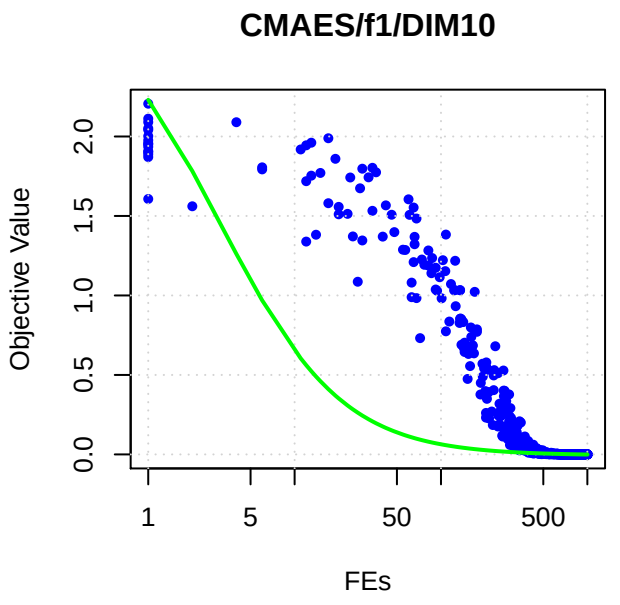
CMAES/f1/DIM10
Objective Value
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1.0
1.5
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5
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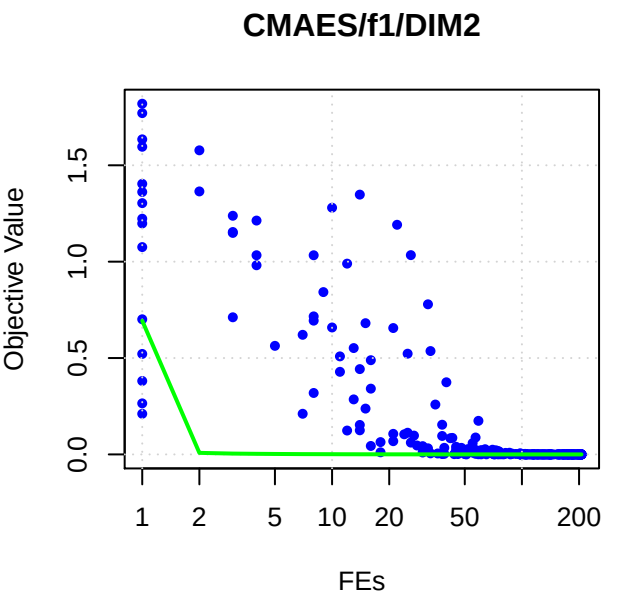
500
FEs


CMAES/f1/DIM2
Objective Value
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1.0
1.5
1
2
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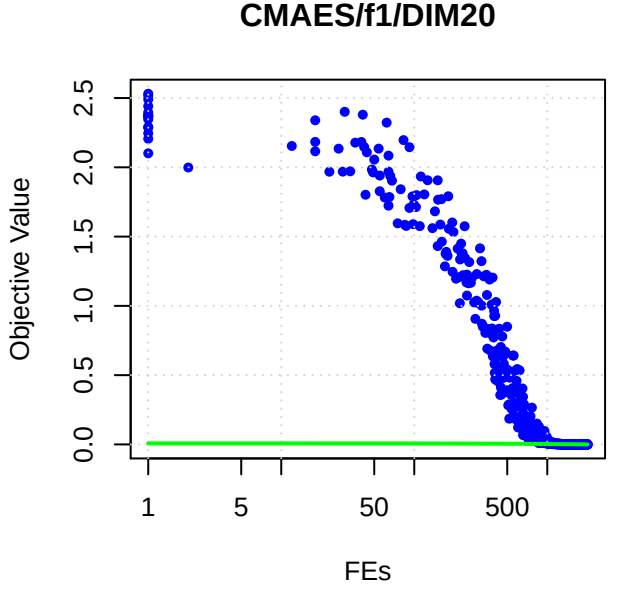
FEs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Objective Value
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1.5
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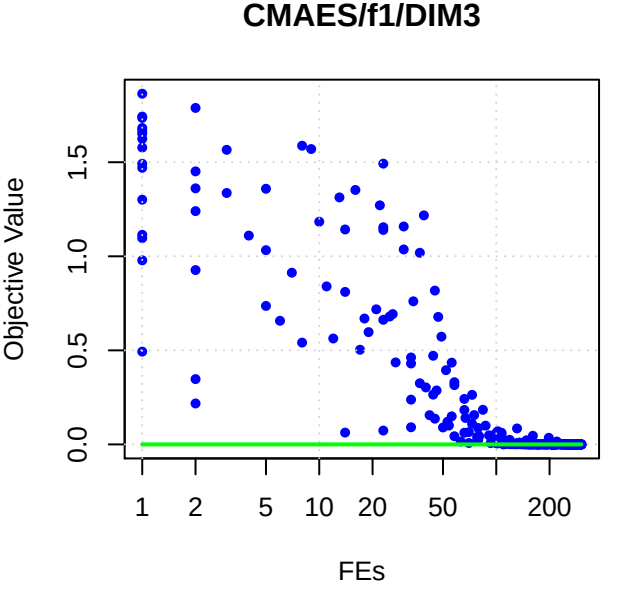
FEs


CMAES/f1/DIM3
Objective Value
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0.5
1.0
1.5
1
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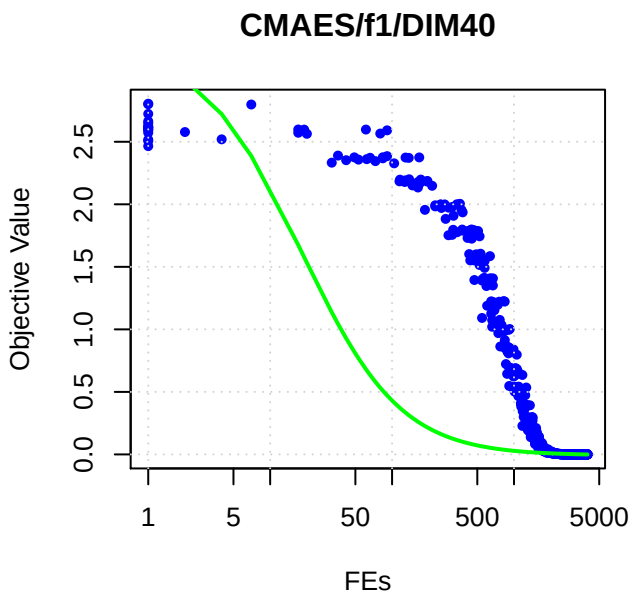
20
50
200
FEs


CMAES/f1/DIM40
Objective Value
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2.5
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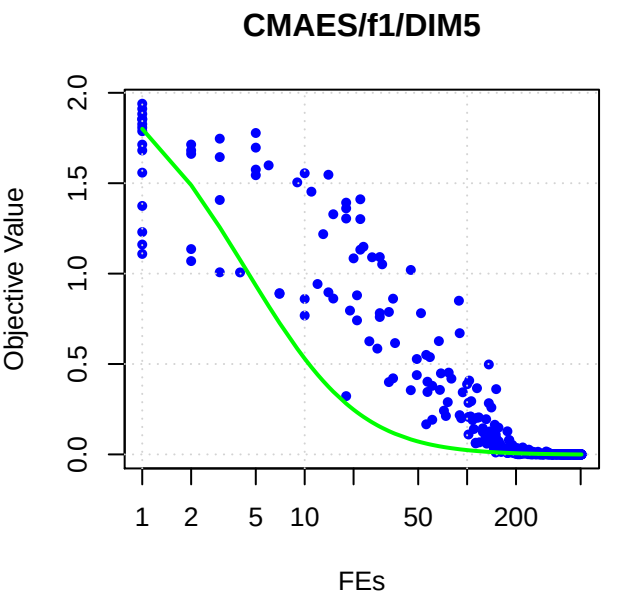
5000
FEs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Objective Value
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1.5
2.0
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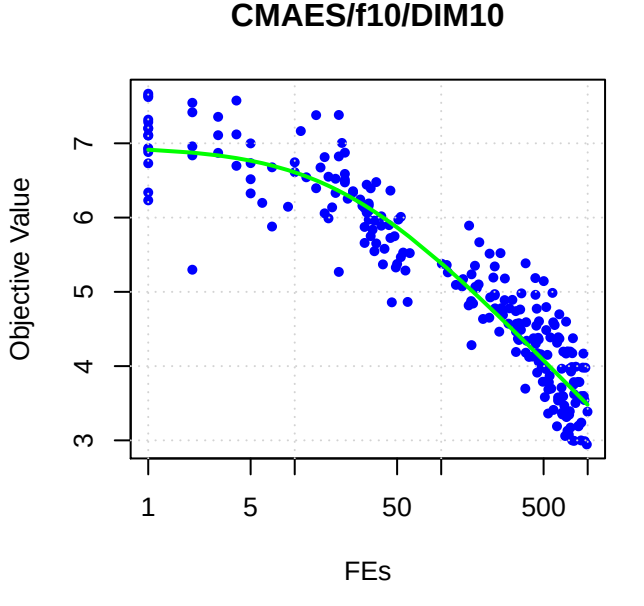
5
10
50
200
FEs


CMAES/f10/DIM10
Objective Value
3
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5
6
7
1
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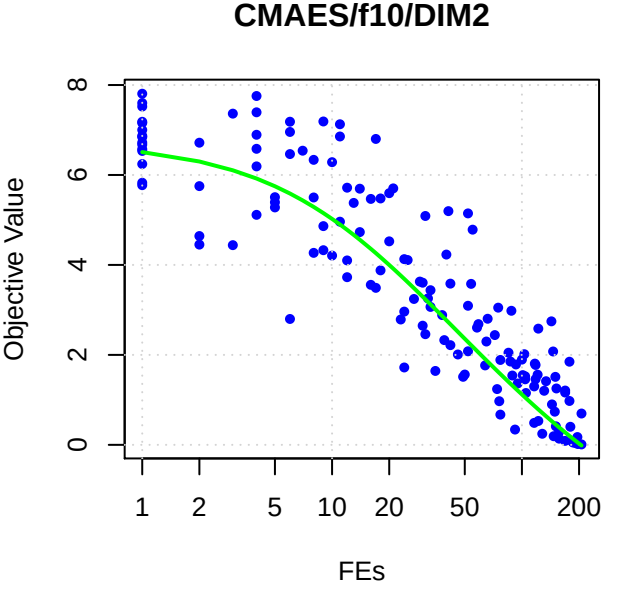
FEs


CMAES/f10/DIM2
Objective Value
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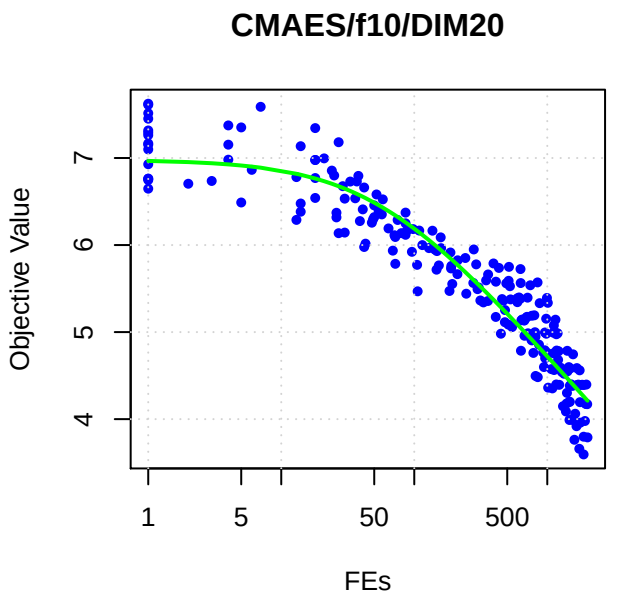
FEs


CMAES/f10/DIM20
Objective Value
FEs
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7
1
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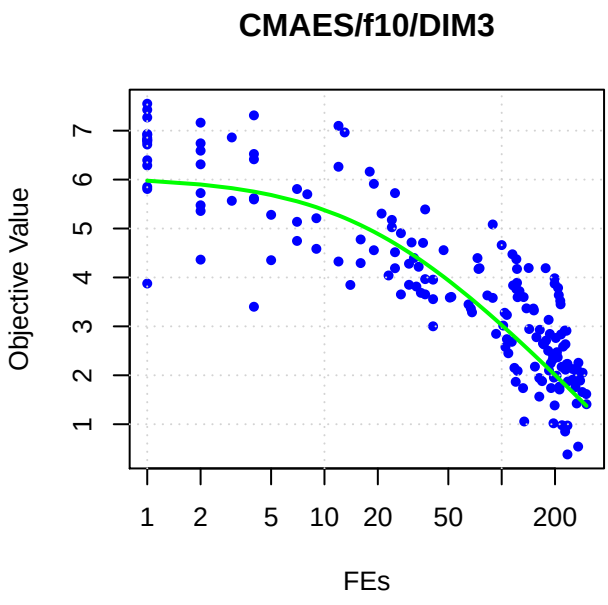
500


CMAES/f10/DIM3
Objective Value
FEs
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2
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4
5
6
7
1
2
5
10
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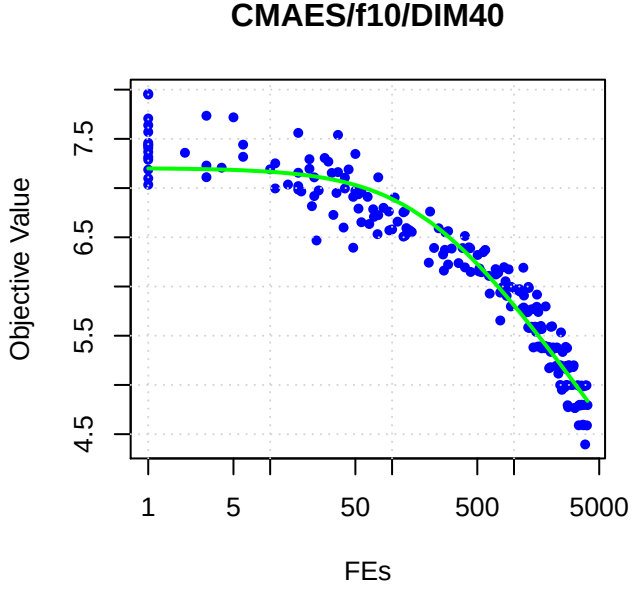
CMAES/f10/DIM40
Objective Value
FEs
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6.5
7.5
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5
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500
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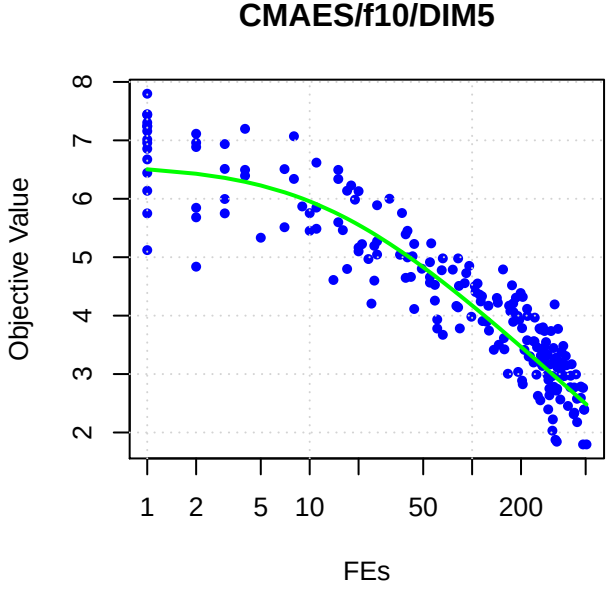
CMAES/f10/DIM5
Objective Value
FEs
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3
4
5
6
7
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2
5
10
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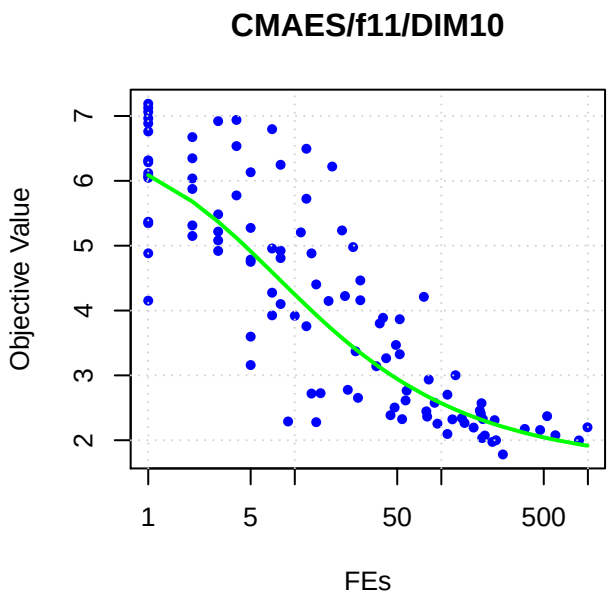
CMAES/f11/DIM10
Objective Value
FEs
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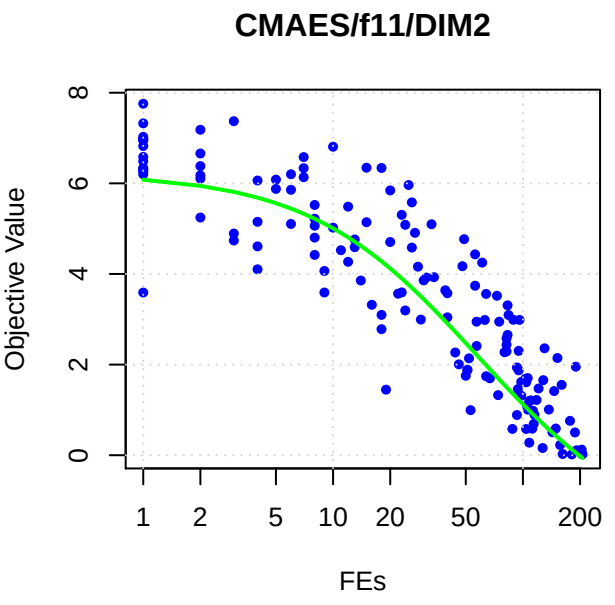
6
7


CMAES/f11/DIM2
Objective Value
FEs
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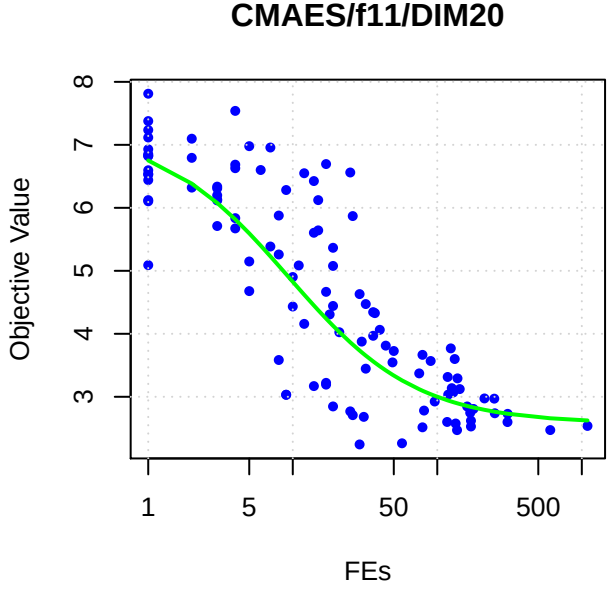
CMAES/f11/DIM20
Objective Value
FEs
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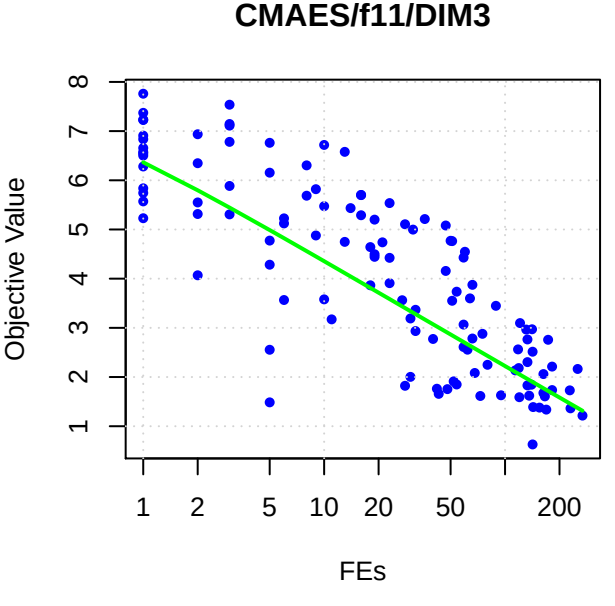
CMAES/f11/DIM3
Objective Value
FEs
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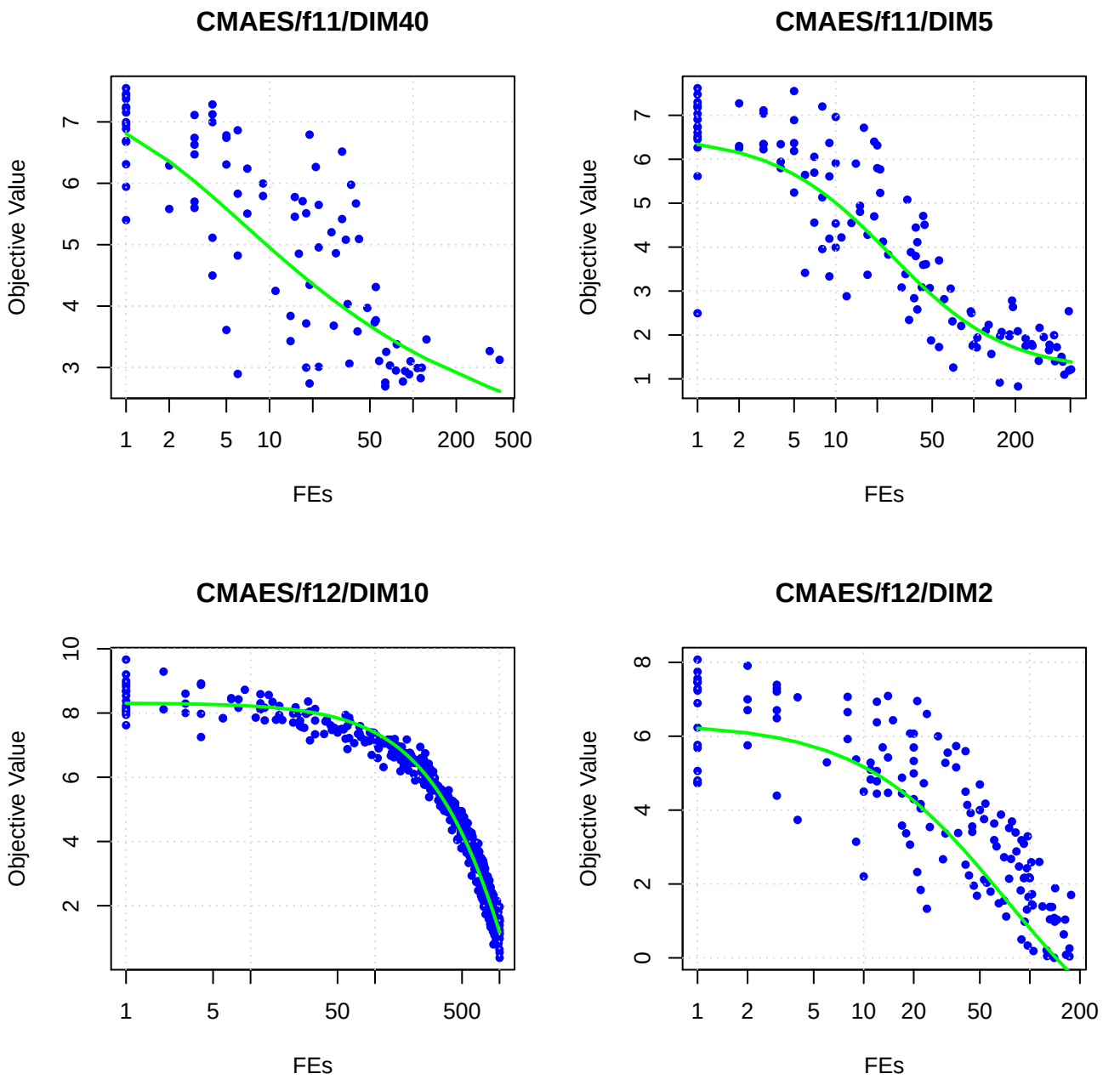
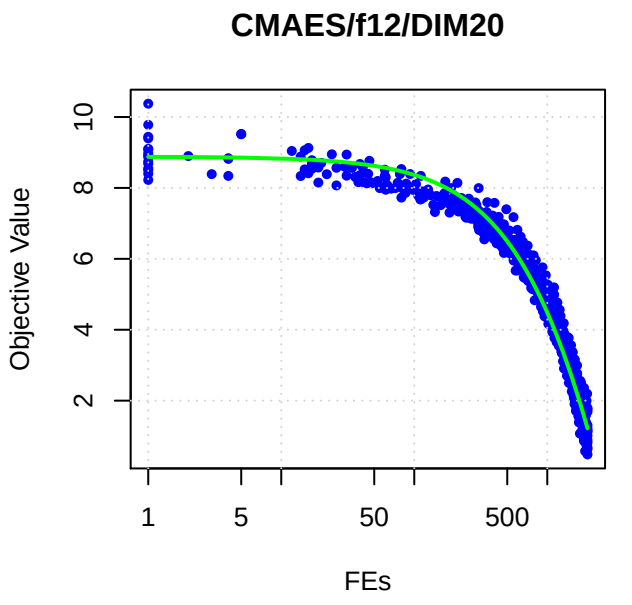

