

Comparison tables: BBOB 2012 noisy testbed in 40-D

The BBOBies

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Abstract

This document provides tabular results of the workshop for Black-Box Optimization Benchmarking at GECCO 2012, see <http://coco.gforge.inria.fr/doku.php?id=bbob-2012>. 4 algorithms have been tested on 24 benchmark functions in dimensions between 2 and 40. A description of the used objective functions can be found in [4, 2]. The experimental set-up is described in [3].

The performance measure provided in the following tables is the expected number of objective function evaluations to reach a given target function value (ERT, expected running time), divided by the respective value for the best algorithm in BBOB-2009 (see [1]) if an algorithm from BBOB-2009 reached the given target function value. The ERT value is given otherwise (ERT_{best} is noted as infinite). See [3] for details on how ERT is obtained. Bold entries in the table correspond to values below 3 or the top-three best values. Table 1 gives an overview on all algorithms submitted to the noise-free testbed in 2012.

Table 1: Names and references of all algorithms submitted for the noise-free testbed

algorithm name	short	paper	reference
IPOPsaACM		Black-box Optimization Benchmarking of IPOP-saACM-ES on the BBOB-2012 Noisy Testbed (Page 261)	[8]
SNES		Benchmarking Separable Natural Evolution Strategies on the Noiseless and Noisy Black-Box Optimization Testbeds (Page 205)	[7]
xNES		Benchmarking Exponential Natural Evolution Strategies on the Noiseless and Noisy Black-Box Optimization Testbeds (Page 213)	[5]
xNESas		Benchmarking Natural Evolution Strategies with Adaptation Sampling on the Noiseless and Noisy Black-Box Optimization Testbeds (Page 229)	[6]
SNES, xNES, xNESas		Comparing Natural Evolution Strategies to BIPOP-CMA-ES on Noiseless and Noisy Black-Box Optimization Testbeds (Page 237)	[9]

Table 2: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}} 2009$ on f_{101} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	|#succ
f101	584	905	1255	1913	2556	3237	15/15
SNES	<i>1.2</i> _(0.2) ^{*5}	<i>1.9</i> _(0.1) ^{*5}	<i>2.1</i> _(0.1) ^{*5}	<i>2.4</i> _(0.1) ^{*5}	<i>2.5</i> _(0.1) ^{*5}	<i>2.6</i> _(0.0) ^{*5}	15/15
xNESas	9.3(1)	16(3)	16(6)	14(9)	12(8)	10(6)	30/30

Table 3: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best 2009}}$ on f_{102} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	/#succ
f102	821	1286	1742	2629	3557	4504	15/15
SNES	0.94 _(0.2) ^{*4}	1.3 _(0.1) ^{*4}	1.5 _(0.1) ^{*4}	1.8 _(0.0) ^{*4}	1.8 _(0.0) ^{*4}	1.9 _(0.0) ^{*4}	15/15
xNES	6.8(1)	14(0.6)	18(0.6)	22(0.2)	23(0.3)	24(0.2)	15/15
xNESas	6.9(1)	12(2)	12(4)	11(6)	10(7)	9.3(8)	30/30

Table 4: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best 2009}}$ on f_{103} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

$\Delta \hat{f}_{\text{opt}}$	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f103	529	1223	1693	2720	3818	4963	15/15
SNES	1.4(0.1)*⁴	1.4(0.1)*⁴	1.6(0.1)*⁴	1.8(0.1)*⁴	2.0(0.0)*⁴	4.3(2)*⁴	15/15
xNES	11(1)	15(0.7)	18(0.4)	22(0.3)	24(0.4)	25(0.3)	15/15
xNESas	10(2)	12(3)	12(5)	13(8)	19(13)	24(13)	30/30

Table 6: 40-D, running time excess $ERT/ERT_{\text{best}} 2009$ on f_{105} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f105	5.6e6	5.9e6	6.0e6	6.1e6	6.2e6	6.3e6	15/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	∞	∞	∞	∞	∞	∞ <i>2e7</i>	0/19

