.0

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	20.8	46.6	41.3
100	.0	10.6	41.6	46.6	41.3
200	.0	.0	41.6	37.2	33.0
300	.0	31.7	62.4	39.9	41.3
400	.0	42.2	41.6	41.4	36.7

M \ N	2	16	32	48	64
50	.0	16.2	32.3	48.5	64.6
100	.0	21.4	42.9	38.6	42.9
200	32.1	51.3	46.7	40.5	39.5
300	36.1	44.4	41.2	42.2	41.2
400	42.7	44.6	41.0	43.3	38.0
500	40.0	42.1	44.5	43.3	42.1

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	32.3	48.5	64.6
100	8.0	64.3	42.9	64.3	42.9
200	32.1	64.2	57.0	59.2	57.0
300	72.1	57.7	52.5	55.8	57.7
400	64.1	54.0	55.4	51.3	50.0
500	100.1	59.3	56.2	54.6	54.3

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	32.3	48.5	64.6
100	.0	32.2	42.9	48.2	42.9
200	.0	51.3	42.8	40.5	39.5
300	72.1	44.4	42.7	39.3	40.5
400	32.0	41.0	42.7	44.6	44.6
500	40.0	43.3	45.8	43.3	44.2

ZTRMM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	16.2	.0	24.2	64.6
100	8.0	64.3	32.2	48.2	36.8
200	32.1	42.8	42.8	40.5	42.8
300	36.1	41.2	42.7	44.4	41.2
400	42.7	46.6	44.6	43.3	43.2
500	50.1	42.1	44.5	43.7	43.0

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3
100	.0	10.6	.0	93.1	55.0
200	.0	21.1	83.2	46.6	55.0
300	.0	31.7	62.4	55.9	61.9
400	.0	.0	83.2	62.1	60.0

500	.0	26.4	52.0	42.3	41.3

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	5.3	.0	23.3	27.5
100	.0	.0	41.6	31.0	41.3
200	.0	10.6	27.7	37.2	36.7
300	.0	31.7	41.6	39.9	41.3
400	.0	42.2	33.3	41.4	41.3
500	.0	26.4	41.6	42.3	41.3

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3
100	.0	.0	41.6	46.6	41.3
200	.0	.0	41.6	46.6	41.3
300	.0	31.7	41.6	31.0	38.1
400	.0	21.1	55.5	46.6	38.9
500	.0	26.4	52.0	42.3	43.5

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	20.8	46.6	41.3
100	.0	10.6	41.6	46.6	41.3
200	.0	21.1	41.6	46.6	36.7
300	.0	31.7	31.2	39.9	45.0
400	.0	21.1	41.6	46.6	44.0
500	.0	26.4	34.7	38.8	43.5

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3
100	.0	.0	41.6	93.1	33.0
200	.0	21.1	41.6	46.6	36.7
300	.0	31.7	41.6	39.9	41.3
400	.0	.0	41.6	53.2	41.3
500	.0	52.8	41.6	46.6	43.5

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	20.8	46.6	41.3

500	.0	52.8	69.3	58.2	55.0

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	82.6
100	.0	10.6	41.6	93.1	41.3
200	.0	.0	41.6	46.6	47.2
300	.0	.0	31.2	55.9	55.0
400	.0	42.2	55.5	53.2	50.8
500	.0	52.8	41.6	51.7	48.6

ZTRMM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	20.8	46.6	41.3
100	.0	.0	41.6	46.6	55.0
200	.0	21.1	41.6	62.1	66.0
300	.0	.0	41.6	55.9	55.0
400	.0	.0	83.2	52.1	50.8
500	.0	52.8	52.0	46.6	51.6

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	23.3	.0
100	.0	.0	41.6	46.6	55.0
200	.0	.0	83.2	31.0	41.3
300	.0	.0	31.2	55.9	61.9
400	.0	42.2	83.2	53.2	55.0
500	.0	52.8	69.3	58.2	55.0

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3
100	.0	.0	41.6	31.0	82.6
200	.0	21.1	41.6	62.1	47.2
300	.0	.0	41.6	55.9	49.5
400	.0	42.2	55.5	53.2	60.0
500	.0	52.8	69.3	58.2	55.0

ZTRMM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3

100	.0	.0	20.8	31.0	55.0
200	.0	.0	41.6	46.6	36.7
300	.0	31.7	41.6	46.6	41.3
400	.0	42.2	41.6	46.6	44.0
500	.0	52.8	34.7	38.8	45.9

*** Speed of ZTRSM in megaflops ***
with LDA = 513

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	16.2	32.3	24.2	32.3
100	.0	32.2	42.9	27.6	32.2
200	32.1	42.8	36.7	38.5	36.7
300	36.1	38.5	36.1	39.3	36.6
400	42.7	39.4	38.0	39.9	37.6
500	50.1	39.1	39.1	39.4	39.8

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	16.2	32.3	16.2	32.3
100	8.0	32.2	32.2	32.2	32.2
200	32.1	32.1	32.1	30.8	33.1
300	36.1	36.1	33.0	33.3	32.5
400	32.0	35.4	36.0	34.6	34.5
500	33.4	34.1	34.4	33.8	34.4

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	16.2	32.3	24.2	21.5
100	.0	32.2	25.7	32.2	28.6
200	32.1	36.7	32.1	32.1	33.1
300	36.1	32.1	33.0	33.3	33.9
400	32.0	35.4	34.8	34.2	32.5
500	33.4	33.4	35.6	33.8	34.1

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	8.1	32.3	24.2	32.3
100	.0	32.2	32.2	27.6	36.8
200	32.1	36.7	36.7	33.5	34.2
300	36.1	36.1	37.2	33.9	36.1
400	42.7	35.4	36.6	35.8	36.6
500	40.0	39.1	40.0	38.7	39.5

100	.0	.0	41.6	46.6	55.0
200	.0	21.1	41.6	62.1	55.0
300	.0	31.7	62.4	55.9	55.0
400	.0	42.2	83.2	53.2	55.0

*** Speed of ZTRSM in megaflops ***
with LDA = 513

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	16.2	32.3	48.5	64.6
100	.0	64.3	42.9	38.6	64.3
200	32.1	51.3	51.3	51.3	51.3
300	72.1	57.7	52.5	52.5	53.7
400	128.2	54.0	55.4	52.1	52.6
500	66.7	55.2	53.4	54.0	55.2

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	32.3	24.2	32.3
100	.0	32.2	64.3	38.6	42.9
200	32.1	51.3	42.8	45.3	44.6
300	72.1	44.4	44.4	44.4	42.7
400	42.7	44.6	44.6	43.9	42.7
500	50.1	44.5	43.3	44.9	44.2

ZTRSM with SIDE = 'L', UPLO = 'U', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	16.2	24.2	32.3
100	.0	32.2	42.9	38.6	36.8
200	32.1	42.8	42.8	38.5	41.1
300	72.1	44.4	42.7	42.2	42.7
400	32.0	39.4	44.6	42.1	41.4
500	40.0	42.1	40.0	42.1	43.0

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	32.3	24.2	64.6
100	8.0	.0	32.2	48.2	51.5
200	32.1	42.8	46.7	48.1	51.3
300	24.0	48.1	54.9	49.5	52.5
400	64.1	54.0	50.0	47.3	51.9
500	50.1	48.5	49.3	50.6	51.3

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	16.2	32.3	24.2	21.5
100	.0	32.2	32.2	27.6	28.6
200	32.1	36.7	28.5	35.0	33.1
300	36.1	36.1	33.0	33.3	33.4
400	42.7	34.2	36.0	32.7	32.8
500	40.0	34.1	34.4	35.1	34.3

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	32.3	48.5	21.5
100	.0	21.4	32.2	27.6	25.7
200	16.0	32.1	30.2	32.1	31.1
300	36.1	33.9	33.9	33.9	33.0
400	32.0	34.2	32.5	33.1	33.1
500	40.0	34.1	33.7	33.1	33.5

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3
100	.0	.0	41.6	31.0	41.3
200	.0	21.1	27.7	31.0	41.3
300	.0	.0	41.6	46.6	38.1
400	.0	42.2	41.6	33.9	36.7
500	.0	26.4	41.6	38.8	41.3

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	20.8	46.6	27.5
100	.0	.0	41.6	31.0	33.0
200	.0	.0	41.6	37.2	36.7
300	.6	.0	41.6	39.9	41.3
400	.0	42.2	33.3	37.2	41.3
500	.0	52.8	69.3	35.8	37.5

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	.0	23.3	41.3
100	.0	.0	20.8	31.0	41.3

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	32.3	48.5	64.6
100	8.0	.0	25.7	38.6	42.9
200	32.1	42.8	42.8	38.5	46.7
300	72.1	38.5	46.2	42.2	43.5
400	42.7	41.0	42.7	43.9	43.2
500	50.1	45.8	44.5	43.7	44.2

ZTRSM with SIDE = 'L', UPLO = 'L', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	16.2	48.5	32.3
100	.0	32.2	42.9	48.2	51.5
200	.0	51.3	42.8	38.5	41.1
300	36.1	44.4	41.2	41.2	39.8
400	42.7	44.6	41.8	43.3	42.7
500	40.0	42.1	42.7	42.9	40.8

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3
100	.0	.0	41.6	46.6	55.0
200	.0	.0	83.2	46.6	66.0
300	.0	31.7	62.4	55.9	49.5
400	.0	42.2	55.5	53.2	66.0
500	.0	52.8	52.0	51.7	55.0

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	82.6
100	.0	.0	13.9	46.6	41.3
200	.0	21.1	83.2	62.1	55.0
300	.0	.0	41.6	69.8	45.0
400	.0	.0	55.5	53.2	50.8
500	.0	52.8	52.0	51.7	51.6

ZTRSM with SIDE = 'R', UPLO = 'U', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3
100	.0	.0	41.6	46.6	55.0

200	.0	21.1	41.6	37.2	41.3
300	.0	31.7	41.6	34.9	41.3
400	.8	42.2	33.3	41.4	41.3
500	.0	26.4	34.7	42.3	37.5

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	20.8	46.6	82.6
100	.0	10.6	41.6	46.6	27.5
200	.0	.0	27.7	62.1	41.3
300	.0	31.7	41.6	34.9	41.3
400	.0	42.2	33.3	41.4	41.3
500	.0	52.8	41.6	38.8	39.3

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	20.8	46.6	27.5
100	.0	10.6	41.6	46.6	41.3
200	.0	.0	41.6	46.6	47.2
300	.0	31.7	41.6	34.9	38.1
400	.0	21.1	41.6	41.4	44.0
500	.0	52.8	52.0	42.3	43.5

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	5.3	.0	23.3	41.3
100	.0	.0	20.8	46.6	33.0
200	.0	.0	27.7	37.2	41.3
300	.0	31.7	41.6	34.9	45.0
400	.8	42.2	41.6	46.6	38.9
500	.0	26.4	41.6	38.8	41.3

End of tests
Total time used = 2273.28 seconds

200	.0	.0	41.6	46.6	55.0
300	.0	31.7	62.4	46.6	49.5
400	.0	42.2	55.5	53.2	55.0
500	.0	52.8	41.6	46.6	55.0

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'N'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	41.3
100	.0	.0	41.6	46.6	55.0
200	.0	.0	41.6	62.1	55.0
300	.0	.0	62.4	55.9	61.9
400	.0	21.1	55.5	74.5	50.8
500	.0	52.8	41.6	58.2	55.0

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'T'

M \ N	2	16	32	48	64
50	.0	.0	20.8	46.6	41.3
100	.0	.0	41.6	93.1	55.0
200	.0	.0	41.6	62.1	41.3
300	.0	.0	41.6	69.8	55.0
400	.0	42.2	55.5	62.1	55.0
500	.0	52.8	52.0	66.5	63.5

ZTRSM with SIDE = 'R', UPLO = 'L', TRANS = 'C'

M \ N	2	16	32	48	64
50	.0	.0	.0	46.6	82.6
100	.0	.0	41.6	93.1	55.0
200	.0	.0	41.6	62.1	66.0
300	.0	31.7	62.4	55.9	49.5
400	.0	42.2	55.5	53.2	55.0
500	.0	52.8	52.0	51.7	55.0

End of tests
Total time used = 787.97 seconds

Appendix 4. Linear Algebra PACKage (LAPACK) timing data. Comparison between normal and enhanced nodes

The timing data refer to the Linear Equations Routines, rectangular matrices, and the generalized eigenvalues problem. Only real values were used.

The Fortran ETIME routine was used in timing routines.

In the left column we report the data of the normal node of the SP2.

In the right column we report the related data of the enhanced node of the SP2.

LAPACK VERSION 2.0, released September 30, 1994

LAPACK timing, DOUBLE PRECISION rectangular matrices

The following parameter values will be used:

M:	100	200	100	200	400	200	400
N:	100	100	200	200	200	400	400
K:	1	2	16	100			
NB:	1	16	32	48	64		
NX:	0	48	128	128	128		
LDA:	401						

The minimum time a subroutine will be timed = .000 seconds

>>>>> Timing data <<<<<

*** Speed of DGEQRF in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	33.8	37.4	33.8	32.6	33.1	32.8	35.0
(16,	48)	45.1	84.1	84.6	107.5	107.2	92.6	109.8
(32,	128)	45.1	37.4	37.6	97.7	65.3	72.6	104.5
(48,	128)	67.7	37.4	33.8	82.7	62.3	68.9	97.3
(64,	128)	45.1	37.4	33.8	71.7	62.3	79.0	89.2

*** Speed of DORGQR in megaflops ***

K = min(M,N)

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	67.2	41.7	44.8	34.5	33.3	35.7	34.8
(16,	48)	67.2	111.1	67.2	107.1	102.6	107.1	106.9
(32,	128)	67.2	41.7	44.8	82.4	74.1	89.2	106.9
(48,	128)	67.2	33.3	67.2	82.4	65.0	89.2	97.2
(64,	128)	67.2	41.7	67.2	71.4	59.3	76.5	90.0

*** Speed of DORMQR in megaflops ***

DORMQR with SIDE = 'L', TRANS = 'N', N = 1

M	100	200	200	400	400
K	100	100	200	200	400
NB					
1	.0	.0	8.1	24.1	16.1
16	.0	6.0	8.1	12.0	8.0
32	.0	6.0	4.0	6.0	5.4
48	2.0	6.0	2.7	4.0	3.6

LAPACK VERSION 2.0, released September 30, 1994

LAPACK timing, DOUBLE PRECISION rectangular matrices

The following parameter values will be used:

M:	100	200	100	200	400	200	400
N:	100	100	200	200	200	400	400
K:	1	2	16	100			
NB:	1	16	32	48	64		
NX:	0	48	128	128	128		
LDA:	401						

The minimum time a subroutine will be timed = .020 seconds

>>>>> Timing data <<<<<

*** Speed of DGEQRF in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	45.1	84.1	67.7	76.8	68.7	65.5	64.4
(16,	48)	90.3	112.1	135.4	107.5	111.6	127.9	120.6
(32,	128)	90.3	67.3	67.7	107.5	99.2	103.3	129.8
(48,	128)	67.7	84.1	84.6	82.7	107.2	103.3	117.3
(64,	128)	45.1	84.1	84.6	97.7	99.2	99.5	112.7

*** Speed of DORGQR in megaflops ***

K = min(M,N)

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	89.5	83.3	67.2	66.9	65.0	66.9	67.3
(16,	48)	67.2	111.1	67.2	119.0	121.2	119.0	120.4
(32,	128)	67.2	66.7	89.5	119.0	95.2	133.8	125.7
(48,	128)	89.5	66.7	67.2	89.2	95.2	97.3	118.7
(64,	128)	89.5	66.7	89.5	76.5	102.6	133.8	108.2

*** Speed of DORMQR in megaflops ***

DORMQR with SIDE = 'L', TRANS = 'N', N = 1

M	100	200	200	400	400
K	100	100	200	200	400
NB					
1	10.1	10.1	13.4	16.0	21.4
16	4.1	8.0	12.1	12.0	8.0
32	4.1	9.0	4.0	8.0	6.4
48	2.0	.0	6.0	4.8	5.4

64	2.0	3.0	2.7	2.7	2.9

DORMQR with SIDE = 'L', TRANS = 'N', N = 2

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	.0	16.1	24.1	32.1
16		.0	12.1	8.1	16.0	16.1
32		.0	.0	8.1	9.6	10.7
48		.0	12.1	5.4	6.9	7.1
64		4.1	6.0	8.1	5.3	4.9

DORMQR with SIDE = 'L', TRANS = 'N', N = 16

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		32.5	96.5	43.0	77.0	64.2
16		.0	96.5	43.0	64.2	64.2
32		32.5	48.2	43.0	48.1	57.1
48		32.5	48.2	32.2	38.5	42.8
64		16.2	32.2	32.2	32.1	34.3

DORMQR with SIDE = 'L', TRANS = 'N', N = 100

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		67.7	33.5	38.4	35.4	34.9
16		67.7	100.5	89.6	109.4	107.1
32		67.7	86.1	89.6	109.4	103.6
48		67.7	86.1	100.8	96.2	94.5
64		50.8	86.1	89.6	89.1	91.8