CMAES/f11/DIM40
Objective Value
FEs
CMAES/f11/DIM5
Objective Value
FEs
CMAES/f12/DIM10
Objective Value
FEs
CMAES/f12/DIM2
Objective Value
FEs


CMAES/f12/DIM20
Objective Value
FEs
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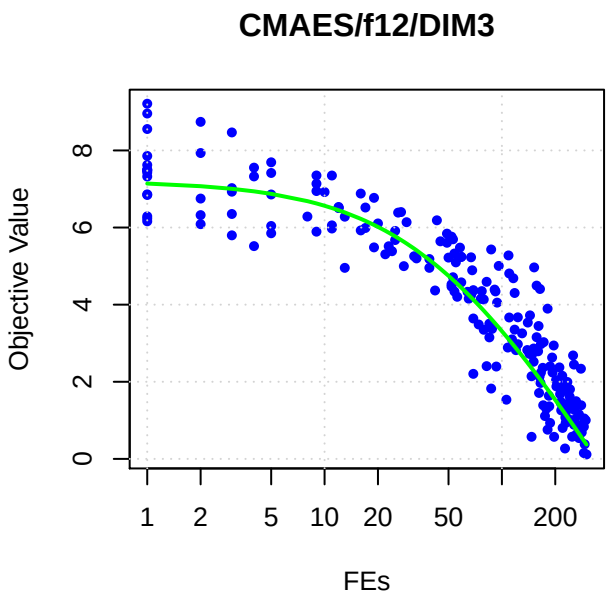
500
2
4
6
8
10


CMAES/f12/DIM3
Objective Value
FEs
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10
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2
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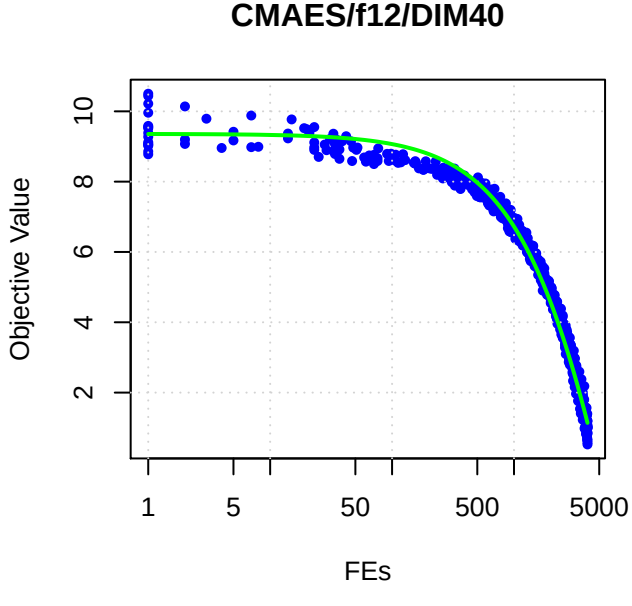
6
8


CMAES/f12/DIM40
Objective Value
FEs
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5000
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8
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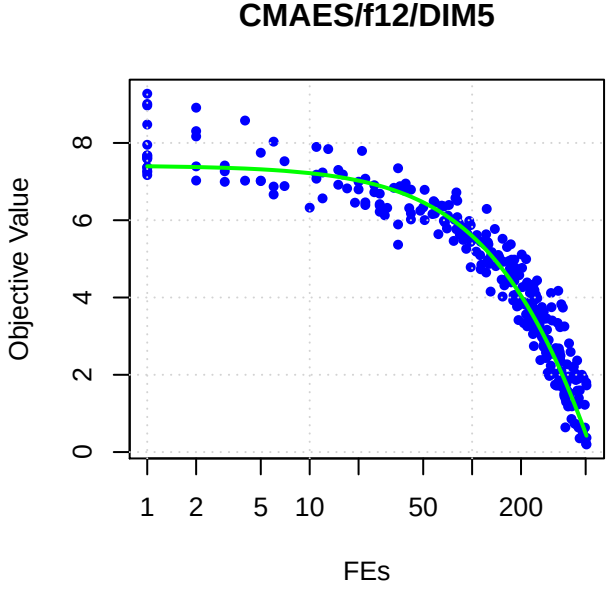
CMAES/f12/DIM5
Objective Value
FEs
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6
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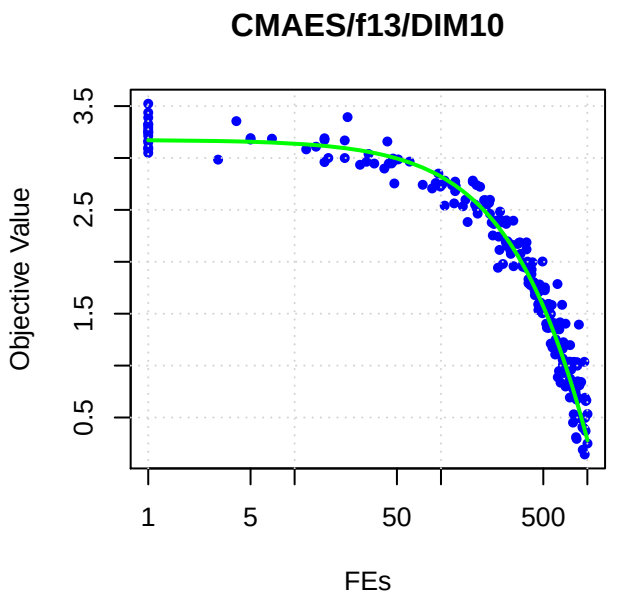
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Objective Value
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3.5
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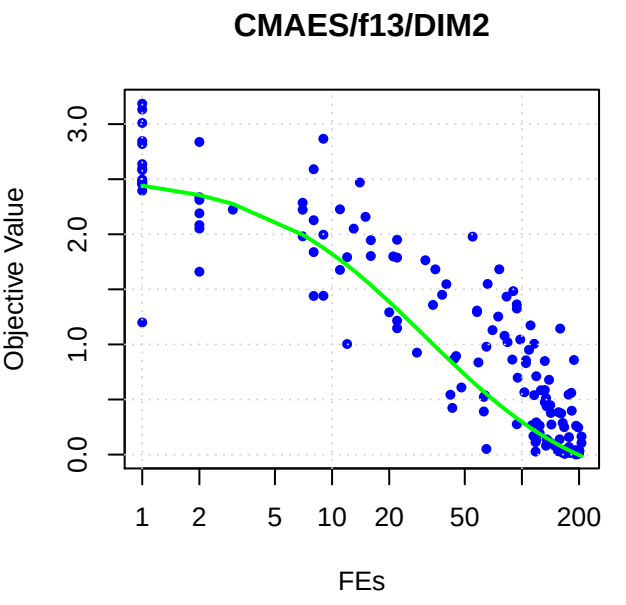
FEs


CMAES/f13/DIM2
Objective Value
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3.0
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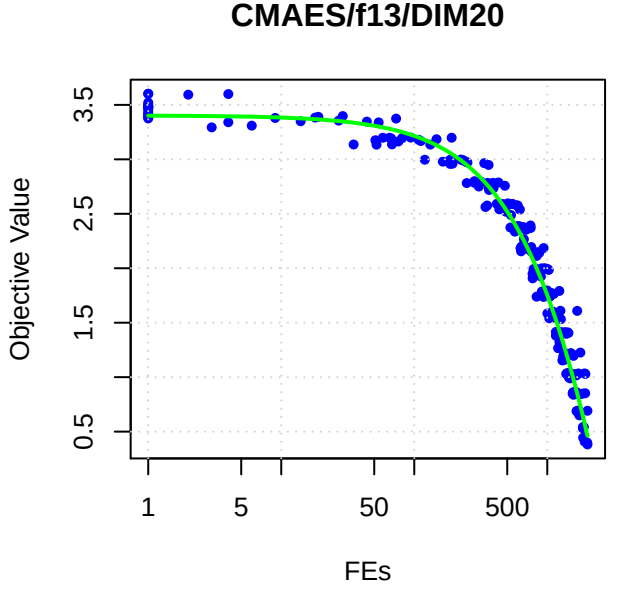
FEs


CMAES/f13/DIM20
Objective Value
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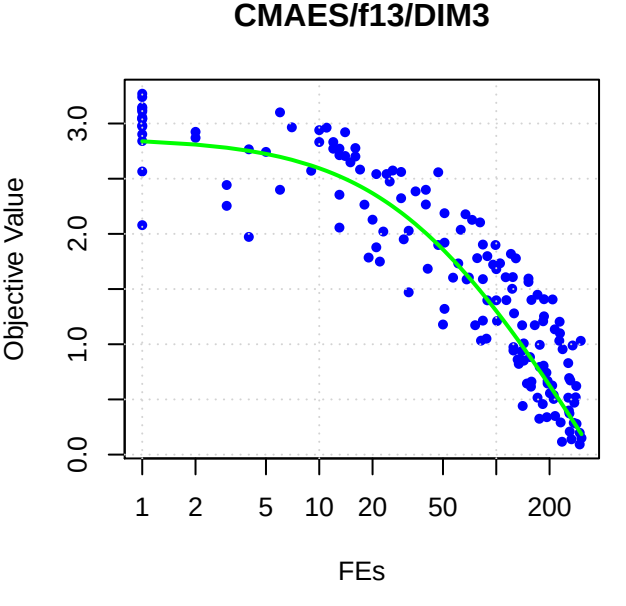
CMAES/f13/DIM3
Objective Value
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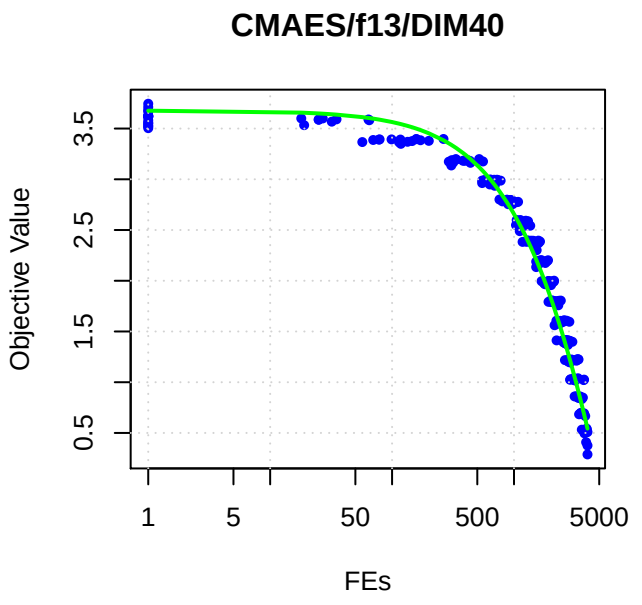
CMAES/f13/DIM40
Objective Value
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3.5
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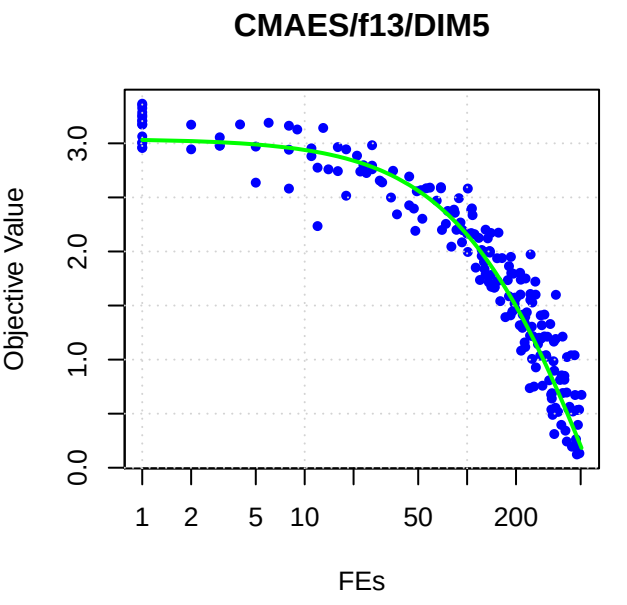
FEs


CMAES/f13/DIM5
Objective Value
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3.0
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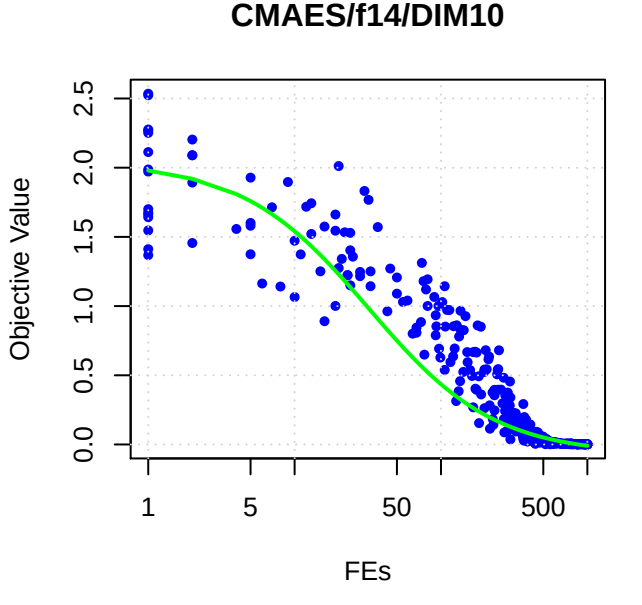
200
FEs


CMAES/f14/DIM10
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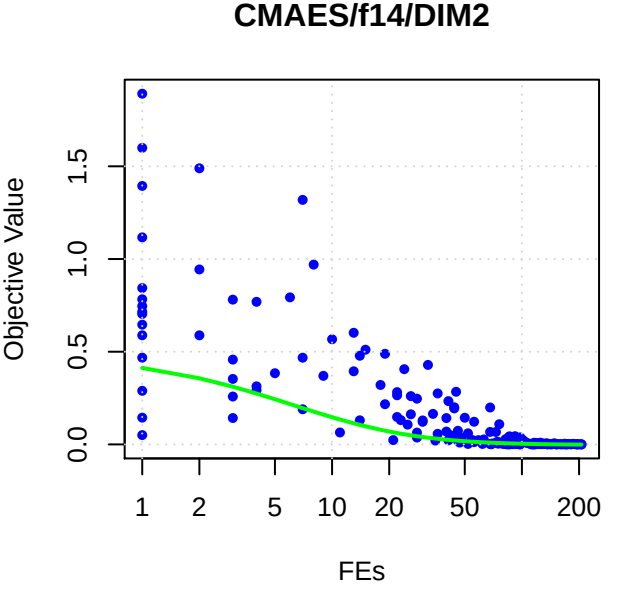
FEs


CMAES/f14/DIM2
Objective Value
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1.5
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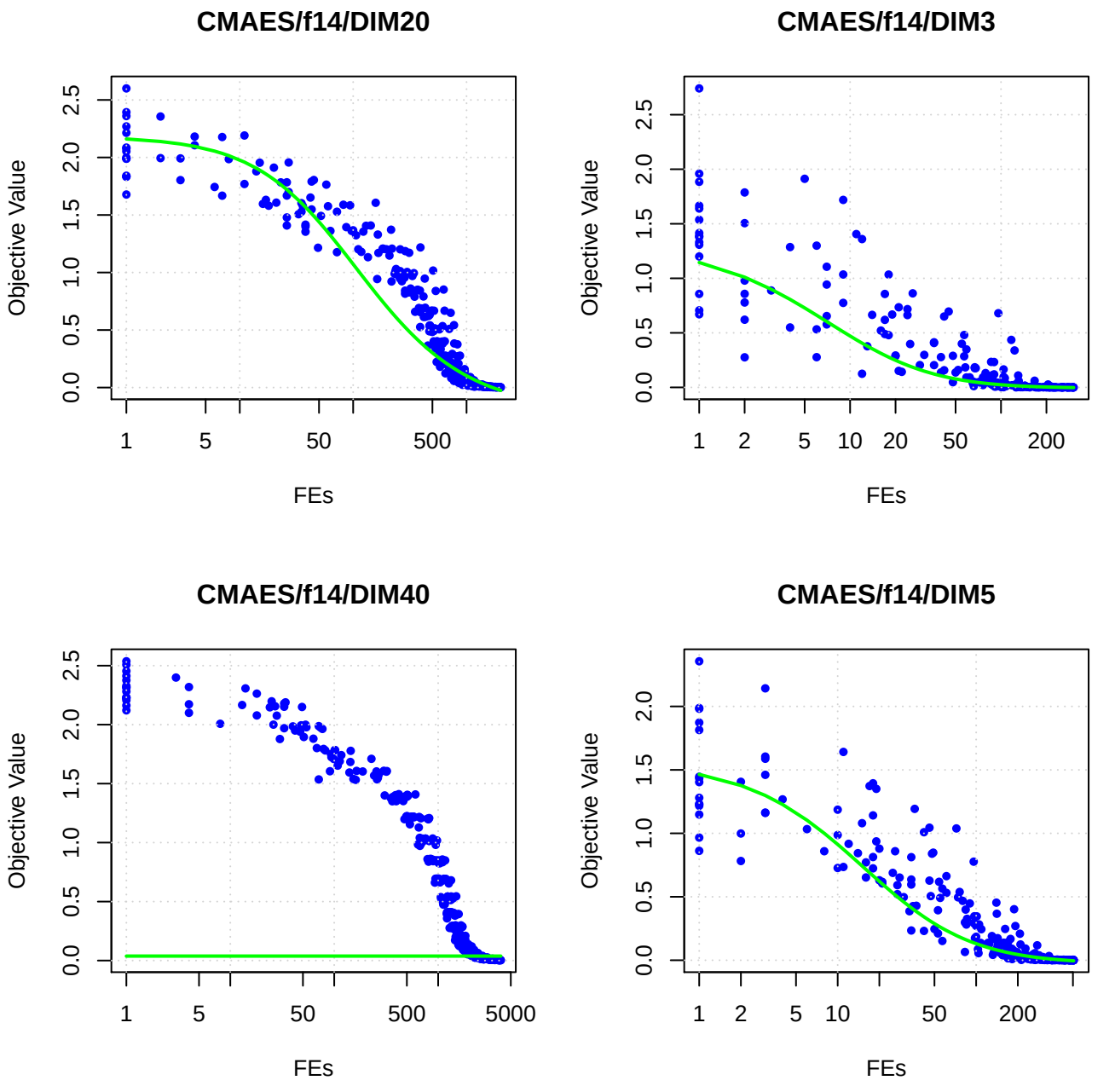
20
50
200
FEs


CMAES/f14/DIM20
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1.0
1.5
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2.5
1
5
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500
FEs
CMAES/f14/DIM3
Objective Value
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0.5
1.0
1.5
2.0
2.5
1
2
5
10
20
50
200
FEs
CMAES/f14/DIM40
Objective Value
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1.0
1.5
2.0
2.5
1
5
50
500
5000
FEs
CMAES/f14/DIM5
Objective Value
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1.0
1.5
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1
2
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10
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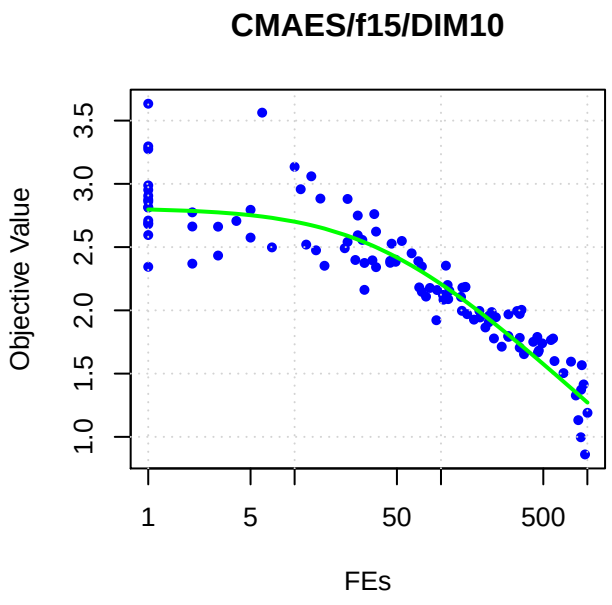
FEs


CMAES/f15/DIM10
Objective Value
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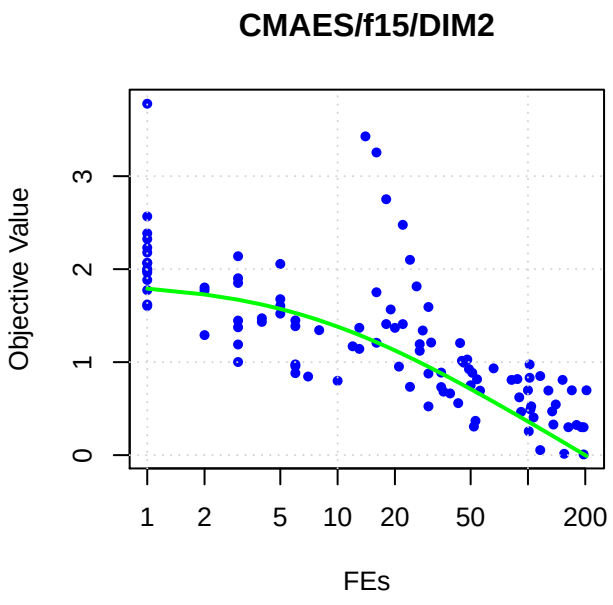
FEs


CMAES/f15/DIM2
Objective Value
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2
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1
2
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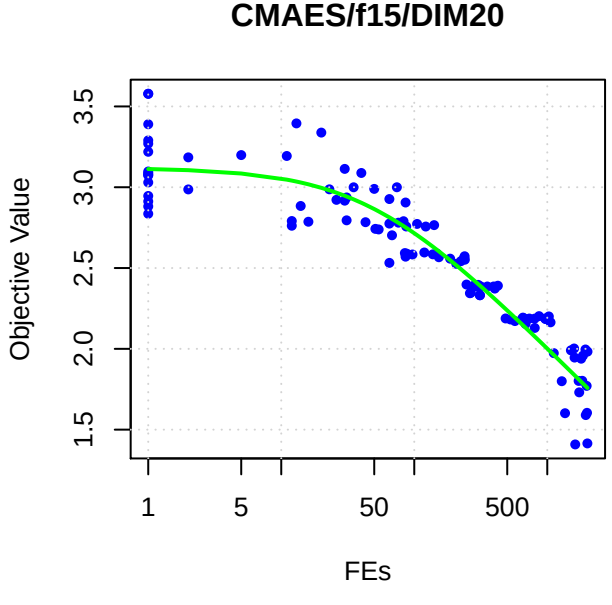
FEs