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Table 7: 40-D, running time excess $ERT/ERT_{\text{best } 2009}$ on f_{106} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	/#succ
f106	69253	90821	95524	99526	1.0e5	1.0e5	15/15
SNES	∞	∞	∞	∞	∞	∞	0/15
xNESas	<i>1.4</i> _(0.1) ^{*4}	<i>1.6</i> _(0.1) ^{*4}	<i>1.6</i> _(0.1) ^{*4}	<i>1.7</i> _(0.1) ^{*4}	<i>2.0</i> _(0.8) ^{*4}	<i>3.0</i> ₍₁₎ ^{*4}	15/15

Table 8: 40-D, running time excess $ERT/ERT_{\text{best 2009}}$ on f_{107} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f107	38382	57745	74911	97700	1.2e5	1.4e5	15/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNES	∞	∞	∞	∞	∞	∞ <i>9e6</i>	0/2
xNESas	∞	∞	∞	∞	∞	∞ <i>2e7</i>	0/27

Table 9: 40-D, running time excess $ERT/ERT_{\text{best}} 2009$ on f_{108} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f108	2.1e5	5.6e5	9.4e5	1.8e6	2.8e6	4.3e6	15/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	∞	∞	∞	∞	∞	∞ <i>2e7</i>	0/15

Table 10: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}} 2009$ on f_{109} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f109	841	1456	2504	4958	7525	10054	15/15
SNES	0.92 _(0.1) ^{*4}	1.4 _(0.1) ^{*4}	1.6 _(0.1) ^{*4}	3.4 ₍₂₎ ^{*4}	18 ₍₂₄₎	129 ₍₁₃₉₎	1/15
xNESas	6.6 ₍₁₎	15 ₍₂₎	19 ₍₁₎	23 _(0.7)	30 ₍₁₁₎	32 ₍₁₀₎	15/15

Table 12: 40-D, running time excess $ERT/ERT_{\text{best 2009}}$ on f_{111} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f111	∞	∞	∞	∞	∞	∞	0
SNES	0/15
xNESas	0/3

Table 13: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}}$ 2009 on f_{112} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f112	1.8e5	2.5e5	2.7e5	2.8e5	2.8e5	2.9e5	14/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15

Table 14: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}} 2009$ on f_{113} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f113	4.4e5	2.5e6	2.7e6	3.0e6	3.0e6	3.0e6	15/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNES	∞	∞	∞	∞	∞	∞ <i>2e7</i>	0/1
xNESas	∞	∞	∞	∞	∞	∞ <i>3e7</i>	0/15

Table 15: 40-D, running time excess $ERT/ERT_{\text{best 2009}}$ on f_{114} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f114	1.7e6	6.5e6	1.0e7	1.2e7	1.2e7	1.2e7	15/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	∞	∞	∞	∞	∞	∞ <i>2e7</i>	0/15

Table 16: 40-D, running time excess $ERT/ERT_{\text{best}} 2009$ on f_{115} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f115	20541	1.9e5	3.7e5	4.2e5	4.2e5	4.2e5	15/15
SNES	0.93(1)	∞	∞	∞	∞	∞	0/15
xNESas	0.92 (0.1)	0.21 (9e-3) ^{*4}	0.24 (0.0) ^{*4}	0.96 (0.7) ^{*4}	0.96 (0.7) ^{*4}	0.96 (0.7)	15/15

Table 17: 40-D, running time excess $ERT/ERT_{\text{best 2009}}$ on f_{116} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f116	4.2e6	4.3e6	4.5e6	4.8e6	5.1e6	5.4e6	15/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	∞	∞	∞	∞	∞	∞ <i>3e7</i>	0/15

Table 18: 40-D, running time excess $ERT/ERT_{\text{best 2009}}$ on f_{117} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f117	8.4e6	1.2e7	1.4e7	1.7e7	1.9e7	2.1e7	15/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	∞	∞	∞	∞	∞	∞ <i>2e7</i>	0/7

Table 19: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}}$ 2009 on f_{118} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f118	39183	47888	81836	1.1e5	1.2e5	1.3e5	15/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15

