

Result tables

**Arnold Neumaier, Hannes Fendl,
Harald Schilly, Thomas Leitner**

*Fakultät für Mathematik, Universität Wien
Nordbergstr. 15, A-1090 Wien, Austria
email: Arnold.Neumaier@univie.ac.at
WWW: <http://www.mat.univie.ac.at/~neum/>*

June 18, 2010

The tables A, B, C and D give the mean, maximum, minimum and median errors of the function values reached after $5000n$ function evaluations from the global minimum value, averaged over all 25 runs, for the algorithm VXQR1. Table E summarizes this information numerically in terms of median function values reached after selected values of the number of function evaluations in problem dimensions $n \in \{50, 100, 200\}$, and table F does the same for dimensions $n \in \{500, 1000\}$. Table G, H, I and J give the mean, maximum, minimum and median errors after $5000n$ function values together with the corresponding results for the reference algorithms DE, CHC, and (for $n \neq 1000$) G-CMA-ES.

References

- [1] A. Neumaier, VXQR1. Web document, <http://http://www.mat.univie.ac.at/~neum/software/vxqr1/>

Table A: Mean deviations from the global minimum

VXQR1	$n = 50$	$n = 100$	$n = 200$	$n = 500$	$n = 1000$
F1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F2	2.36e+00	5.12e+01	8.50e+01	9.38e+01	9.60e+01
F3	3.69e−09	3.19e−01	3.60e+01	2.14e+02	6.35e+02
F4	0.00e+00	0.00e+00	2.50e−14	1.86e−13	6.55e−13
F5	4.55e−14	6.03e−14	1.18e−03	2.96e−04	1.31e−11
F6	3.07e−13	9.44e−13	3.10e−12	9.10e−12	1.70e−11
F7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F9	9.62e+00	2.15e+01	4.54e+01	8.68e+01	1.26e+02
F10	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F11	1.09e+01	1.89e+01	4.37e+01	8.52e+01	1.58e+02
F12	1.49e+00	5.24e+00	4.00e+01	1.21e+02	2.75e+02
F13	8.39e+00	1.78e+01	9.55e+01	2.21e+02	5.92e+02
F14	2.58e−01	6.41e−01	1.27e+00	4.31e+00	6.19e+00
F15	3.72e−05	7.14e−04	1.09e−01	2.24e−01	2.35e+00
F16*	4.48e+00	1.18e+01	3.00e+01	6.32e+01	9.65e+01
F17*	1.73e+01	1.14e+02	8.79e+01	1.65e+02	3.09e+02
F18*	6.94e−01	1.26e+00	8.48e+00	5.52e+01	1.07e+02
F19*	0.00e+00	1.49e−06	3.56e−05	1.14e−03	1.70e−03

Table B: Maximum deviations from the global minimum

VXQR1	$n = 50$	$n = 100$	$n = 200$	$n = 500$	$n = 1000$
F1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F2	1.20e+01	7.15e+01	9.42e+01	9.62e+01	9.83e+01
F3	1.33e−08	3.99e+00	2.58e+02	3.41e+02	8.40e+02
F4	0.00e+00	0.00e+00	6.25e−13	3.41e−12	1.30e−11
F5	1.42e−13	2.56e−13	2.95e−02	7.40e−03	3.14e−11
F6	5.68e−13	2.64e−12	5.60e−12	1.37e−11	2.03e−11
F7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F9	2.18e+01	4.62e+01	1.17e+02	2.07e+02	2.91e+02
F10	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F11	2.21e+01	4.51e+01	1.16e+02	2.45e+02	4.38e+02
F12	3.20e+00	9.97e+00	1.65e+02	3.07e+02	5.98e+02
F13	7.48e+01	7.41e+01	6.06e+02	3.32e+02	1.45e+03
F14	1.38e+00	3.02e+00	8.75e+00	3.81e+01	1.39e+01
F15	2.15e−04	4.88e−03	1.54e+00	4.22e+00	1.58e+01
F16*	8.35e+00	3.81e+01	7.14e+01	1.79e+02	2.85e+02
F17*	8.33e+01	8.63e+02	2.11e+02	3.55e+02	3.60e+02
F18*	3.60e+00	2.28e+00	4.32e+01	2.50e+02	5.03e+02
F19*	1.73e−14	3.28e−05	2.51e−04	5.54e−03	6.81e−03

Table C: Minimum deviations from the global minimum

VXQR1	$n = 50$	$n = 100$	$n = 200$	$n = 500$	$n = 1000$
F1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F2	6.55e-01	1.87e+01	6.93e+01	8.83e+01	9.08e+01
F3	5.23e-12	1.21e-10	3.99e-10	1.22e-07	2.17e+02
F4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F5	0.00e+00	0.00e+00	0.00e+00	1.65e-12	3.33e-12
F6	1.42e-13	2.27e-13	7.67e-13	3.18e-12	1.47e-11
F7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F9	3.21e+00	6.07e+00	1.86e+01	3.29e+01	8.20e+01
F10	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F11	2.91e+00	8.64e+00	1.31e+01	4.48e+01	7.18e+01
F12	3.63e-01	1.35e+00	4.02e+00	4.14e+01	2.65e+01
F13	6.61e-01	2.45e+00	1.72e+01	9.24e+01	3.32e+02
F14	4.85e-02	2.42e-01	5.39e-01	1.83e+00	1.06e-03
F15	0.00e+00	2.91e-12	6.48e-05	6.38e-05	3.80e-03
F16*	1.02e+00	2.86e+00	7.59e+00	1.89e+01	4.00e+01
F17*	3.59e+00	1.17e+01	3.79e+01	1.41e+02	2.90e+02
F18*	3.09e-01	6.97e-07	1.03e+00	2.22e-01	6.92e-03
F19*	0.00e+00	0.00e+00	0.00e+00	1.84e-07	1.06e-05

Table D: Median deviations from the global minimum

VXQR1	$n = 50$	$n = 100$	$n = 200$	$n = 500$	$n = 1000$
F1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F2	1.66e+00	5.17e+01	8.68e+01	9.43e+01	9.64e+01
F3	1.83e-09	1.86e-08	2.87e+01	2.11e+02	6.05e+02
F4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.68e-14
F5	5.68e-14	0.00e+00	7.96e-13	5.32e-12	1.09e-11
F6	2.84e-13	8.24e-13	2.70e-12	8.98e-12	1.67e-11
F7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F9	9.21e+00	1.85e+01	4.32e+01	5.95e+01	9.99e+01
F10	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
F11	1.01e+01	1.74e+01	3.89e+01	7.32e+01	1.12e+02
F12	1.34e+00	4.56e+00	2.71e+01	1.08e+02	2.24e+02
F13	2.51e+00	1.08e+01	6.21e+01	2.40e+02	5.39e+02
F14	1.37e-01	3.59e-01	8.56e-01	2.81e+00	5.64e+00
F15	8.01e-08	1.21e-05	5.66e-03	1.19e-02	2.70e-02
F16*	4.33e+00	8.34e+00	2.94e+01	3.69e+01	6.35e+01
F17*	1.04e+01	2.92e+01	5.66e+01	1.47e+02	2.97e+02
F18*	4.75e-01	1.34e+00	4.18e+00	8.33e+00	1.57e+01
F19*	0.00e+00	1.16e-10	7.87e-07	8.48e-04	1.37e-03