DORMQR with SIDE = 'L', TRANS = 'T', N = 1

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	6.0	.0	24.1	32.1
16		.0	.0	8.1	8.0	8.0
32		2.0	3.0	.0	6.0	5.4
48		2.0	6.0	8.1	3.4	3.6
64		.0	3.0	2.7	2.4	2.9

DORMQR with SIDE = 'L', TRANS = 'T', N = 2

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						

64	3.0	4.0	4.0	4.0	3.6

DORMQR with SIDE = 'L', TRANS = 'N', N = 2

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		24.4	30.1	40.3	96.2	32.1
16		10.1	18.1	16.1	24.1	16.1
32		10.8	12.1	10.7	12.0	12.8
48		4.1	12.1	5.4	12.0	9.2
64		6.1	6.0	5.4	9.6	7.1

DORMQR with SIDE = 'L', TRANS = 'N', N = 16

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		43.3	96.5	43.0	64.2	64.2
16		48.7	64.3	51.6	77.0	64.2
32		43.3	48.2	64.5	77.0	57.1
48		43.3	48.2	64.5	77.0	51.4
64		43.3	24.1	43.0	42.8	46.7

DORMQR with SIDE = 'L', TRANS = 'N', N = 100

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		101.5	120.6	80.6	70.8	66.9
16		203.0	100.5	115.1	126.6	110.8
32		67.7	120.6	115.1	126.6	114.7
48		101.5	100.5	115.1	126.6	123.5
64		67.7	120.6	115.1	109.4	103.6

DORMQR with SIDE = 'L', TRANS = 'T', N = 1

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		11.2	18.1	12.1	24.1	16.1
16		7.1	9.0	8.1	8.0	8.0
32		4.1	6.0	5.4	12.0	6.4
48		5.1	6.0	5.4	6.0	4.6
64		3.0	6.0	4.0	4.0	4.6

DORMQR with SIDE = 'L', TRANS = 'T', N = 2

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						

1	.0	.0	.0	48.1	32.1
16	4.1	12.1	16.1	16.0	16.1
32	4.1	6.0	8.1	9.6	10.7
48	4.1	12.1	8.1	6.9	6.4
64	4.1	6.0	5.4	5.3	4.9

DORMQR with SIDE = 'L', TRANS = 'T', N = 16

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		32.5	48.2	64.5	64.2	73.4
16		.0	48.2	64.5	77.0	64.2
32		32.5	96.5	64.5	55.0	51.4
48		.0	48.2	43.0	48.1	42.8
64		.0	48.2	32.2	32.1	32.1

DORMQR with SIDE = 'L', TRANS = 'T', N = 100

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		50.8	33.5	36.6	33.4	36.9
16		101.5	120.6	115.1	104.6	107.1
32		101.5	100.5	100.8	109.4	103.6
48		67.7	75.4	80.6	100.3	91.8
64		67.7	86.1	89.6	89.1	91.8

DORMQR with SIDE = 'R', TRANS = 'N', M = 1

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	7.5	.0	15.0	13.4
16		2.5	7.5	10.1	10.0	13.4
32		2.5	7.5	5.0	10.0	8.0
48		.0	7.5	5.0	4.3	5.7
64		2.5	3.8	5.0	3.0	3.3

DORMQR with SIDE = 'R', TRANS = 'N', M = 2

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	.0	9.0	27.0	24.1
16		.0	.0	18.1	18.0	14.4
32		.0	13.5	9.0	13.5	12.0
48		4.5	13.5	9.0	6.8	8.0
64		.0	6.8	6.0	6.0	6.0

DORMQR with SIDE = 'R', TRANS = 'N', M = 16

1	20.3	54.3	16.1	32.1	32.1
16	8.1	18.1	16.1	16.0	16.1
32	10.1	12.1	8.1	24.1	12.8
48	8.1	6.0	8.1	9.6	10.7
64	4.1	6.0	5.4	8.0	9.2

DORMQR with SIDE = 'L', TRANS = 'T', N = 16

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		16.2	96.5	64.5	77.0	73.4
16		32.5	96.5	64.5	128.3	73.4
32		48.7	64.3	129.0	64.2	64.2
48		16.2	32.2	64.5	42.8	51.4
64		65.0	32.2	43.0	64.2	42.8

DORMQR with SIDE = 'L', TRANS = 'T', N = 100

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		67.7	75.4	89.6	70.8	68.3
16		101.5	120.6	134.3	114.6	133.8
32		67.7	120.6	115.1	126.6	107.1
48		67.7	120.6	100.8	126.6	119.0
64		67.7	86.1	89.6	96.2	107.1

DORMQR with SIDE = 'R', TRANS = 'N', M = 1

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		7.6	22.6	15.1	15.0	40.1
16		8.8	10.0	10.0	10.0	13.4
32		6.3	10.0	6.7	10.0	13.4
48		2.5	5.0	5.0	6.0	6.7
64		3.8	3.8	4.0	5.0	5.0

DORMQR with SIDE = 'R', TRANS = 'N', M = 2

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		18.2	54.2	27.1	36.1	24.1
16		13.6	20.3	18.1	13.5	18.0
32		7.6	13.5	12.1	18.0	24.1
48		7.6	13.5	12.1	13.5	10.3
64		6.8	9.0	6.0	7.7	9.0

DORMQR with SIDE = 'R', TRANS = 'N', M = 16

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	.0	48.9	43.6	39.1	43.4
16	.0	48.9	43.6	65.1	65.2
32	.0	32.6	43.6	55.8	57.9
48	32.8	97.8	43.6	43.4	43.4
64	32.8	48.9	32.7	32.6	29.0

DORMQR with SIDE = 'R', TRANS = 'N', M = 100

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	67.5	33.5	33.6	31.3	32.5
16	101.3	120.7	115.1	104.8	100.5
32	67.5	100.6	89.6	104.8	103.7
48	101.3	86.2	80.6	92.7	91.9
64	101.3	86.2	89.6	86.1	86.9

DORMQR with SIDE = 'R', TRANS = 'T', M = 1

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	.0	7.5	.0	15.0	20.1
16	.0	7.5	10.1	10.0	10.0
32	2.5	7.5	10.1	7.5	8.0
48	.0	3.8	5.0	5.0	4.5
64	2.5	7.5	3.4	3.3	4.0

DORMQR with SIDE = 'R', TRANS = 'T', M = 2

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	4.5	13.5	.0	27.0	36.1
16	4.5	.0	18.1	18.0	18.0
32	4.5	13.5	18.1	13.5	9.0
48	.0	6.8	18.1	7.7	8.0
64	4.5	6.8	9.0	6.8	5.6

DORMQR with SIDE = 'R', TRANS = 'T', M = 16

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	32.8	48.9	65.3	35.5	40.1
16	16.4	97.8	65.3	65.1	65.2
32	32.8	97.8	65.3	55.8	65.2
48	32.8	48.9	43.6	43.4	43.4

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	49.2	65.2	65.3	78.1	52.1
16	65.6	65.2	87.1	78.1	74.5
32	49.2	65.2	65.3	78.1	57.9
48	65.6	32.6	65.3	65.1	65.2
64	32.8	48.9	65.3	55.8	47.4

DORMQR with SIDE = 'R', TRANS = 'N', M = 100

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	101.3	67.1	80.6	57.4	58.5
16	67.5	100.6	100.7	109.5	100.5
32	67.5	120.7	115.1	109.5	110.9
48	67.5	150.9	115.1	126.8	114.9
64	67.5	100.6	100.7	104.8	110.9

DORMQR with SIDE = 'R', TRANS = 'T', M = 1

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	5.0	10.0	10.0	15.0	20.1
16	8.4	7.5	10.1	15.0	13.4
32	5.0	7.5	6.7	10.0	8.0
48	2.5	22.6	5.0	7.5	6.7
64	3.8	7.5	5.0	6.0	6.7

DORMQR with SIDE = 'R', TRANS = 'T', M = 2

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	13.6	33.9	18.1	18.0	24.1
16	11.4	20.3	9.0	27.0	18.0
32	9.1	13.5	12.1	13.5	14.4
48	6.8	13.5	4.5	10.8	12.0
64	4.5	13.5	6.0	10.8	9.0

DORMQR with SIDE = 'R', TRANS = 'T', M = 16

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	32.8	48.9	65.3	55.8	57.9
16	21.9	48.9	43.6	78.1	57.9
32	43.8	65.2	65.3	55.8	65.2
48	65.6	48.9	65.3	65.1	52.1

64	32.8	48.9	43.6	32.6	34.8

DORMQR with SIDE = 'R', TRANS = 'T', M = 100

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	50.6	33.5	38.4	31.3	33.2
16	101.3	100.6	73.3	104.8	103.7
32	67.5	100.6	80.6	104.8	97.5
48	101.3	100.6	89.6	100.4	91.9
64	67.5	86.2	80.6	89.3	80.4

*** Speed of DGELQF in megaflops ***

M	100	200	100	200	400	200	400
N	100	100	200	200	200	400	400
(NB, NX)							
(1, 0)	45.1	42.2	30.7	31.6	32.3	31.6	32.7
(16, 48)	67.7	67.5	67.5	89.6	95.8	86.5	100.8
(32, 128)	67.7	37.5	37.5	82.7	72.5	59.6	92.1
(48, 128)	45.1	37.5	37.5	76.8	68.8	52.6	84.0
(64, 128)	67.7	37.5	33.7	63.2	78.9	51.6	79.3

*** Speed of DORGLQ in megaflops ***

K = min(M,N)

M	100	200	100	200	400	200	400
N	100	100	200	200	200	400	400
(NB, NX)							
(1, 0)	44.8	44.8	37.1	32.4	31.5	30.0	31.4
(16, 48)	67.2	67.2	66.9	89.2	89.2	83.5	97.2
(32, 128)	44.8	44.8	30.4	82.4	82.4	56.8	96.1
(48, 128)	67.2	67.2	33.4	76.5	76.5	55.6	83.0
(64, 128)	44.8	67.2	37.1	71.4	66.9	51.4	79.9

*** Speed of DORMLQ in megaflops ***

DORMLQ with SIDE = 'L', TRANS = 'N', N = 1

K	100	100	200	200	400
M	100	200	200	400	400
NB					
1	2.0	6.0	8.1	12.0	16.1
16	.0	.0	8.1	6.0	8.0
32	.0	6.0	4.0	4.0	4.6
48	.0	6.0	4.0	2.2	2.7
64	2.0	3.0	2.7	2.0	2.3

DORMLQ with SIDE = 'L', TRANS = 'N', N = 2

64	32.8	65.2	43.6	39.1	47.4

DORMQR with SIDE = 'R', TRANS = 'T', M = 100

N	100	200	200	400	400
K	100	100	200	200	400
NB					
1	81.0	86.2	67.2	56.0	57.4
16	101.3	120.7	100.8	109.5	114.9
32	101.3	100.6	134.3	120.5	114.9
48	101.3	120.7	100.7	133.9	114.9
64	67.5	120.7	115.1	92.7	100.5

*** Speed of DGELQF in megaflops ***

M	100	200	100	200	400	200	400
N	100	100	200	200	200	400	400
(NB, NX)							
(1, 0)	101.5	67.5	56.2	71.7	62.4	55.9	56.7
(16, 48)	67.7	112.5	84.3	89.6	107.3	99.4	114.2
(32, 128)	67.7	56.2	112.5	97.7	103.2	89.4	117.3
(48, 128)	90.3	112.4	67.5	89.6	95.8	81.3	112.7
(64, 128)	67.7	84.3	84.3	82.7	116.6	74.5	94.1

*** Speed of DORGLQ in megaflops ***

K = min(M,N)

M	100	200	100	200	400	200	400
N	100	100	200	200	200	400	400
(NB, NX)							
(1, 0)	89.6	89.5	66.9	56.4	56.3	56.8	55.9
(16, 48)	134.3	44.8	83.6	97.3	97.3	106.8	114.0
(32, 128)	89.6	89.6	66.9	89.2	82.4	86.2	122.1
(48, 128)	134.3	67.2	66.9	89.2	76.5	86.2	104.3
(64, 128)	100.7	67.2	66.9	89.2	89.2	83.5	98.3

*** Speed of DORMLQ in megaflops ***

DORMLQ with SIDE = 'L', TRANS = 'N', N = 1

K	100	100	200	200	400
M	100	200	200	400	400
NB					
1	10.1	15.1	12.1	8.0	10.7
16	7.1	12.1	8.1	12.0	10.7
32	3.0	6.0	8.1	12.0	8.0
48	3.4	3.0	5.4	4.0	4.6
64	6.1	6.0	2.7	3.0	3.2

DORMLQ with SIDE = 'L', TRANS = 'N', N = 2

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		.0	12.1	8.1	16.0	21.4
16		4.1	12.1	16.1	12.0	16.1
32		.0	6.0	8.1	8.0	9.2
48		4.1	12.1	8.1	6.0	5.4
64		.0	6.0	5.4	4.4	4.3

DORMLQ with SIDE = 'L', TRANS = 'N', N = 16

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		32.5	48.2	43.0	32.1	34.3
16		.0	96.5	64.5	55.0	73.4
32		32.5	48.2	43.0	55.0	46.7
48		32.5	48.2	43.0	35.0	36.7
64		32.5	32.2	43.0	29.6	28.6

DORMLQ with SIDE = 'L', TRANS = 'N', N = 100

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		67.7	30.2	33.6	31.7	31.8
16		101.5	100.5	100.8	109.4	103.6
32		203.0	100.5	80.6	96.2	97.3
48		101.5	100.5	89.6	85.9	89.2
64		67.7	86.1	80.6	80.2	80.3

DORMLQ with SIDE = 'L', TRANS = 'T', N = 1

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		.0	.0	.0	12.0	10.7
16		.0	6.0	8.1	12.0	8.0
32		2.0	6.0	8.1	4.8	4.6
48		1.0	3.0	2.7	3.4	3.2
64		2.0	3.0	2.7	2.0	2.1

DORMLQ with SIDE = 'L', TRANS = 'T', N = 2

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		.0	.0	.0	24.1	21.4
16		4.1	12.1	16.1	16.0	12.8
32		4.1	12.1	16.1	8.0	8.0
48		.0	6.0	8.1	5.3	5.4

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		21.7	30.1	21.5	32.1	21.4
16		14.2	12.1	10.7	16.0	16.1
32		8.1	12.1	10.7	12.0	9.2
48		5.4	8.0	10.7	6.9	8.0
64		10.8	8.0	10.7	6.9	8.0

DORMLQ with SIDE = 'L', TRANS = 'N', N = 16

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		81.2	64.3	64.5	42.8	46.7
16		54.1	64.3	43.0	96.3	102.8
32		43.3	32.2	86.0	55.0	51.4
48		32.5	48.2	43.0	55.0	42.8
64		48.7	48.2	43.0	35.0	39.5

DORMLQ with SIDE = 'L', TRANS = 'N', N = 100

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		81.2	67.0	80.6	58.7	58.4
16		101.5	120.6	100.7	120.3	119.0
32		203.0	150.8	80.6	120.3	114.7
48		101.5	100.5	115.2	104.6	107.1
64		101.5	100.5	89.6	109.4	103.6

DORMLQ with SIDE = 'L', TRANS = 'T', N = 1

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		10.1	16.1	10.7	12.0	16.1
16		2.0	6.0	8.1	12.0	12.8
32		4.7	3.0	4.0	8.0	5.4
48		3.4	6.0	4.0	4.0	4.6
64		3.0	3.0	4.0	3.4	2.9

DORMLQ with SIDE = 'L', TRANS = 'T', N = 2

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		22.3	24.1	24.2	24.1	32.1
16		10.8	18.1	16.1	24.1	32.1
32		8.1	12.1	12.1	12.0	21.4
48		10.1	12.1	8.1	8.0	8.0

64	4.1	4.0	4.0	4.0	4.3

DORMLQ with SIDE = 'L', TRANS = 'T', N = 16

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		32.5	48.2	43.0	35.0	34.3
16		32.5	48.2	64.5	64.2	64.2
32		.0	48.2	43.0	48.1	46.7
48		32.5	32.2	32.2	32.1	34.3
64		16.2	32.2	32.2	25.7	27.0

DORMLQ with SIDE = 'L', TRANS = 'T', N = 100

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		40.6	30.2	35.0	31.7	32.1
16		101.5	100.5	100.8	104.6	103.6
32		67.7	100.5	100.8	100.3	94.5
48		67.7	86.1	89.6	92.5	84.5
64		67.7	100.5	80.6	80.2	78.3

DORMLQ with SIDE = 'R', TRANS = 'N', M = 1

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		.0	.0	10.1	4.3	5.7
16		.0	7.5	10.1	7.5	8.0
32		.0	7.5	10.1	5.0	5.0
48		.0	3.8	5.0	3.3	3.6
64		.0	3.8	3.4	2.7	2.9