CMAES/f15/DIM20
Objective Value
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2.5
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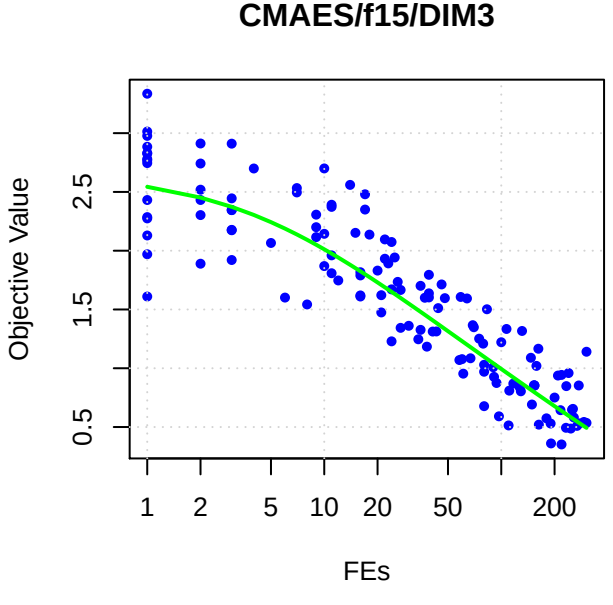
FEs


CMAES/f15/DIM3
Objective Value
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2.5
1
2
5
10
20
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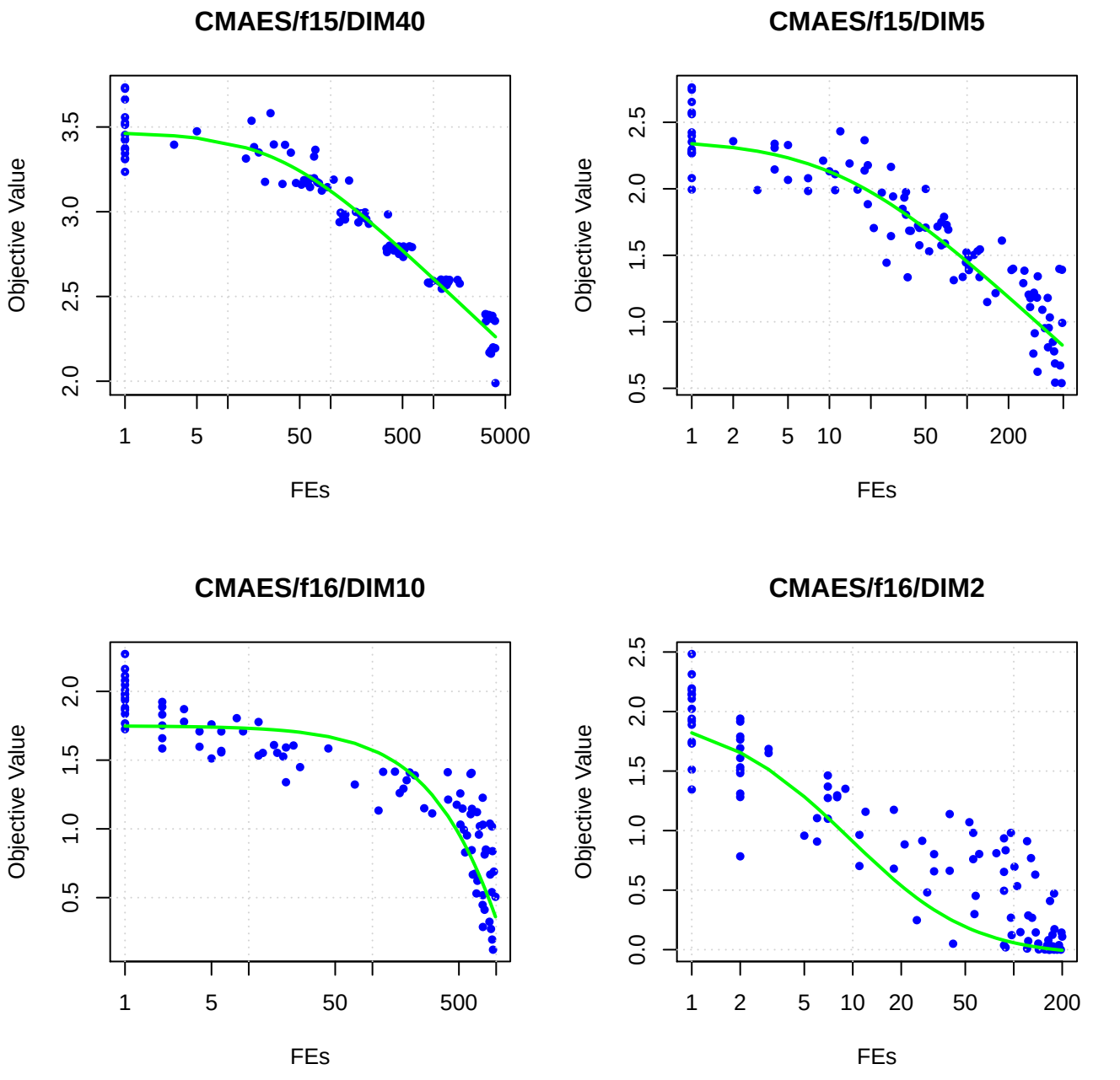
200
FEs


CMAES/f15/DIM40
Objective Value
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2.5
3.0
3.5
1
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5000
FEs
CMAES/f15/DIM5
Objective Value
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1.0
1.5
2.0
2.5
1
2
5
10
50
200
FEs
CMAES/f16/DIM10
Objective Value
0.5
1.0
1.5
2.0
1
5
50
500
FEs
CMAES/f16/DIM2
Objective Value
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1.0
1.5
2.0
2.5
1
2
5
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20
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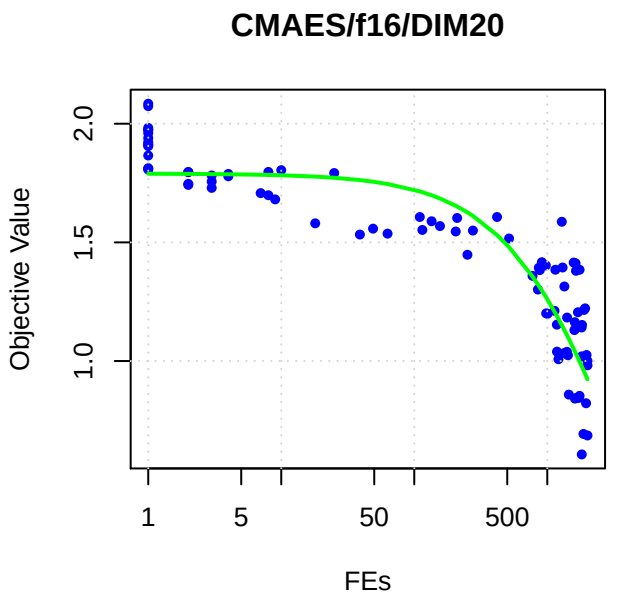
200
FEs


CMAES/f16/DIM20
Objective Value
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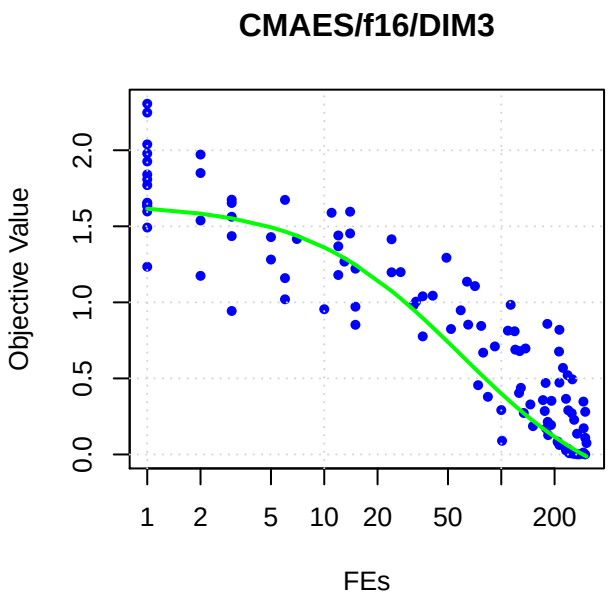
FEs


CMAES/f16/DIM3
Objective Value
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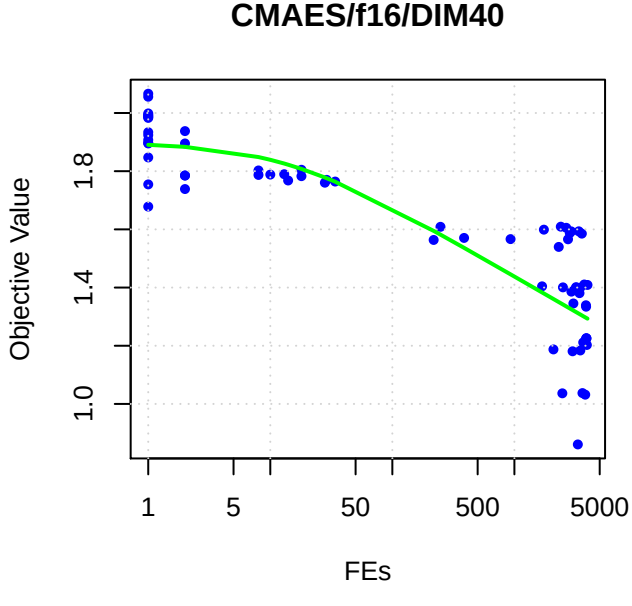
FEs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Objective Value
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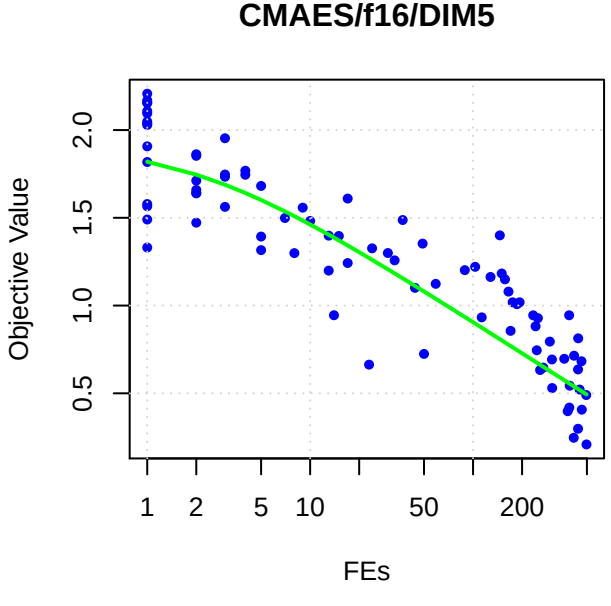
5000
FEs


CMAES/f16/DIM5
Objective Value
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1.0
0.5
1
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10
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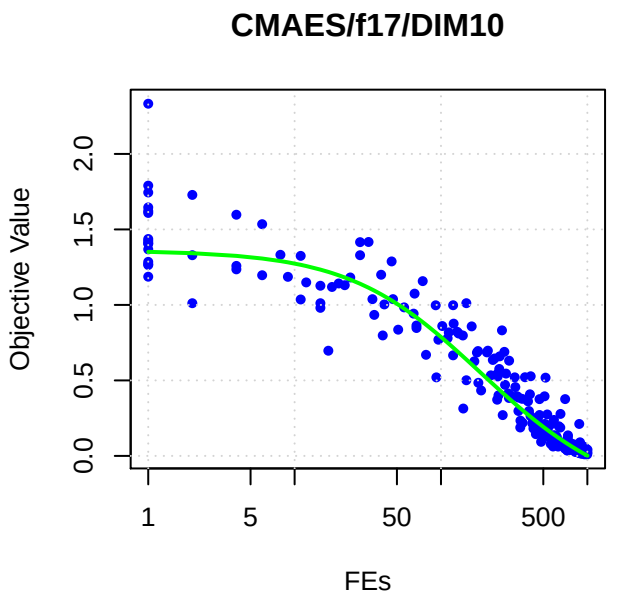
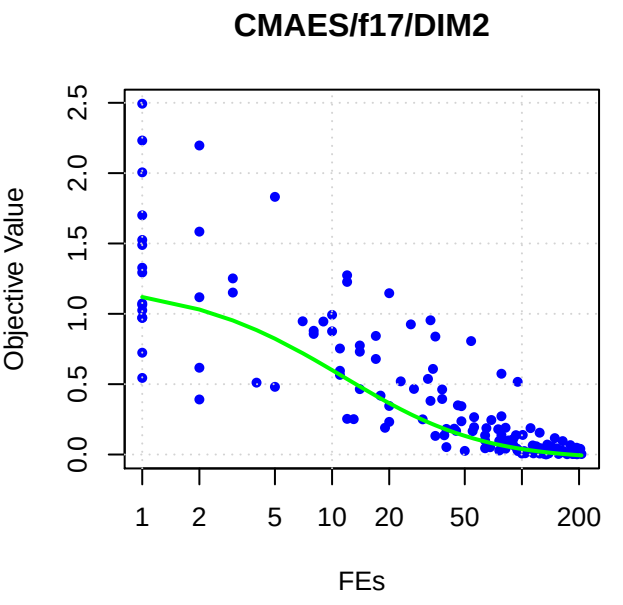
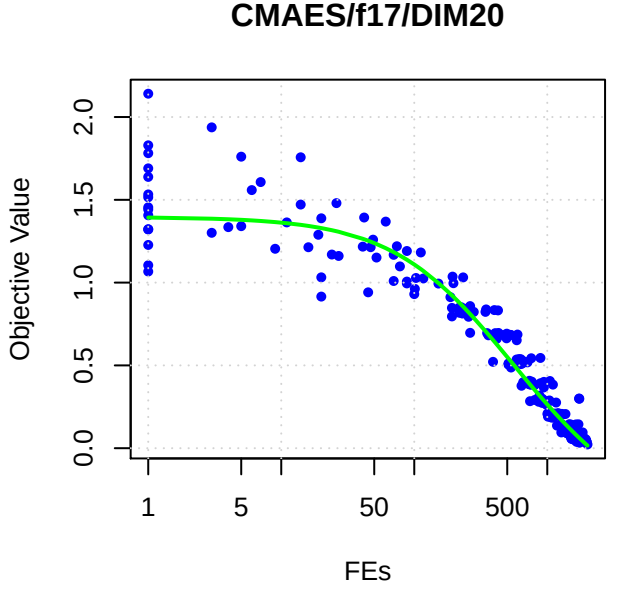
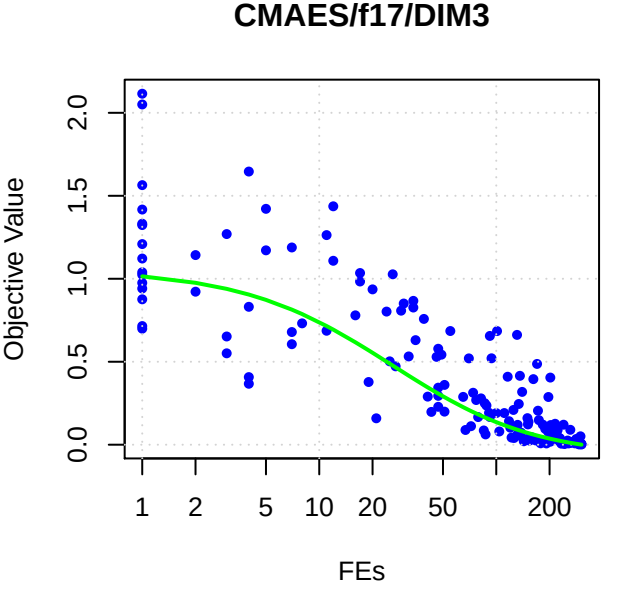
200
FEs


CMAES/f17/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
1
5
50
500
FEs


CMAES/f17/DIM2
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
2
5
10
20
50
200
FEs


CMAES/f17/DIM20
Objective Value
0.0
0.5
1.0
1.5
2.0
1
5
50
500
FEs


CMAES/f17/DIM3
Objective Value
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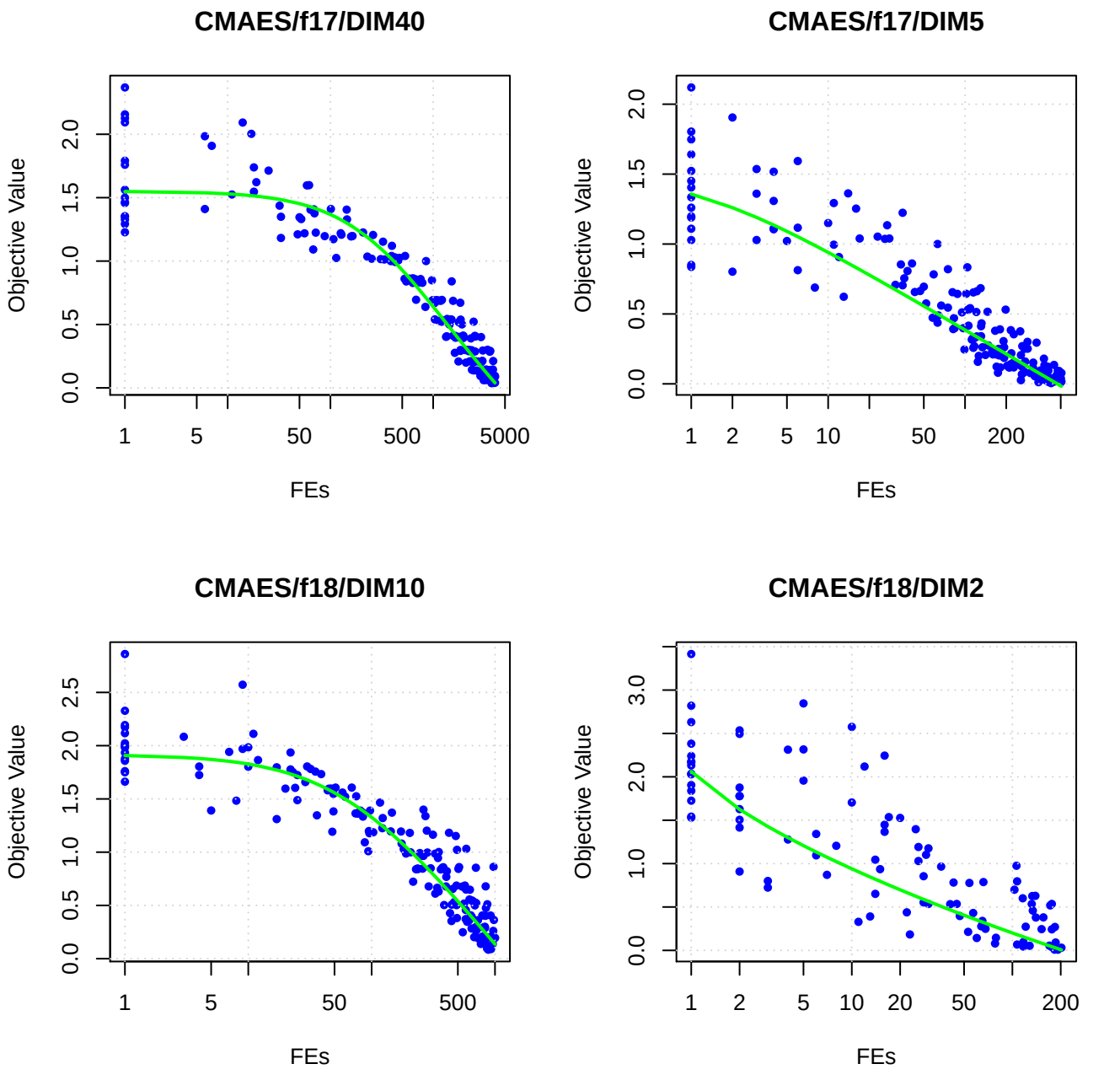
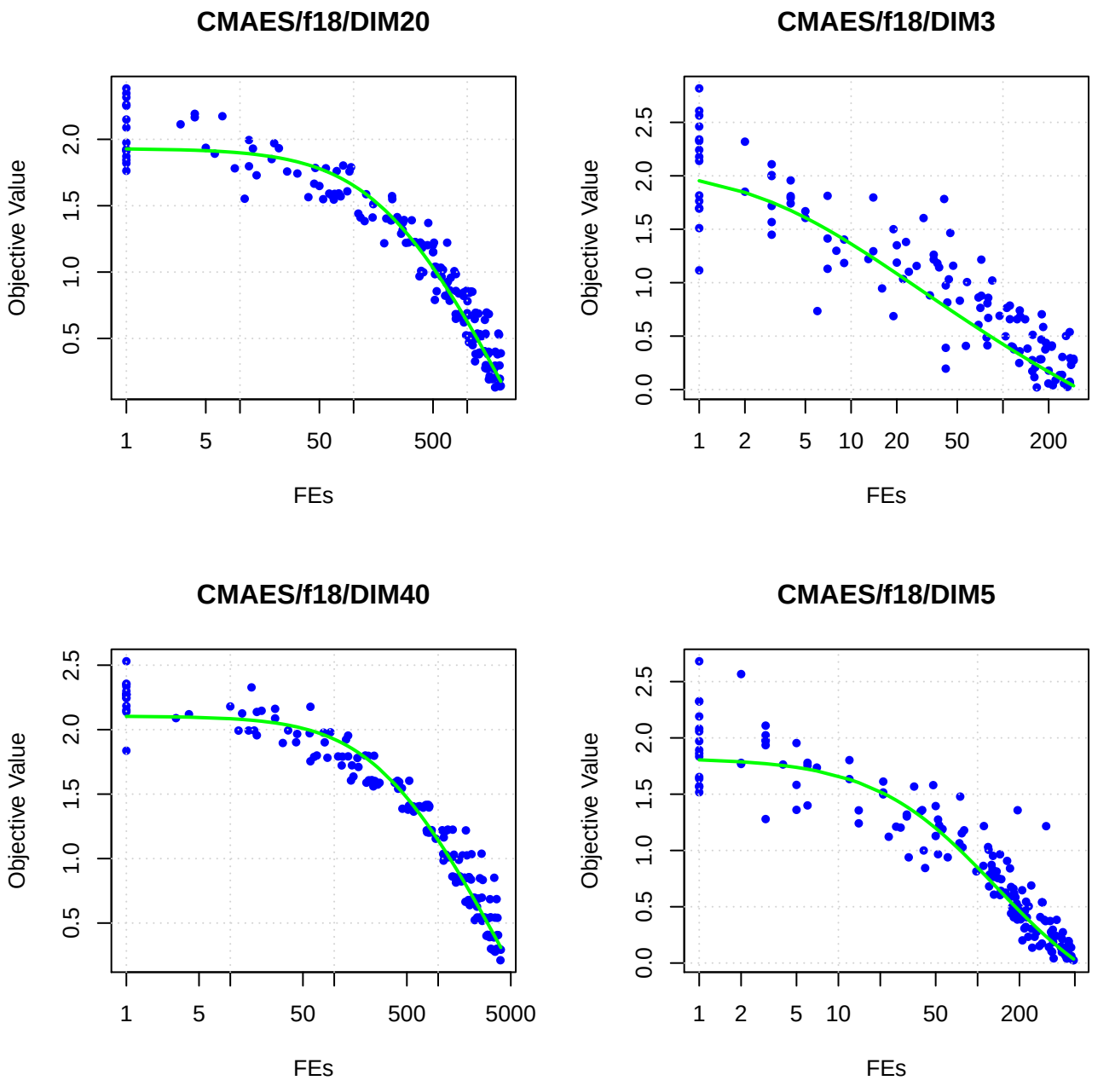
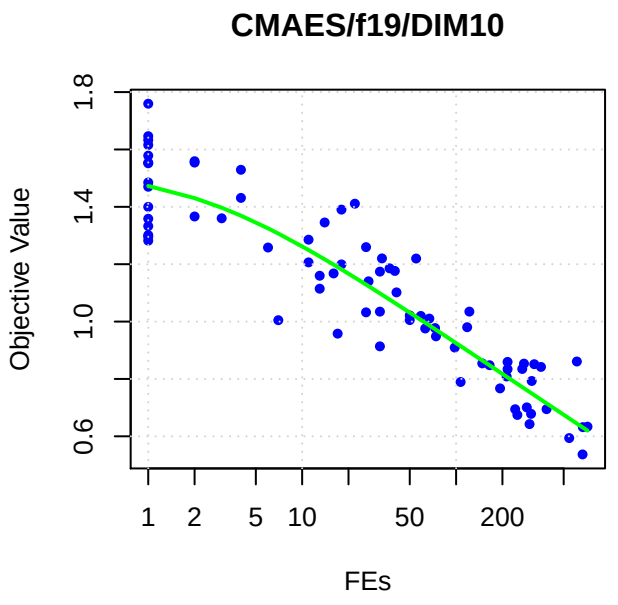
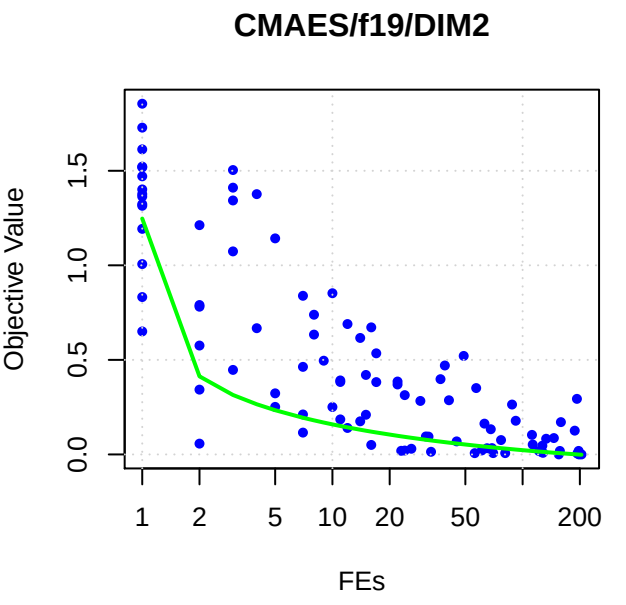
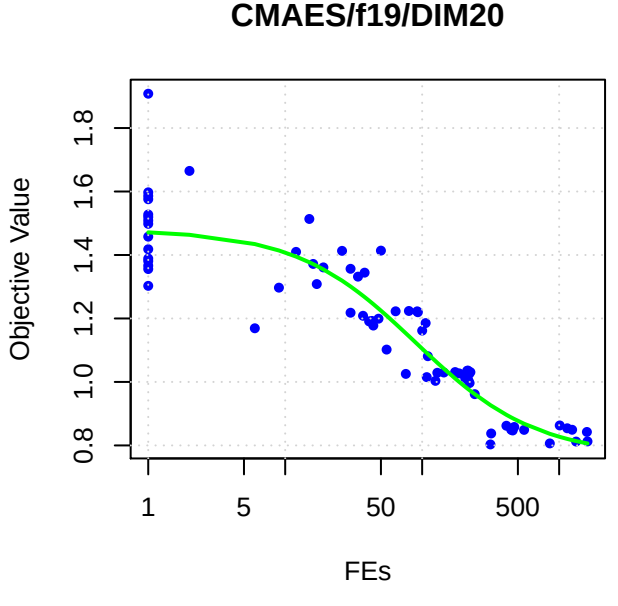
0.5
1.0
1.5
2.0
1
2
5
10
20
50
200
FEs