Table E: Tables of median results, $n \in \{50, 100, 200\}$

n	nf	F1	F2	F3	F4	F5
50	500	0.00e+00	8.03e+01	1.07e+06	5.41e+02	5.68e-14
	1000	0.00e+00	7.84e+01	2.23e+03	5.40e+02	5.68e-14
	2000	0.00e+00	7.64e+01	4.56e+02	4.63e+02	5.68e-14
	5000	0.00e+00	7.20e+01	4.87e+01	2.02e+02	5.68e-14
	10000	0.00e+00	7.03e+01	4.57e+01	3.78e+01	5.68e-14
	20000	0.00e+00	6.60e+01	4.04e+01	8.96e+00	5.68e-14
	50000	0.00e+00	5.73e+01	2.50e+01	0.00e+00	5.68e-14
	100000	0.00e+00	3.47e+01	7.30e-02	0.00e+00	5.68e-14
	200000	0.00e+00	3.10e+00	1.85e-09	0.00e+00	5.68e-14
	250000	0.00e+00	1.66e+00	1.83e-09	0.00e+00	5.68e-14
100	1000	0.00e+00	8.88e+01	1.18e+06	9.86e+02	0.00e+00
	2000	0.00e+00	8.76e+01	5.62e+03	9.81e+02	0.00e+00
	5000	0.00e+00	8.64e+01	1.31e+03	5.52e+02	0.00e+00
	10000	0.00e+00	8.42e+01	1.04e+03	3.67e+02	0.00e+00
	20000	0.00e+00	8.16e+01	4.81e+02	7.59e+01	0.00e+00
	50000	0.00e+00	7.98e+01	9.07e+01	1.19e+01	0.00e+00
	100000	0.00e+00	7.60e+01	7.26e+01	0.00e+00	0.00e+00
	200000	0.00e+00	6.88e+01	3.83e+01	0.00e+00	0.00e+00
	500000	0.00e+00	5.17e+01	1.86e-08	0.00e+00	0.00e+00
	200	2000	0.00e+00	9.49e+01	2.60e+06	1.82e+03
5000		0.00e+00	9.44e+01	2.01e+03	1.80e+03	2.69e-04
10000		0.00e+00	9.38e+01	1.13e+03	1.10e+03	2.72e-05
20000		0.00e+00	9.24e+01	3.91e+02	6.76e+02	2.66e-09
50000		0.00e+00	8.96e+01	2.92e+02	9.51e+01	2.61e-11
100000		0.00e+00	8.84e+01	2.44e+02	2.79e+01	2.24e-11
200000		0.00e+00	8.75e+01	2.10e+02	2.99e+00	1.62e-11
500000		0.00e+00	8.69e+01	1.19e+02	0.00e+00	5.34e-12
1000000		0.00e+00	8.68e+01	2.87e+01	0.00e+00	7.96e-13

n	nf	F6	F7	F8	F9	F10
50	500	1.94e+01	1.28e+02	5.21e+03	3.44e+02	7.45e+01
	1000	1.94e+01	1.27e+02	2.50e+03	3.36e+02	3.98e+01
	2000	1.92e+01	1.24e+02	1.65e+03	2.87e+02	1.38e+01
	5000	1.64e+01	1.48e-13	8.04e+00	1.89e+02	2.10e+00
	10000	3.46e+00	0.00e+00	6.96e-04	1.17e+02	6.69e-03
	20000	2.82e-06	0.00e+00	1.41e-12	5.26e+01	0.00e+00
	50000	3.41e-13	0.00e+00	0.00e+00	1.57e+01	0.00e+00
	100000	3.41e-13	0.00e+00	0.00e+00	9.45e+00	0.00e+00
	200000	3.13e-13	0.00e+00	0.00e+00	9.30e+00	0.00e+00
250000	2.84e-13	0.00e+00	0.00e+00	9.21e+00	0.00e+00	
100	1000	1.93e+01	3.23e+12	2.04e+04	6.63e+02	1.49e+02
	2000	1.93e+01	2.65e+02	1.05e+04	6.50e+02	8.20e+01
	5000	1.84e+01	1.88e+02	3.22e+03	4.36e+02	6.30e+00
	10000	1.67e+01	7.90e-13	9.93e+01	3.19e+02	1.11e+00
	20000	4.24e+00	0.00e+00	5.17e-02	1.96e+02	0.00e+00
	50000	1.74e-10	0.00e+00	4.44e-12	7.20e+01	0.00e+00
	100000	9.38e-13	0.00e+00	0.00e+00	3.05e+01	0.00e+00
	200000	8.81e-13	0.00e+00	0.00e+00	2.07e+01	0.00e+00
500000	8.24e-13	0.00e+00	0.00e+00	1.85e+01	0.00e+00	
200	2000	1.93e+01	1.88e+33	4.97e+04	1.33e+03	2.74e+02
	5000	1.93e+01	5.04e+02	2.33e+04	1.29e+03	1.49e+02
	10000	1.83e+01	3.84e+02	1.08e+04	8.73e+02	1.26e+01
	20000	1.64e+01	3.28e-12	4.12e+02	6.56e+02	4.22e+00
	50000	2.65e+00	3.00e-14	6.54e-02	3.07e+02	1.05e+00
	100000	6.90e-11	0.00e+00	2.85e-08	1.34e+02	0.00e+00
	200000	2.96e-12	0.00e+00	0.00e+00	5.61e+01	0.00e+00
	500000	2.81e-12	0.00e+00	0.00e+00	4.43e+01	0.00e+00
1000000	2.70e-12	0.00e+00	0.00e+00	4.32e+01	0.00e+00	