DORMLQ with SIDE = 'R', TRANS = 'N', M = 2

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		.0	.0	18.1	10.8	8.0
16		.0	.0	9.0	18.0	14.4
32		.0	13.5	18.1	7.7	9.0
48		.0	6.8	6.0	6.8	6.0
64		4.5	6.8	9.0	5.4	4.8

DORMLQ with SIDE = 'R', TRANS = 'N', M = 16

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						

64	6.8	6.0	8.1	6.9	9.2

DORMLQ with SIDE = 'L', TRANS = 'T', N = 16

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		48.7	48.2	64.5	64.2	46.7
16		54.1	72.4	257.7	77.0	64.3
32		43.3	64.3	64.5	64.1	64.2
48		43.3	48.2	43.0	77.0	64.3
64		32.5	48.2	43.0	38.5	39.5

DORMLQ with SIDE = 'L', TRANS = 'T', N = 100

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		67.7	67.0	80.6	57.3	60.6
16		101.5	150.8	115.2	126.6	110.8
32		101.5	201.0	115.2	126.6	110.8
48		67.7	100.5	115.1	104.6	100.4
64		40.6	86.1	89.6	92.5	103.6

DORMLQ with SIDE = 'R', TRANS = 'N', M = 1

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		8.4	10.0	10.0	7.5	10.0
16		6.3	3.8	10.1	12.0	13.4
32		6.3	7.5	5.0	10.0	8.0
48		3.8	15.1	10.0	6.0	5.7
64		2.5	5.0	5.0	5.0	4.0

DORMLQ with SIDE = 'R', TRANS = 'N', M = 2

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		13.6	18.1	24.1	18.0	12.0
16		12.1	13.5	18.1	27.0	24.1
32		9.1	13.5	12.1	10.8	14.4
48		11.4	9.0	18.1	10.8	8.0
64		10.6	9.0	9.0	6.8	6.6

DORMLQ with SIDE = 'R', TRANS = 'N', M = 16

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						

1	32.8	48.9	43.6	20.6	23.7
16	.0	48.9	65.3	65.1	52.1
32	.0	48.9	65.3	48.8	52.1
48	32.8	48.9	43.6	30.1	34.8
64	.0	32.6	26.1	26.0	29.0

DORMLQ with SIDE = 'R', TRANS = 'N', M = 100

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		40.5	31.8	32.2	28.7	29.5
16		101.3	100.6	100.8	104.8	100.5
32		67.5	100.6	100.8	96.4	91.9
48		67.5	100.6	80.6	89.3	89.3
64		101.3	75.4	80.6	77.7	82.5

DORMLQ with SIDE = 'R', TRANS = 'T', M = 1

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		.0	7.5	10.1	6.0	6.7
16		2.5	7.5	10.1	6.0	10.0
32		2.5	7.5	10.1	4.3	5.7
48		2.5	7.5	5.0	3.8	3.6
64		2.5	3.8	3.4	2.5	2.7

DORMLQ with SIDE = 'R', TRANS = 'T', M = 2

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		.0	13.5	18.1	9.0	10.3
16		4.5	13.5	18.1	18.0	18.0
32		4.5	13.5	9.0	9.0	9.0
48		4.5	13.5	9.0	6.0	6.0
64		4.5	6.8	6.0	5.4	4.8

DORMLQ with SIDE = 'R', TRANS = 'T', M = 16

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		.0	32.6	43.6	23.0	23.7
16		32.8	97.8	43.6	78.1	65.2
32		.0	48.9	65.3	48.8	43.4
48		32.8	32.6	43.6	32.6	34.8
64		32.8	48.9	32.7	24.4	29.0

DORMLQ with SIDE = 'R', TRANS = 'T', M = 100

1	49.2	48.9	43.6	26.0	34.8
16	54.7	97.8	65.3	65.1	130.3
32	43.8	48.9	52.3	65.1	57.9
48	32.8	65.2	43.6	43.4	43.4
64	32.8	48.9	43.6	39.1	43.4

DORMLQ with SIDE = 'R', TRANS = 'N', M = 100

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		81.0	54.9	80.6	50.2	56.4
16		101.3	100.6	115.1	133.9	114.9
32		67.5	100.6	134.3	114.8	128.6
48		101.2	100.6	89.6	120.5	100.5
64		81.0	86.2	73.3	114.8	100.5

DORMLQ with SIDE = 'R', TRANS = 'T', M = 1

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		8.4	12.5	10.0	6.0	6.7
16		6.3	10.0	10.0	15.0	20.0
32		6.3	7.5	5.0	10.0	8.0
48		4.2	5.6	10.0	5.0	5.7
64		4.2	5.0	5.0	5.0	4.0

DORMLQ with SIDE = 'R', TRANS = 'T', M = 2

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		15.2	20.3	12.1	10.8	12.0
16		13.6	20.3	18.1	27.0	18.0
32		9.1	13.5	18.1	10.8	12.0
48		7.6	13.5	6.0	9.0	9.0
64		4.5	10.2	9.0	9.0	6.6

DORMLQ with SIDE = 'R', TRANS = 'T', M = 16

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		32.8	48.9	43.6	39.1	37.2
16		49.2	65.2	87.1	65.1	86.9
32		32.8	65.2	52.3	55.8	65.2
48		24.6	48.9	43.5	43.4	52.1
64		43.8	48.9	43.6	65.1	40.1

DORMLQ with SIDE = 'R', TRANS = 'T', M = 100

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		50.6	28.7	33.6	28.7	29.5
16		67.5	100.6	100.8	100.4	97.5
32		67.5	86.2	89.6	92.7	97.5
48		67.5	86.2	89.6	89.3	86.9
64		67.5	100.6	89.6	77.7	80.4

*** Speed of DGEQLF in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	67.7	37.4	33.8	34.7	34.8	32.8	35.0
(16,	48)	67.7	84.1	84.6	97.7	103.0	103.3	112.7
(32,	128)	67.7	37.4	33.8	82.7	67.0	70.7	107.1
(48,	128)	67.7	37.4	37.6	76.8	63.8	67.2	97.3
(64,	128)	67.7	37.4	30.8	67.2	59.5	81.4	94.1

*** Speed of DORGQL in megaflops ***

K = min(M,N)

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	67.2	41.7	44.8	34.5	34.6	33.5	34.3
(16,	48)	67.2	83.3	67.2	97.3	98.8	107.1	112.5
(32,	128)	44.8	41.7	44.8	89.2	66.7	97.3	101.8
(48,	128)	134.3	41.7	67.2	82.4	65.0	89.2	100.6
(64,	128)	44.8	37.0	67.2	82.4	63.5	76.5	92.9

*** Speed of DORMQL in megaflops ***

DORMQL with SIDE = 'L', TRANS = 'N', N = 1

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	6.0	.0	24.1	32.1
16		2.0	6.0	8.1	8.0	6.4
32		2.0	6.0	4.0	6.0	5.4
48		.0	6.0	4.0	4.0	3.6
64		.0	6.0	2.7	3.0	2.9

DORMQL with SIDE = 'L', TRANS = 'N', N = 2

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						

	K	100	100	200	200	400
	N	100	200	200	400	400
NB						
1		101.2	54.9	62.0	46.3	52.7
16		67.5	120.7	100.8	126.8	103.7
32		67.5	100.6	73.3	114.8	123.7
48		67.5	120.7	100.7	109.5	103.7
64		67.5	75.4	89.6	114.8	94.6

*** Speed of DGEQLF in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	67.7	56.1	56.4	56.6	72.4	61.1	65.9
(16,	48)	67.7	112.1	84.6	89.6	116.5	112.0	127.8
(32,	128)	90.3	67.3	56.4	119.4	95.7	99.5	124.1
(48,	128)	67.7	112.1	84.6	97.7	83.7	96.0	119.0
(64,	128)	90.3	84.1	48.3	82.7	92.4	111.9	117.3

*** Speed of DORGQL in megaflops ***

K = min(M,N)

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	89.6	83.3	134.3	51.0	65.0	56.3	65.8
(16,	48)	134.3	111.1	89.6	133.8	115.9	153.0	133.6
(32,	128)	134.3	66.7	100.8	107.1	115.9	89.2	127.6
(48,	128)	67.1	111.1	67.1	97.3	95.2	97.3	129.5
(64,	128)	89.6	47.6	67.2	97.3	98.8	89.2	112.5

*** Speed of DORMQL in megaflops ***

DORMQL with SIDE = 'L', TRANS = 'N', N = 1

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		13.2	12.1	18.8	24.1	21.4
16		6.8	9.0	8.1	12.0	10.7
32		4.1	3.0	8.1	6.0	5.4
48		4.1	3.6	2.7	4.8	4.0
64		2.0	4.0	5.4	6.0	3.6

DORMQL with SIDE = 'L', TRANS = 'N', N = 2

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						

1	.0	.0	.0	24.1	21.4
16	4.1	12.1	16.1	24.1	16.1
32	.0	12.1	8.1	12.0	9.2
48	4.1	6.0	5.4	8.0	7.1
64	4.1	12.1	5.4	5.3	5.4

DORMQL with SIDE = 'L', TRANS = 'N', N = 16

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		32.5	96.5	129.0	64.2	64.2
16		32.5	96.5	64.5	77.0	57.1
32		32.5	48.2	43.0	55.0	57.1
48		32.5	48.2	43.0	38.5	39.5
64		32.5	48.2	25.8	29.6	32.1

DORMQL with SIDE = 'L', TRANS = 'N', N = 100

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		50.8	33.5	38.4	33.0	33.8
16		67.7	100.5	100.8	109.4	110.8
32		101.5	120.6	100.8	114.6	110.8
48		67.7	120.6	89.6	92.5	94.5
64		67.7	100.5	89.6	89.1	84.5

DORMQL with SIDE = 'L', TRANS = 'T', N = 1

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	.0	8.1	24.1	16.1
16		.0	.0	8.1	8.0	6.4
32		.0	6.0	8.1	4.0	5.4
48		2.0	6.0	8.1	3.4	3.6
64		2.0	3.0	2.7	2.4	2.5

DORMQL with SIDE = 'L', TRANS = 'T', N = 2

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	.0	16.1	48.1	32.1
16		.0	12.1	8.1	16.0	12.8
32		4.1	12.1	16.1	9.6	9.2
48		.0	12.1	8.1	8.0	8.0
64		4.1	12.1	5.4	5.3	5.4

DORMQL with SIDE = 'L', TRANS = 'T', N = 16

1	16.2	30.1	26.9	48.1	32.1
16	9.5	18.1	8.1	24.1	16.1
32	8.1	12.1	8.1	12.0	10.7
48	6.8	9.0	10.7	16.0	9.2
64	5.4	8.0	10.7	6.0	8.0

DORMQL with SIDE = 'L', TRANS = 'N', N = 16

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		75.8	57.9	43.0	77.0	64.2
16		43.3	64.3	86.0	77.0	64.2
32		75.8	48.2	43.0	77.0	73.4
48		32.5	64.3	25.8	55.0	51.4
64		32.5	48.2	32.2	48.1	46.7

DORMQL with SIDE = 'L', TRANS = 'N', N = 100

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		101.5	75.4	89.6	63.3	68.3
16		101.5	86.2	100.8	120.3	123.5
32		67.7	120.6	115.2	109.4	110.8
48		101.5	100.5	115.2	109.4	100.4
64		81.2	150.8	100.7	100.3	114.7

DORMQL with SIDE = 'L', TRANS = 'T', N = 1

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		9.1	21.1	13.4	24.1	21.4
16		4.7	9.0	10.7	8.0	10.7
32		4.1	4.0	8.1	8.0	6.4
48		2.7	8.0	5.4	3.4	6.4
64		3.4	4.0	4.8	6.0	4.0

DORMQL with SIDE = 'L', TRANS = 'T', N = 2

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		18.9	28.1	24.2	24.1	32.1
16		8.1	24.1	16.1	19.2	21.4
32		8.1	12.1	16.1	16.0	12.8
48		8.1	18.1	10.7	12.0	9.2
64		6.8	12.1	8.1	8.0	9.2

DORMQL with SIDE = 'L', TRANS = 'T', N = 16

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	48.2	64.5	77.0	57.1
16		.0	48.2	64.5	64.2	102.8
32		.0	48.2	43.0	55.0	46.7
48		32.5	48.2	43.0	38.5	36.7
64		32.5	32.2	43.0	32.1	36.7

DORMQL with SIDE = 'L', TRANS = 'T', N = 100

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		67.7	35.5	33.6	34.9	35.3
16		67.7	100.5	100.8	109.4	119.0
32		67.7	100.5	100.8	100.3	97.3
48		50.8	86.1	89.6	96.2	97.3
64		101.5	100.5	80.6	92.5	86.8

DORMQL with SIDE = 'R', TRANS = 'N', M = 1

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	7.5	10.1	30.1	20.1
16		2.5	.0	10.1	7.5	13.4
32		2.5	7.5	10.1	10.0	8.0
48		2.5	7.5	3.4	5.0	5.0
64		2.5	3.8	3.4	3.3	3.6

DORMQL with SIDE = 'R', TRANS = 'N', M = 2

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	6.8	.0	54.1	24.1
16		.0	.0	18.1	27.0	14.4
32		4.5	13.5	9.0	13.5	12.0
48		.0	13.5	9.0	9.0	8.0
64		.0	6.8	6.0	4.9	6.6

DORMQL with SIDE = 'R', TRANS = 'N', M = 16

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		32.8	48.9	43.6	35.5	43.4
16		.0	48.9	65.3	55.8	65.2
32		32.8	32.6	43.6	65.1	47.4
48		32.8	48.9	43.6	39.1	43.4

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		54.1	48.2	51.6	77.0	57.1
16		54.1	64.3	64.5	55.0	64.2
32		40.6	64.3	64.5	64.2	64.2
48		24.4	48.2	64.5	64.2	57.1
64		32.5	48.2	32.2	42.8	42.8

DORMQL with SIDE = 'L', TRANS = 'T', N = 100

	M	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		67.7	75.4	89.5	61.7	68.3
16		50.7	120.6	161.2	104.6	123.5
32		101.5	100.5	89.6	114.6	110.8
48		67.7	100.5	115.1	109.4	133.8
64		101.5	120.6	100.7	114.6	119.0

DORMQL with SIDE = 'R', TRANS = 'N', M = 1

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		5.0	15.0	13.4	30.0	20.0
16		5.1	15.0	10.0	15.0	13.4
32		3.8	5.6	6.7	6.0	10.0
48		5.1	11.3	5.0	6.0	5.0
64		3.4	5.0	5.0	6.0	5.7

DORMQL with SIDE = 'R', TRANS = 'N', M = 2

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		18.2	31.6	9.0	27.0	28.9
16		9.1	10.2	24.1	27.0	24.1
32		15.2	13.5	9.0	13.5	18.0
48		4.5	13.5	9.0	13.5	12.0
64		6.1	10.2	6.0	10.8	12.0

DORMQL with SIDE = 'R', TRANS = 'N', M = 16

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		54.7	48.9	65.3	55.8	52.1
16		32.8	97.8	65.3	65.1	74.5
32		32.8	48.9	65.3	78.1	65.2
48		49.2	65.2	32.7	65.1	57.9

64	32.8	48.9	43.6	35.5	37.2

DORMQL with SIDE = 'R', TRANS = 'N', M = 100

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		50.6	31.8	35.0	30.1	32.2
16		67.5	86.2	80.6	96.4	100.5
32		101.3	86.2	115.1	100.4	100.5
48		101.3	100.6	89.6	96.4	91.9
64		67.5	86.2	67.2	89.3	89.3

DORMQL with SIDE = 'R', TRANS = 'T', M = 1

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	.0	10.1	15.0	20.1
16		.0	7.5	10.1	10.0	13.4
32		.0	7.5	10.1	7.5	6.7
48		.0	2.5	5.0	3.8	5.7
64		2.5	7.5	3.4	3.3	3.3

DORMQL with SIDE = 'R', TRANS = 'T', M = 2

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	.0	18.1	27.0	18.0
16		4.5	13.5	9.0	18.0	18.0
32		.0	13.5	18.1	9.0	10.3
48		4.5	6.8	9.0	9.0	8.0
64		4.5	6.8	6.0	6.0	6.6

DORMQL with SIDE = 'R', TRANS = 'T', M = 16

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		.0	48.9	65.3	35.5	43.4
16		32.8	97.8	65.3	78.1	57.9
32		32.8	48.9	65.3	55.8	57.9
48		32.8	48.9	43.6	39.1	43.4
64		32.8	48.9	43.6	32.6	34.8

DORMQL with SIDE = 'R', TRANS = 'T', M = 100

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						

64	32.8	24.5	43.6	48.8	52.1

DORMQL with SIDE = 'R', TRANS = 'N', M = 100

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		67.5	86.2	67.2	58.8	60.7
16		67.5	120.7	80.6	126.8	134.0
32		101.2	86.2	115.1	114.8	114.9
48		81.0	120.7	115.2	133.9	107.2
64		101.2	120.7	134.3	109.5	107.2