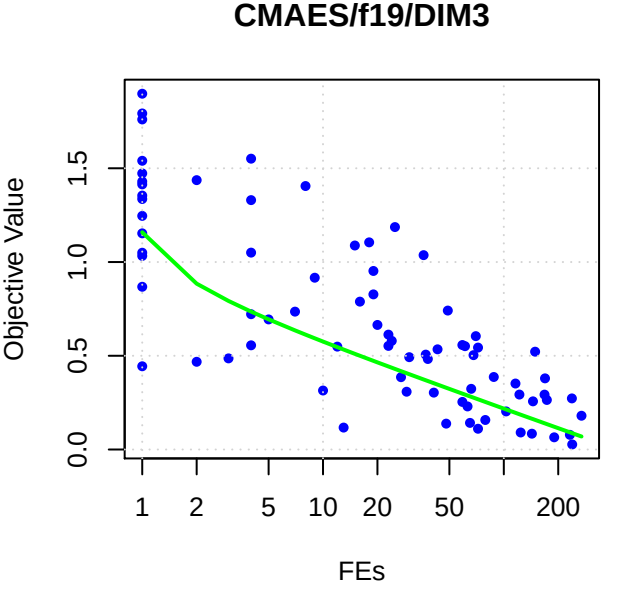

CMAES/f17/DIM40
Objective Value
0.0
0.5
1.0
1.5
2.0
1
5
50
500
5000
FEs
CMAES/f17/DIM5
Objective Value
0.0
0.5
1.0
1.5
2.0
1
2
5
10
50
200
FEs
CMAES/f18/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
5
50
500
FEs
CMAES/f18/DIM2
Objective Value
0.0
1.0
2.0
3.0
1
2
5
10
20
50
200
FEs

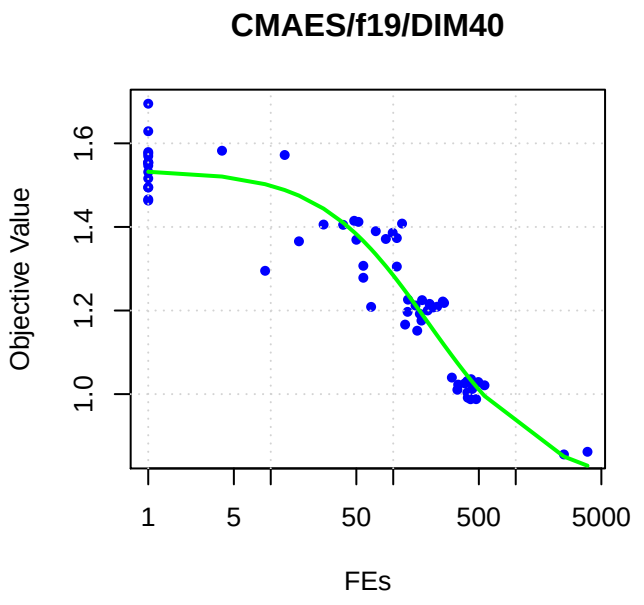

CMAES/f18/DIM20
Objective Value
0.5
1.0
1.5
2.0
1
5
50
500
FEs
CMAES/f18/DIM3
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
2
5
10
20
50
200
FEs
CMAES/f18/DIM40
Objective Value
0.5
1.0
1.5
2.0
2.5
1
5
50
500
5000
FEs
CMAES/f18/DIM5
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
2
5
10
50
200
FEs

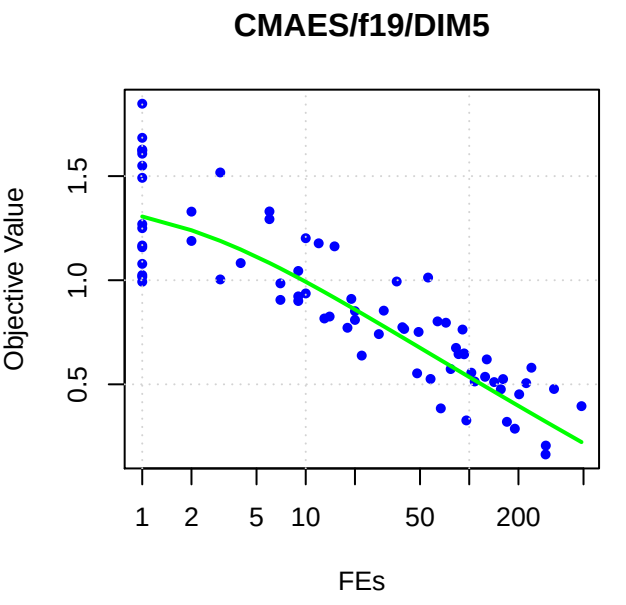

CMAES/f19/DIM10
Objective Value
0.6
1.0
1.4
1.8
1
2
5
10
50
200
FEs

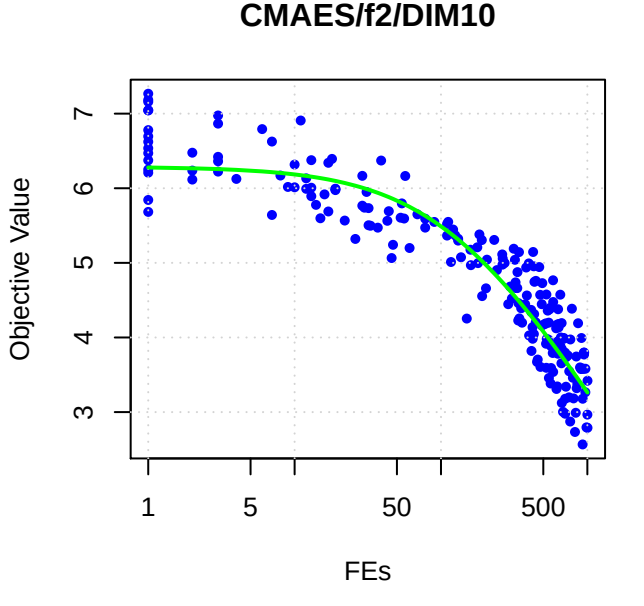

CMAES/f19/DIM2
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
20
50
200
FEs

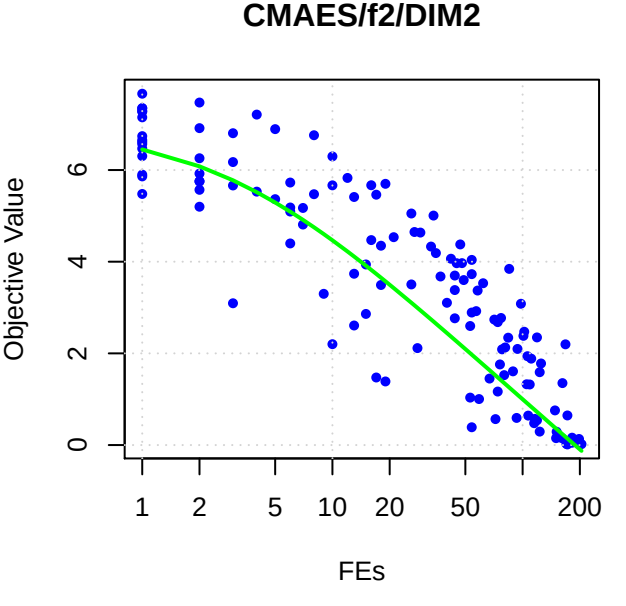

CMAES/f19/DIM20
Objective Value
0.8
1.0
1.2
1.4
1.6
1.8
1
5
50
500
FEs

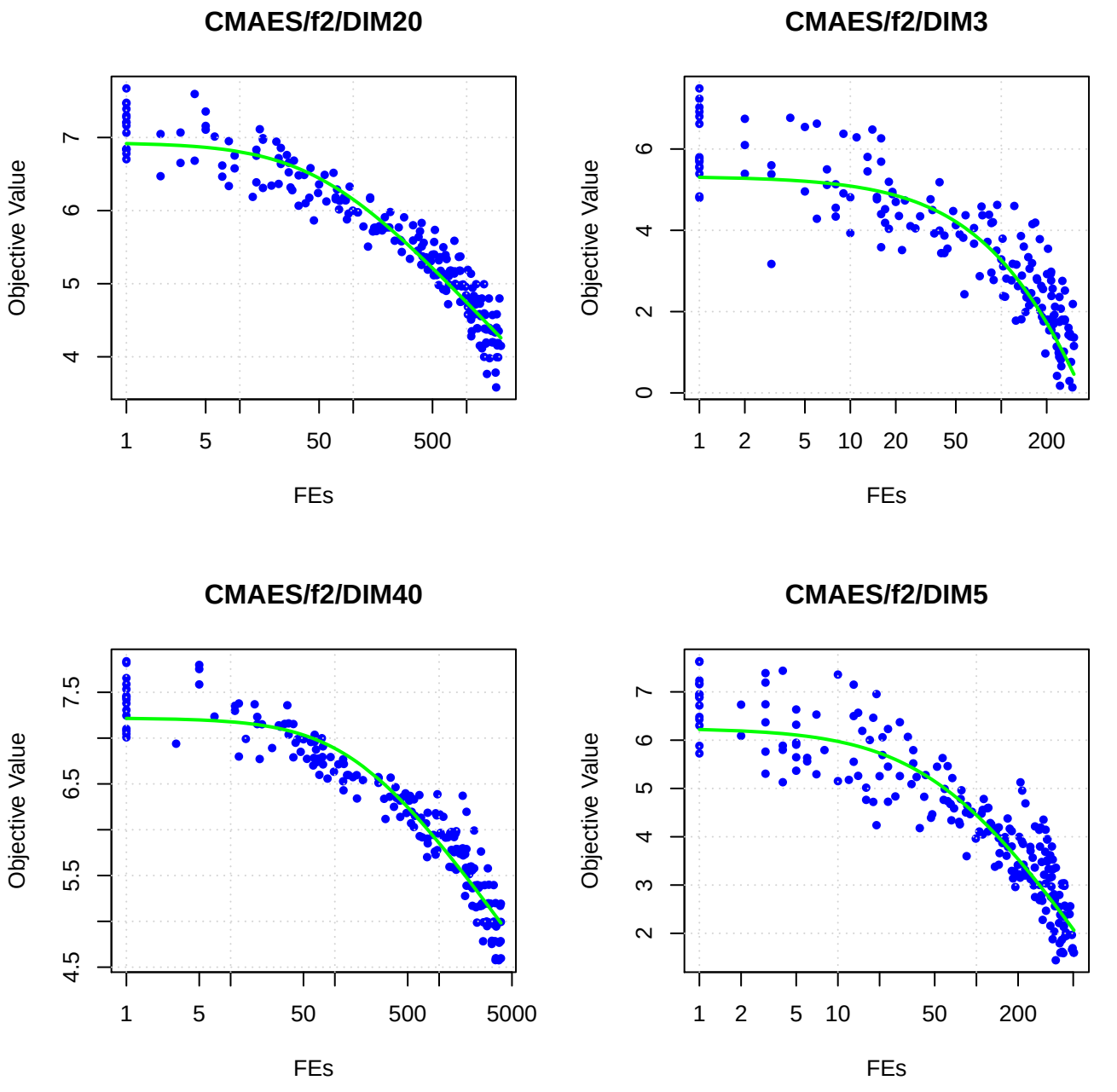

CMAES/f19/DIM3
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
20
50
200
FEs

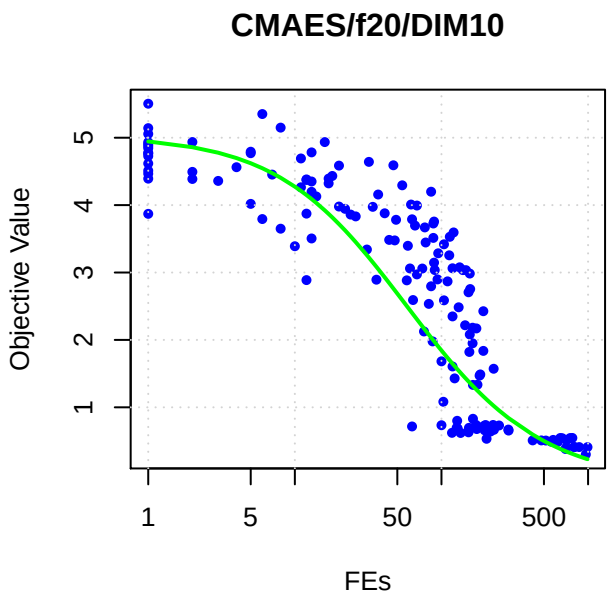

CMAES/f19/DIM40
Objective Value
1.0
1.2
1.4
1.6
1
5
50
500
5000
FEs

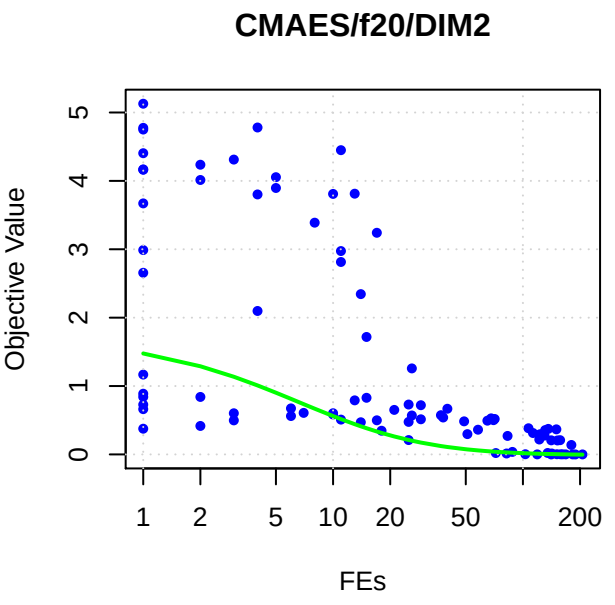

CMAES/f19/DIM5
Objective Value
0.5
1.0
1.5
1
2
5
10
50
200
FEs

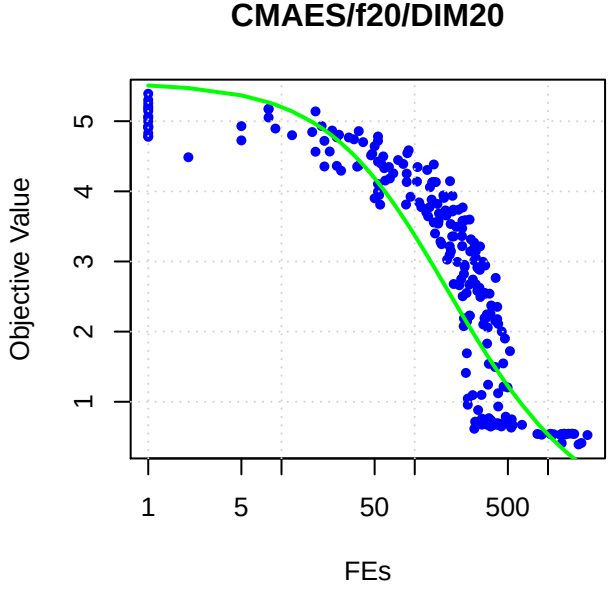

CMAES/f2/DIM10
Objective Value
3
4
5
6
7
1
5
50
500
FEs

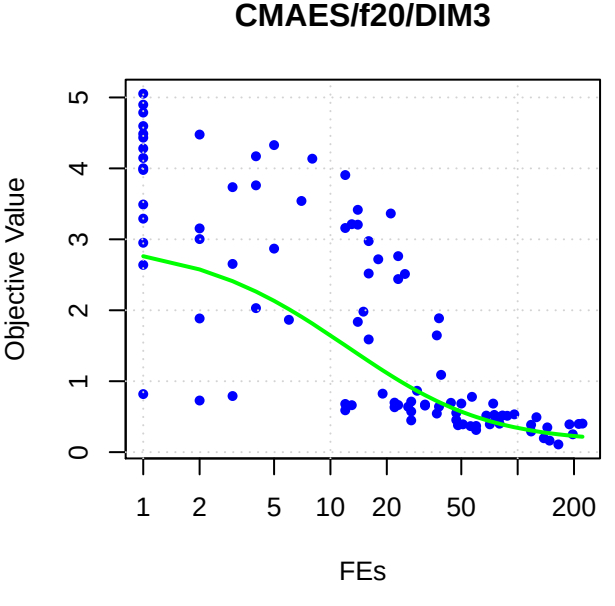

CMAES/f2/DIM2
Objective Value
0
2
4
6
1
2
5
10
20
50
200
FEs

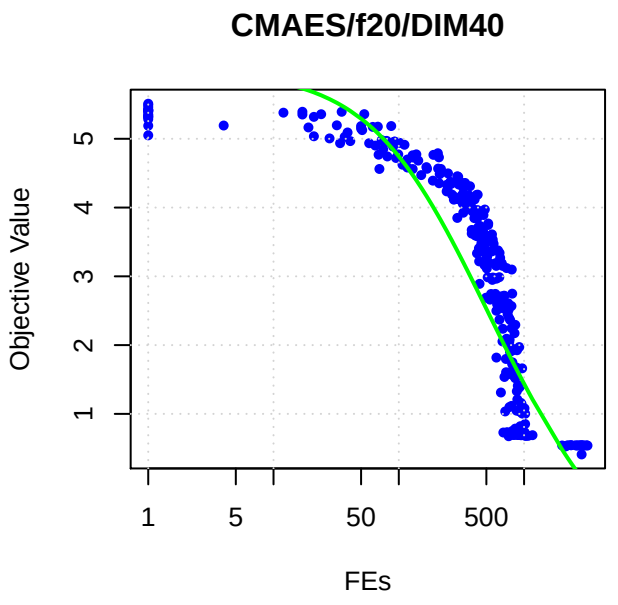

CMAES/f2/DIM20
Objective Value
FEs
CMAES/f2/DIM3
Objective Value
FEs
CMAES/f2/DIM40
Objective Value
FEs
CMAES/f2/DIM5
Objective Value
FEs