n	nf	F11	F12	F13	F14	F15
50	500	3.38e+02	1.04e+02	1.10e+06	3.86e+02	3.97e+02
	1000	3.30e+02	8.96e+01	3.10e+05	3.84e+02	3.92e+02
	2000	2.78e+02	5.42e+01	9.70e+04	2.91e+02	3.86e+02
	5000	1.82e+02	3.40e+01	6.92e+01	8.87e+01	6.10e+00
	10000	1.14e+02	2.08e+01	5.00e+01	2.32e+01	1.49e-02
	20000	5.14e+01	9.38e+00	3.89e+01	6.21e+00	1.85e-03
	50000	1.60e+01	3.72e+00	2.42e+01	1.12e+00	5.50e-04
	100000	1.16e+01	2.39e+00	7.76e+00	2.81e-01	1.56e-04
	200000	1.01e+01	1.71e+00	4.03e+00	1.88e-01	2.61e-06
	250000	1.01e+01	1.34e+00	2.51e+00	1.37e-01	8.01e-08
100	1000	6.69e+02	2.19e+02	4.40e+05	7.55e+02	1.01e+03
	2000	6.55e+02	1.91e+02	4.24e+04	7.52e+02	9.81e+02
	5000	4.49e+02	1.18e+02	2.95e+02	3.22e+02	6.56e+02
	10000	3.38e+02	8.18e+01	1.29e+02	1.54e+02	1.46e+01
	20000	2.05e+02	3.88e+01	1.04e+02	4.98e+01	3.77e-01
	50000	6.80e+01	1.41e+01	8.01e+01	7.58e+00	5.21e-03
	100000	2.73e+01	1.11e+01	6.56e+01	1.99e+00	3.52e-03
	200000	2.15e+01	9.65e+00	3.82e+01	8.26e-01	1.12e-03
	500000	1.74e+01	4.56e+00	1.08e+01	3.59e-01	1.21e-05
200	2000	1.35e+03	4.64e+02	3.98e+05	1.41e+03	1.12e+20
	5000	1.31e+03	3.76e+02	5.53e+03	1.39e+03	1.93e+03
	10000	8.73e+02	2.36e+02	4.82e+03	5.59e+02	1.08e+03
	20000	6.52e+02	1.63e+02	3.38e+03	2.63e+02	2.91e+00
	50000	3.03e+02	7.94e+01	3.13e+02	5.33e+01	3.07e-01
	100000	1.38e+02	3.68e+01	2.29e+02	1.70e+01	3.38e-02
	200000	5.49e+01	3.49e+01	1.79e+02	4.25e+00	1.57e-02
	500000	4.66e+01	3.30e+01	9.82e+01	1.83e+00	8.43e-03
	1000000	3.89e+01	2.71e+01	6.21e+01	8.56e-01	5.66e-03

n	nf	F16*	F17*	F18*	F19*
50	500	2.54e+02	6.03e+02	1.62e+02	1.41e+02
	1000	2.22e+02	4.13e+02	1.61e+02	5.19e+01
	2000	1.71e+02	3.36e+02	7.96e+01	2.25e+01
	5000	1.01e+02	1.63e+02	3.80e+01	2.91e+00
	10000	6.04e+01	9.57e+01	1.80e+01	4.77e-01
	20000	2.32e+01	5.22e+01	7.98e+00	1.65e-03
	50000	6.62e+00	1.98e+01	2.00e+00	5.02e-05
	100000	6.45e+00	1.27e+01	9.59e-01	7.29e-10
	200000	5.62e+00	1.10e+01	5.88e-01	0.00e+00
	250000	4.33e+00	1.04e+01	4.75e-01	0.00e+00
100	1000	4.91e+02	1.17e+03	3.29e+02	9.55e+02
	2000	4.35e+02	9.85e+02	3.27e+02	8.70e+02
	5000	2.71e+02	6.50e+02	1.46e+02	5.11e+01
	10000	1.90e+02	5.30e+02	6.11e+01	4.22e+00
	20000	1.05e+02	2.66e+02	3.13e+01	1.06e+00
	50000	3.18e+01	1.60e+02	1.08e+01	3.41e-03
	100000	1.60e+01	1.29e+02	4.68e+00	1.41e-03
	200000	1.44e+01	4.06e+01	2.75e+00	1.43e-04
	500000	8.34e+00	2.92e+01	1.34e+00	1.16e-10
200	2000	9.90e+02	1.96e+03	1.12e+03	3.84e+03
	5000	8.47e+02	1.46e+03	1.12e+03	3.84e+03
	10000	5.38e+02	7.87e+02	1.12e+03	3.20e+03
	20000	3.79e+02	5.69e+02	1.10e+02	5.87e+01
	50000	1.60e+02	2.83e+02	4.35e+01	1.39e-01
	100000	6.66e+01	1.58e+02	2.73e+01	7.13e-03
	200000	3.61e+01	9.76e+01	1.42e+01	3.02e-03
	500000	3.14e+01	7.75e+01	7.07e+00	3.53e-04
	1000000	2.94e+01	5.66e+01	4.18e+00	7.87e-07

Table F: Tables of median results, $n \in \{500, 1000\}$

n	nf	F1	F2	F3	F4	F5
500	5000	0.00e+00	9.74e+01	1.14e+07	4.31e+03	2.46e-01
	10000	0.00e+00	9.72e+01	6.96e+03	4.28e+03	1.00e-02
	20000	0.00e+00	9.70e+01	2.29e+03	3.39e+03	1.32e-03
	50000	0.00e+00	9.62e+01	5.97e+02	1.60e+03	1.22e-08
	100000	0.00e+00	9.58e+01	5.43e+02	3.70e+02	1.05e-10
	200000	0.00e+00	9.55e+01	5.20e+02	1.15e+02	9.64e-11
	500000	0.00e+00	9.47e+01	4.64e+02	8.96e+00	7.19e-11
	1000000	0.00e+00	9.46e+01	3.88e+02	0.00e+00	4.48e-11
	2000000	0.00e+00	9.43e+01	2.39e+02	0.00e+00	1.26e-11
2500000	0.00e+00	9.43e+01	2.11e+02	0.00e+00	5.32e-12	
1000	10000	1.54e-11	9.88e+01	1.65e+08	8.45e+03	6.77e-01
	20000	0.00e+00	9.86e+01	1.90e+05	8.36e+03	1.92e-02
	50000	0.00e+00	9.85e+01	1.47e+03	4.50e+03	2.24e-04
	100000	0.00e+00	9.81e+01	1.04e+03	3.16e+03	2.72e-08
	200000	0.00e+00	9.75e+01	1.03e+03	7.61e+02	2.27e-10
	500000	0.00e+00	9.71e+01	1.01e+03	1.40e+02	2.00e-10
	1000000	0.00e+00	9.69e+01	9.63e+02	2.62e+01	1.58e-10
	2000000	0.00e+00	9.65e+01	8.66e+02	9.95e-01	9.77e-11
	5000000	0.00e+00	9.64e+01	6.05e+02	5.68e-14	1.09e-11