DORMQL with SIDE = 'R', TRANS = 'T', M = 1

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		12.6	17.6	20.1	20.0	20.0
16		11.8	11.3	10.0	10.0	13.4
32		3.8	7.5	6.7	15.0	8.0
48		4.2	7.5	5.0	7.5	8.0
64		4.2	5.0	5.0	5.0	8.0

DORMQL with SIDE = 'R', TRANS = 'T', M = 2

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		15.2	33.9	24.1	54.1	36.1
16		10.6	27.1	9.0	18.0	24.1
32		9.1	40.6	12.1	10.8	18.0
48		9.1	13.5	12.1	13.5	14.4
64		6.8	13.5	9.0	9.0	12.0

DORMQL with SIDE = 'R', TRANS = 'T', M = 16

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						
1		32.8	48.9	43.6	48.8	52.1
16		87.5	65.2	87.1	130.2	74.5
32		32.8	48.9	43.6	65.1	65.2
48		43.8	48.9	52.3	65.1	52.1
64		24.6	48.9	43.6	55.8	52.1

DORMQL with SIDE = 'R', TRANS = 'T', M = 100

	N	100	200	200	400	400
	K	100	100	200	200	400
NB						

1	50.6	31.8	35.0	30.9	31.2
16	101.3	86.2	89.6	100.4	103.7
32	101.3	86.2	100.8	96.4	97.5
48	67.5	100.6	100.8	100.4	91.9
64	67.5	86.2	80.6	83.1	86.9

*** Speed of DGERQF in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	67.7	37.5	30.7	32.6	33.5	30.8	32.9
(16,	48)	67.7	84.3	67.5	89.6	107.3	86.5	100.8
(32,	128)	45.1	42.2	37.5	76.8	74.5	57.1	95.2
(48,	128)	45.1	37.5	42.2	76.8	68.8	51.6	88.3
(64,	128)	67.7	37.5	30.7	67.2	78.9	50.6	76.5

*** Speed of DORGRQ in megaflops ***

K = min(M,N)

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	67.2	44.8	30.4	31.5	32.4	30.7	31.7
(16,	48)	134.3	67.2	66.9	89.2	82.4	89.0	103.0
(32,	128)	67.2	67.2	37.1	89.2	89.2	60.7	96.1
(48,	128)	67.2	44.8	37.1	82.4	76.5	53.4	89.1
(64,	128)	44.8	44.8	37.1	63.0	71.4	52.4	80.7

*** Speed of DORMRQ in megaflops ***

DORMRQ with SIDE = 'L', TRANS = 'N', N = 1

K	100	100	200	200	400
M	100	200	200	400	400
NB					
1	2.0	6.0	8.1	12.0	8.0
16	.0	.0	8.1	8.0	6.4
32	.0	6.0	4.0	4.8	5.4
48	.0	6.0	2.7	2.7	3.2
64	2.0	6.0	4.0	2.2	2.3

DORMRQ with SIDE = 'L', TRANS = 'N', N = 2

K	100	100	200	200	400
M	100	200	200	400	400
NB					
1	.0	.0	.0	16.0	32.1
16	.0	12.1	16.1	24.1	12.8
32	4.1	12.1	8.1	9.6	9.2
48	.0	12.1	8.1	5.3	5.8

1	101.2	54.9	100.7	57.4	63.1
16	81.0	100.6	134.3	109.5	123.7
32	135.1	150.8	115.2	114.8	107.2
48	67.5	120.7	100.7	114.8	119.1
64	50.6	100.6	89.6	104.8	107.2

*** Speed of DGERQF in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	90.3	67.5	67.5	67.2	58.3	53.7	56.4
(16,	48)	67.7	168.7	67.5	82.7	121.9	103.2	102.0
(32,	128)	67.7	56.2	56.2	119.4	99.4	78.9	120.6
(48,	128)	67.7	84.3	112.5	82.7	89.4	81.3	115.8
(64,	128)	90.3	84.4	67.5	82.7	103.2	78.9	112.7

*** Speed of DORGRQ in megaflops ***

K = min(M,N)

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB,	NX)							
(1,	0)	89.6	67.2	55.7	76.5	71.4	53.4	58.6
(16,	48)	67.2	67.2	111.4	119.0	97.3	102.7	120.4
(32,	128)	89.6	67.2	66.9	107.1	97.3	78.5	123.9
(48,	128)	67.2	89.6	47.8	97.3	97.3	78.5	105.5
(64,	128)	89.6	67.2	83.6	82.4	97.3	76.3	104.3

*** Speed of DORMRQ in megaflops ***

DORMRQ with SIDE = 'L', TRANS = 'N', N = 1

K	100	100	200	200	400
M	100	200	200	400	400
NB					
1	12.2	12.1	8.1	18.0	16.0
16	8.1	8.0	4.0	9.6	8.0
32	4.7	6.0	8.1	6.0	8.0
48	4.7	6.0	5.4	6.0	6.4
64	2.7	4.0	2.0	3.4	3.6

DORMRQ with SIDE = 'L', TRANS = 'N', N = 2

K	100	100	200	200	400
M	100	200	200	400	400
NB					
1	12.2	24.1	16.1	32.1	21.4
16	10.8	12.1	12.1	12.0	16.1
32	9.5	12.1	10.7	12.0	10.7
48	6.8	18.1	12.1	12.0	9.2

64	.0	6.0	3.2	4.4	4.6

DORMRQ with SIDE = 'L', TRANS = 'N', N = 16

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		32.5	96.5	64.5	32.1	34.3
16		32.5	96.5	43.0	64.2	64.2
32		32.5	48.2	43.0	48.1	51.4
48		32.5	48.2	32.2	35.0	34.3
64		32.5	48.2	32.2	29.6	30.2

DORMRQ with SIDE = 'L', TRANS = 'N', N = 100

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		67.7	33.5	33.6	32.1	33.8
16		67.7	100.5	89.6	100.3	100.4
32		101.5	86.1	89.6	100.3	107.1
48		67.7	86.1	100.8	89.1	82.4
64		101.5	100.5	80.6	80.2	86.8

DORMRQ with SIDE = 'L', TRANS = 'T', N = 1

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		.0	6.0	.0	12.0	10.7
16		2.0	6.0	8.1	8.0	8.0
32		.0	6.0	8.1	4.0	5.4
48		2.0	3.0	4.0	2.7	2.9
64		2.0	6.0	2.7	2.2	2.3

DORMRQ with SIDE = 'L', TRANS = 'T', N = 2

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		.0	12.1	8.1	24.1	21.4
16		.0	12.1	16.1	16.0	12.8
32		.0	12.1	16.1	8.0	10.7
48		4.1	12.1	8.1	5.3	6.4
64		4.1	6.0	5.4	4.8	5.4

DORMRQ with SIDE = 'L', TRANS = 'T', N = 16

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						

64	5.4	8.0	8.1	6.9	8.0

DORMRQ with SIDE = 'L', TRANS = 'N', N = 16

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		43.4	64.3	43.0	55.0	64.3
16		54.1	48.3	43.0	77.0	57.1
32		43.3	64.3	64.4	64.2	64.2
48		48.7	32.2	43.0	48.1	42.8
64		43.3	48.3	32.2	55.0	42.8

DORMRQ with SIDE = 'L', TRANS = 'N', N = 100

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		67.7	54.8	89.6	61.7	53.5
16		135.3	150.7	115.2	126.6	128.5
32		101.5	100.5	100.7	114.6	123.5
48		67.7	120.6	80.6	104.6	114.7
64		135.3	120.6	100.8	100.3	103.6

DORMRQ with SIDE = 'L', TRANS = 'T', N = 1

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		7.4	14.1	4.0	16.0	16.1
16		9.5	10.1	8.1	8.0	10.7
32		4.7	6.0	5.4	8.0	5.4
48		4.1	4.5	4.0	4.8	4.0
64		4.1	4.5	6.0	3.4	3.2

DORMRQ with SIDE = 'L', TRANS = 'T', N = 2

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						
1		10.8	20.1	21.5	16.0	25.7
16		14.9	15.1	16.1	24.1	18.4
32		9.5	12.1	8.1	12.0	12.9
48		5.4	16.1	16.1	12.0	7.1
64		8.1	12.0	10.7	6.0	6.4

DORMRQ with SIDE = 'L', TRANS = 'T', N = 16

	K	100	100	200	200	400
	M	100	200	200	400	400
NB						

1	32.5	96.5	43.0	29.6	34.3
16	32.5	48.2	64.5	64.2	73.4
32	32.5	48.2	129.0	48.1	46.7
48	32.5	24.1	64.5	38.5	36.7
64	32.5	96.5	25.8	32.1	27.0

DORMRQ with SIDE = 'L', TRANS = 'T', N = 100

K	100	100	200	200	400
M	100	200	200	400	400
NB					
1	50.8	30.2	32.2	32.1	31.5
16	67.7	120.6	115.1	104.6	97.3
32	67.7	100.5	80.6	96.2	97.3
48	67.7	60.3	89.6	89.1	94.5
64	67.7	100.5	89.6	80.2	82.4

DORMRQ with SIDE = 'R', TRANS = 'N', M = 1

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	.0	7.5	10.1	5.0	5.7
16	2.5	7.5	10.1	6.0	10.0
32	.0	7.5	10.1	6.0	5.0
48	2.5	3.8	5.0	3.8	3.6
64	.0	3.8	3.4	3.0	2.9

DORMRQ with SIDE = 'R', TRANS = 'N', M = 2

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	4.5	.0	18.1	7.7	9.0
16	.0	13.5	18.1	13.5	14.4
32	4.5	13.5	18.1	10.8	10.3
48	4.5	6.8	6.0	6.0	6.6
64	4.5	6.8	6.0	5.4	5.2

DORMRQ with SIDE = 'R', TRANS = 'N', M = 16

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	32.8	48.9	43.6	21.7	22.7
16	32.8	48.9	65.3	65.1	52.1
32	32.8	48.9	43.6	43.4	43.4
48	32.8	48.9	43.6	39.1	40.1
64	32.8	48.9	32.7	27.9	30.7

DORMRQ with SIDE = 'R', TRANS = 'N', M = 100

1	48.7	64.3	86.0	77.0	51.4
16	54.1	96.4	86.0	77.0	85.7
32	54.1	48.2	64.5	48.1	73.4
48	32.5	48.2	86.0	55.0	51.4
64	21.7	48.2	43.0	38.5	46.7

DORMRQ with SIDE = 'L', TRANS = 'T', N = 100

K	100	100	200	200	400
M	100	200	200	400	400
NB					
1	67.7	54.8	73.3	57.3	63.0
16	101.5	100.5	115.1	114.6	110.8
32	67.7	120.6	100.7	126.6	139.7
48	67.7	75.4	80.6	120.3	100.4
64	67.7	100.5	80.6	109.4	89.2

DORMRQ with SIDE = 'R', TRANS = 'N', M = 1

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	5.9	15.0	13.4	7.5	6.7
16	5.9	7.5	6.7	10.0	13.4
32	5.9	7.5	10.1	7.5	8.0
48	2.5	3.8	6.7	7.5	5.7
64	3.4	5.0	6.7	4.3	5.0

DORMRQ with SIDE = 'R', TRANS = 'N', M = 2

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	13.6	18.1	24.1	10.8	12.0
16	12.1	20.3	9.0	13.5	14.4
32	7.6	10.2	12.1	13.5	12.0
48	9.1	6.8	9.0	10.8	10.3
64	4.5	9.0	12.0	10.8	8.0

DORMRQ with SIDE = 'R', TRANS = 'N', M = 16

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	41.0	32.6	52.3	35.5	34.7
16	54.7	97.7	87.1	55.8	52.1
32	54.7	65.2	43.6	55.8	52.1
48	21.9	48.9	43.6	43.4	57.9
64	21.9	48.9	43.6	39.1	40.1

DORMRQ with SIDE = 'R', TRANS = 'N', M = 100

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	50.6	30.2	28.8	28.4	29.5
16	67.5	100.6	80.6	96.4	107.2
32	67.5	86.2	100.8	92.7	97.5
48	101.3	86.2	89.6	89.3	84.6
64	67.5	100.6	89.6	83.1	80.4

DORMRQ with SIDE = 'R', TRANS = 'T', M = 1

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	.0	7.5	10.1	6.0	5.7
16	.0	7.5	10.1	10.0	8.0
32	.0	7.5	5.0	5.0	8.0
48	.0	7.5	5.0	3.3	3.6
64	2.5	.0	3.4	2.7	3.1

DORMRQ with SIDE = 'R', TRANS = 'T', M = 2

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	.0	13.5	18.1	9.0	10.3
16	.0	.0	18.1	18.0	12.0
32	.0	13.5	18.1	10.8	10.3
48	4.5	13.5	6.0	6.0	6.0
64	.0	6.8	9.0	4.9	5.6

DORMRQ with SIDE = 'R', TRANS = 'T', M = 16

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	.0	32.6	65.3	20.6	22.7
16	.0	48.9	65.3	65.1	65.2
32	32.8	48.9	65.3	48.8	52.1
48	32.8	48.9	32.7	32.6	37.2
64	32.8	32.6	32.7	27.9	32.6

DORMRQ with SIDE = 'R', TRANS = 'T', M = 100

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	67.5	30.2	28.8	29.8	31.5
16	101.3	86.2	89.6	104.8	91.9
32	67.5	100.6	73.3	96.4	103.7
48	101.3	67.1	89.6	92.7	86.9

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	135.1	50.3	57.6	48.2	53.6
16	67.5	120.7	89.6	114.8	110.9
32	67.5	100.6	100.8	114.8	114.9
48	101.2	100.6	100.7	109.5	100.5
64	81.0	100.6	100.7	86.1	100.5

DORMRQ with SIDE = 'R', TRANS = 'T', M = 1

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	14.3	15.1	16.8	6.0	6.7
16	6.7	7.5	10.0	12.0	13.4
32	5.1	7.5	10.1	10.0	8.0
48	3.4	5.6	5.0	4.3	5.7
64	3.4	3.8	3.4	5.0	3.6

DORMRQ with SIDE = 'R', TRANS = 'T', M = 2

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	12.1	13.5	18.1	10.8	14.4
16	10.6	10.2	18.1	27.0	14.4
32	10.6	13.5	12.1	18.0	14.4
48	12.1	9.0	6.0	9.0	12.0
64	8.0	6.8	6.0	7.7	8.0

DORMRQ with SIDE = 'R', TRANS = 'T', M = 16

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	65.7	73.4	43.6	30.0	30.7
16	54.7	65.2	52.3	65.1	86.9
32	43.8	65.2	65.3	65.1	43.4
48	32.8	65.2	43.6	65.1	57.9
64	43.8	48.9	32.7	43.4	47.4

DORMRQ with SIDE = 'R', TRANS = 'T', M = 100

K	100	100	200	200	400
N	100	200	200	400	400
NB					
1	101.2	67.1	57.6	50.2	53.6
16	135.0	100.6	115.1	109.5	110.9
32	81.0	120.7	115.1	133.9	110.9
48	67.5	100.5	100.8	104.8	110.9

64	67.5	75.4	80.6	80.3	82.5		

*** Speed of DGEQPF in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
Type								
2		46.4	34.2	32.0	30.3	33.8	30.1	32.9
3		34.8	34.2	29.4	30.3	32.2	31.2	32.3

*** Speed of DGEBRD in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB, NX)								
(1, 0)		53.8	37.1	39.3	33.5	32.7	31.8	33.7
(16, 48)		44.8	47.7	39.3	48.7	52.3	50.4	56.4
(32, 128)		53.8	39.3	33.4	43.7	45.2	41.4	51.8
(48, 128)		53.8	39.3	35.1	40.4	41.7	39.0	47.6
(64, 128)		44.8	39.3	35.1	34.0	39.5	36.6	44.2

*** Speed of DORGBR in megaflops ***

DORGBR with VECT = 'Q', N = MIN(M,K)

	M	100	200	100	200	400	200	400
	K	100	100	200	200	200	400	400
(NB, NX)								
(1, 0)		44.8	37.0	43.4	34.5	34.6	35.2	34.6
(16, 48)		44.8	111.1	65.2	97.3	106.7	87.9	118.7
(32, 128)		67.2	47.6	130.3	89.2	68.4	95.9	105.5
(48, 128)		67.2	37.0	43.4	82.4	63.5	87.9	95.0
(64, 128)		67.2	41.7	43.4	76.5	62.0	70.3	90.0

DORGBR with VECT = 'P', M = MIN(K,N)

	K	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB, NX)								
(1, 0)		43.5	43.5	30.4	33.0	31.0	30.7	31.7
(16, 48)		130.4	130.4	83.6	75.3	87.9	83.5	102.2
(32, 128)		65.2	65.2	37.1	75.3	81.1	58.1	103.5
(48, 128)		43.5	65.2	37.1	75.3	70.3	52.4	88.4
(64, 128)		43.5	65.2	33.4	65.9	65.9	50.4	77.8