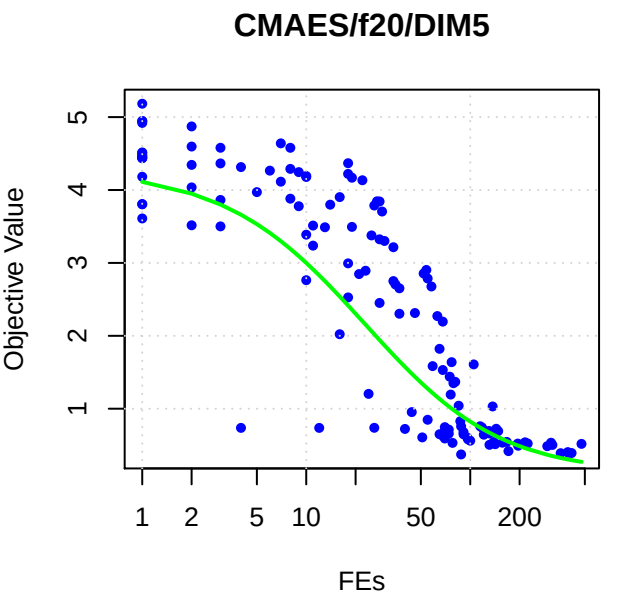

CMAES/f20/DIM10
Objective Value
FEs
1
5
50
500
1
2
3
4
5

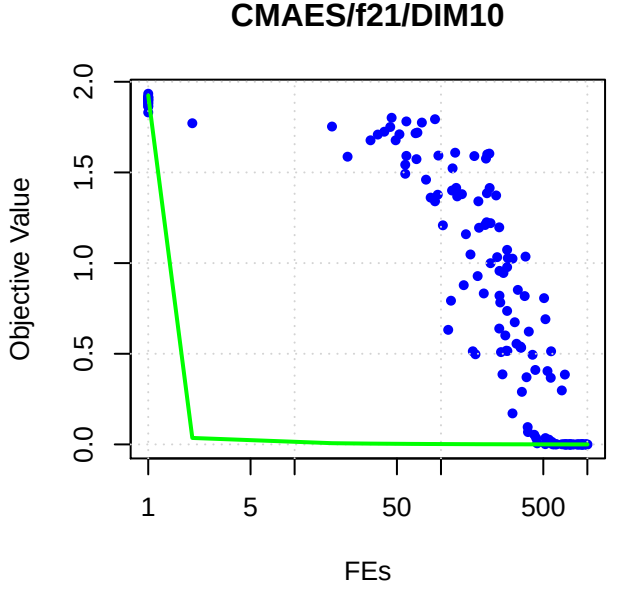

CMAES/f20/DIM2
Objective Value
FEs
1
2
5
10
20
50
200
0
1
2
3
4
5

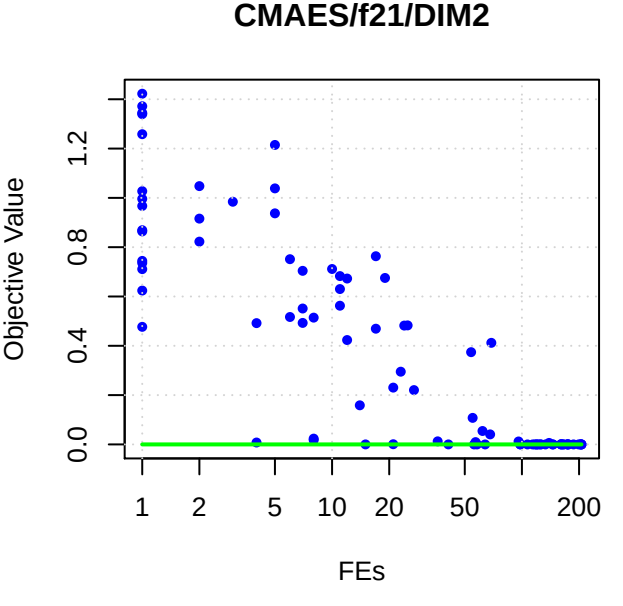

CMAES/f20/DIM20
Objective Value
FEs
1
5
50
500
1
2
3
4
5

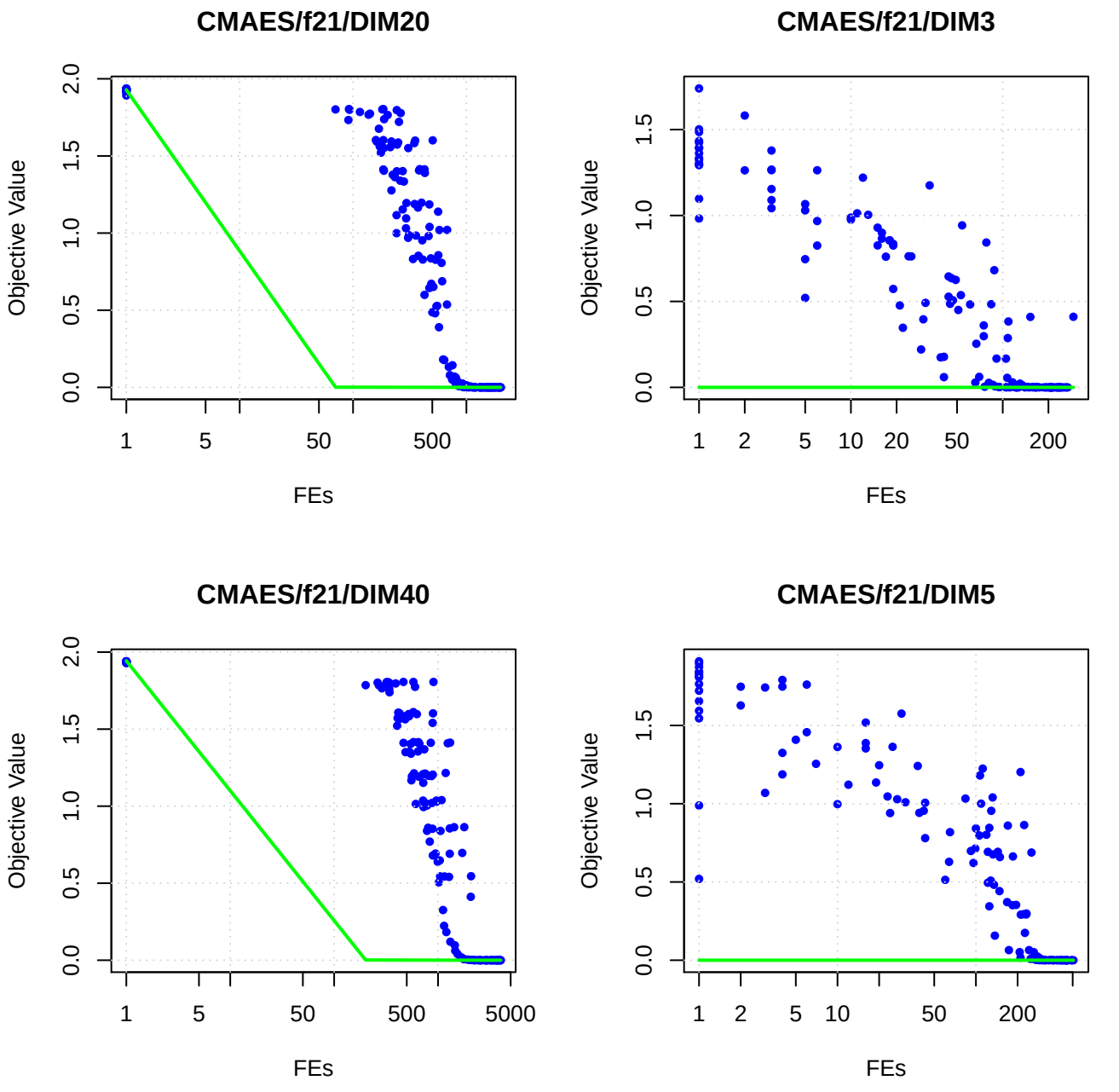

CMAES/f20/DIM3
Objective Value
FEs
1
2
5
10
20
50
200
0
1
2
3
4
5


CMAES/f20/DIM40
Objective Value
1
2
3
4
5
1
5
50
500
FEs


CMAES/f20/DIM5
Objective Value
1
2
3
4
5
1
2
5
10
50
200
FEs


CMAES/f21/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
1
5
50
500
FEs


CMAES/f21/DIM2
Objective Value
0.0
0.4
0.8
1.2
1
2
5
10
20
50
200
FEs


CMAES/f21/DIM20
Objective Value
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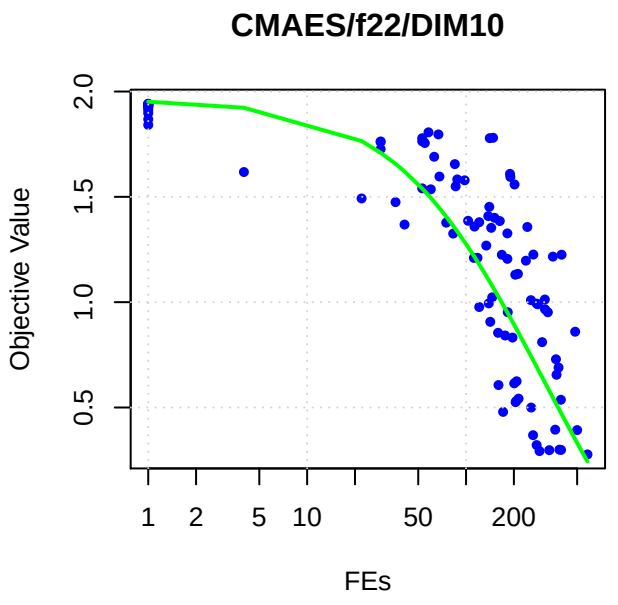
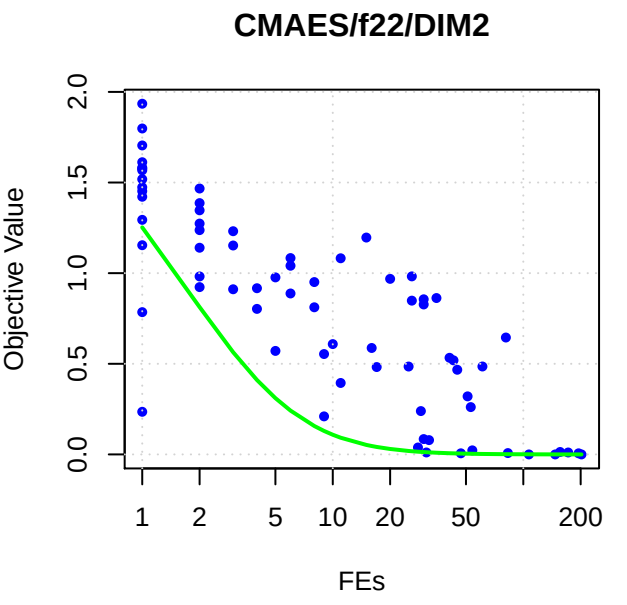
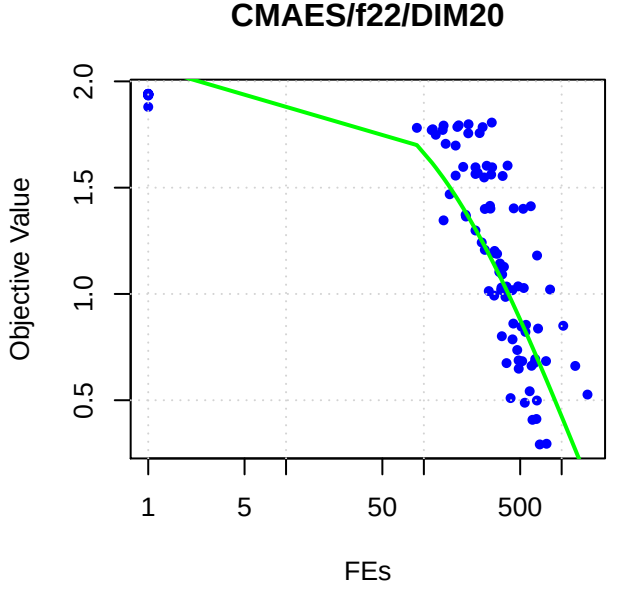
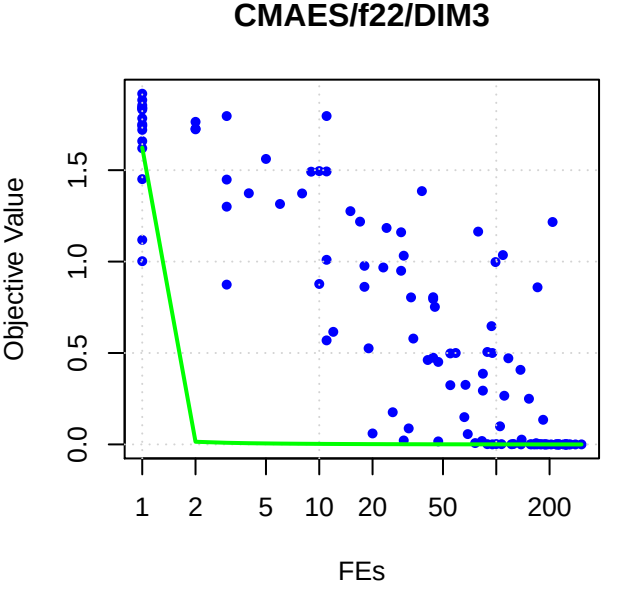
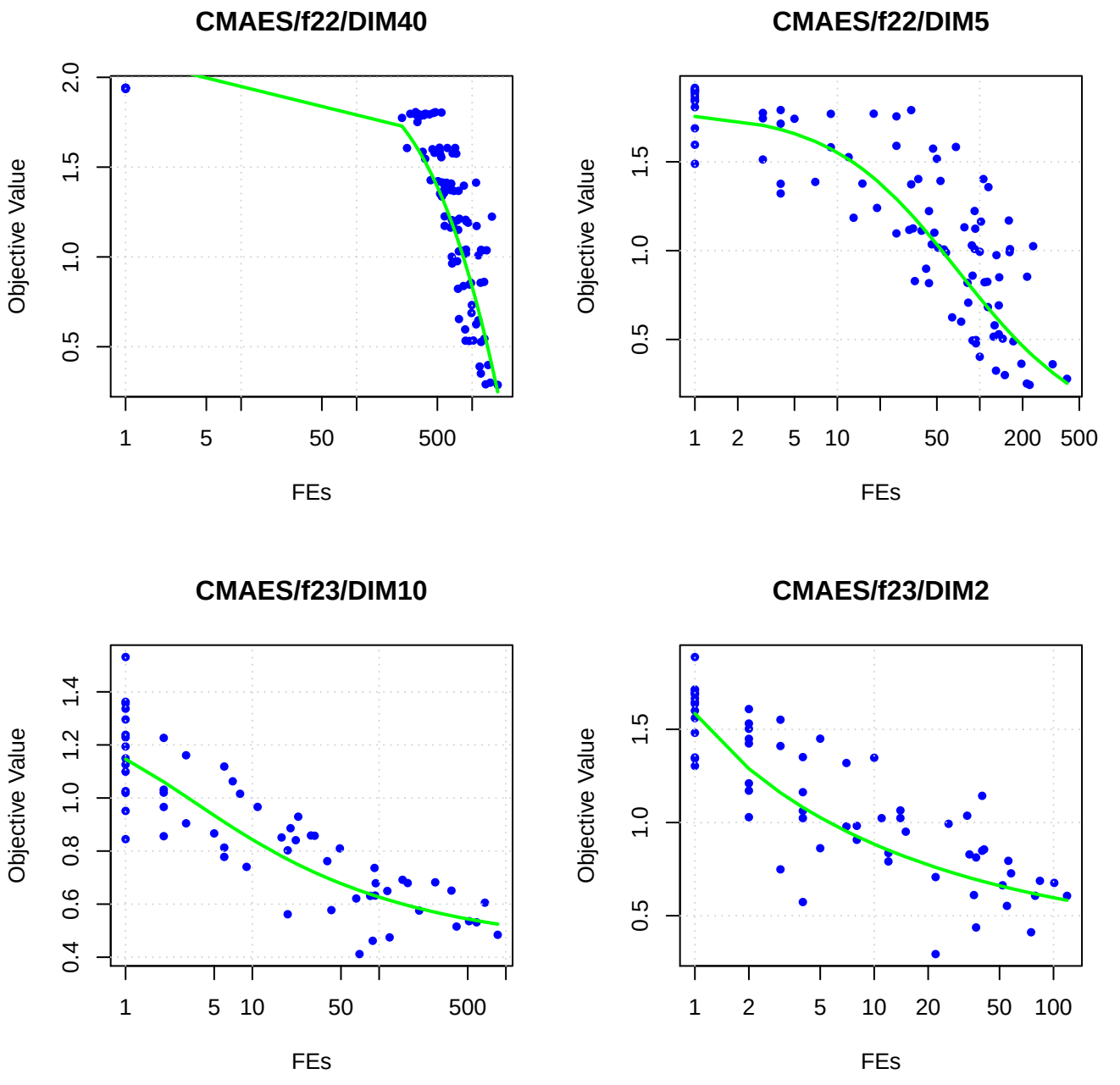
0.5
1.0
1.5
2.0
1
5
50
500
FEs
CMAES/f21/DIM3
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
20
50
200
FEs
CMAES/f21/DIM40
Objective Value
0.0
0.5
1.0
1.5
2.0
1
5
50
500
5000
FEs
CMAES/f21/DIM5
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
50
200
FEs

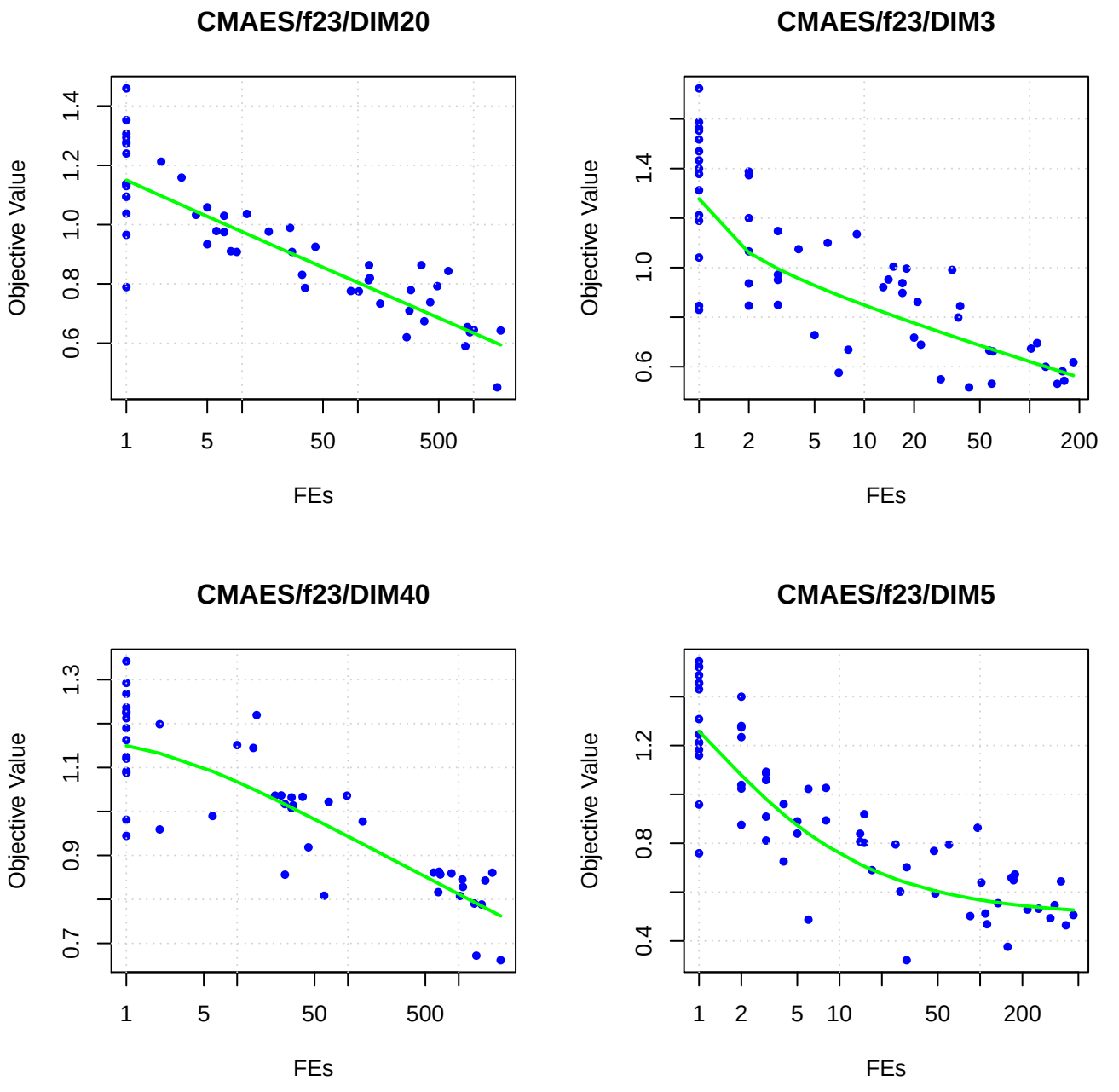

CMAES/f22/DIM10
Objective Value
2.0
1.5
1.0
0.5
1
2
5
10
50
200
FEs

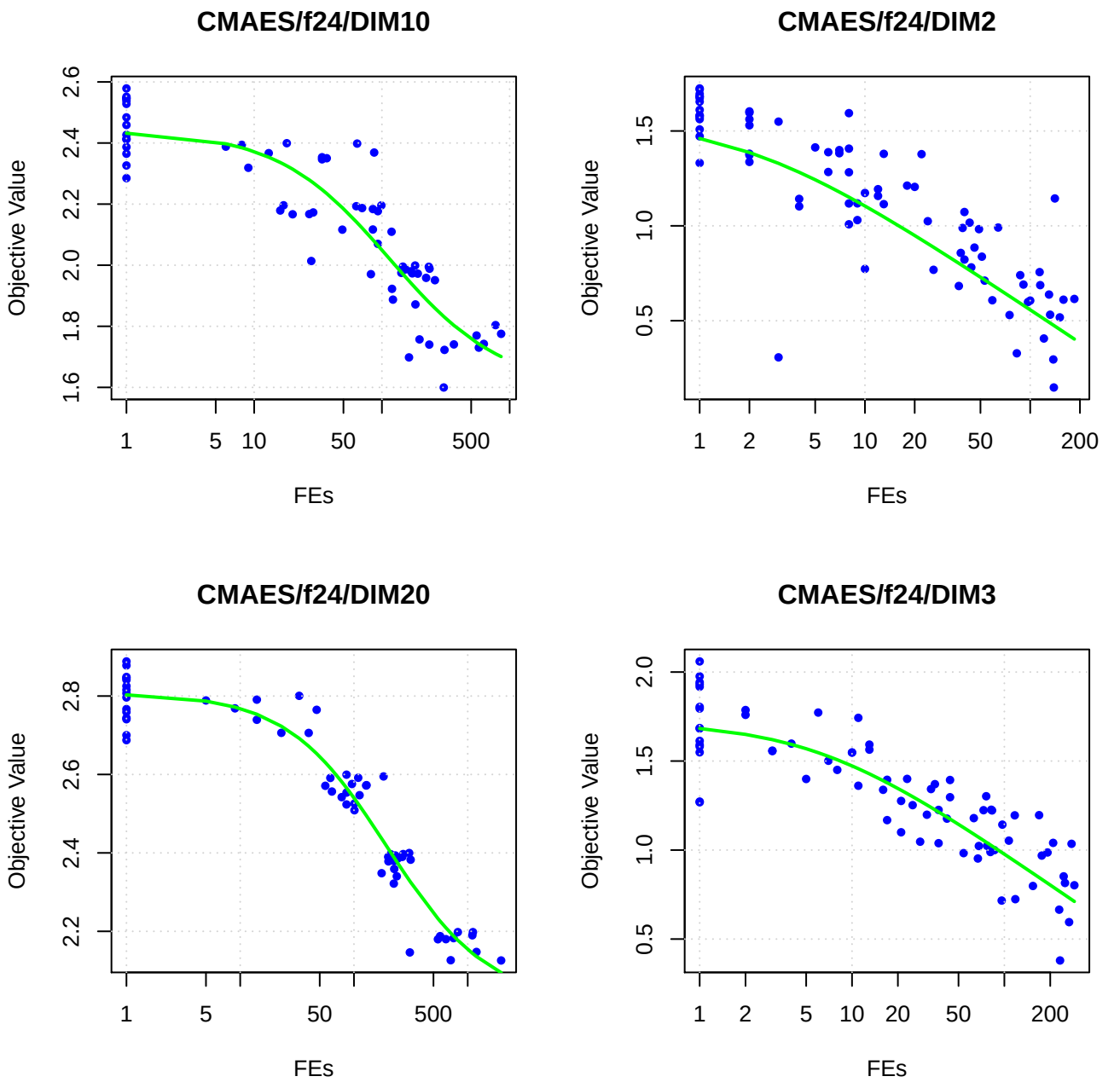

CMAES/f22/DIM2
Objective Value
2.0
1.5
1.0
0.5
0.0
1
2
5
10
20
50
200
FEs

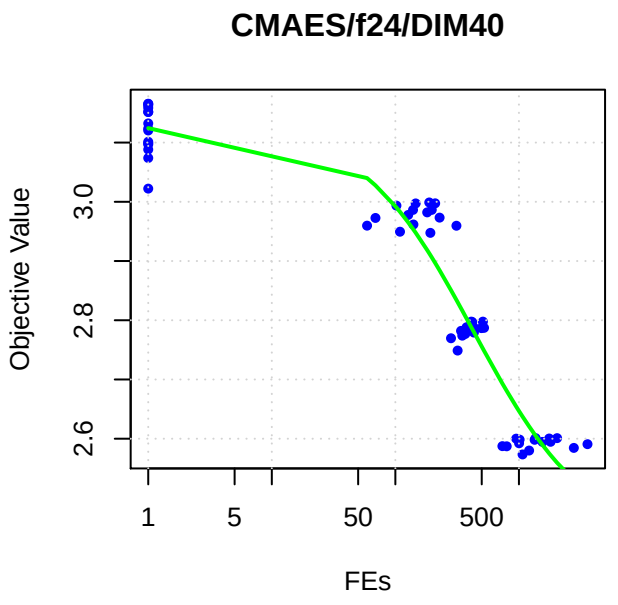

CMAES/f22/DIM20
Objective Value
2.0
1.5
1.0
0.5
1
5
50
500
FEs

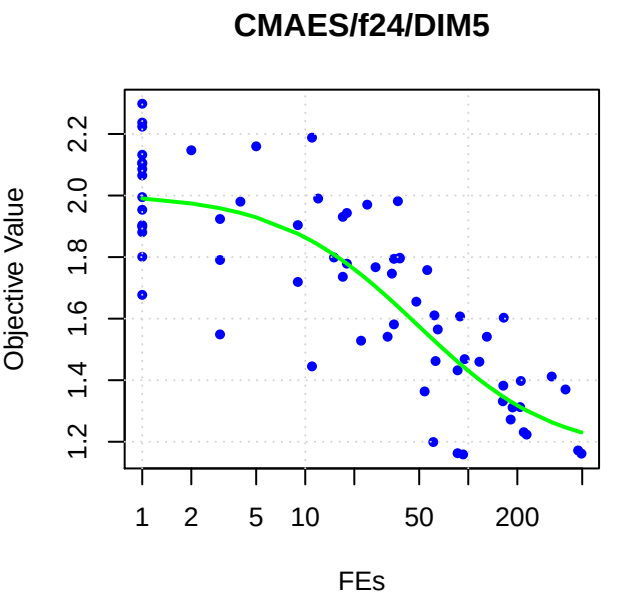

CMAES/f22/DIM3
Objective Value
1.5
1.0
0.5
0.0
1
2
5
10
20
50
200
FEs

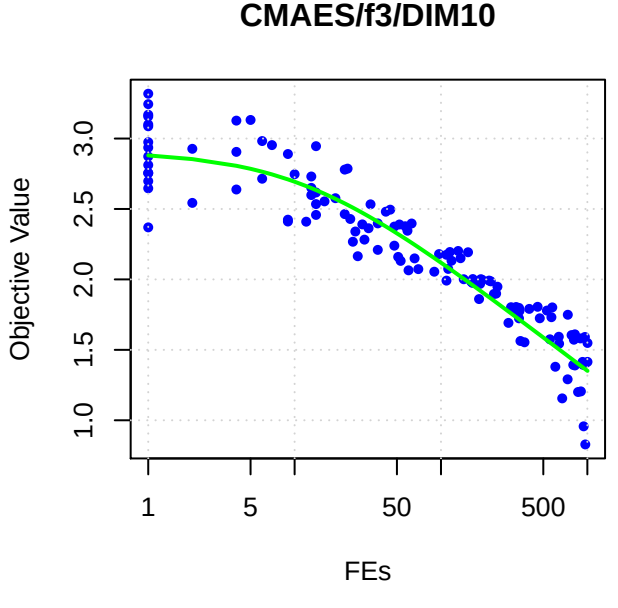

CMAES/f22/DIM40
Objective Value
2.0
1.5
1.0
0.5
1
5
50
500
FEs
CMAES/f22/DIM5
Objective Value
1.5
1.0
0.5
1
2
5
10
50
200
500
FEs
CMAES/f23/DIM10
Objective Value
1.4
1.2
1.0
0.8
0.6
0.4
1
5
10
50
500
FEs
CMAES/f23/DIM2
Objective Value
1.5
1.0
0.5
1
2
5
10
20
50
100
FEs