n	nf	F6	F7	F8	F9	F10
500	5000	1.93e+01	3.35e+118	2.98e+05	3.32e+03	6.33e+02
	10000	1.93e+01	2.45e+104	1.76e+05	3.24e+03	3.95e+02
	20000	1.90e+01	1.29e+03	1.41e+05	2.63e+03	1.02e+02
	50000	1.66e+01	1.95e-11	6.91e+03	1.64e+03	5.25e+00
	100000	2.88e+00	2.49e-13	7.57e+01	9.73e+02	3.15e+00
	200000	3.53e-11	2.22e-14	1.90e-02	4.57e+02	1.05e+00
	500000	1.09e-11	0.00e+00	3.05e-13	1.43e+02	0.00e+00
	1000000	1.00e-11	0.00e+00	0.00e+00	1.02e+02	0.00e+00
	2000000	9.41e-12	0.00e+00	0.00e+00	6.89e+01	0.00e+00
2500000	8.98e-12	0.00e+00	0.00e+00	5.95e+01	0.00e+00	
1000	10000	1.94e+01	2.33e+245	1.23e+06	6.68e+03	1.28e+03
	20000	1.94e+01	1.22e+239	7.58e+05	6.53e+03	7.56e+02
	50000	1.84e+01	1.96e+03	3.35e+05	4.51e+03	6.51e+01
	100000	1.68e+01	7.52e-11	5.34e+04	3.41e+03	8.83e+00
	200000	3.18e+00	7.47e-13	8.51e+02	2.03e+03	2.10e+00
	500000	4.08e-11	4.24e-14	4.83e-02	7.46e+02	1.05e+00
	1000000	2.91e-11	0.00e+00	1.32e-08	2.99e+02	0.00e+00
	2000000	2.16e-11	0.00e+00	0.00e+00	1.72e+02	0.00e+00
	5000000	1.67e-11	0.00e+00	0.00e+00	9.99e+01	0.00e+00

n	nf	F11	F12	F13	F14	F15
500	5000	3.35e+03	1.15e+03	1.23e+06	3.26e+03	1.35e+71
	10000	3.27e+03	9.47e+02	4.13e+03	3.24e+03	4.19e+03
	20000	2.64e+03	5.94e+02	2.05e+03	2.30e+03	3.93e+03
	50000	1.60e+03	3.99e+02	1.01e+03	5.99e+02	8.73e+00
	100000	9.33e+02	2.25e+02	7.28e+02	1.91e+02	1.36e+00
	200000	4.42e+02	1.24e+02	5.91e+02	6.94e+01	3.61e-01
	500000	1.42e+02	1.20e+02	5.00e+02	1.72e+01	3.71e-02
	1000000	1.00e+02	1.18e+02	4.12e+02	6.26e+00	1.94e-02
	2500000	7.45e+01	1.14e+02	2.91e+02	3.33e+00	1.26e-02
1000	10000	6.76e+03	2.65e+03	3.04e+07	1.37e+04	1.44e+160
	20000	6.60e+03	1.95e+03	8.27e+03	8.38e+03	4.97e+153
	50000	4.46e+03	1.19e+03	2.73e+03	4.05e+03	4.85e+03
	100000	3.33e+03	8.61e+02	1.76e+03	1.35e+03	1.87e+01
	200000	1.99e+03	5.14e+02	1.51e+03	5.01e+02	2.74e+00
	500000	7.51e+02	2.38e+02	1.28e+03	1.08e+02	1.05e+00
	1000000	3.15e+02	2.37e+02	1.10e+03	2.52e+01	9.87e-02
	2000000	2.02e+02	2.37e+02	8.31e+02	1.39e+01	6.04e-02
	5000000	1.12e+02	2.24e+02	5.39e+02	5.64e+00	2.70e-02

n	nf	F16*	F17*	F18*	F19*
500	5000	2.33e+03	7.56e+03	2.55e+03	1.90e+10
	10000	2.10e+03	3.57e+03	2.55e+03	1.01e+04
	20000	1.60e+03	2.64e+03	2.55e+03	1.00e+04
	50000	9.36e+02	1.23e+03	2.18e+02	2.70e+01
	100000	5.09e+02	7.27e+02	2.18e+02	1.11e+00
	200000	2.19e+02	4.16e+02	1.52e+02	3.41e-02
	500000	9.08e+01	2.26e+02	1.52e+02	9.68e-03
	1000000	5.73e+01	1.70e+02	3.00e+01	5.82e-03
	2500000	4.71e+01	1.52e+02	1.27e+01	1.36e-03
1000	10000	3.69e+01	1.47e+02	8.33e+00	8.48e-04
	10000	4.67e+03	2.74e+04	4.82e+03	1.56e+32
	20000	4.08e+03	6.97e+03	4.82e+03	2.04e+04
	50000	2.49e+03	3.44e+03	4.82e+03	1.65e+04
	100000	1.73e+03	2.38e+03	3.98e+02	4.56e+01
	200000	9.81e+02	1.47e+03	3.97e+02	6.45e+00
	500000	3.44e+02	7.41e+02	1.39e+02	4.27e-02
	1000000	1.66e+02	4.76e+02	5.49e+01	1.65e-02
	2000000	1.25e+02	3.58e+02	1.98e+01	7.09e-03
5000000	6.35e+01	2.97e+02	1.57e+01	1.37e-03	

Table G: Comparison of final mean results

$n = 50$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	1.67e-11	0.00e+00	0.00e+00
F2	3.60e-01	6.19e+01	2.75e-11	2.36e+00
F3	2.89e+01	1.25e+06	7.97e-01	3.69e-09
F4	3.98e-02	7.43e+01	1.05e+02	0.00e+00
F5	0.00e+00	1.67e-03	2.96e-04	4.55e-14
F6	1.43e-13	6.15e-07	2.09e+01	3.07e-13
F7	0.00e+00	2.66e-09	1.01e-10	0.00e+00
F8	3.44e+00	2.24e+02	0.00e+00	0.00e+00
F9	2.73e+02	3.10e+02	1.66e+01	9.62e+00
F10	0.00e+00	7.30e+00	6.81e+00	0.00e+00
F11	6.23e-05	2.16e+00	3.01e+01	1.09e+01
F12	5.35e-13	9.57e-01	1.88e+02	1.49e+00
F13	2.45e+01	2.08e+06	1.97e+02	8.39e+00
F14	4.16e-08	6.17e+01	1.09e+02	2.58e-01
F15	0.00e+00	3.98e-01	9.79e-04	3.72e-05
F16*	1.56e-09	2.95e-09	4.27e+02	4.48e+00
F17*	7.98e-01	2.26e+04	6.89e+02	1.73e+01
F18*	1.22e-04	1.58e+01	1.31e+02	6.94e-01
F19*	0.00e+00	3.59e+02	4.76e+00	0.00e+00