End of tests
Total time used = 635.70 seconds

64	67.5	100.6	100.8	100.4	97.5		

*** Speed of DGEQPF in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
Type								
2		46.4	57.0	70.5	54.5	62.9	49.0	59.1
3		46.4	57.0	44.0	49.6	62.8	48.1	57.5

*** Speed of DGEBRD in megaflops ***

	M	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB, NX)								
(1, 0)		44.8	66.8	74.2	63.0	56.2	58.0	64.5
(16, 48)		44.8	60.7	66.8	66.9	86.1	78.5	81.4
(32, 128)		67.2	66.8	55.6	66.9	74.1	66.7	77.0
(48, 128)		67.2	66.8	66.8	61.2	66.7	65.9	73.4
(64, 128)		89.6	111.3	66.8	49.8	65.1	56.2	68.9

*** Speed of DORGBR in megaflops ***

DORGBR with VECT = 'Q', N = MIN(M,K)

	M	100	200	100	200	400	200	400
	K	100	100	200	200	200	400	400
(NB, NX)								
(1, 0)		67.1	111.1	86.9	71.4	63.5	65.9	68.4
(16, 48)		67.1	83.3	86.9	82.4	133.3	87.9	125.7
(32, 128)		67.2	83.3	65.2	107.1	98.8	87.9	131.5
(48, 128)		89.6	83.3	65.1	119.0	106.7	95.9	122.1
(64, 128)		89.6	83.3	65.1	97.3	98.8	117.2	115.5

DORGBR with VECT = 'P', M = MIN(K,N)

	K	100	200	100	200	400	200	400
	N	100	100	200	200	200	400	400
(NB, NX)								
(1, 0)		86.9	65.2	83.6	62.0	65.9	53.4	56.9
(16, 48)		65.2	52.2	111.4	87.9	117.2	95.4	116.2
(32, 128)		65.1	65.2	47.8	95.9	95.9	98.9	113.1
(48, 128)		65.2	86.9	83.6	87.9	87.9	89.0	107.4
(64, 128)		86.9	65.2	66.9	87.9	87.9	72.2	104.8

End of tests
Total time used = 421.81 seconds

```
Timing the Generalized Eigenvalue Problem routines
   DGGHRD, DHGEQZ, and DTGEVC

LAPACK VERSION 2.0, released September 30, 1994

The following parameter values will be used:
   Values of  N   :      50   100   150   200
   Values of  NB  :      10    10    10    10
   Values of  NS  :       2     2     4     4
   Values of  MAXB:     200     2     4     4
   Values of NBMIN:     200   200   200    10
   Values of MINBL:     200   200   200    10
   Values of  LDA :     201   201   201   201

Minimum time a subroutine will be timed =      .00 seconds


****** Results for DGGHRD(N)   ******
    with    LDA=  201,     NB=   10

*** Time in seconds ***
       N      50       100       150       200
  Type
     1     5.00E-02  .19       .63       1.4
     2     3.00E-02  .18       .60       1.4
     3     3.00E-02  .17       .63       1.4
     4     3.00E-02  .19       .60       1.4

*** Number of floating-point operations ***
       N      50       100       150       200
  Type
     1     1.14E+06 9.21E+06 3.12E+07 7.42E+07
     2     1.14E+06 9.21E+06 3.12E+07 7.42E+07
     3     1.14E+06 9.21E+06 3.12E+07 7.42E+07
     4     1.14E+06 9.21E+06 3.12E+07 7.42E+07

*** Speed in megaflops ***
       N      50       100       150       200
  Type
     1      23.      48.       50.       53.
     2      38.      51.       52.       55.
     3      38.      54.       50.       52.
     4      38.      48.       52.       52.


****** Results for DGGHRD(Q)   ******
    with    LDA=  201,     NB=   10

*** Time in seconds ***
       N      50       100       150       200
  Type
     1     4.00E-02  .25       .85       2.1
     2     4.00E-02  .24       .87       2.1
```

```
Timing the Generalized Eigenvalue Problem routines
   DGGHRD, DHGEQZ, and DTGEVC

LAPACK VERSION 2.0, released September 30, 1994

The following parameter values will be used:
   Values of  N   :      50   100   150   200
   Values of  NB  :      10    10    10    10
   Values of  NS  :       2     2     4     4
   Values of  MAXB:     200     2     4     4
   Values of NBMIN:     200   200   200    10
   Values of MINBL:     200   200   200    10
   Values of  LDA :     201   201   201   201

Minimum time a subroutine will be timed =      .02 seconds


****** Results for DGGHRD(N)   ******
    with    LDA=  201,     NB=   10

*** Time in seconds ***
       N      50       100       150       200
  Type
     1     3.00E-02  .14       .58       1.3
     2     3.00E-02  .19       .55       1.3
     3     3.00E-02  .18       .52       1.3
     4     4.00E-02  .17       .57       1.3

*** Number of floating-point operations ***
       N      50       100       150       200
  Type
     1     1.14E+06 9.21E+06 3.12E+07 7.42E+07
     2     1.14E+06 9.21E+06 3.12E+07 7.42E+07
     3     1.14E+06 9.21E+06 3.12E+07 7.42E+07
     4     1.14E+06 9.21E+06 3.12E+07 7.42E+07

*** Speed in megaflops ***
       N      50       100       150       200
  Type
     1      38.      66.       54.       56.
     2      38.      48.       57.       58.
     3      38.      51.       60.       55.
     4      28.      54.       55.       57.


****** Results for DGGHRD(Q)   ******
    with    LDA=  201,     NB=   10

*** Time in seconds ***
       N      50       100       150       200
  Type
     1     4.00E-02  .25       .83       1.8
     2     3.00E-02  .24       .83       1.8
```

3	4.00E-02	.25	.87	2.0
4	3.00E-02	.27	.86	2.1

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	1.49E+06	1.21E+07	4.12E+07	9.78E+07
2	1.49E+06	1.21E+07	4.12E+07	9.78E+07
3	1.49E+06	1.21E+07	4.12E+07	9.78E+07
4	1.49E+06	1.21E+07	4.12E+07	9.78E+07

*** Speed in megaflops ***

N / Type	50	100	150	200
1	37.	48.	48.	47.
2	37.	51.	47.	47.
3	37.	48.	47.	48.
4	50.	45.	48.	47.

****** Results for DGGHRD(Z) ******
with LDA= 201, NB= 10

*** Time in seconds ***

N / Type	50	100	150	200
1	4.00E-02	.22	.80	1.8
2	3.00E-02	.25	.79	1.8
3	4.00E-02	.25	.80	1.9
4	4.00E-02	.25	.78	1.8

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	1.49E+06	1.21E+07	4.12E+07	9.78E+07
2	1.49E+06	1.21E+07	4.12E+07	9.78E+07
3	1.49E+06	1.21E+07	4.12E+07	9.78E+07
4	1.49E+06	1.21E+07	4.12E+07	9.78E+07

*** Speed in megaflops ***

N / Type	50	100	150	200
1	37.	55.	51.	53.
2	50.	48.	52.	53.
3	37.	48.	51.	52.
4	37.	48.	53.	53.

****** Results for DGGHRD(Q,Z) ******
with LDA= 201, NB= 10

*** Time in seconds ***

N / Type

3	3.00E-02	.24	.79	1.8
4	3.00E-02	.21	.75	1.8

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	1.49E+06	1.21E+07	4.12E+07	9.78E+07
2	1.49E+06	1.21E+07	4.12E+07	9.78E+07
3	1.49E+06	1.21E+07	4.12E+07	9.78E+07
4	1.49E+06	1.21E+07	4.12E+07	9.78E+07

*** Speed in megaflops ***

N / Type	50	100	150	200
1	37.	48.	50.	55.
2	50.	51.	50.	53.
3	50.	51.	52.	54.
4	50.	58.	55.	55.

****** Results for DGGHRD(Z) ******
with LDA= 201, NB= 10

*** Time in seconds ***

N / Type	50	100	150	200
1	3.00E-02	.23	.73	1.8
2	4.00E-02	.21	.72	1.7
3	5.00E-02	.22	.73	1.6
4	3.00E-02	.26	.76	1.8

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	1.49E+06	1.21E+07	4.12E+07	9.78E+07
2	1.49E+06	1.21E+07	4.12E+07	9.78E+07
3	1.49E+06	1.21E+07	4.12E+07	9.78E+07
4	1.49E+06	1.21E+07	4.12E+07	9.78E+07

*** Speed in megaflops ***

N / Type	50	100	150	200
1	50.	53.	56.	55.
2	37.	58.	57.	58.
3	30.	55.	56.	61.
4	50.	47.	54.	55.

****** Results for DGGHRD(Q,Z) ******
with LDA= 201, NB= 10

*** Time in seconds ***

N / Type

1	4.00E-02	.31	1.0	2.7
2	4.00E-02	.30	1.0	2.6
3	4.00E-02	.30	1.0	2.6
4	5.00E-02	.30	1.0	2.6

*** Number of floating-point operations ***

N	50	100	150	200
Type				
1	1.84E+06	1.50E+07	5.11E+07	1.21E+08
2	1.84E+06	1.50E+07	5.11E+07	1.21E+08
3	1.84E+06	1.50E+07	5.11E+07	1.21E+08
4	1.84E+06	1.50E+07	5.11E+07	1.21E+08

*** Speed in megaflops ***

N	50	100	150	200
Type				
1	46.	48.	49.	45.
2	46.	50.	51.	47.
3	46.	50.	49.	46.
4	37.	50.	49.	47.

****** Results for DHGEQZ(E) ******
with LDA= 201

*** Time in seconds ***

N	50	100	150	200
Type				
1	5.00E-02	.24	.65	1.4
2	5.00E-02	.25	.67	1.4
3	4.00E-02	.24	.63	1.5
4	4.00E-02	.23	.71	1.5

*** Number of floating-point operations ***

N	50	100	150	200
Type				
1	1.53E+06	1.20E+07	3.61E+07	8.21E+07
2	1.86E+06	1.20E+07	3.93E+07	8.28E+07
3	1.55E+06	1.23E+07	3.53E+07	9.03E+07
4	1.74E+06	1.16E+07	3.92E+07	9.12E+07

*** Speed in megaflops ***

N	50	100	150	200
Type				
1	31.	50.	56.	60.
2	37.	48.	59.	59.
3	39.	51.	56.	61.
4	44.	50.	55.	61.

****** Results for DHGEQZ(S) ******
with LDA= 201

*** Time in seconds ***

1	4.00E-02	.30	.96	2.2
2	3.00E-02	.29	.91	2.1
3	4.00E-02	.29	.92	2.3
4	4.00E-02	.29	.97	2.3

*** Number of floating-point operations ***

N	50	100	150	200
Type				
1	1.84E+06	1.50E+07	5.11E+07	1.21E+08
2	1.84E+06	1.50E+07	5.11E+07	1.21E+08
3	1.84E+06	1.50E+07	5.11E+07	1.21E+08
4	1.84E+06	1.50E+07	5.11E+07	1.21E+08

*** Speed in megaflops ***

N	50	100	150	200
Type				
1	46.	50.	53.	55.
2	61.	52.	56.	57.
3	46.	52.	56.	53.
4	46.	52.	53.	54.

****** Results for DHGEQZ(E) ******
with LDA= 201

*** Time in seconds ***

N	50	100	150	200
Type				
1	4.00E-02	.21	.59	1.3
2	5.00E-02	.24	.67	1.3
3	4.00E-02	.18	.57	1.3
4	3.00E-02	.19	.61	1.3

*** Number of floating-point operations ***

N	50	100	150	200
Type				
1	1.53E+06	1.20E+07	3.61E+07	8.21E+07
2	1.86E+06	1.20E+07	3.93E+07	8.28E+07
3	1.55E+06	1.23E+07	3.53E+07	9.03E+07
4	1.74E+06	1.16E+07	3.92E+07	9.12E+07

*** Speed in megaflops ***

N	50	100	150	200
Type				
1	38.	57.	61.	64.
2	37.	50.	59.	65.
3	39.	68.	62.	69.
4	58.	61.	64.	69.

****** Results for DHGEQZ(S) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	4.00E-02	.28	.87	1.8
2	5.00E-02	.30	.93	1.9
3	4.00E-02	.30	.83	2.1
4	5.00E-02	.27	.92	2.1

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	1.98E+06	1.62E+07	5.11E+07	1.18E+08
2	2.47E+06	1.66E+07	5.58E+07	1.19E+08
3	2.07E+06	1.68E+07	4.96E+07	1.29E+08
4	2.19E+06	1.58E+07	5.50E+07	1.32E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	49.	58.	59.	65.
2	49.	55.	60.	63.
3	52.	56.	60.	63.
4	44.	59.	60.	63.

****** Results for DHGEQZ(Q) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	5.00E-02	.40	1.2	2.6
2	6.00E-02	.44	1.3	2.8
3	6.00E-02	.42	1.2	2.9
4	6.00E-02	.39	1.3	3.1

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	2.87E+06	2.39E+07	7.58E+07	1.76E+08
2	3.58E+06	2.45E+07	8.27E+07	1.77E+08
3	3.00E+06	2.47E+07	7.35E+07	1.92E+08
4	3.18E+06	2.33E+07	8.16E+07	1.96E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	57.	60.	62.	69.
2	60.	56.	63.	63.
3	50.	59.	62.	65.
4	53.	60.	64.	64.

****** Results for DHGEQZ(Z) ******
with LDA= 201

N / Type	50	100	150	200
1	4.00E-02	.28	.70	1.7
2	6.00E-02	.28	.85	1.7
3	5.00E-02	.29	.70	1.8
4	4.00E-02	.26	.84	1.8

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	1.98E+06	1.62E+07	5.11E+07	1.18E+08
2	2.47E+06	1.66E+07	5.58E+07	1.19E+08
3	2.07E+06	1.68E+07	4.96E+07	1.29E+08
4	2.19E+06	1.58E+07	5.50E+07	1.32E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	49.	58.	73.	71.
2	41.	59.	66.	71.
3	41.	58.	71.	73.
4	55.	61.	65.	72.

****** Results for DHGEQZ(Q) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	5.00E-02	.39	1.1	2.4
2	9.00E-02	.36	1.2	2.4
3	5.00E-02	.40	1.1	2.6
4	7.00E-02	.37	1.2	2.7

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	2.87E+06	2.39E+07	7.58E+07	1.76E+08
2	3.58E+06	2.45E+07	8.27E+07	1.77E+08
3	3.00E+06	2.47E+07	7.35E+07	1.92E+08
4	3.18E+06	2.33E+07	8.16E+07	1.96E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	57.	61.	66.	73.
2	40.	68.	71.	75.
3	60.	62.	68.	74.
4	45.	63.	71.	74.

****** Results for DHGEQZ(Z) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	6.00E-02	.39	1.2	2.7
2	6.00E-02	.43	1.3	2.8
3	6.00E-02	.43	1.2	3.0
4	6.00E-02	.39	1.3	3.0

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	2.87E+06	2.39E+07	7.58E+07	1.76E+08
2	3.58E+06	2.45E+07	8.27E+07	1.77E+08
3	3.00E+06	2.47E+07	7.35E+07	1.92E+08
4	3.18E+06	2.33E+07	8.16E+07	1.96E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	48.	61.	62.	65.
2	60.	57.	63.	63.
3	50.	58.	63.	64.
4	53.	60.	63.	64.

****** Results for DHGEQZ(Q,Z) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	6.00E-02	.51	1.6	3.9
2	7.00E-02	.54	1.8	3.9
3	7.00E-02	.52	1.5	4.2
4	7.00E-02	.50	1.7	4.3

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	3.76E+06	3.16E+07	1.01E+08	2.34E+08
2	4.70E+06	3.25E+07	1.10E+08	2.35E+08
3	3.94E+06	3.27E+07	9.74E+07	2.55E+08
4	4.17E+06	3.08E+07	1.08E+08	2.61E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	63.	62.	62.	60.
2	67.	60.	62.	60.
3	56.	63.	63.	60.
4	60.	62.	62.	61.

*** Time in seconds ***

N / Type	50	100	150	200
1	6.00E-02	.35	1.0	2.4
2	7.00E-02	.35	1.2	2.5
3	5.00E-02	.43	1.0	2.5
4	6.00E-02	.34	1.2	2.8

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	2.87E+06	2.39E+07	7.58E+07	1.76E+08
2	3.58E+06	2.45E+07	8.27E+07	1.77E+08
3	3.00E+06	2.47E+07	7.35E+07	1.92E+08
4	3.18E+06	2.33E+07	8.16E+07	1.96E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	48.	68.	73.	73.
2	51.	70.	70.	72.
3	60.	58.	73.	76.
4	53.	69.	71.	71.

