HOPDM, version 2.30 Benchmark Results: from Linear to Quadratic Programming

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Abstract

This note presents computational results obtained with HOPDM interior point code applied to solve large scale linear and convex quadratic programming problems.

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There exists a collection of 46 convex (nonseparable) quadratic programs that are transformed linear programs from the Netlib set. The transformation consists in adding nonseparable quadratic term Q to the objective of the original linear program. We solved both the linear problems and the corresponding quadratic problems and collected the results in Table 1. In all cases 8-digit optimal solutions were found.

The computations were done on a PC with a 200MHz Pentium Pro processor and 128 MB of RAM run under Linux operating system. HOPDM was compiled with the FORTRAN GNU compiler `fort77`; options `-O2 -m486` were used. All solution times were measured with the Linux `time` command. Solution times are given in seconds and include reading the MPS input file and writing MPS output report.

All test problems used in our computational experiments come from the public domain sources. The linear optimization examples come from Netlib collection:
`ftp://ftp.netlib.org/lp/data/`.
Quadratic programs corresponding to Netlib's linear programs can be retrieved from:
`ftp://ftp.brunel.ac.uk/maths/qplib/qdata/`.

Table 1: Solving linear and quadratic programs (Pentium Pro, 200 MHz).

Problem	Linear Program					Quadratic Program		
	m	n	nz(A)	it	time	nz(Q)	it	time
25fv47	821	1571	11127	22	7.85	59053	33	66.12
adlittle	56	97	465	12	0.17	70	10	0.18
afiro	27	32	88	7	0.05	3	10	0.07
bandm	305	472	2659	18	0.87	16	19	1.20
beaconfd	173	262	3476	11	0.53	9	18	1.05
bore3d	233	315	1525	15	0.42	50	14	0.63
brandy	220	249	2150	21	0.84	49	15	0.86
capri	271	353	1786	18	0.82	838	48	2.45
e226	223	282	2767	21	0.93	897	13	1.09
etamacro	400	688	2489	19	1.85	4069	44	18.41
fffff800	524	854	6235	26	2.89	1638	36	9.68
forplan	161	421	4916	19	1.08	546	37	2.53
gfrd-pnc	616	1092	3467	15	1.19	108	16	1.62
grow15	300	645	5665	14	1.62	462	13	1.89
grow22	440	946	8318	15	2.48	787	13	3.03
grow7	140	301	2633	14	0.72	327	12	0.86
israel	174	142	2358	21	0.81	656	16	0.83
pilotnov	975	2172	13129	15	9.75	391	26	20.90
recipe	91	180	752	9	0.20	30	16	0.32
sc205	205	203	552	11	0.32	10	10	0.35
scagr25	471	500	2029	16	0.85	100	15	0.92
scagr7	129	140	553	12	0.23	17	14	0.23
scfxm1	330	457	2612	17	0.94	677	31	2.10
scfxm2	660	914	5229	20	2.16	1057	35	5.13
scfxm3	990	1371	7846	21	3.46	1132	31	7.00
scorpion	388	358	1708	13	0.55	18	12	0.63
scrs8	490	1169	4029	19	1.56	88	16	1.77
scsd1	77	760	3148	9	0.63	691	9	0.82
scsd6	147	1350	5666	11	1.18	1308	11	1.66
scsd8	397	2750	11334	11	2.60	2370	11	3.91
sctap1	300	480	2052	15	0.72	117	16	0.95
sctap2	1090	1880	8124	16	3.33	636	13	3.74
sctap3	1480	2480	10734	16	4.47	861	13	5.56
seba	515	1028	4874	8	0.74	550	33	2.89
share1b	117	225	1182	19	0.48	21	16	0.53
share2b	96	79	730	13	0.28	45	25	0.48
shell	536	1775	4900	22	2.12	34385	22	7.20
ship04l	402	2118	8450	12	1.88	42	10	2.07
ship04s	402	1458	5810	12	1.37	42	11	1.56
ship08l	778	4283	17085	13	3.60	34025	11	29.94
ship08s	778	2387	9501	13	1.97	11139	12	6.40
ship12l	1151	5427	21597	14	4.98	60205	11	46.00
ship12s	1151	2763	10941	13	2.54	16361	13	8.24
sierra	1227	2036	9252	20	4.44	61	17	4.83
stair	356	467	3857	15	1.56	952	32	3.49
standata	359	1075	3038	15	1.16	666	12	1.42