$n = 100$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	3.56e-11	0.00e+00	0.00e+00
F2	4.45e+00	8.58e+01	1.51e-10	5.12e+01
F3	8.01e+01	4.19e+06	3.88e+00	3.19e-01
F4	7.96e-02	2.19e+02	2.50e+02	0.00e+00
F5	0.00e+00	3.83e-03	1.58e-03	6.03e-14
F6	3.10e-13	4.10e-07	2.12e+01	9.44e-13
F7	0.00e+00	1.40e-02	4.22e-04	0.00e+00
F8	3.69e+02	1.69e+03	0.00e+00	0.00e+00
F9	5.06e+02	5.86e+02	1.02e+02	2.15e+01
F10	0.00e+00	3.30e+01	1.66e+01	0.00e+00
F11	1.28e-04	7.32e+01	1.64e+02	1.89e+01
F12	5.99e-11	1.03e+01	4.17e+02	5.24e+00
F13	6.17e+01	2.70e+06	4.21e+02	1.78e+01
F14	4.79e-02	1.66e+02	2.55e+02	6.41e-01
F15	0.00e+00	8.13e+00	6.30e-01	7.14e-04
F16*	3.58e-09	2.23e+01	8.59e+02	1.18e+01
F17*	1.23e+01	1.47e+05	1.51e+03	1.14e+02
F18*	2.98e-04	7.00e+01	3.07e+02	1.26e+00
F19*	0.00e+00	5.45e+02	2.02e+01	1.49e-06

$n = 200$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	8.34e-01	0.00e+00	0.00e+00
F2	1.92e+01	1.03e+02	1.16e-09	8.50e+01
F3	1.78e+02	2.01e+07	8.91e+01	3.60e+01
F4	1.27e-01	5.40e+02	6.48e+02	2.50e-14
F5	0.00e+00	8.76e-03	0.00e+00	1.18e-03
F6	6.54e-13	1.23e+00	2.14e+01	3.10e-12
F7	0.00e+00	2.59e-01	1.17e-01	0.00e+00
F8	5.53e+03	9.38e+03	0.00e+00	0.00e+00
F9	1.01e+03	1.19e+03	3.75e+02	4.54e+01
F10	0.00e+00	7.13e+01	4.43e+01	0.00e+00
F11	2.62e-04	3.85e+02	8.03e+02	4.37e+01
F12	9.76e-10	7.44e+01	9.06e+02	4.00e+01
F13	1.36e+02	5.75e+06	9.43e+02	9.55e+01
F14	1.38e-01	4.29e+02	6.09e+02	1.27e+00
F15	0.00e+00	2.14e+01	1.75e+00	1.09e-01
F16*	7.46e-09	1.60e+02	1.92e+03	3.00e+01
F17*	3.70e+01	1.75e+05	3.36e+03	8.79e+01
F18*	4.73e-04	2.12e+02	6.89e+02	8.48e+00
F19*	0.00e+00	2.06e+03	7.52e+02	3.56e-05

$n = 500$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	2.84e-12	0.00e+00	0.00e+00
F2	5.35e+01	1.29e+02	3.48e-04	9.38e+01
F3	4.76e+02	1.14e+06	3.58e+02	2.14e+02
F4	3.20e-01	1.91e+03	2.10e+03	1.86e-13
F5	0.00e+00	6.98e-03	2.96e-04	2.96e-04
F6	1.65e-12	5.16e+00	2.15e+01	9.10e-12
F7	0.00e+00	1.27e-01	7.21e+153	0.00e+00
F8	6.09e+04	7.22e+04	2.36e-06	0.00e+00
F9	2.52e+03	3.00e+03	1.74e+03	8.68e+01
F10	0.00e+00	1.86e+02	1.27e+02	0.00e+00
F11	6.76e-04	1.81e+03	4.16e+03	8.52e+01
F12	7.07e-09	4.48e+02	2.58e+03	1.21e+02
F13	3.59e+02	3.22e+07	2.87e+03	2.21e+02
F14	1.35e-01	1.46e+03	1.95e+03	4.31e+00
F15	0.00e+00	6.01e+01	2.82e+262	2.24e-01
F16*	2.04e-08	9.55e+02	5.45e+03	6.32e+01
F17*	1.11e+02	8.40e+05	9.59e+03	1.65e+02
F18*	1.22e-03	7.32e+02	2.05e+03	5.52e+01
F19*	0.00e+00	1.76e+03	2.44e+06	1.14e-03

$n = 1000$	DE	CHC	VXQR1
F1	0.00e+00	1.36e-11	0.00e+00
F2	8.46e+01	1.44e+02	9.60e+01
F3	9.69e+02	8.75e+03	6.35e+02
F4	1.44e+00	4.76e+03	6.55e-13
F5	0.00e+00	7.02e-03	1.31e-11
F6	3.29e-12	1.38e+01	1.70e-11
F7	0.00e+00	3.52e-01	0.00e+00
F8	2.46e+05	3.11e+05	0.00e+00
F9	5.13e+03	6.11e+03	1.26e+02
F10	0.00e+00	3.83e+02	0.00e+00
F11	1.35e-03	4.82e+03	1.58e+02
F12	1.68e-08	1.05e+03	2.75e+02
F13	7.30e+02	6.66e+07	5.92e+02
F14	6.90e-01	3.62e+03	6.19e+00
F15	0.00e+00	8.37e+01	2.35e+00
F16*	4.18e-08	2.32e+03	9.65e+01
F17*	2.36e+02	2.04e+07	3.09e+02
F18*	2.37e-03	1.72e+03	1.07e+02
F19*	0.00e+00	4.20e+03	1.70e-03

Table H: Comparison of final maximum results

$n = 50$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	2.33e-11	0.00e+00	0.00e+00
F2	8.49e-01	8.43e+01	3.82e-11	1.20e+01
F3	3.10e+01	2.01e+07	3.99e+00	1.33e-08
F4	9.95e-01	1.00e+02	1.33e+02	0.00e+00
F5	0.00e+00	2.21e-02	7.40e-03	1.42e-13
F6	1.71e-13	7.33e-07	2.12e+01	5.68e-13
F7	0.00e+00	9.92e-09	2.32e-10	0.00e+00
F8	4.62e+00	6.27e+02	0.00e+00	0.00e+00
F9	2.74e+02	3.20e+02	3.36e+01	2.18e+01
F10	0.00e+00	1.62e+01	1.26e+01	0.00e+00
F11	1.04e-04	1.34e+01	6.94e+01	2.21e+01
F12	7.19e-13	2.39e+01	2.51e+02	3.20e+00
F13	2.64e+01	5.08e+07	2.32e+02	7.48e+01
F14	1.80e-07	1.48e+02	1.50e+02	1.38e+00
F15	0.00e+00	2.12e+00	3.85e-03	2.15e-04
F16*	2.68e-09	9.17e-09	5.27e+02	8.35e+00
F17*	2.24e+00	5.59e+05	8.03e+02	8.33e+01
F18*	2.36e-04	2.94e+01	1.59e+02	3.60e+00
F19*	0.00e+00	5.26e+03	9.28e+00	1.73e-14