****** Results for DHGEQZ(Q,Z) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	6.00E-02	.49	1.5	3.2
2	8.00E-02	.50	1.6	3.1
3	7.00E-02	.48	1.4	3.3
4	7.00E-02	.46	1.5	3.7

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	3.76E+06	3.16E+07	1.01E+08	2.34E+08
2	4.70E+06	3.25E+07	1.10E+08	2.35E+08
3	3.94E+06	3.27E+07	9.74E+07	2.55E+08
4	4.17E+06	3.08E+07	1.08E+08	2.61E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	63.	65.	68.	73.
2	59.	65.	70.	76.
3	56.	68.	68.	77.
4	60.	67.	70.	71.

****** Results for DTGEVC(L,A) ******
with LDA= 201

*** Time in seconds ***

Type \ N	50	100	150	200
1	1.00E-02	3.00E-02	9.00E-02	.16
2	0.00E+00	3.00E-02	9.00E-02	.17
3	1.00E-02	2.00E-02	7.00E-02	.16
4	0.00E+00	2.00E-02	8.00E-02	.19

*** Number of floating-point operations ***

Type \ N	50	100	150	200
1	1.15E+05	7.93E+05	2.53E+06	5.86E+06
2	1.13E+05	7.83E+05	2.54E+06	5.84E+06
3	1.15E+05	7.94E+05	2.54E+06	5.86E+06
4	1.15E+05	7.95E+05	2.54E+06	5.84E+06

*** Speed in megaflops ***

Type \ N	50	100	150	200
1	12.	26.	28.	37.
2	0.00E+00	26.	28.	34.
3	11.	40.	36.	37.
4	0.00E+00	40.	32.	31.

****** Results for DTGEVC(L,B) ******
with LDA= 201

*** Time in seconds ***

Type \ N	50	100	150	200
1	1.00E-02	6.00E-02	.17	.36
2	1.00E-02	6.00E-02	.17	.35
3	1.00E-02	4.00E-02	.18	.37
4	1.00E-02	5.00E-02	.15	.36

*** Number of floating-point operations ***

Type \ N	50	100	150	200
1	2.44E+05	1.81E+06	5.94E+06	1.39E+07
2	2.41E+05	1.80E+06	5.95E+06	1.39E+07
3	2.43E+05	1.81E+06	5.95E+06	1.39E+07
4	2.44E+05	1.81E+06	5.95E+06	1.39E+07

*** Speed in megaflops ***

Type \ N	50	100	150	200
1	24.	30.	35.	39.
2	24.	30.	35.	40.
3	24.	45.	33.	38.
4	24.	36.	40.	39.

****** Results for DTGEVC(L,A) ******
with LDA= 201

*** Time in seconds ***

Type \ N	50	100	150	200
1	5.00E-03	2.50E-02	8.00E-02	.12
2	7.50E-03	2.00E-02	6.00E-02	.12
3	6.00E-03	3.00E-02	6.00E-02	.13
4	5.00E-03	3.00E-02	5.00E-02	.12

*** Number of floating-point operations ***

Type \ N	50	100	150	200
1	1.15E+05	7.93E+05	2.53E+06	5.86E+06
2	1.13E+05	7.83E+05	2.54E+06	5.84E+06
3	1.15E+05	7.94E+05	2.54E+06	5.86E+06
4	1.15E+05	7.95E+05	2.54E+06	5.84E+06

*** Speed in megaflops ***

Type \ N	50	100	150	200
1	23.	32.	32.	49.
2	15.	39.	42.	49.
3	19.	26.	42.	45.
4	23.	27.	51.	49.

****** Results for DTGEVC(L,B) ******
with LDA= 201

*** Time in seconds ***

Type \ N	50	100	150	200
1	7.50E-03	5.00E-02	.12	.28
2	6.00E-03	4.00E-02	.12	.26
3	6.67E-03	4.00E-02	.13	.23
4	7.50E-03	3.00E-02	.13	.25

*** Number of floating-point operations ***

Type \ N	50	100	150	200
1	2.44E+05	1.81E+06	5.94E+06	1.39E+07
2	2.41E+05	1.80E+06	5.95E+06	1.39E+07
3	2.43E+05	1.81E+06	5.95E+06	1.39E+07
4	2.44E+05	1.81E+06	5.95E+06	1.39E+07

*** Speed in megaflops ***

Type \ N	50	100	150	200
1	33.	36.	50.	50.
2	40.	45.	50.	53.
3	36.	45.	46.	61.
4	33.	60.	46.	56.

****** Results for DTGEVC(R,A) ******
with LDA= 201

*** Time in seconds ***

Type \ N	50	100	150	200
1	0.00E+00	2.00E-02	8.00E-02	.15
2	1.00E-02	3.00E-02	8.00E-02	.16
3	1.00E-02	3.00E-02	7.00E-02	.16
4	1.00E-02	3.00E-02	8.00E-02	.15

*** Number of floating-point operations ***

Type \ N	50	100	150	200
1	1.39E+05	9.81E+05	3.16E+06	7.29E+06
2	1.40E+05	9.90E+05	3.16E+06	7.35E+06
3	1.38E+05	9.75E+05	3.15E+06	7.29E+06
4	1.38E+05	9.77E+05	3.14E+06	7.34E+06

*** Speed in megaflops ***

Type \ N	50	100	150	200
1	0.00E+00	49.	40.	49.
2	14.	33.	39.	46.
3	14.	32.	45.	46.
4	14.	33.	39.	49.

****** Results for DTGEVC(R,B) ******
with LDA= 201

*** Time in seconds ***

Type \ N	50	100	150	200
1	1.00E-02	6.00E-02	.20	.44
2	1.00E-02	6.00E-02	.20	.43
3	1.00E-02	6.00E-02	.20	.41
4	1.00E-02	6.00E-02	.19	.40

*** Number of floating-point operations ***

Type \ N	50	100	150	200
1	2.68E+05	2.00E+06	6.57E+06	1.54E+07
2	2.68E+05	2.00E+06	6.57E+06	1.54E+07
3	2.67E+05	1.99E+06	6.56E+06	1.54E+07
4	2.67E+05	1.99E+06	6.55E+06	1.54E+07

*** Speed in megaflops ***

Type \ N	50	100	150	200
1	27.	33.	33.	35.
2	27.	33.	33.	36.
3	27.	33.	33.	37.

****** Results for DTGEVC(R,A) ******
with LDA= 201

*** Time in seconds ***

Type \ N	50	100	150	200
1	5.00E-03	2.00E-02	7.00E-02	.12
2	4.29E-03	3.00E-02	6.00E-02	.13
3	5.00E-03	3.00E-02	6.00E-02	.12
4	6.00E-03	2.00E-02	5.00E-02	.11

*** Number of floating-point operations ***

Type \ N	50	100	150	200
1	1.39E+05	9.81E+05	3.16E+06	7.29E+06
2	1.40E+05	9.90E+05	3.16E+06	7.35E+06
3	1.38E+05	9.75E+05	3.15E+06	7.29E+06
4	1.38E+05	9.77E+05	3.14E+06	7.34E+06

*** Speed in megaflops ***

Type \ N	50	100	150	200
1	28.	49.	45.	61.
2	33.	33.	53.	57.
3	28.	32.	52.	61.
4	23.	49.	63.	67.

****** Results for DTGEVC(R,B) ******
with LDA= 201

*** Time in seconds ***

Type \ N	50	100	150	200
1	6.67E-03	3.00E-02	.12	.27
2	1.00E-02	5.00E-02	.13	.27
3	8.00E-03	3.00E-02	.12	.25
4	6.00E-03	4.00E-02	.12	.29

*** Number of floating-point operations ***

Type \ N	50	100	150	200
1	2.68E+05	2.00E+06	6.57E+06	1.54E+07
2	2.68E+05	2.00E+06	6.57E+06	1.54E+07
3	2.67E+05	1.99E+06	6.56E+06	1.54E+07
4	2.67E+05	1.99E+06	6.55E+06	1.54E+07

*** Speed in megaflops ***

Type \ N	50	100	150	200
1	40.	67.	55.	57.
2	27.	40.	51.	57.
3	33.	66.	55.	61.

```
     4      27.       33.       34.       38.


****** Results for QZHES(F)     ******
    with    LDA=  201

*** Time in seconds ***
       N      50       100       150       200
  Type
     1     3.00E-02  .19       .69       1.7
     2     2.00E-02  .19       .69       1.7
     3     2.00E-02  .19       .70       1.6
     4     2.00E-02  .19       .71       1.6

*** Number of floating-point operations ***
       N      50       100       150       200
  Type
     1     1.33E+06 1.07E+07 3.60E+07 8.53E+07
     2     1.33E+06 1.07E+07 3.60E+07 8.53E+07
     3     1.33E+06 1.07E+07 3.60E+07 8.53E+07
     4     1.33E+06 1.07E+07 3.60E+07 8.53E+07

*** Speed in megaflops ***
       N      50       100       150       200
  Type
     1      44.       56.       52.       51.
     2      66.       56.       52.       50.
     3      66.       56.       51.       52.
     4      66.       56.       51.       52.


****** Results for QZHES(T)     ******
    with    LDA=  201

*** Time in seconds ***
       N      50       100       150       200
  Type
     1     2.00E-02  .24       .83       2.1
     2     3.00E-02  .24       .84       2.1
     3     2.00E-02  .27       .85       2.1
     4     2.00E-02  .26       .86       2.1

*** Number of floating-point operations ***
       N      50       100       150       200
  Type
     1     1.68E+06 1.36E+07 4.59E+07 1.09E+08
     2     1.68E+06 1.36E+07 4.59E+07 1.09E+08
     3     1.68E+06 1.36E+07 4.59E+07 1.09E+08
     4     1.68E+06 1.36E+07 4.59E+07 1.09E+08

*** Speed in megaflops ***
       N      50       100       150       200
  Type
     1      84.       57.       55.       51.
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```
     4      44.       50.       55.       53.


****** Results for QZHES(F)     ******
    with    LDA=  201

*** Time in seconds ***
       N      50       100       150       200
  Type
     1     2.00E-02  .14       .46       1.0
     2     1.50E-02  .14       .46       1.0
     3     1.50E-02  .14       .48       1.1
     4     2.00E-02  .14       .44       1.1

*** Number of floating-point operations ***
       N      50       100       150       200
  Type
     1     1.33E+06 1.07E+07 3.60E+07 8.53E+07
     2     1.33E+06 1.07E+07 3.60E+07 8.53E+07
     3     1.33E+06 1.07E+07 3.60E+07 8.53E+07
     4     1.33E+06 1.07E+07 3.60E+07 8.53E+07

*** Speed in megaflops ***
       N      50       100       150       200
  Type
     1      66.       76.       78.       82.
     2      89.       76.       78.       82.
     3      89.       76.       75.       79.
     4      66.       76.       82.       78.


****** Results for QZHES(T)     ******
    with    LDA=  201

*** Time in seconds ***
       N      50       100       150       200
  Type
     1     3.00E-02  .16       .59       1.3
     2     1.00E-02  .15       .56       1.4
     3     3.00E-02  .16       .57       1.4
     4     2.00E-02  .15       .57       1.4

*** Number of floating-point operations ***
       N      50       100       150       200
  Type
     1     1.68E+06 1.36E+07 4.59E+07 1.09E+08
     2     1.68E+06 1.36E+07 4.59E+07 1.09E+08
     3     1.68E+06 1.36E+07 4.59E+07 1.09E+08
     4     1.68E+06 1.36E+07 4.59E+07 1.09E+08

*** Speed in megaflops ***
       N      50       100       150       200
  Type
     1      56.       85.       78.       84.
```

2	56.	57.	55.	52.
3	84.	50.	54.	52.
4	84.	52.	53.	52.

****** Results for QZIT(F) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	3.00E-02	.21	.62	1.3
2	4.00E-02	.20	.65	1.3
3	4.00E-02	.20	.57	1.4
4	4.00E-02	.19	.62	1.4

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	1.93E+06	1.55E+07	4.78E+07	1.02E+08
2	2.33E+06	1.45E+07	5.16E+07	1.06E+08
3	2.06E+06	1.53E+07	4.41E+07	1.09E+08
4	2.41E+06	1.39E+07	4.63E+07	1.10E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	64.	74.	77.	77.
2	58.	72.	79.	80.
3	51.	77.	77.	79.
4	60.	73.	75.	78.

****** Results for QZIT(T) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	5.00E-02	.39	1.3	2.8
2	5.00E-02	.42	1.4	2.9
3	4.00E-02	.42	1.2	2.9
4	5.00E-02	.38	1.2	3.0

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	3.70E+06	3.19E+07	1.00E+08	2.29E+08
2	4.61E+06	3.04E+07	1.12E+08	2.38E+08
3	3.96E+06	3.17E+07	9.54E+07	2.42E+08
4	4.48E+06	2.85E+07	9.79E+07	2.40E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
2	1.68E+02	90.	82.	78.
3	56.	85.	81.	78.
4	84.	90.	81.	80.

****** Results for QZIT(F) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	4.00E-02	.17	.55	.97
2	2.00E-02	.19	.59	1.1
3	3.00E-02	.21	.52	1.3
4	3.00E-02	.22	.51	1.2

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	1.89E+06	1.41E+07	4.64E+07	9.05E+07
2	2.26E+06	1.41E+07	4.88E+07	1.03E+08
3	2.18E+06	1.50E+07	4.55E+07	1.15E+08
4	2.36E+06	1.44E+07	4.62E+07	1.08E+08

*** Speed in megaflops ***

N / Type	50	100	150	200
1	47.	83.	84.	93.
2	1.13E+02	74.	83.	93.
3	73.	71.	88.	87.
4	79.	66.	91.	88.

****** Results for QZIT(T) ******
with LDA= 201

*** Time in seconds ***

N / Type	50	100	150	200
1	4.00E-02	.34	1.2	2.3
2	6.00E-02	.36	1.2	2.5
3	5.00E-02	.42	1.2	2.7
4	5.00E-02	.36	1.1	2.6

*** Number of floating-point operations ***

N / Type	50	100	150	200
1	3.59E+06	2.91E+07	9.86E+07	1.99E+08
2	4.57E+06	2.94E+07	1.05E+08	2.32E+08
3	4.21E+06	3.10E+07	9.92E+07	2.48E+08
4	4.44E+06	2.96E+07	9.82E+07	2.35E+08

*** Speed in megaflops ***

N / Type	50	100	150	200

Type				
1	74.	82.	78.	82.
2	92.	72.	82.	81.
3	99.	75.	82.	83.
4	90.	75.	80.	81.

****** Results for QZVEC ******
with LDA= 201

*** Time in seconds ***

Type	N	50	100	150	200
1		1.00E-02	4.00E-02	.12	.29
2		1.00E-02	3.00E-02	.12	.30
3		0.00E+00	4.00E-02	.12	.28
4		1.00E-02	3.00E-02	.12	.30

*** Number of floating-point operations ***

Type	N	50	100	150	200
1		2.58E+05	2.01E+06	6.72E+06	1.60E+07
2		2.55E+05	1.98E+06	6.80E+06	1.60E+07
3		2.56E+05	2.01E+06	6.81E+06	1.60E+07
4		2.59E+05	2.03E+06	6.80E+06	1.59E+07

*** Speed in megaflops ***

Type	N	50	100	150	200
1		26.	50.	56.	55.
2		25.	66.	57.	53.
3		0.00E+00	50.	57.	57.
4		26.	68.	57.	53.

End of timing run
Total time used = 222.71 seconds

Type				
1	90.	86.	83.	87.
2	76.	82.	86.	92.
3	84.	74.	84.	93.
4	89.	82.	85.	90.

****** Results for QZVEC ******
with LDA= 201

*** Time in seconds ***

Type	N	50	100	150	200
1		6.00E-03	4.00E-02	.11	.22
2		6.00E-03	3.00E-02	.10	.25
3		1.33E-02	3.00E-02	9.00E-02	.21
4		6.00E-03	3.00E-02	9.00E-02	.19

*** Number of floating-point operations ***

Type	N	50	100	150	200
1		2.58E+05	2.01E+06	6.73E+06	1.61E+07
2		2.55E+05	1.97E+06	6.78E+06	1.61E+07
3		2.56E+05	2.01E+06	6.77E+06	1.61E+07
4		2.61E+05	2.03E+06	6.78E+06	1.61E+07

*** Speed in megaflops ***

Type	N	50	100	150	200
1		43.	50.	61.	73.
2		42.	66.	68.	64.
3		19.	67.	75.	76.
4		44.	68.	75.	85.

End of timing run
Total time used = 182.09 seconds

Enclosure - More About Timing

We add here as enclosure the section 7 of the LAPACK Working Note 41 where the data are contained to interpret the results of the timing routines we reported above.

7 More About Timing

There are two distinct timing programs for LAPACK routines in each data type, one for the linear equations routines and one for the eigensystem routines. The linear equation timing program also times the Level 2 and 3 BLAS, and the reductions to bidiagonal, tridiagonal, or Hessenberg form for eigenvalue computations. Results from the linear equation timing program are given in megaflops, and the operation counts are computed from a formula (see Appendix C). Results from the eigensystem timing program are given in execution times, operation counts, and megaflops, where the operation counts are calculated during execution using special versions of the LAPACK routines which have been instrumented to count operations. Each program has its own style of input, and the eigensystem timing program accepts four different sets of parameters, for the generalized nonsymmetric eigenvalue problem, the nonsymmetric eigenvalue problem, the symmetric and generalized symmetric eigenvalue problem, and the singular value decomposition. The following sections describe the different input formats and timing parameters.