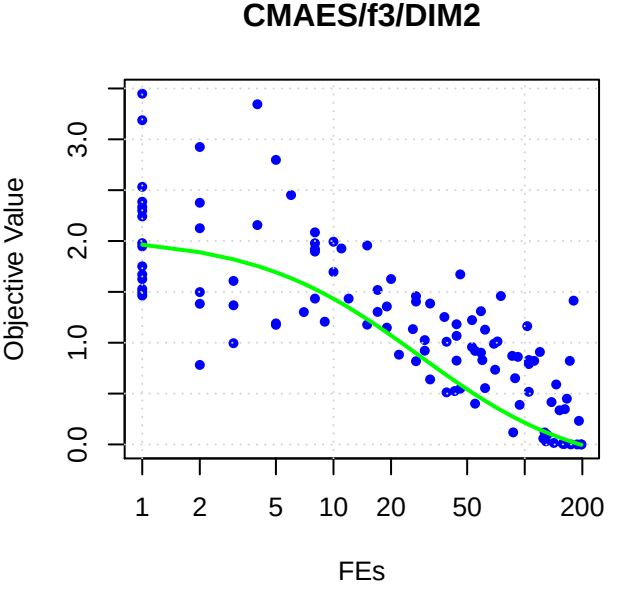

CMAES/f23/DIM20
Objective Value
0.6
0.8
1.0
1.2
1.4
1
5
50
500
FEs
CMAES/f23/DIM3
Objective Value
0.6
1.0
1.4
1
2
5
10
20
50
200
FEs
CMAES/f23/DIM40
Objective Value
0.7
0.9
1.1
1.3
1
5
50
500
FEs
CMAES/f23/DIM5
Objective Value
0.4
0.8
1.2
1
2
5
10
50
200
FEs

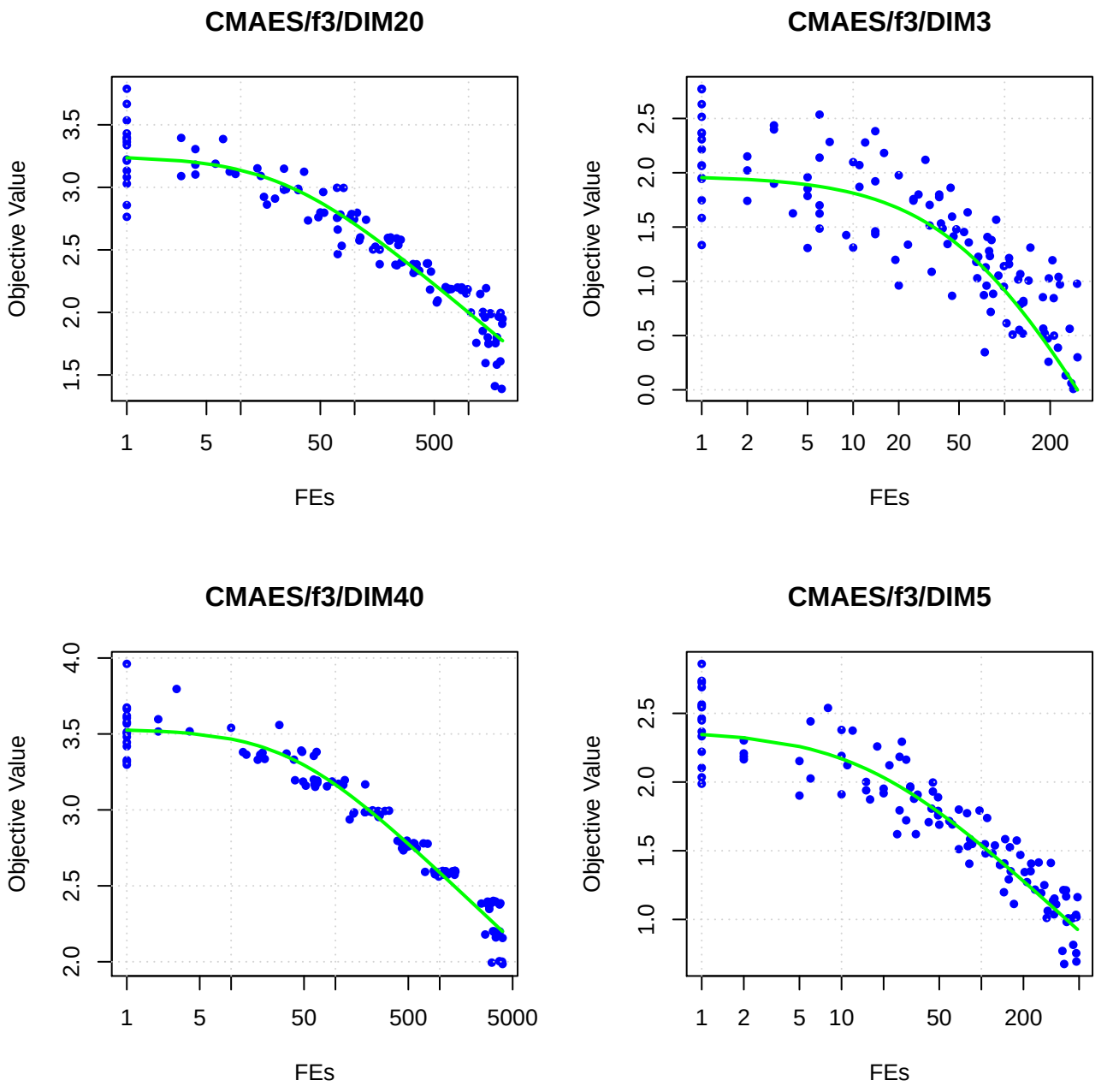

CMAES/f24/DIM10
Objective Value
FEs
CMAES/f24/DIM2
Objective Value
FEs
CMAES/f24/DIM20
Objective Value
FEs
CMAES/f24/DIM3
Objective Value
FEs

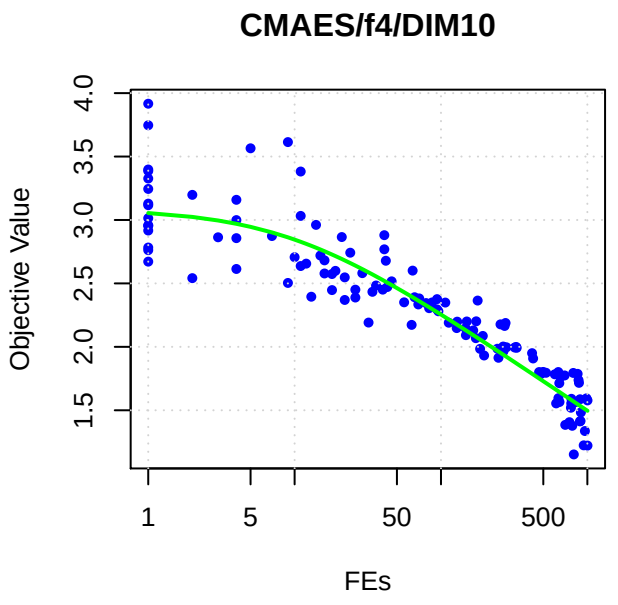

CMAES/f24/DIM40
Objective Value
2.6
2.8
3.0
1
5
50
500
FEs


CMAES/f24/DIM5
Objective Value
1.2
1.4
1.6
1.8
2.0
2.2
1
2
5
10
50
200
FEs


CMAES/f3/DIM10
Objective Value
1.0
1.5
2.0
2.5
3.0
1
5
50
500
FEs


CMAES/f3/DIM2
Objective Value
0.0
1.0
2.0
3.0
1
2
5
10
20
50
200
FEs


CMAES/f3/DIM20
Objective Value
1.5
2.0
2.5
3.0
3.5
1
5
50
500
FEs
CMAES/f3/DIM3
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
2
5
10
20
50
200
FEs
CMAES/f3/DIM40
Objective Value
2.0
2.5
3.0
3.5
4.0
1
5
50
500
5000
FEs
CMAES/f3/DIM5
Objective Value
1.0
1.5
2.0
2.5
1
2
5
10
50
200
FEs


CMAES/f4/DIM10
Objective Value
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3.5
3.0
2.5
2.0
1.5
1
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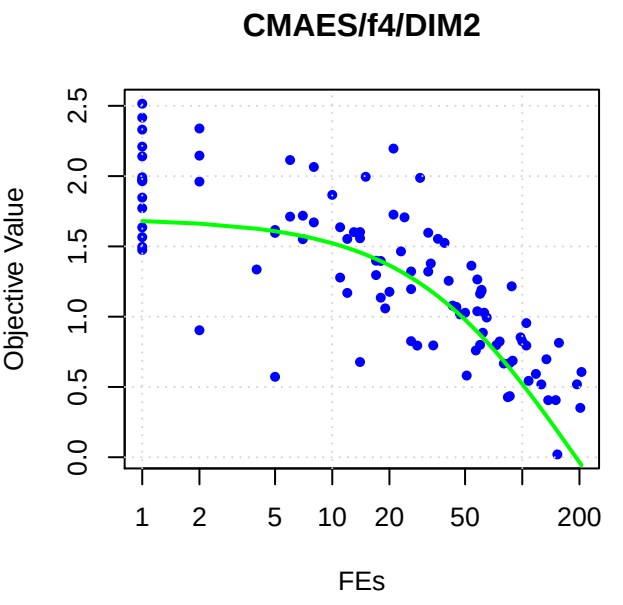
500
FEs


CMAES/f4/DIM2
Objective Value
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2.0
1.5
1.0
0.5
0.0
1
2
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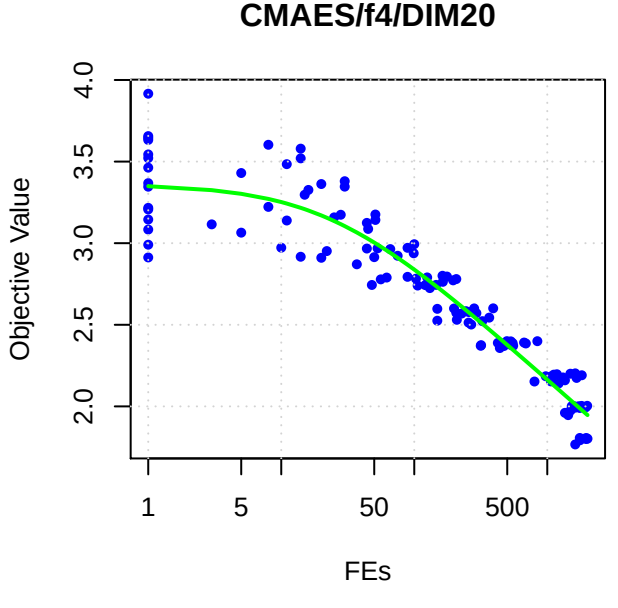
20
50
200
FEs


CMAES/f4/DIM20
Objective Value
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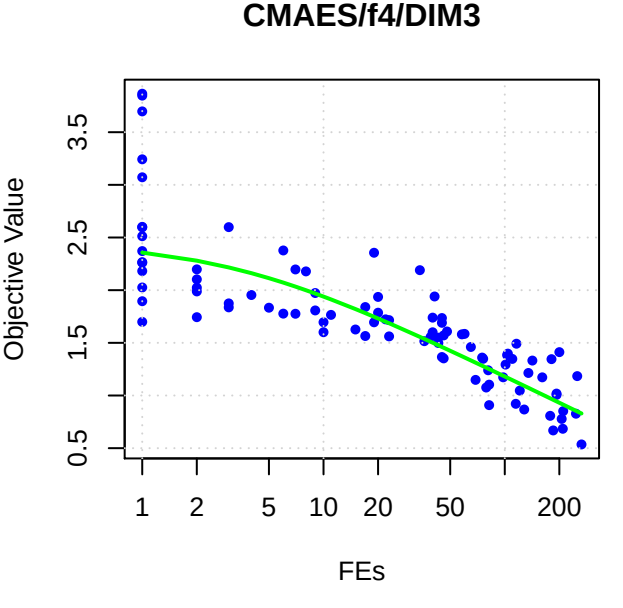
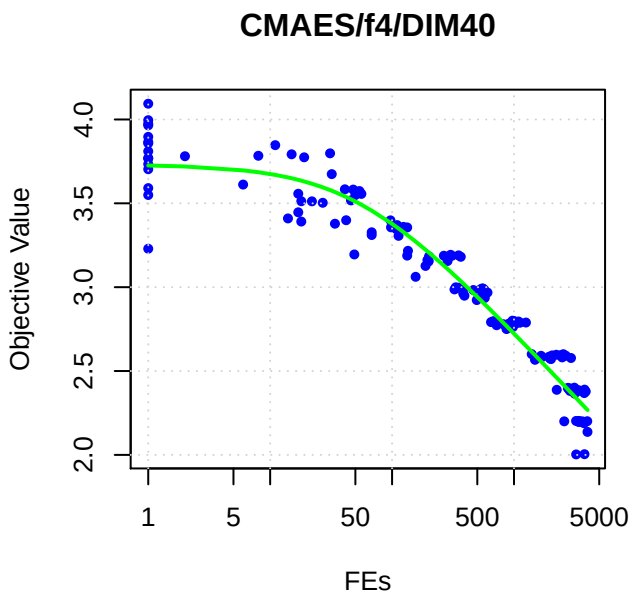
3.5
3.0
2.5
2.0
1
5
50
500
FEs


CMAES/f4/DIM3
Objective Value
3.5
2.5
1.5
0.5
1
2
5
10
20
50
200
FEs


CMAES/f4/DIM40
Objective Value
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3.0
2.5
2.0
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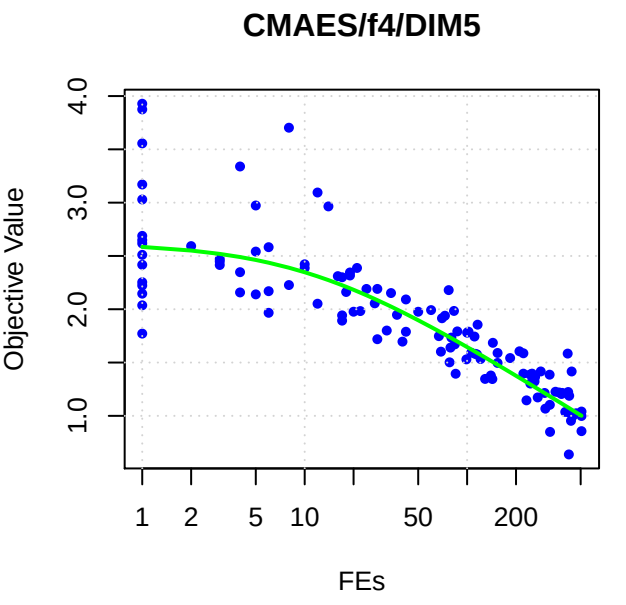
50
500
5000
FEs


CMAES/f4/DIM5
Objective Value
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3.0
2.0
1.0
1
2
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10
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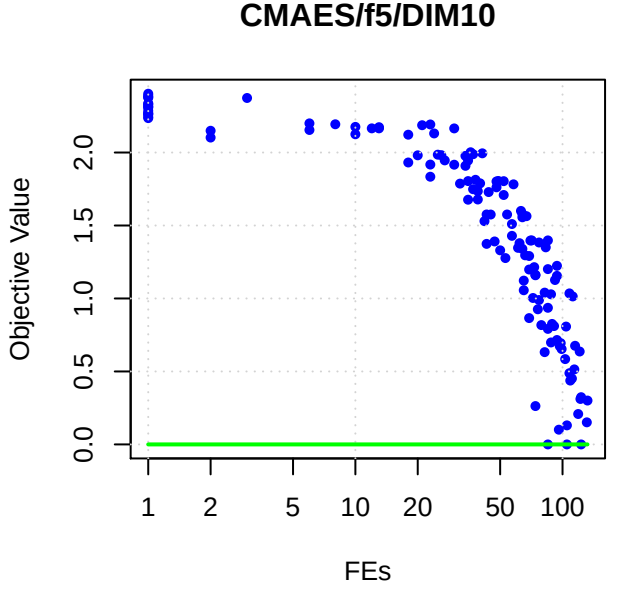
200
FEs


CMAES/f5/DIM10
Objective Value
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1.0
0.5
0.0
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2
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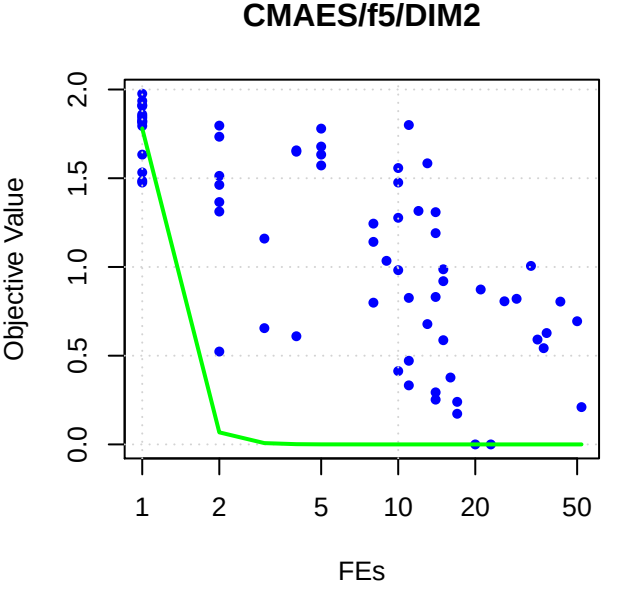
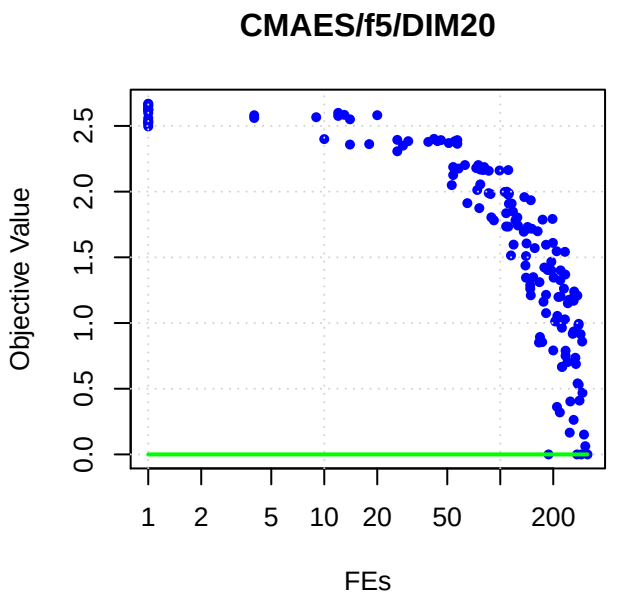
100
FEs


CMAES/f5/DIM2
Objective Value
2.0
1.5
1.0
0.5
0.0
1
2
5
10
20
50
FEs


CMAES/f5/DIM20
Objective Value
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1.5
2.0
2.5
1
2
5
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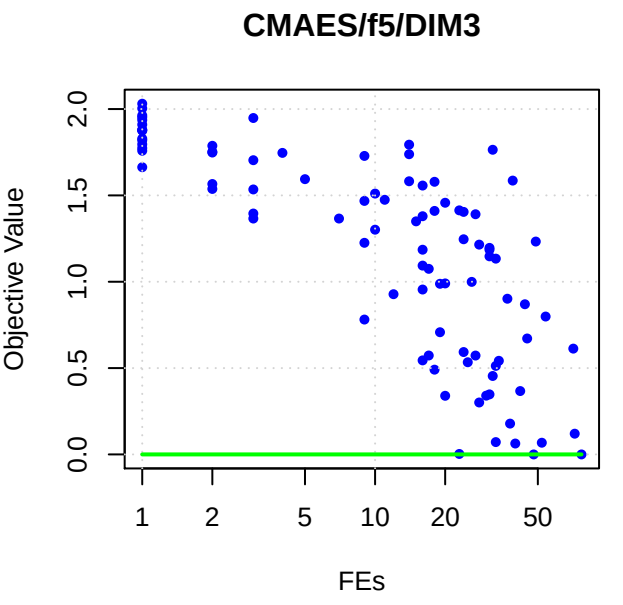
20
50
200
FEs


CMAES/f5/DIM3
Objective Value
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1.5
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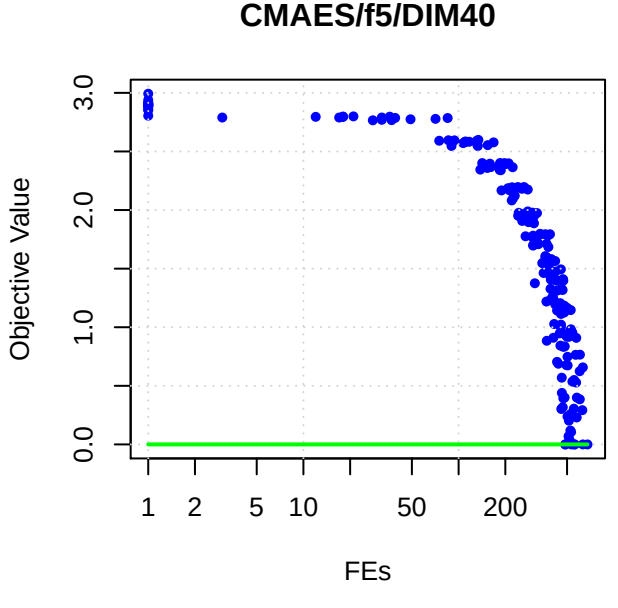
FEs