$n = 100$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	4.80e-11	0.00e+00	0.00e+00
F2	5.59e+00	9.74e+01	2.72e-10	7.15e+01
F3	1.25e+02	7.26e+07	1.84e+01	3.99e+00
F4	9.95e-01	2.93e+02	3.50e+02	0.00e+00
F5	0.00e+00	4.16e-02	1.48e-02	2.56e-13
F6	3.41e-13	5.46e-07	2.14e+01	2.64e-12
F7	0.00e+00	3.50e-01	9.41e-03	0.00e+00
F8	4.84e+02	3.26e+03	0.00e+00	0.00e+00
F9	5.07e+02	5.99e+02	1.56e+02	4.62e+01
F10	0.00e+00	9.61e+01	2.46e+01	0.00e+00
F11	1.70e-04	1.55e+02	2.60e+02	4.51e+01
F12	8.27e-11	5.19e+01	4.77e+02	9.97e+00
F13	6.45e+01	5.61e+07	5.52e+02	7.41e+01
F14	9.95e-01	2.24e+02	3.04e+02	3.02e+00
F15	0.00e+00	6.42e+01	2.51e+00	4.88e-03
F16*	4.52e-09	6.71e+01	9.75e+02	3.81e+01
F17*	1.47e+01	1.78e+06	1.74e+03	8.63e+02
F18*	4.98e-04	9.51e+01	3.41e+02	2.28e+00
F19*	0.00e+00	5.67e+03	1.55e+02	3.28e-05

$n = 200$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	2.09e+01	0.00e+00	0.00e+00
F2	2.10e+01	1.15e+02	5.79e-09	9.42e+01
F3	2.27e+02	4.31e+08	1.19e+02	2.58e+02
F4	9.95e-01	7.72e+02	8.31e+02	6.25e-13
F5	0.00e+00	4.67e-02	0.00e+00	2.95e-02
F6	7.11e-13	4.41e+00	2.15e+01	5.60e-12
F7	0.00e+00	2.65e+00	7.85e-01	0.00e+00
F8	6.63e+03	1.49e+04	0.00e+00	0.00e+00
F9	1.01e+03	1.22e+03	4.92e+02	1.17e+02
F10	0.00e+00	1.42e+02	5.88e+01	0.00e+00
F11	3.10e-04	5.96e+02	1.04e+03	1.16e+02
F12	1.49e-09	1.59e+02	1.01e+03	1.65e+02
F13	1.38e+02	1.01e+08	1.08e+03	6.06e+02
F14	9.95e-01	5.14e+02	7.05e+02	8.75e+00
F15	0.00e+00	1.23e+02	4.92e+00	1.54e+00
F16*	9.60e-09	2.94e+02	2.12e+03	7.14e+01
F17*	3.95e+01	4.37e+06	3.84e+03	2.11e+02
F18*	6.07e-04	2.61e+02	7.35e+02	4.32e+01
F19*	0.00e+00	2.11e+04	3.08e+03	2.51e-04

$n = 500$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	4.38e-12	0.00e+00	0.00e+00
F2	5.59e+01	1.41e+02	5.70e-04	9.62e+01
F3	5.22e+02	2.85e+07	8.31e+02	3.41e+02
F4	2.25e+00	2.22e+03	2.31e+03	3.41e-12
F5	0.00e+00	4.42e-02	7.40e-03	7.40e-03
F6	1.71e-12	8.05e+00	2.16e+01	1.37e-11
F7	0.00e+00	1.66e+00	2.45e+156	0.00e+00
F8	6.51e+04	8.86e+04	3.91e-06	0.00e+00
F9	2.53e+03	3.03e+03	1.85e+03	2.07e+02
F10	0.00e+00	5.18e+02	1.55e+02	0.00e+00
F11	7.83e-04	2.47e+03	4.54e+03	2.45e+02
F12	9.29e-09	5.52e+02	2.76e+03	3.07e+02
F13	3.78e+02	2.21e+08	3.55e+03	3.32e+02
F14	1.12e+00	1.77e+03	2.15e+03	3.81e+01
F15	0.00e+00	2.66e+02	3.93e+263	4.22e+00
F16*	2.30e-08	1.11e+03	5.85e+03	1.79e+02
F17*	1.13e+02	1.21e+07	1.06e+04	3.55e+02
F18*	1.74e-03	8.13e+02	2.17e+03	2.50e+02
F19*	0.00e+00	1.17e+04	6.00e+06	5.54e-03

$n = 1000$	DE	CHC	VXQR1
F1	0.00e+00	2.33e-11	0.00e+00
F2	8.65e+01	1.57e+02	9.83e+01
F3	9.71e+02	1.80e+05	8.40e+02
F4	4.69e+00	5.36e+03	1.30e-11
F5	0.00e+00	3.83e-02	3.14e-11
F6	3.41e-12	1.63e+01	2.03e-11
F7	0.00e+00	2.90e+00	0.00e+00
F8	2.58e+05	3.43e+05	0.00e+00
F9	5.14e+03	6.16e+03	2.91e+02
F10	0.00e+00	7.40e+02	0.00e+00
F11	1.48e-03	5.42e+03	4.38e+02
F12	1.94e-08	1.21e+03	5.98e+02
F13	7.31e+02	1.67e+09	1.45e+03
F14	2.77e+00	3.98e+03	1.39e+01
F15	0.00e+00	1.31e+02	1.58e+01
F16*	4.71e-08	2.75e+03	2.85e+02
F17*	2.51e+02	3.15e+08	3.60e+02
F18*	3.23e-03	2.02e+03	5.03e+02
F19*	0.00e+00	1.73e+04	6.81e-03

Table I: Comparison of final minimum results

$n = 50$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	1.23e-11	0.00e+00	0.00e+00
F2	2.56e-01	5.13e+01	2.08e-11	6.55e-01
F3	2.55e+01	9.74e-01	0.00e+00	5.23e-12
F4	0.00e+00	5.47e+01	7.16e+01	0.00e+00
F5	0.00e+00	9.92e-12	0.00e+00	0.00e+00
F6	1.14e-13	4.72e-07	2.00e+01	1.42e-13
F7	0.00e+00	4.58e-10	6.16e-11	0.00e+00
F8	1.89e+00	3.19e+01	0.00e+00	0.00e+00
F9	2.72e+02	2.99e+02	4.38e+00	3.21e+00
F10	0.00e+00	4.62e-11	2.10e+00	0.00e+00
F11	3.35e-05	3.68e-04	7.83e+00	2.91e+00
F12	2.72e-13	6.04e-11	1.15e+02	3.63e-01
F13	2.28e+01	1.14e+01	1.36e+02	6.61e-01
F14	1.32e-08	3.99e+01	7.42e+01	4.85e-02
F15	0.00e+00	1.11e-08	1.73e-04	0.00e+00
F16*	9.33e-10	0.00e+00	3.19e+02	1.02e+00
F17*	1.18e-02	9.55e-01	5.96e+02	3.59e+00
F18*	6.13e-05	3.98e+00	1.13e+02	3.09e-01
F19*	0.00e+00	0.00e+00	4.13e-01	0.00e+00