Both timing programs, but the linear equation timing program in particular, are intended to be used to collect data to determine optimal values for the block routines. All of the block factorization, inversion, reduction, and orthogonal transformation routines in LAPACK are included in the linear equation timing program. Currently, the block parameters NB and NX, as well as others, are passed to the block routines by the environment inquiry function ILAENV, which in turn receives these values through a common block set in the timing program. Future implementations of ILAENV may be tuned to a specific machine so that users of LAPACK will not have to set the block size. For a brief introduction to ILAENV and guidelines on setting some of the parameters, see the LAPACK Users' Guide [1].

The main timing procedure for the REAL linear equation routines is found in `LAPACK/TIMING/LIN/stimaa.f` in the Unix version and is the first program unit in SLINTIMF in the non-Unix version. The main timing procedure for the REAL eigenvalue routines is found in `LAPACK/TIMING/EIG/stimee.f` in the Unix version and is the first program unit in SEIGTIMF in the non-Unix version.

7.1 The Linear Equation Timing Program

The timing program for the linear equation routines is driven by a data file from which the following parameters may be varied:

- M, the matrix row dimension
- N, the matrix column dimension, or the half-bandwidth for the band routines
- K, the number of right-hand sides for the linear solvers, or the third dimension for the Level 3 BLAS
- NB, the block size for the blocked routines, or INCX for the Level 2 BLAS
- NX, the crossover point, the point in a block algorithm at which we switch to an unblocked algorithm
- LDA, the leading dimension of the dense and banded matrices.

For banded matrices, the values of M are used for the matrix row and column dimensions, and for symmetric or Hermitian matrices that are not banded, the values of N are used for the matrix dimension.

The number and size of the input values are limited by certain program maximums which are defined in PARAMETER statements in the main timing program:

Parameter	Description	Value
NMAX	Maximum value of M, N, K, and NB for dense matrices	512
LDAMAX	Maximum value of LDA	532
NMAXB	Maximum value of M for banded matrices	5000
MAXIN	Maximum number of values of M, N, K, or NB	12
MXNLDA	Maximum number of values of LDA	4

The parameter LDAMAX should be at least NMAX. For the xGB path, we must have $(\mathrm{LDA} + K)M \leq 3(\mathrm{LDAMAX})(\mathrm{NMAX})$, where $\mathrm{LDA} \geq 3K + 1$, which restricts the value of K. These limits allow K to be as big as 200 for M = 1000. For the xPB and xTB paths, the condition is $(2K + 1)M \leq 3(\mathrm{NMAX})(\mathrm{LDAMAX})$.

The input file also specifies a set of LAPACK routine names or LAPACK path names to be timed. The path names are similar to those used for the test program, and include the following standard paths:

{S, C, D, Z}	GE	General matrices (LU factorization)
{S, C, D, Z}	GB	General banded matrices
{S, C, D, Z}	PO	Positive definite matrices (Cholesky factorization)
{S, C, D, Z}	PP	Positive definite packed
{S, C, D, Z}	PB	Positive definite banded
{S, C, D, Z}	SY	Symmetric indefinite matrices (Bunch-Kaufman factorization)
{S, C, D, Z}	SP	Symmetric indefinite packed
{C, Z}	HE	Hermitian indefinite matrices (Bunch-Kaufman factorization)
{C, Z}	HP	Hermitian indefinite packed
{S, C, D, Z}	TR	Triangular matrices
{S, C, D, Z}	TP	Triangular packed matrices
{S, C, D, Z}	TB	Triangular band
{S, C, D, Z}	QR	QR decomposition
{S, C, D, Z}	RQ	RQ decomposition
{S, C, D, Z}	LQ	LQ decomposition
{S, C, D, Z}	QL	QL decomposition
{S, C, D, Z}	QP	QR decomposition with column pivoting
{S, C, D, Z}	HR	Reduction to Hessenberg form
{S, C, D, Z}	TD	Reduction to real tridiagonal form
{S, C, D, Z}	BR	Reduction to bidiagonal form

For timing the Level 2 and 3 BLAS, two extra paths are provided:

{S, C, D, Z}	B2	Level 2 BLAS
{S, C, D, Z}	B3	Level 3 BLAS

The paths xGT, xPT, xHR and xTD include timing of the equivalent LINPACK solvers or EISPACK reductions for comparison.

The timing programs have their own matrix generator that supplies random Toeplitz matrices (constant along a diagonal) for many of the timing paths. Toeplitz matrices are used because they can be generated more quickly than dense matrices, and the call to the matrix generator is inside the timing loop. The LAPACK test matrix generator is used to generate matrices of known condition for the xQR, xRQ, xLQ, xQL, xQP, xHR, xTD, and xBR paths.

The user specifies a minimum time for which each routine should run and the computation is repeated if necessary until this time is used. In order to prevent inflated performance due to a matrix remaining in the cache from one iteration to the next, the paths that use random Toeplitz matrices regenerate the matrix before each call to the LAPACK routine in the timing loop. The time for generating the matrix at each iteration is subtracted from the total time.

An annotated example of an input file for timing the REAL linear equation routines that operate on dense square matrices is shown below. The first line of input is printed as the first line of output and can be used to identify different sets of results.

```
LAPACK timing, REAL square matrices
5                               Number of values of M
10 20 40 60 80                  Values of M (row dimension)
5                               Number of values of N
10 20 40 60 80                  Values of N (column dimension)
2                               Number of values of K
20 80                           Values of K
2                               Number of values of NB
1  8                            Values of NB (blocksize)
0  8                            Values of NX (crossover point)
1                               Number of values of LDA
81                              Values of LDA (leading dimension)
0.05                            Minimum time in seconds
SGE     T T T
SPO     T T T
SPP     T T T
SSY     T T T
SSP     T T T
STR     T T
STP     T T
SQR     T T T
SLQ     T T T
SQL     T T T
SRQ     T T T
SQP     T
SHR     T T T T
STD     T T T T
SBR     T T T
```

The first 13 lines of the input file are read using list-directed input and are used to specify the values of M, N, K, NB, NX, LDA, and TIMMIN (the minimum time). By default, xGEMV and xGEMM are called to sample the BLAS performance on square matrices of order N, but this option can be controlled by entering one of the following on line 14:

BAND Time xGBMV (instead of xGEMV) using matrices of order M and bandwidth K, and time xGEMM using matrices of order K.

NONE Do not do the sample timing of xGEMV and xGEMM.

The timing paths or routine names which follow may be specified in any order.

When timing the band routines it is more interesting to use one large value of the matrix size and vary the bandwidth. An annotated example of an input file for timing the REAL linear equation routines that operate on banded matrices is shown below.

```
LAPACK timing, REAL band matrices
1                               Number of values of M
200                             Values of M (row dimension)
5                               Number of values of K
```

```
10 20 30 40 50                  Values of K (bandwidth)
4                               Number of values of NRHS
1 2 16 100                      Values of NRHS (the number of right-hand sides)
2                               Number of values of NB
1  8                            Values of NB (blocksize)
0  8                            Values of NX (crossover point)
1                               Number of values of LDA
152                             Values of LDA (leading dimension)
0.05                            Minimum time in seconds
BAND                            Time sample banded BLAS
SGB
SPB
STB
```

Here M specifies the matrix size and K specifies the bandwidth for the test paths SGB, SPB, and STB. Note that we request timing of the sample BLAS for banded matrices by specifying "BAND" on line 13.

We also provide a separate input file for timing the orthogonal factorization and reduction routines that operate on rectangular matrices. For these routines, the values of M and N are specified in ordered pairs (M, N). An annotated example of an input file for timing the REAL linear equation routines that operate on dense rectangular matrices is shown below. The input file is read in the same way as the one for dense square matrices.

```
LAPACK timing, REAL rectangular matrices
7                               Number of values of M
20 40 20 40 80 40 80            Values of M (row dimension)
7                               Number of values of N
20 20 40 40 40 80 80            Values of N (column dimension)
4                               Number of values of K
1 2 16 100                      Values of K
2                               Number of values of NB
1  8                            Values of NB (blocksize)
0  8                            Values of NX (crossover point)
1                               Number of values of LDA
81                              Values of LDA (leading dimension)
0.05                            Minimum time in seconds
none
SQR    T T T
SLQ    T T T
SQL    T T T
SRQ    T T T
SQP    T
SBR    T T F
```

7.2 Timing the Level 2 and 3 BLAS

Timing of the Level 2 and 3 BLAS routines may be requested from one of the linear equation input files, or by using a special BLAS format provided for compatibility with previous releases of LAPACK. The BLAS input format is the same as the linear equation input format, except that values of NX are not read in. The BLAS input format is requested by specifying 'BLAS' on the first line of the file.

Three input files are provided for timing the BLAS with the matrix shapes encountered in the LAPACK routines. In each of these files, one of the parameters M, N, and K for the Level 3 BLAS is on the order of the blocksize while the other two are on the order of the matrix size. The first of these input files also times the Level 2 BLAS, and we include the single precision real version of this data file here for reference:

```
BLAS timing, REAL data, K small
5                       Number of values of M
10 20 40 60 80          Values of M
5                       Number of values of N
10 20 40 60 80          Values of N
2                       Number of values of K
2 16                    Values of K
1                       Number of values of INCX
1                       Values of INCX
1                       Number of values of LDA
81                      Values of LDA
0.05                    Minimum time in seconds
none                    Do not time the sample BLAS
SB2
SB3
```

Since the Fortran BLAS do not contain any sub-blocking, the block size NB is not required and its value is replaced by that of INCX, the increment between successive elements of a vector in the Level 2 BLAS. Note that we have specified "none" on line 13 to suppress timing of the sample BLAS, which are redundant in this case.

7.3 Timing the Nonsymmetric Eigenproblem

A separate input file drives the timing codes for the nonsymmetric eigenproblem. The input file specifies

- N, the matrix size
- four-tuples of parameter values (NB, NS, MAXB, LDA) specifying the block size NB, the number of shifts NS, the matrix size MAXB less than which an unblocked routine is used, and the leading dimension LDA
- the test matrix types
- the routines or sequences of routines from LAPACK or EISPACK to be timed

The parameters NS and MAXB apply only to the QR iteration routine xHSEQR, and NB is used only by the block algorithms. A goal of this timing code is to determine the values of NB, NS and MAXB which maximize the speed of the codes.

The number and size of the input values are limited by certain program maximums which are defined in PARAMETER statements in the main timing program:

Parameter	Description	Value
MAXN	Maximum value for N, NB, NS, or MAXB	400
LDAMAX	Maximum value for LDA	420
MAXIN	Maximum number of values of N	12
MAXPRM	Maximum number of parameter sets (NB, NS, MAXB, LDA)	10

The computations that may be timed for the REAL version are

1. SGEHRD (LAPACK reduction to upper Hessenberg form)
2. SHSEQR(E) (LAPACK computation of eigenvalues only of a Hessenberg matrix)
3. SHSEQR(S) (LAPACK computation of the Schur form of a Hessenberg matrix)
4. SHSEQR(V) (LAPACK computation of the Schur form and Schur vectors of a Hessenberg matrix)
5. STREVC(L) (LAPACK computation of the the left eigenvectors of a matrix in Schur form)
6. STREVC(R) (LAPACK computation of the the right eigenvectors of a matrix in Schur form)
7. SHSEIN(L) (LAPACK computation of the the left eigenvectors of an upper Hessenberg matrix using inverse iteration)
8. SHSEIN(R) (LAPACK computation of the the right eigenvectors of an upper Hessenberg matrix using inverse iteration)
9. ORTHES (EISPACK reduction to upper Hessenberg form, to be compared to SGEHRD)
10. HQR (EISPACK computation of eigenvalues only of a Hessenberg matrix, to be compared to SHSEQR(E))
11. HQR2 (EISPACK computation of eigenvalues and eigenvectors of a Hessenberg matrix, to be compared to SHSEQR(V) plus STREVC(R))
12. INVIT (EISPACK computation of the right eigenvectors of an upper Hessenberg matrix using inverse iteration, to be compared to SHSEIN(R)).

Eight different matrix types are provided for timing the nonsymmetric eigenvalue routines. A variety of matrix types is allowed because the number of iterations to compute the eigenvalues, and hence the timing, can depend on the type of matrix whose eigendecomposition is desired. The matrices used for timing are of the form XTX^{-1} where X is either orthogonal (for types 1–4) or random with condition number $1/\sqrt{\varepsilon}$ (for types 5–8), where ε is the machine roundoff error. The matrix T is upper triangular with random $O(1)$ entries in the strict upper triangle and has on its diagonal

- evenly spaced entries from 1 down to ε with random signs (matrix types 1 and 5)
- geometrically spaced entries from 1 down to ε with random signs (matrix types 2 and 6)
- "clustered" entries $1, \varepsilon, \ldots, \varepsilon$ with random signs (matrix types 3 and 7), or
- real or complex conjugate paired eigenvalues randomly chosen from the interval $(\varepsilon, 1)$ (matrix types 4 or 8).

An annotated example of an input file for timing the REAL nonsymmetric eigenproblem routines is shown below.

```
NEP:  Data file for timing Nonsymmetric Eigenvalue Problem routines
4                               Number of values of N
10 20 30 40                     Values of N (dimension)
4                               Number of values of parameters
1   1   1   1                   Values of NB (blocksize)
2   4   6   2                   Values of NS (number of shifts)
```

```
12  12  12  50                  Values of MAXB (multishift crossover pt)
81  81  81  81                  Values of LDA (leading dimension)
0.05                            Minimum time in seconds
4                               Number of matrix types
1 3 4 6
SHS    T T T T T T T T T T T T
```

The first line of the input file must contain the characters **NEP** in columns 1-3. Lines 2-10 are read using list-directed input and specify the following values:

line 2:	The number of values of N
line 3:	The values of N, the matrix dimension
line 4:	The number of values of the parameters NB, NS, MAXB, and LDA
line 5:	The values of NB, the blocksize
line 6:	The values of NS, the number of shifts
line 7:	The values of MAXB, the maximum blocksize
line 8:	The values of LDA, the leading dimension
line 9:	The minimum time in seconds that a routine will be timed
line 10:	NTYPES, the number of matrix types to be used

If $0 <$ NTYPES < 8, then line 11 specifies NTYPES integer values which are the numbers of the matrix types to be used. The remaining lines specify a path name and the specific computations to be timed. For the nonsymmetric eigenvalue problem, the path names for the four data types are SHS, DHS, CHS, and ZHS. A line to request all the routines in the REAL path has the form

```
SHS    T T T T T T T T T T T T
```

where the first 3 characters specify the path name, and up to 12 nonblank characters may appear in columns 4–80. If the k^{th} such character is 'T' or 't', the k^{th} routine will be timed. If at least one but fewer than 12 nonblank characters are specified, the remaining routines will not be timed. If columns 4–80 are blank, all the routines will be timed, so the input line

```
SHS
```

is equivalent to the line above.

The output is in the form of a table which shows the absolute times in seconds, floating point operation counts, and megaflop rates for each routine over all relevant input parameters. For the blocked routines, the table has one line for each different value of NB, and for the SHSEQR routine, one line for each different combination of NS and MAXB as well.

7.4 Timing the Generalized Nonsymmetric Eigenproblem

A separate input file drives the timing codes for the generalized nonsymmetric eigenproblem. The input file specifies

- N, the matrix size,
- LDA, the leading dimension,
- the test matrix types,
- the routines or sequences of routines from LAPACK or EISPACK to be timed.

The number and size of the input values are limited by certain program maximums which are defined in PARAMETER statements in the main timing program:

Parameter	Description	Value
MAXN	Maximum value for N	400
LDAMAX	Maximum value for LDA	420
MAXIN	Maximum number of values of N	12
MAXPRM	Maximum number of values of LDA	10
	LDA	

The computations that may be timed for the REAL version are

1. SGGHRD(N) (LAPACK reduction to generalized upper Hessenberg form, without computing U or V, including a call to SGEQRF and SORMQR to reduce B to upper triangular form.)
2. SGGHRD(Q) (LAPACK reduction to generalized upper Hessenberg form, computing U but not V, including a call to SGEQRF, SORGQR, and SORMQR to reduce B to upper triangular form.)
3. SGGHRD(Z) (LAPACK reduction to generalized upper Hessenberg form, computing V but not U, including a call to SGEQRF and SORMQR to reduce B to upper triangular form.)
4. SGGHRD(Q,Z) (LAPACK reduction to generalized upper Hessenberg form, computing U and V, including a call to SGEQRF, SORGQR, and SORMQR to reduce B to upper triangular form.)
5. SHGEQZ(E) (LAPACK computation of generalized eigenvalues only of a pair of matrices in generalized Hessenberg form)
6. SHGEQZ(S) (LAPACK computation of generalized Schur form of a pair of matrices in generalized Hessenberg form)
7. SHGEQZ(Q) (LAPACK computation of generalized Schur form of a pair of matrices in generalized Hessenberg form and Q)
8. SHGEQZ(Z) (LAPACK computation of generalized Schur form of a pair of matrices in generalized Hessenberg form and Z)
9. SHGEQZ(Q,Z) (LAPACK computation of generalized Schur form of a pair of matrices in generalized Hessenberg form and Q and Z)
10. STGEVC(A,L) (LAPACK computation of the the left generalized eigenvectors of a matrix pair in generalized Schur form)
11. STGEVC(B,L) (LAPACK computation of the the left generalized eigenvectors of a matrix pair in generalized Schur form, back transformed by Q)
12. STGEVC(A,R) (LAPACK computation of the the right generalized eigenvectors of a matrix pair in generalized Schur form)
13. STGEVC(B,R) (LAPACK computation of the the right generalized eigenvectors of a matrix pair in generalized Schur form, back transformed by Z)
14. QZHES(F) (EISPACK reduction to generalized upper Hessenberg form, with MATZ=.FALSE., so V is not computed.)