CMAES/f5/DIM40
Objective Value
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2.0
3.0
1
2
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10
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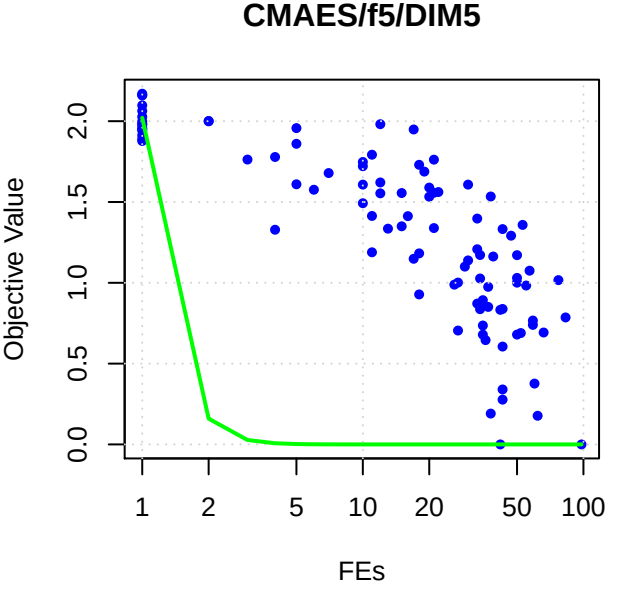
200
FEs


CMAES/f5/DIM5
Objective Value
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1.0
1.5
2.0
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2
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10
20
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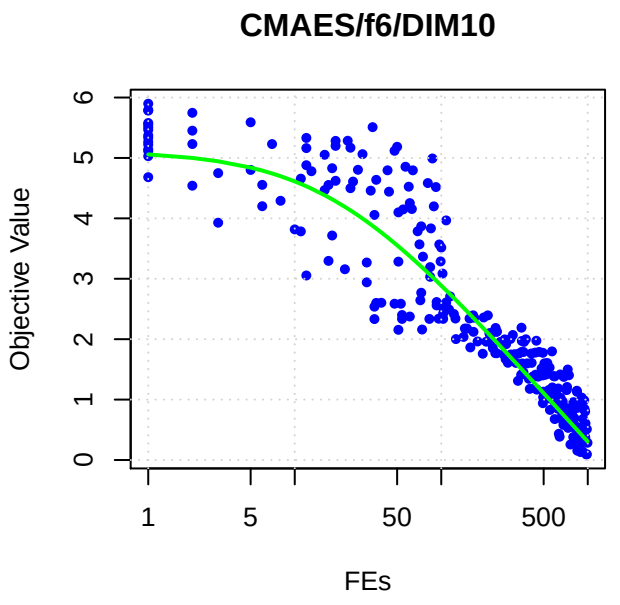
100
FEs


CMAES/f6/DIM10
Objective Value
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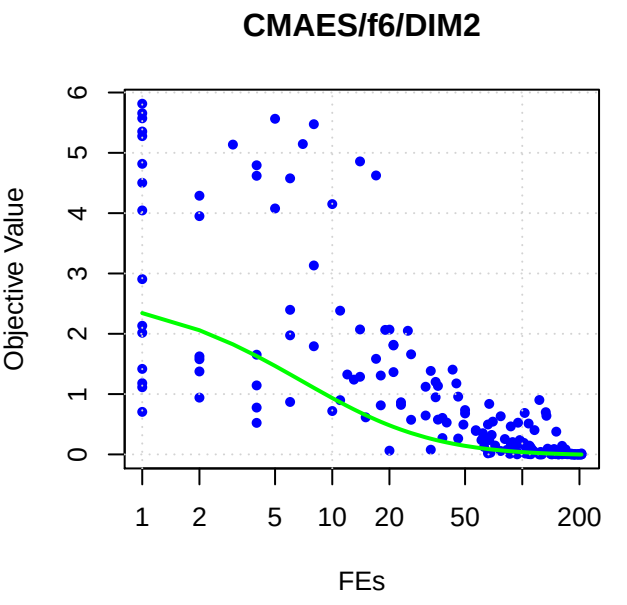
2
3
4
5
6
1
5
50
500
FEs


CMAES/f6/DIM2
Objective Value
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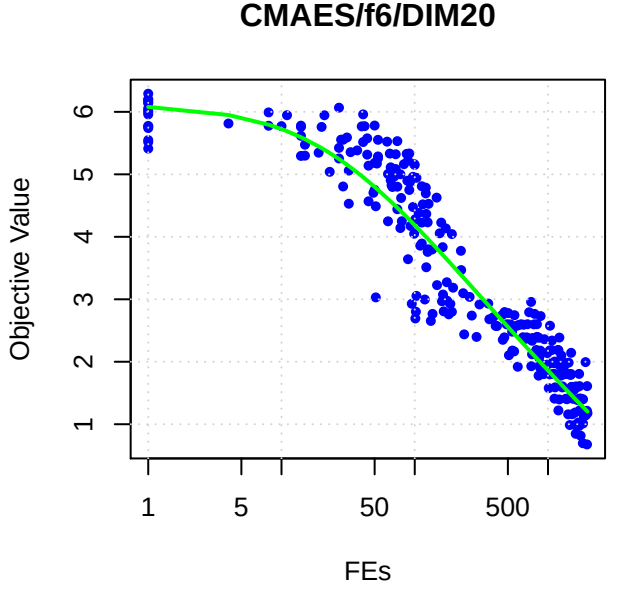
1
2
3
4
5
6
1
2
5
10
20
50
200
FEs


CMAES/f6/DIM20
Objective Value
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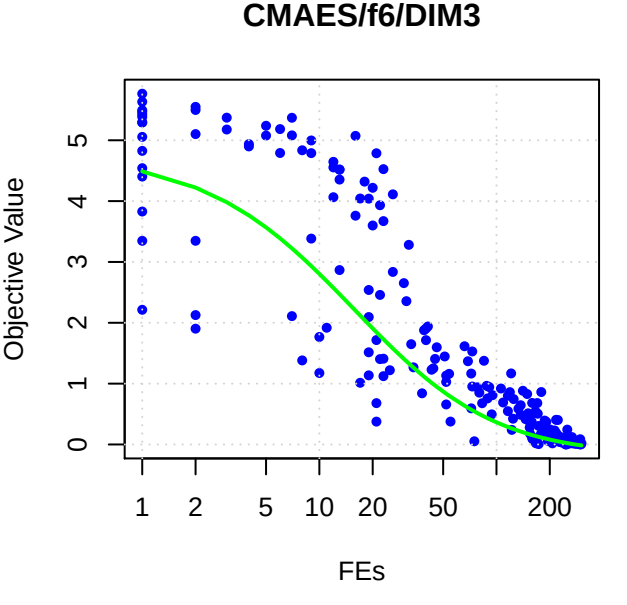
2
3
4
5
6
1
5
50
500
FEs


CMAES/f6/DIM3
Objective Value
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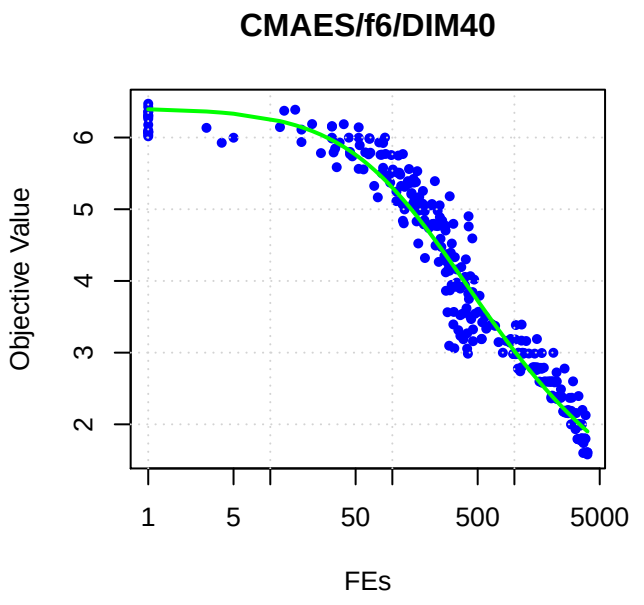
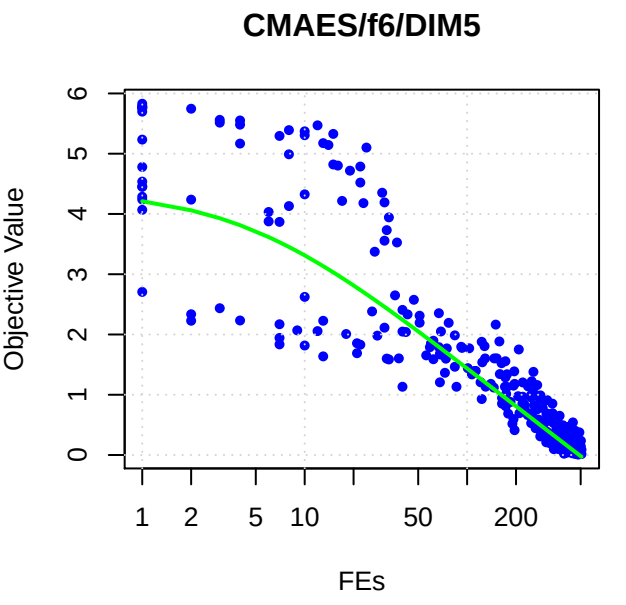
2
3
4
5
1
2
5
10
20
50
200
FEs


CMAES/f6/DIM40
Objective Value
2
3
4
5
6
1
5
50
500
5000
FEs


CMAES/f6/DIM5
Objective Value
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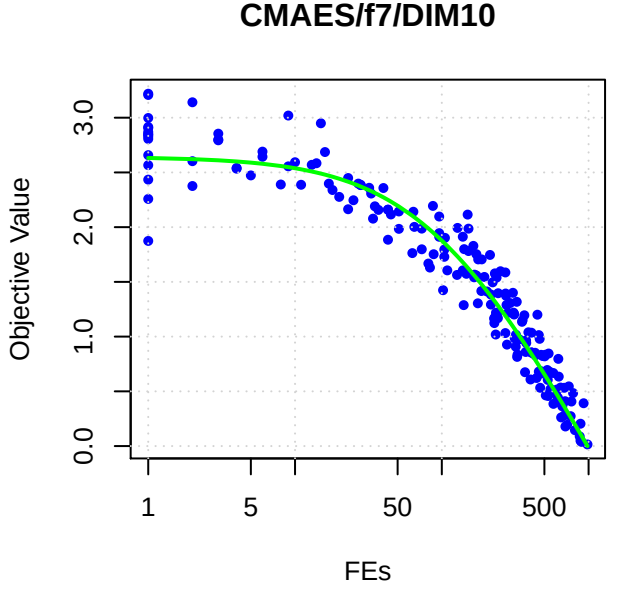
1
2
3
4
5
6
1
2
5
10
50
200
FEs


CMAES/f7/DIM10
Objective Value
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1.0
2.0
3.0
1
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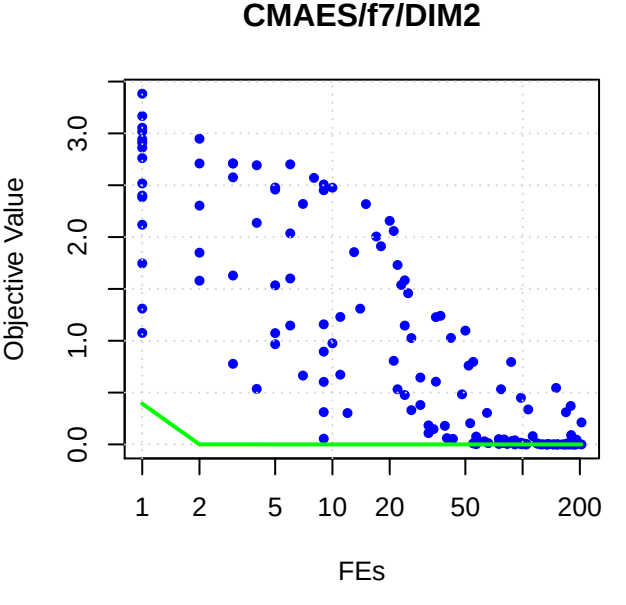
500
FEs


CMAES/f7/DIM2
Objective Value
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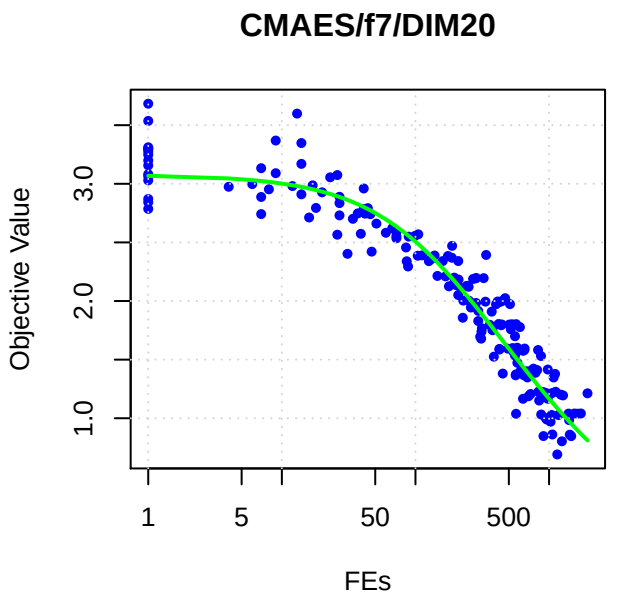
1.0
2.0
3.0
1
2
5
10
20
50
200
FEs


CMAES/f7/DIM20
Objective Value
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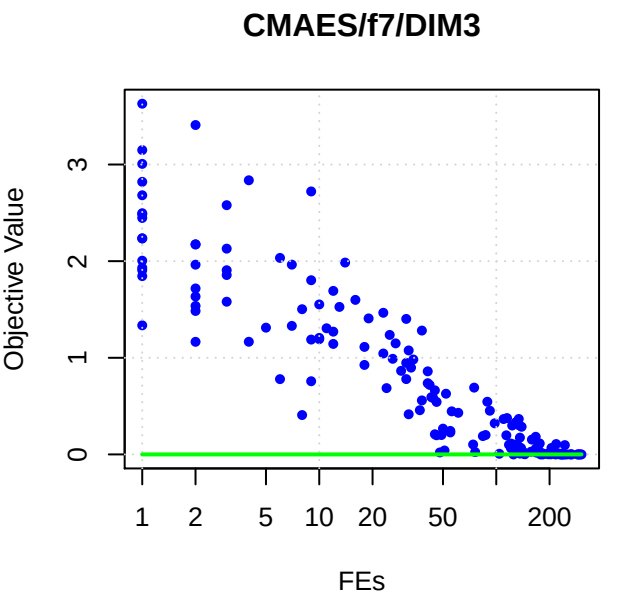
2.0
3.0
1
5
50
500
FEs


CMAES/f7/DIM3
Objective Value
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2
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1
2
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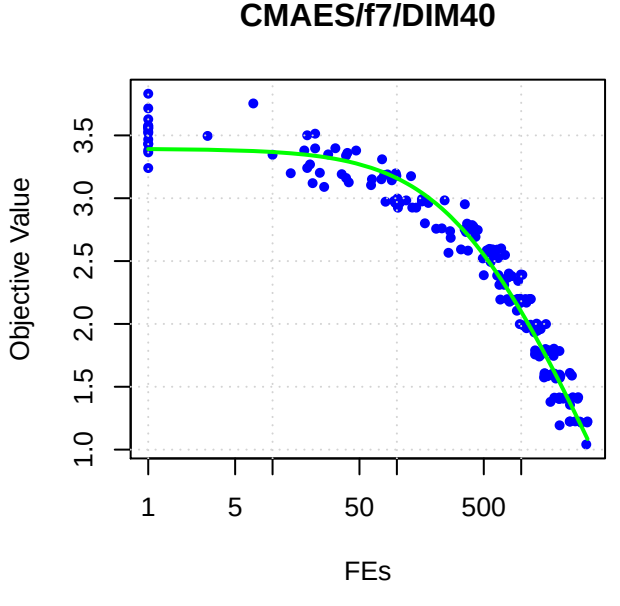
FEs


CMAES/f7/DIM40
Objective Value
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2.5
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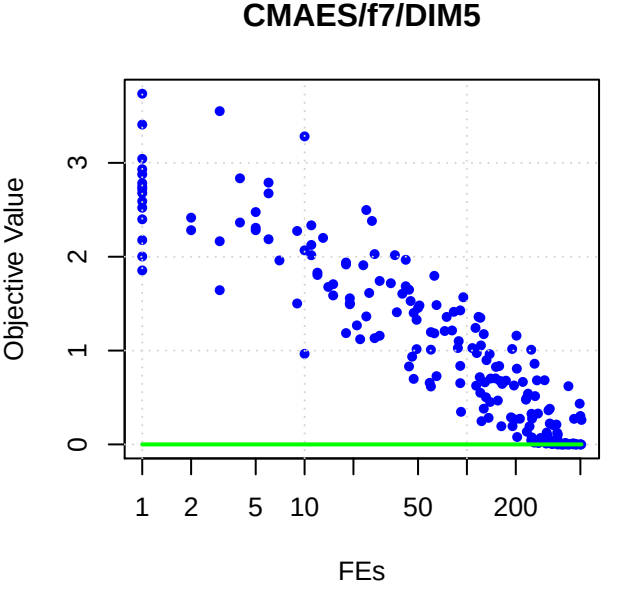
FEs


CMAES/f7/DIM5
Objective Value
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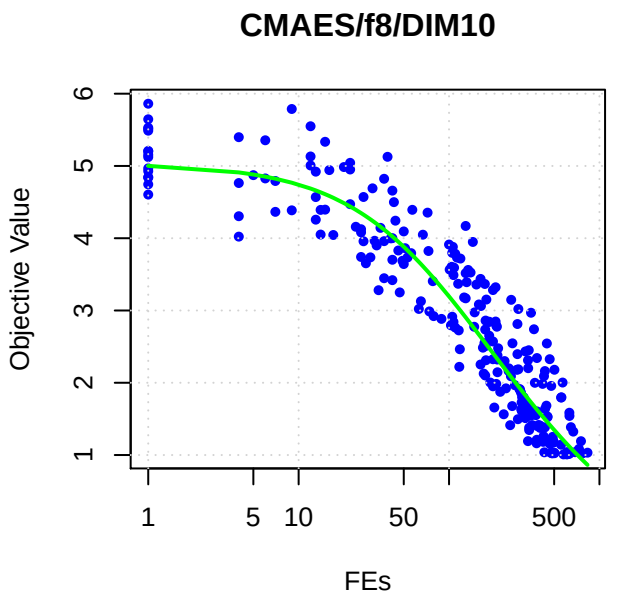
FEs


CMAES/f8/DIM10
Objective Value
FEs
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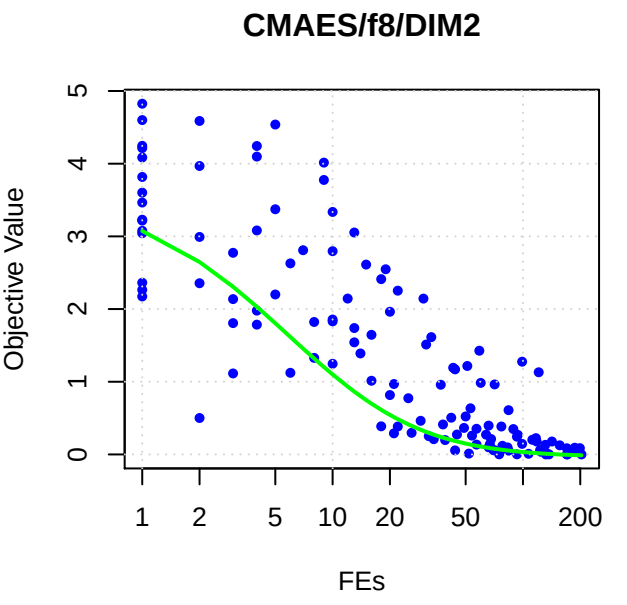
6


CMAES/f8/DIM2
Objective Value
FEs
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2
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10
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2
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4
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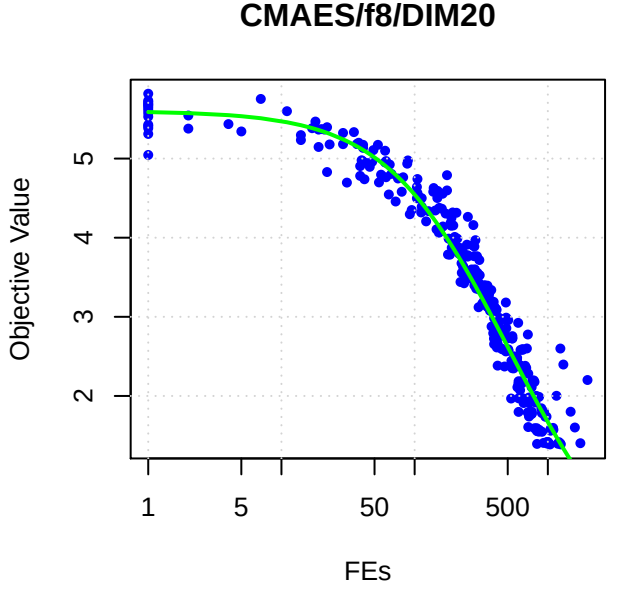
CMAES/f8/DIM20
Objective Value
FEs
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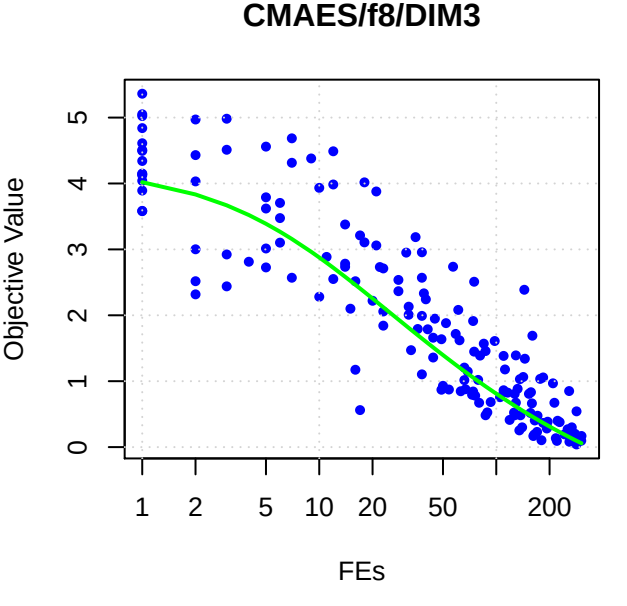
2
3
4
5