$n = 100$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	2.64e-11	0.00e+00	0.00e+00
F2	3.82e+00	7.30e+01	7.71e-11	1.87e+01
F3	7.55e+01	9.12e+01	0.00e+00	1.21e-10
F4	1.37e-13	1.64e+02	1.86e+02	0.00e+00
F5	0.00e+00	7.16e-12	0.00e+00	0.00e+00
F6	2.84e-13	3.02e-07	2.00e+01	2.27e-13
F7	0.00e+00	2.05e-10	2.78e-09	0.00e+00
F8	2.86e+02	9.32e+02	0.00e+00	0.00e+00
F9	5.04e+02	5.69e+02	4.31e+01	6.07e+00
F10	0.00e+00	1.42e+01	9.28e+00	0.00e+00
F11	7.89e-05	1.64e+00	8.07e+01	8.64e+00
F12	3.42e-11	6.43e-11	3.46e+02	1.35e+00
F13	5.95e+01	2.41e+01	3.48e+02	2.45e+00
F14	5.65e-08	1.19e+02	2.16e+02	2.42e-01
F15	0.00e+00	2.42e-08	2.39e-04	2.91e-12
F16*	2.63e-09	1.05e+00	7.47e+02	2.86e+00
F17*	1.49e-01	4.14e+01	1.27e+03	1.17e+01
F18*	1.98e-04	3.97e+01	2.62e+02	6.97e-07
F19*	0.00e+00	4.20e+00	6.71e+00	0.00e+00

$n = 200$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	1.36e-11	0.00e+00	0.00e+00
F2	1.74e+01	9.34e+01	4.90e-10	6.93e+01
F3	1.74e+02	2.07e+02	0.00e+00	3.99e-10
F4	7.44e-13	4.02e+02	0.00e+00	0.00e+00
F5	0.00e+00	4.41e-12	0.00e+00	0.00e+00
F6	5.97e-13	1.30e-07	2.14e+01	7.67e-13
F7	0.00e+00	1.20e-09	4.62e-05	0.00e+00
F8	4.82e+03	5.91e+03	0.00e+00	0.00e+00
F9	1.01e+03	1.16e+03	2.95e+02	1.86e+01
F10	0.00e+00	3.57e+01	3.04e+01	0.00e+00
F11	2.26e-04	1.19e+02	6.37e+02	1.31e+01
F12	6.65e-10	1.60e+01	8.30e+02	4.02e+00
F13	1.34e+02	1.62e+02	8.02e+02	1.72e+01
F14	1.24e-07	3.52e+02	5.08e+02	5.39e-01
F15	0.00e+00	7.42e-08	4.81e-03	6.48e-05
F16*	5.54e-09	6.19e+00	1.66e+03	7.59e+00
F17*	3.49e+01	2.64e+02	3.07e+03	3.79e+01
F18*	2.94e-04	1.63e+02	6.42e+02	1.03e+00
F19*	0.00e+00	1.47e+01	3.36e+01	0.00e+00

$n = 500$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	1.93e-12	0.00e+00	0.00e+00
F2	5.13e+01	1.16e+02	1.52e-04	8.83e+01
F3	4.70e+02	4.94e+02	2.50e+02	1.22e-07
F4	4.64e-12	1.46e+03	1.88e+03	0.00e+00
F5	0.00e+00	8.53e-14	0.00e+00	1.65e-12
F6	1.59e-12	2.83e+00	2.15e+01	3.18e-12
F7	0.00e+00	7.76e-09	1.23e+124	0.00e+00
F8	5.51e+04	6.09e+04	7.68e-07	0.00e+00
F9	2.52e+03	2.97e+03	1.58e+03	3.29e+01
F10	0.00e+00	1.08e+02	1.03e+02	0.00e+00
F11	6.13e-04	1.50e+03	3.50e+03	4.48e+01
F12	5.95e-09	3.63e+02	2.41e+03	4.14e+01
F13	3.57e+02	3.35e+02	2.59e+03	9.24e+01
F14	5.55e-07	1.15e+03	1.80e+03	1.83e+00
F15	0.00e+00	6.53e+00	1.25e+217	6.38e-05
F16*	1.71e-08	2.32e+01	5.23e+03	1.89e+01
F17*	1.10e+02	2.96e+02	8.60e+03	1.41e+02
F18*	9.19e-04	6.32e+02	1.92e+03	2.22e-01
F19*	0.00e+00	4.82e+01	3.48e+05	1.84e-07

$n = 1000$	DE	CHC	VXQR1
F1	0.00e+00	7.56e-12	0.00e+00
F2	8.22e+01	1.38e+02	9.08e+01
F3	9.66e+02	1.22e+03	2.17e+02
F4	2.76e-11	4.13e+03	0.00e+00
F5	0.00e+00	1.14e-13	3.33e-12
F6	3.18e-12	1.03e+01	1.47e-11
F7	0.00e+00	2.28e-07	0.00e+00
F8	2.31e+05	2.61e+05	0.00e+00
F9	5.12e+03	6.06e+03	8.20e+01
F10	0.00e+00	2.15e+02	0.00e+00
F11	1.25e-03	4.42e+03	7.18e+01
F12	1.40e-08	8.80e+02	2.65e+01
F13	7.28e+02	1.32e+03	3.32e+02
F14	1.30e-06	3.21e+03	1.06e-03
F15	0.00e+00	2.83e+01	3.80e-03
F16*	3.61e-08	5.46e+01	4.00e+01
F17*	2.34e+02	1.91e+03	2.90e+02
F18*	2.03e-03	1.59e+03	6.92e-03
F19*	0.00e+00	1.19e+02	1.06e-05