15. QZHES(T) (EISPACK reduction to generalized upper Hessenberg form, with MATZ=.TRUE., so V is computed.)

16. QZIT(F) (QZIT followed by QZVAL with MATZ=.FALSE.: EISPACK computation of generalized eigenvalues only of a pair of matrices in generalized Hessenberg form)

17. QZIT(T) (QZIT followed by QZVAL with MATZ=.TRUE.: EISPACK computation of generalized Schur form of a pair of matrices in generalized Hessenberg form and Z)

18. QZVEC (EISPACK computation of the the right generalized eigenvectors of a matrix pair in generalized Schur form, back transformed by Z)

Note that SGGHRD is timed along with the QR routines that reduce B to upper-triangular form; this is to allow a fair comparison with the EISPACK routine QZHES.

Four different matrix types are provided for timing the generalized nonsymmetric eigenvalue routines. A variety of matrix types is allowed because the number of iterations to compute the eigenvalues, and hence the timing, can depend on the type of matrix whose eigendecomposition is desired. The matrices used for timing have at least one zero, one infinite, and one singular ($\alpha = \beta = 0$) generalized eigenvalue. The remaining eigenvalues are sometimes real and sometimes complex, distributed in magnitude as follows:

- "clustered" entries $1, \varepsilon, \ldots, \varepsilon$ with random signs;
- evenly spaced entries from 1 down to ε with random signs;
- geometrically spaced entries from 1 down to ε with random signs;
- eigenvalues randomly chosen from the interval $(\varepsilon, 1)$.

7.4.1 Input File for Timing the Generalized Nonsymmetric Eigenproblem

An annotated example of an input file for timing the REAL generalized nonsymmetric eigenproblem routines is shown below.

```
GEP:  Data file for timing Generalized Nonsymmetric Eigenvalue Problem
4                                   Number of values of N
50 100 150 200                      Values of N (dimension)
4                                   Number of parameter values
1   10   1  10                      Values of NB (blocksize -- used by SGEQRF, etc.)
201 201 200 200                     Values of LDA (leading dimension)
0.0                                 Minimum time in seconds
5                                   Number of matrix types
SHG   T T T T T T T T T T T T T T T T T T T T
```

The first line of the input file must contain the characters GEP in columns 1–3. Lines 2–12 are read using list-directed input and specify the following values:

line 2: The number of values of N
line 3: The values of N, the matrix dimension
line 4: Number of values of the parameters
line 5: The values for NB, the blocksize
line 6: The values for the leading dimension LDA
line 7: The minimum time (in seconds) that a subroutine will be timed. If TIMMIN is zero, each routine should be timed only once.
line 8: NTYPES, the number of matrix types to be used

If NTYPES >= 4, all the types are used. If 0 < NTYPES < 4, then line 9 specifies NTYPES integer values, which are the numbers of the matrix types to be used. The remaining lines specify a path name and the specific routines to be timed. For the generalized nonsymmetric eigenvalue problem, the path names for the four data types are SHG, CHG, DHG, and ZHG. A line to request all the routines in the REAL path has the form

```
SHG    T T T T T T T T T T T T T T T T T T T T
```

where the first 3 characters specify the path name, and up to MAXTYP nonblank characters may appear in columns 4-80. If the k^{th} such character is 'T' or 't', the k^{th} routine will be timed. If at least one but fewer than 18 nonblank characters are specified, the remaining routines will not be timed. If columns 4-80 are blank, all the routines will be timed, so the input line

```
SHG
```

is equivalent to the line above.

The output is in the form of a table which shows the absolute times in seconds, floating point operation counts, and megaflop rates for each routine over all relevant input parameters. For the timings of SGGHRD plus appropriate QR routines, the table has one line for each different combination of LDA and NB. For other routines, the table has one line for each distinct value of LDA.

7.5 Timing the Symmetric and Generalized Symmetric Eigenproblem

A separate input file drives the timing codes for the symmetric eigenproblem. The input file specifies

- N, the matrix size
- pairs of parameter values (NB, LDA) specifying the block size NB and the leading dimension LDA
- the test matrix types
- the routines or sequences of routines from LAPACK or EISPACK to be timed.

A goal of this timing code is to determine the values of NB which maximize the speed of the block algorithms.

The number and size of the input values are limited by certain program maximums which are defined in PARAMETER statements in the main timing program:

Parameter	Description	Value
MAXN	Maximum value for N or NB	400
LDAMAX	Maximum value for LDA	420
MAXIN	Maximum number of values of N	12
MAXPRM	Maximum number of pairs of values (NB, LDA)	10

The computations that may be timed depend on whether the data is real or complex. For the REAL version the possible computations are

1. SSYTRD (LAPACK reduction to symmetric tridiagonal form)
2. SSTEQR(N) (LAPACK computation of eigenvalues only of a symmetric tridiagonal matrix)
3. SSTEQR(V) (LAPACK computation of the eigenvalues and eigenvectors of a symmetric tridiagonal matrix)

4. SSTERF (LAPACK computation of the eigenvalues only of a symmetric tridiagonal matrix using a square-root free algorithm)

5. SPTEQR(COMPZ='N') (LAPACK computation of the eigenvalues of a symmetric positive definite tridiagonal matrix)

6. SPTEQR(COMPZ='V') (LAPACK computation of the eigenvalues and eigenvectors of a symmetric positive definite tridiagonal matrix)

7. SSTEBZ(RANGE='I') (LAPACK computation of the eigenvalues in a specified interval for a symmetric tridiagonal matrix)

8. SSTEBZ(RANGE='V') (LAPACK computation of the eigenvalues in a half-open interval for a symmetric tridiagonal matrix)

9. SSTEIN (LAPACK computation of the eigenvectors of a symmetric tridiagonal matrix corresponding to specified eigenvalues using inverse iteration)

10. TRED1 (EISPACK reduction to symmetric tridiagonal form, to be compared to SSYTRD)

11. IMTQL1 (EISPACK computation of eigenvalues only of a symmetric tridiagonal matrix, to be compared to SSTEQR(N))

12. IMTQL2 (EISPACK computation of eigenvalues and eigenvectors of a symmetric tridiagonal matrix, to be compared to SSTEQR(V))

13. TQLRAT (EISPACK computation of eigenvalues only of a symmetric tridiagonal matrix, to be compared to SSTERF).

14. TRIDIB (EISPACK computation of the eigenvalues of)(compare with SSTEBZ - RANGE='I')

15. BISECT (EISPACK computation of the eigenvalues of)(compare with SSTEBZ - RANGE='V')

16. TINVIT (EISPACK computation of the eigenvectors of a triangular matrix using inverse iteration) (compare with SSTEIN)

For complex matrices the possible computations are

1. CHETRD (LAPACK reduction of a complex Hermitian matrix to real symmetric tridiagonal form)

2. CSTEQR(N) (LAPACK computation of eigenvalues only of a symmetric tridiagonal matrix)

3. CUNGTR+CSTEQR(V) (LAPACK computation of the eigenvalues and eigenvectors of a symmetric diagonal matrix)

4. CPTEQR(VECT='N') (LAPACK computation of the eigenvalues only of a symmetric positive definite tridiagonal matrix)

5. CUNGTR+CPTEQR(VECT='V') (LAPACK computation of the eigenvalues and eigenvectors of a symmetric positive definite tridiagonal matrix)

6. SSTEBZ+CSTEIN+CUNMTR (LAPACK computation of the eigenvalues and eigenvectors of a symmetric tridiagonal matrix)

7. HTRIDI (EISPACK reduction to symmetric tridiagonal form, to be compared to CHETRD)

8. IMTQL1 (EISPACK computation of eigenvalues only of a symmetric tridiagonal matrix, to be compared to CSTEQR(V))

9. IMTQL2+HTRIBK (EISPACK computation of eigenvalues and eigenvectors of a complex Hermitian matrix given the reduction to real symmetric tridiagonal form, to be compared to CUNGTR+CSTEQR).

Four different matrix types are provided for timing the symmetric eigenvalue routines. The matrices used for timing are of the form XDX^{-1}, where X is orthogonal and D is diagonal with entries

- evenly spaced entries from 1 down to ε with random signs (matrix type 1),
- geometrically spaced entries from 1 down to ε with random signs (matrix type 2),
- "clustered" entries $1, \varepsilon, \ldots, \varepsilon$ with random signs (matrix type 3), or
- eigenvalues randomly chosen from the interval $(\varepsilon, 1)$ (matrix type 4).

An annotated example of an input file for timing the REAL symmetric eigenproblem routines is shown below.

```
SEP:  Data file for timing Symmetric Eigenvalue Problem routines
5                               Number of values of N
10 20 40 60 80                  Values of N (dimension)
2                               Number of values of parameters
1  16                           Values of NB (blocksize)
81 81                           Values of LDA (leading dimension)
0.05                            Minimum time in seconds
4                               Number of matrix types
SST    T T T T T T T T
```

The first line of the input file must contain the characters SEP in columns 1-3. Lines 2-8 are read using list-directed input and specify the following values:

line 2: The number of values of N
line 3: The values of N, the matrix dimension
line 4: The number of values of the parameters NB and LDA
line 5: The values of NB, the blocksize
line 6: The values of LDA, the leading dimension
line 7: The minimum time in seconds that a routine will be timed
line 8: NTYPES, the number of matrix types to be used

If $0 <$ NTYPES < 4, then line 9 specifies NTYPES integer values which are the numbers of the matrix types to be used. The remaining lines specify a path name and the specific computations to be timed. For the symmetric eigenvalue problem, the path names for the four data types are SST, DST, CST, and ZST. The (optional) characters after the path name indicate the computations to be timed, as in the input file for the nonsymmetric eigenvalue problem.

7.6 Timing the Singular Value Decomposition

A separate input file drives the timing codes for the Singular Value Decomposition (SVD). The input file specifies

- pairs of parameter values (M, N) specifying the matrix row dimension M and the matrix column dimension N
- pairs of parameter values (NB, LDA) specifying the block size NB and the leading dimension LDA
- the test matrix types
- the routines or sequences of routines from LAPACK or LINPACK to be timed.

A goal of this timing code is to determine the values of NB which maximize the speed of the block algorithms.

The number and size of the input values are limited by certain program maximums which are defined in PARAMETER statements in the main timing program:

Parameter	Description	Value
MAXN	Maximum value for M, N, or NB	400
LDAMAX	Maximum value for LDA	420
MAXIN	Maximum number of pairs of values (M, N)	12
MAXPRM	Maximum number of pairs of values (NB, LDA)	10

The computations that may be timed for the REAL version are

1. SGEBRD (LAPACK reduction to bidiagonal form)
2. SBDSQR (LAPACK computation of singular values only of a bidiagonal matrix)
3. SBDSQR(L) (LAPACK computation of the singular values and left singular vectors of a bidiagonal matrix)
4. SBDSQR(R) (LAPACK computation of the singular values and right singular vectors of a bidiagonal matrix)
5. SBDSQR(B) (LAPACK computation of the singular values and right and left singular vectors of a bidiagonal matrix)
6. SBDSQR(V) (LAPACK computation of the singular values and multiply square matrix of dimension min(M,N) by transpose of left singular vectors)
7. LAPSVD (LAPACK singular values only of a dense matrix, using SGEBRD and SBDSQR)
8. LAPSVD(l) (LAPACK singular values and min(M,N) left singular vectors of a dense matrix, using SGEBRD, SORGBR and SBDSQR(L))
9. LAPSVD(L) (LAPACK singular values and M left singular vectors of a dense matrix, using SGEBRD, SORGBR and SBDSQR(L))
10. LAPSVD(R) (LAPACK singular values and N right singular vectors of a dense matrix, using SGEBRD, SORGBR and SBDSQR(R))
11. LAPSVD(B) (LAPACK singular values, min(M,N) left singular vectors, and N right singular vectors of a dense matrix, using SGEBRD, SORGBR and SBDSQR(B))
12. LINSVD (LINPACK singular values only of a dense matrix using SSVDC, to be compared to LAPSVD)
13. LINSVD(l) (LINPACK singular values and min(M,N) left singular vectors of a dense matrix using SSVDC, to be compared to LAPSVD(l))

14. LINSVD(L) (LINPACK singular values and M left singular vectors of a dense matrix using SSVDC, to be compared to LAPSVD(L))

15. LINSVD(R) (LINPACK singular values and N right singular vectors of a dense matrix using SSVDC, to be compared to LAPSVD(R))

16. LINSVD(B) (LINPACK singular values, min(M,N) left singular vectors and N right singular vectors of a dense matrix using SSVDC, to be compared to LAPSVD(B)).

Five different matrix types are provided for timing the singular value decomposition routines. Matrix types 1–3 are of the form UDV, where U and V are orthogonal or unitary, and D is diagonal with entries

- evenly spaced entries from 1 down to ε with random signs (matrix type 1),
- geometrically spaced entries from 1 down to ε with random signs (matrix type 2), or
- "clustered" entries $1, \varepsilon, \ldots, \varepsilon$ with random signs (matrix type 3).

Matrix type 4 has in each entry a random number drawn from $[-1, 1]$. Matrix type 5 is a nearly bidiagonal matrix, where the upper bidiagonal entries are $\exp(-2r \log \varepsilon)$ and the nonbidiagonal entries are $r\varepsilon$, where r is a uniform random number drawn from $[0, 1]$ (a different r for each entry).

An annotated example of an input file for timing the REAL singular value decomposition routines is shown below.

```
SVD:  Data file for timing Singular Value Decomposition routines
7                               Number of values of M and N
10 10 20 20 20 40 40            Values of M (row dimension)
10 20 10 20 40 20 40            Values of N (column dimension)
1                               Number of values of parameters
1                               Values of NB (blocksize)
81                              Values of LDA (leading dimension)
0.05                            Minimum time in seconds
4                               Number of matrix types
1 2 3 4
SBD    T T T T T T T T T T T T T T T
```

The first line of the input file must contain the characters **SVD** in columns 1-3. Lines 2-9 are read using list-directed input and specify the following values:

line 2: The number of values of M and N
line 3: The values of M, the matrix row dimension
line 3: The values of N, the matrix column dimension
line 4: The number of values of the parameters NB and LDA
line 5: The values of NB, the blocksize
line 6: The values of LDA, the leading dimension
line 7: The minimum time in seconds that a routine will be timed
line 8: NTYPES, the number of matrix types to be used

If $0 <$ NTYPES < 5, then line 9 specifies NTYPES integer values which are the numbers of the matrix types to be used. The remaining lines specify a path name and the specific computations to be timed. For the SVD, the path names for the four data types are **SBD**, **DBD**, **CBD**, and **ZBD**. The (optional) characters after the path name indicate the computations to be timed, as in the input file for the nonsymmetric eigenvalue problem.

7.7 Timing the Generalized Singular Value Decomposition

At the present time, no timing program for GSVD is provided. The main reason for this omission is because the GSVD subroutine is essentially BLAS 1 sequential code in the current implementation.

7.8 Timing the Generalized QR and RQ Factorizations

At the present time, no timing program for the GQR and GRQ factorizations is provided. The main reason for this omission is because these codes rely heavily on the QR and RQ factorizations which already have existing timing code.

7.9 Timing the Generalized Linear Regression Model Problem

At the present time, no timing program for GLM is provided. The main reason for this omission is because the major floating point operations of this code is in the GQR factorization. The GQR factorization relies heavily on the QR and RQ factorizations which already have existing timing code.

7.10 Timing the Constrained Linear Least Squares Problem

At the present time, no timing program for LSE is provided. The main reason for this omission is because the major floating point operations of this code is in the GRQ factorization. The GRQ factorization relies heavily on the QR and RQ factorizations which already have existing timing code.

Acknowledgments

Zhaojun Bai of the University of Kentucky, Jim Demmel of the University of California-Berkeley, Sven Hammarling of NAG Ltd., and Alan McKenney of the Courant Institute of Mathematical Sciences, New York University, also contributed to this report.