Table 20: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best 2009}}$ on f_{119} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f119	42381	1.2e5	1.6e5	2.1e6	1.0e7	1.3e7	15/15
SNES	31 ₍₃₄₎	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNES	7.4 _(1e-3)	∞	∞	∞	∞	∞ <i>1e7</i>	0/2
xNESas	3.6 ₍₃₎	∞	∞	∞	∞	∞ <i>3e7</i>	0/15

Table 21: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best 2009}}$ on f_{120} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f120	1.6e5	7.1e5	1.7e6	1.1e7	4.3e7	2.4e8	3/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	∞	∞	∞	∞	∞	∞ <i>2e7</i>	0/15

Table 22: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}} 2009$ on f_{121} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f121	728	1739	3362	27554	97381	2.0e5	14/15
SNES	0.77 _(0.2)	1.1 _(0.1) ^{*4}	1.8 _(0.9) ^{*4}	∞	∞	∞ 4e5	0/15
xNESas	1.0 _(0.3)	11 _(0.7)	16 _(0.6)	5.6 ₍₂₎ ^{*4}	2.9 ₍₁₎ ^{*4}	1.8 _(0.5) ^{*4}	15/15

Table 23: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best 2009}}$ on f_{122} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f122	4936	2.7e5	6.4e5	2.8e6	1.2e7	3.3e7	11/15
SNES	2.1(3)	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	1.2 (0.8)	∞	∞	∞	∞	∞ <i>2e7</i>	0/15

Table 24: 40-D, running time excess $ERT/ERT_{\text{best 2009}}$ on f_{123} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f123	13229	2.4e6	9.4e6	2.4e7	2.3e8	7.3e8	0
SNES	<i>77(83)</i>	∞	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	25(28)	∞	∞	∞	∞	∞ <i>2e7</i>	0/4

Table 25: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}}$ 2009 on f_{124} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f124	570	30165	2.1e5	3.7e5	1.1e6	2.2e6	15/15
SNES	0.64 _(0.1) _{↓2}	0.15 _(0.0)	0.69 _(0.5)	∞	∞	∞ <i>4e5</i>	0/15

Table 26: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best 2009}}$ on f_{125} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f125	1	4611	1.1e8	5.4e8	∞	∞	0
SNES	2.3(2)	44(49)	∞	∞	.	.	0/15
xNES	1.4 (0.5)	3.2(5)	∞	∞	.	.	0/15
xNESas	1.7(2)	2.3 (2)	∞	∞	.	.	0/15

Table 27: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}}$ 2009 on f_{126} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f126	1	8740	∞	∞	∞	∞	0
SNES	1.4 (0.5)	∞	0/15
xNES	2.1(2)	1088 (835)	.	.	.	.	0/12
xNESas	1.8(2)	1183(1011)	.	.	.	.	0/15

Table 28: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best 2009}}$ on f_{127} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f127	1	702	1.8e6	1.5e7	2.6e7	2.7e7	15/15
SNES	1.5 (1)	0.58 (0.3) \downarrow 2	∞	∞	∞	∞ <i>4e5</i>	0/15
xNESas	1.7(0.5)	0.68(0.3)	∞	∞	∞	∞ <i>2e7</i>	0/10

Table 29: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}}$ 2009 on f_{128} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f128	4.1e6	3.8e7	1.1e8	1.1e8	1.1e8	1.1e8	4/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15

Table 30: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}}$ 2009 on f_{129} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f129	<i>3.5e7</i>	<i>3.8e7</i>	1.0e8	1.0e8	1.0e8	1.0e8	2/15
SNES	∞	∞	∞	∞	∞	∞ <i>4e5</i>	0/15

Table 31: 40-D, running time excess $\text{ERT}/\text{ERT}_{\text{best}}$ 2009 on f_{130} , in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

Δf_{opt}	1e1	1e0	1e-1	1e-3	1e-5	1e-7	#succ
f130	12699	2.8e5	1.7e6	1.7e6	1.7e6	1.7e6	3/15
SNES	0.64 ₍₁₎	0.27 _(0.3)	0.07 _{(0.1)↓₂}	0.07 _{(0.1)↓₂}	0.13 _{(0.1)↓}	0.23 _(0.3)	4/15

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