Table J: Comparison of final median results

$n = 50$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	1.67e-11	0.00e+00	0.00e+00
F2	3.29e-01	6.19e+01	2.64e-11	1.66e+00
F3	2.90e+01	1.25e+06	0.00e+00	1.83e-09
F4	1.51e-13	7.43e+01	1.08e+02	0.00e+00
F5	0.00e+00	1.67e-03	0.00e+00	5.68e-14
F6	1.42e-13	6.15e-07	2.11e+01	2.84e-13
F7	0.00e+00	2.66e-09	7.67e-11	0.00e+00
F8	3.54e+00	2.24e+02	0.00e+00	0.00e+00
F9	2.73e+02	3.10e+02	1.61e+01	9.21e+00
F10	0.00e+00	7.30e+00	6.71e+00	0.00e+00
F11	5.60e-05	2.16e+00	2.83e+01	1.01e+01
F12	5.27e-13	9.57e-01	1.87e+02	1.34e+00
F13	2.44e+01	2.08e+06	1.97e+02	2.51e+00
F14	2.58e-08	6.17e+01	1.05e+02	1.37e-01
F15	0.00e+00	3.98e-01	8.12e-04	8.01e-08
F16*	1.51e-09	2.95e-09	4.22e+02	4.33e+00
F17*	6.83e-01	2.26e+04	6.71e+02	1.04e+01
F18*	1.20e-04	1.58e+01	1.27e+02	4.75e-01
F19*	0.00e+00	3.59e+02	4.03e+00	0.00e+00

$n = 100$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	3.56e-11	0.00e+00	0.00e+00
F2	4.34e+00	8.58e+01	1.62e-10	5.17e+01
F3	7.81e+01	4.19e+06	2.27e+00	1.86e-08
F4	4.23e-13	2.19e+02	2.50e+02	0.00e+00
F5	0.00e+00	3.83e-03	0.00e+00	0.00e+00
F6	3.13e-13	4.10e-07	2.13e+01	8.24e-13
F7	0.00e+00	1.40e-02	6.98e-07	0.00e+00
F8	3.47e+02	1.69e+03	0.00e+00	0.00e+00
F9	5.06e+02	5.86e+02	1.06e+02	1.85e+01
F10	0.00e+00	3.30e+01	1.68e+01	0.00e+00
F11	1.29e-04	7.32e+01	1.51e+02	1.74e+01
F12	6.18e-11	1.03e+01	4.20e+02	4.56e+00
F13	6.17e+01	2.70e+06	4.12e+02	1.08e+01
F14	1.30e-07	1.66e+02	2.52e+02	3.59e-01
F15	0.00e+00	8.13e+00	4.13e-01	1.21e-05
F16*	3.53e-09	2.23e+01	8.48e+02	8.34e+00
F17*	1.28e+01	1.47e+05	1.52e+03	2.92e+01
F18*	2.86e-04	7.00e+01	3.13e+02	1.34e+00
F19*	0.00e+00	5.45e+02	1.47e+01	1.16e-10

$n = 200$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	8.34e-01	0.00e+00	0.00e+00
F2	1.93e+01	1.03e+02	9.91e-10	8.68e+01
F3	1.77e+02	2.01e+07	8.95e+01	2.87e+01
F4	3.58e-12	5.40e+02	6.68e+02	0.00e+00
F5	0.00e+00	8.76e-03	0.00e+00	7.96e-13
F6	6.54e-13	1.23e+00	2.14e+01	2.70e-12
F7	0.00e+00	2.59e-01	2.61e-02	0.00e+00
F8	5.33e+03	9.38e+03	0.00e+00	0.00e+00
F9	1.01e+03	1.19e+03	3.81e+02	4.32e+01
F10	0.00e+00	7.13e+01	4.41e+01	0.00e+00
F11	2.59e-04	3.85e+02	7.93e+02	3.89e+01
F12	9.36e-10	7.44e+01	9.08e+02	2.71e+01
F13	1.36e+02	5.75e+06	9.34e+02	6.21e+01
F14	2.71e-07	4.29e+02	6.24e+02	8.56e-01
F15	0.00e+00	2.14e+01	2.10e+00	5.66e-03
F16*	7.26e-09	1.60e+02	1.90e+03	2.94e+01
F17*	3.70e+01	1.75e+05	3.33e+03	5.66e+01
F18*	4.70e-04	2.12e+02	6.88e+02	4.18e+00
F19*	0.00e+00	2.06e+03	5.74e+02	7.87e-07

$n = 500$	DE	CHC	G-CMA-ES	VXQR1
F1	0.00e+00	2.84e-12	0.00e+00	0.00e+00
F2	5.33e+01	1.29e+02	3.31e-04	9.43e+01
F3	4.74e+02	1.14e+06	3.55e+02	2.11e+02
F4	9.22e-03	1.91e+03	2.07e+03	0.00e+00
F5	0.00e+00	6.98e-03	0.00e+00	5.32e-12
F6	1.65e-12	5.16e+00	2.15e+01	8.98e-12
F7	0.00e+00	1.27e-01	2.14e+143	0.00e+00
F8	6.11e+04	7.22e+04	2.31e-06	0.00e+00
F9	2.52e+03	3.00e+03	1.76e+03	5.95e+01
F10	0.00e+00	1.86e+02	1.27e+02	0.00e+00
F11	6.71e-04	1.81e+03	4.18e+03	7.32e+01
F12	6.98e-09	4.48e+02	2.59e+03	1.08e+02
F13	3.58e+02	3.22e+07	2.87e+03	2.40e+02
F14	9.01e-07	1.46e+03	1.95e+03	2.81e+00
F15	0.00e+00	6.01e+01	5.57e+258	1.19e-02
F16*	2.05e-08	9.55e+02	5.43e+03	3.69e+01
F17*	1.11e+02	8.40e+05	9.50e+03	1.47e+02
F18*	1.22e-03	7.32e+02	2.06e+03	8.33e+00
F19*	0.00e+00	1.76e+03	2.50e+06	8.48e-04

$n = 1000$	DE	CHC	VXQR1
F1	0.00e+00	1.36e-11	0.00e+00
F2	8.44e+01	1.44e+02	9.64e+01
F3	9.69e+02	8.75e+03	6.05e+02
F4	1.32e+00	4.76e+03	5.68e-14
F5	0.00e+00	7.02e-03	1.09e-11
F6	3.30e-12	1.38e+01	1.67e-11
F7	0.00e+00	3.52e-01	0.00e+00
F8	2.46e+05	3.11e+05	0.00e+00
F9	5.13e+03	6.11e+03	9.99e+01
F10	0.00e+00	3.83e+02	0.00e+00
F11	1.35e-03	4.82e+03	1.12e+02
F12	1.70e-08	1.05e+03	2.24e+02
F13	7.29e+02	6.66e+07	5.39e+02
F14	9.95e-01	3.62e+03	5.64e+00
F15	0.00e+00	8.37e+01	2.70e-02
F16*	4.19e-08	2.32e+03	6.35e+01
F17*	2.35e+02	2.04e+07	2.97e+02
F18*	2.37e-03	1.72e+03	1.57e+01
F19*	0.00e+00	4.20e+03	1.37e-03