CMAES/f8/DIM3
Objective Value
FEs
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2
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10
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4
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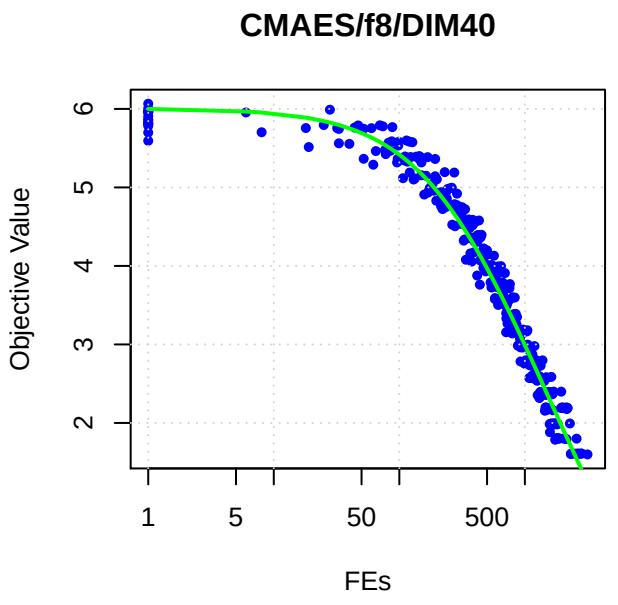
CMAES/f8/DIM40
Objective Value
FEs
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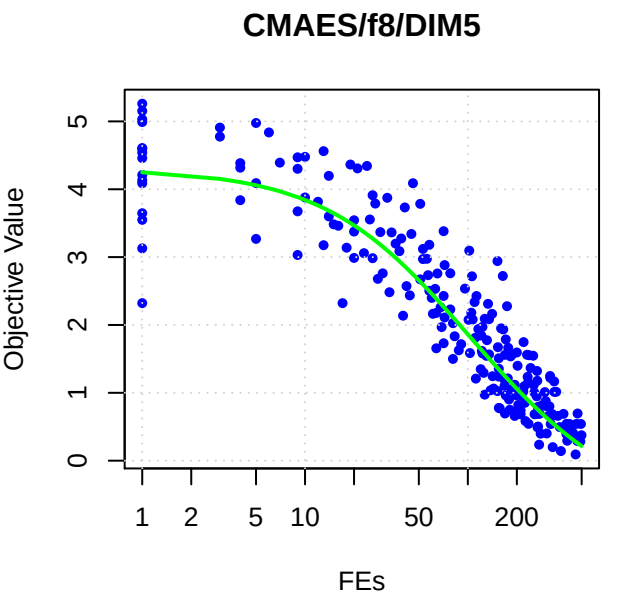
6


CMAES/f8/DIM5
Objective Value
FEs
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2
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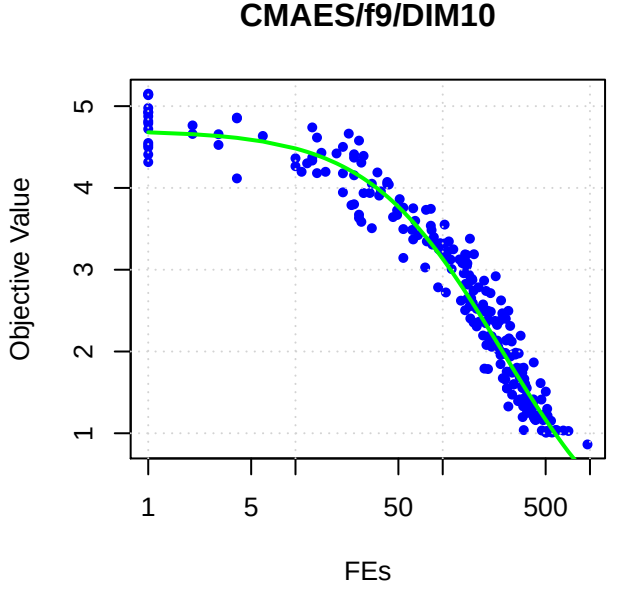
5


CMAES/f9/DIM10
Objective Value
FEs
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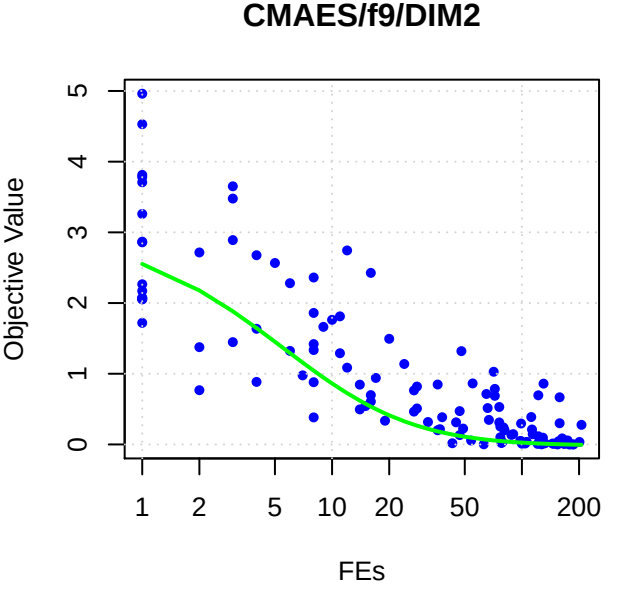
4
5


CMAES/f9/DIM2
Objective Value
FEs
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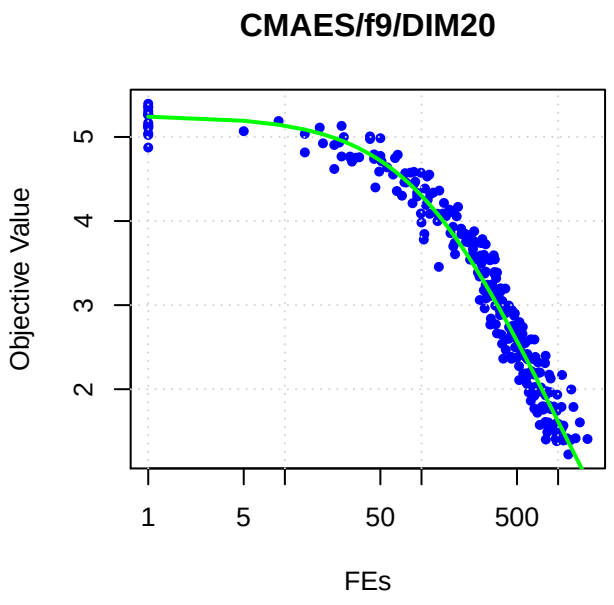
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Objective Value
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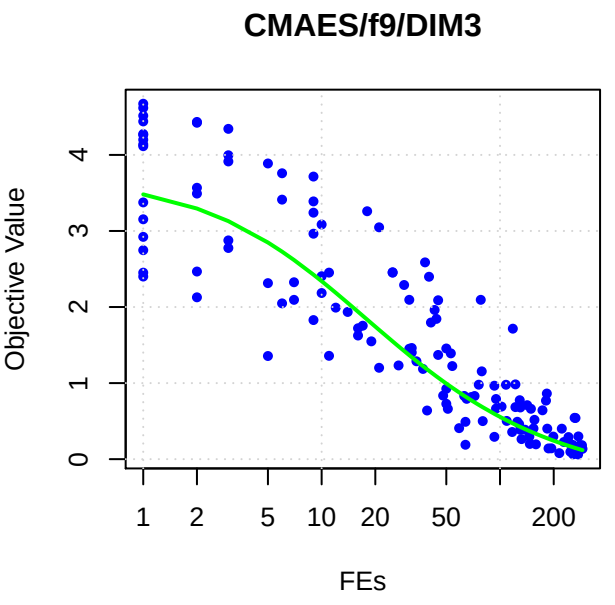
CMAES/f9/DIM3
Objective Value
FEs
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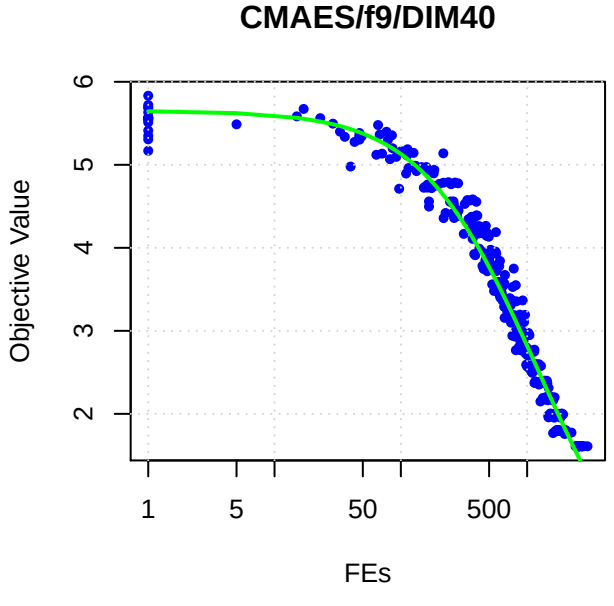
CMAES/f9/DIM40
Objective Value
FEs
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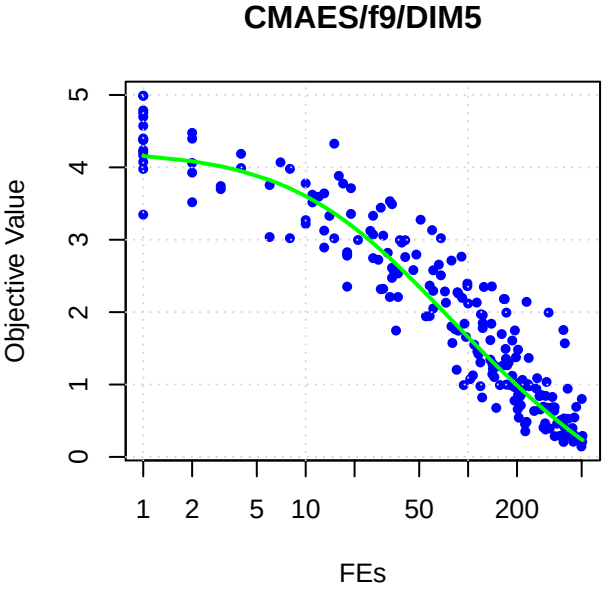
6


CMAES/f9/DIM5
Objective Value
FEs
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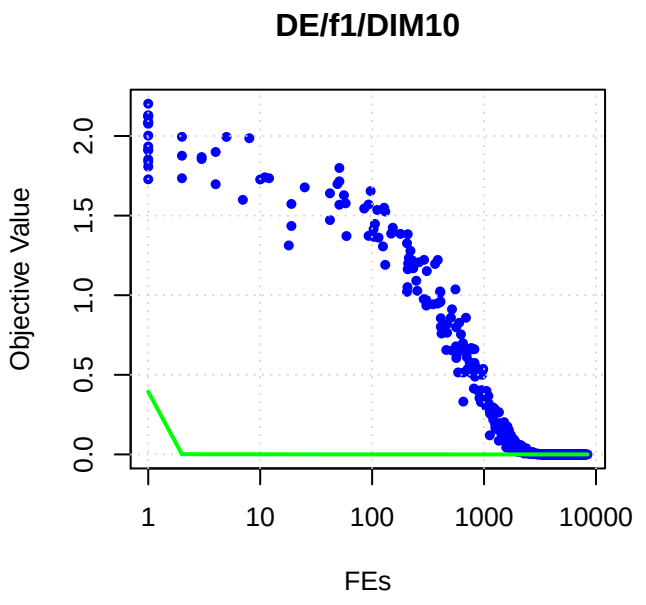
2
3
4
5


DE/f1/DIM10
Objective Value
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1.5
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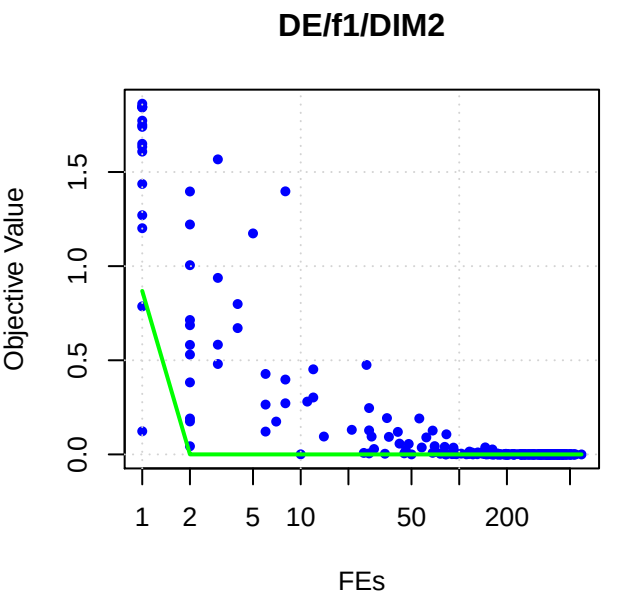
1
10
100
1000
10000
FEs


DE/f1/DIM2
Objective Value
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2
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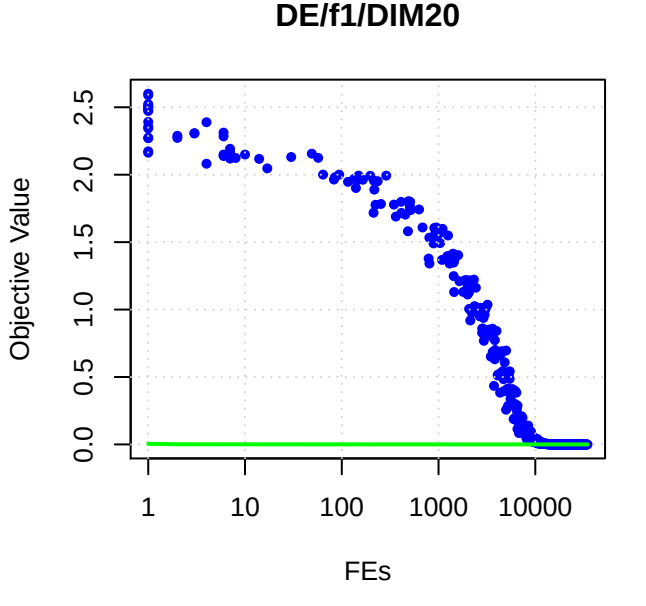
FEs


DE/f1/DIM20
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1.5
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2.5
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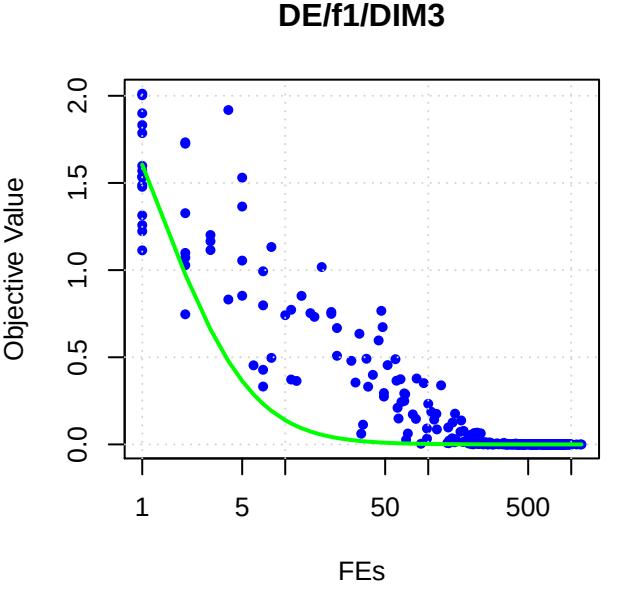
10
100
1000
10000
FEs


DE/f1/DIM3
Objective Value
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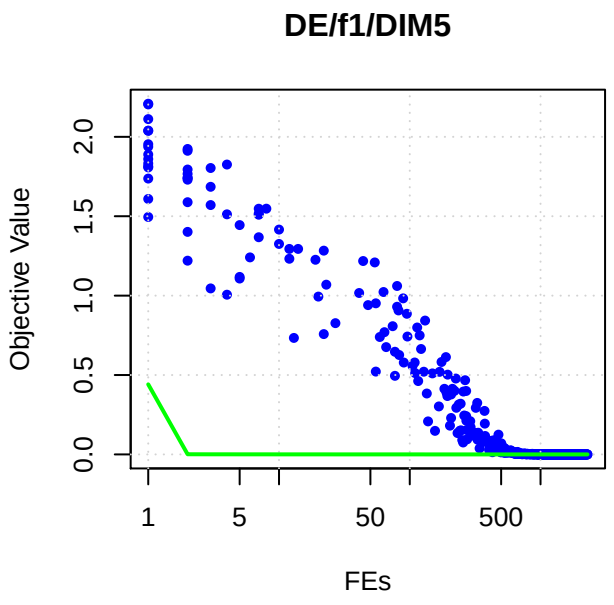
1.0
1.5
2.0
1
5
50
500
FEs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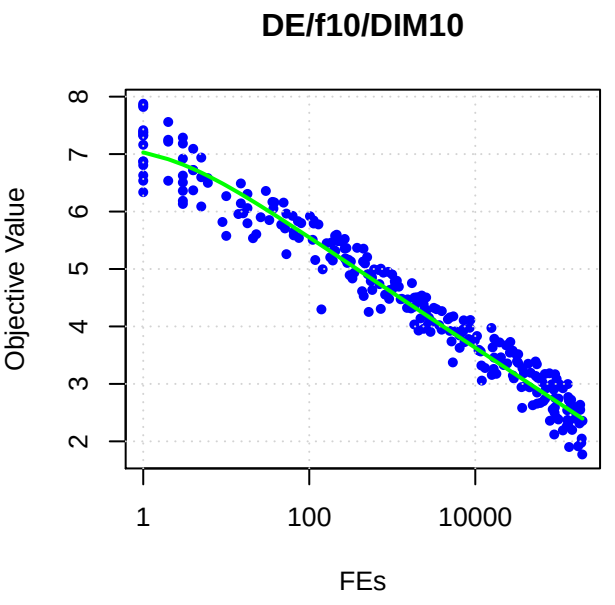
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Objective Value
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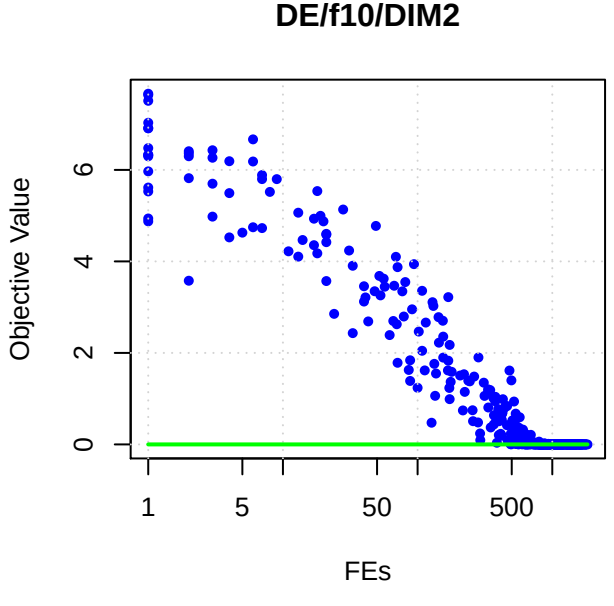
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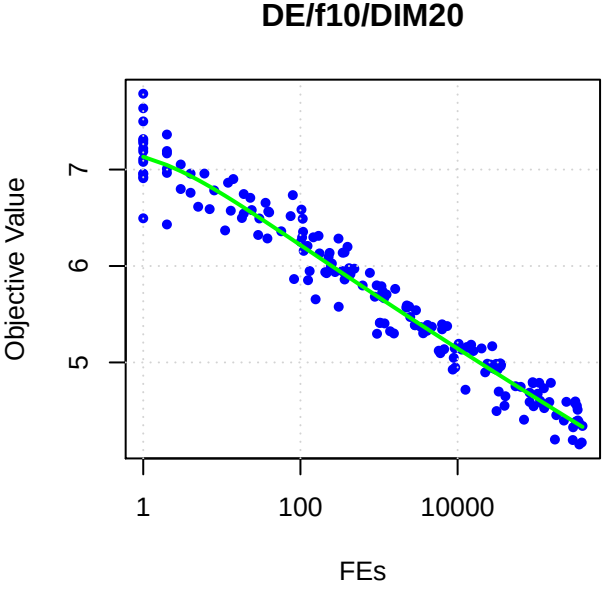
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Objective Value
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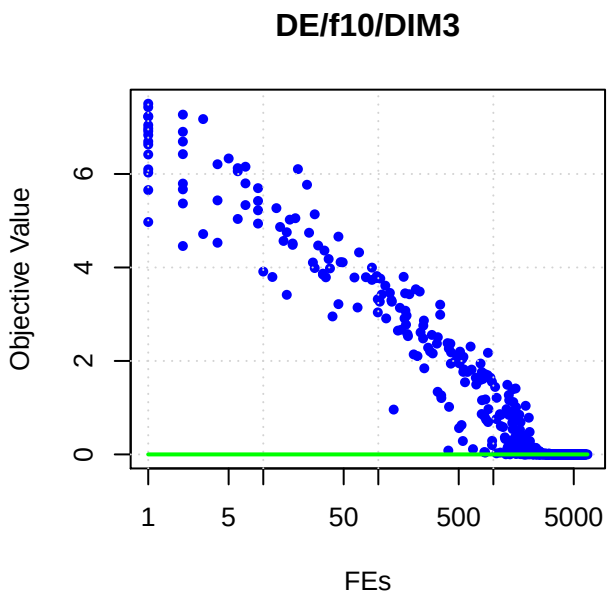
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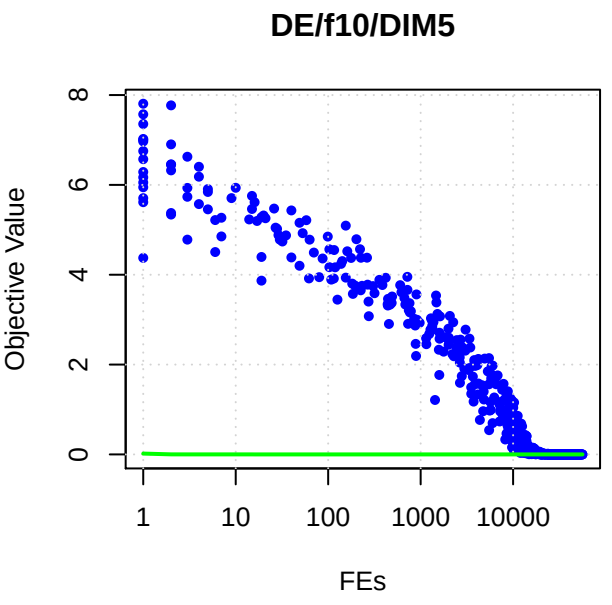
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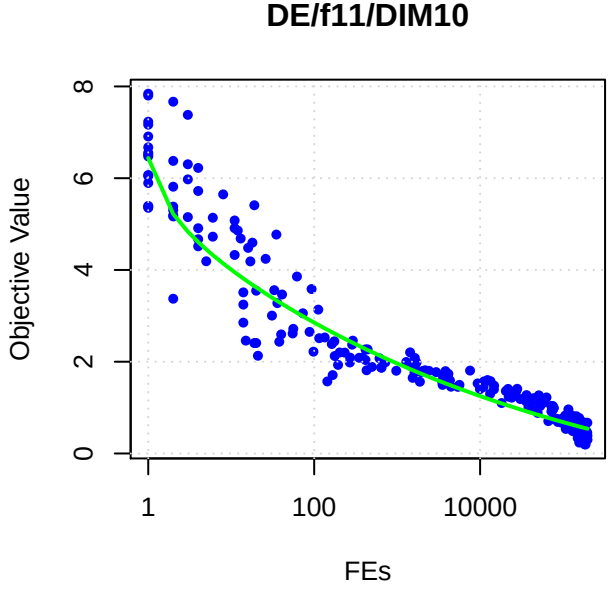
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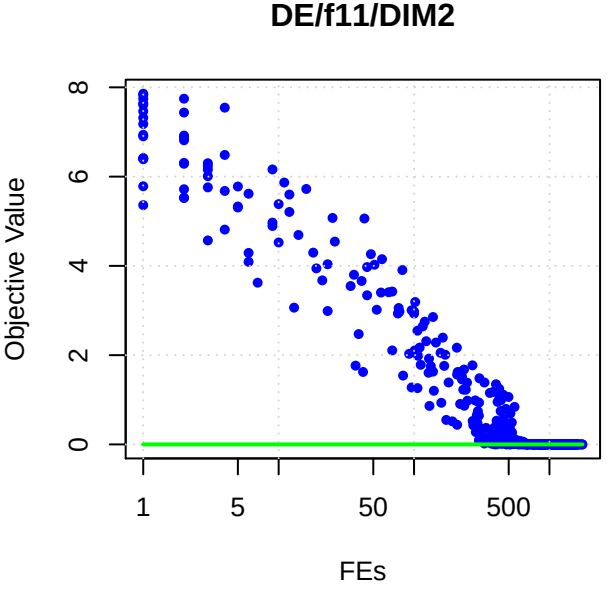
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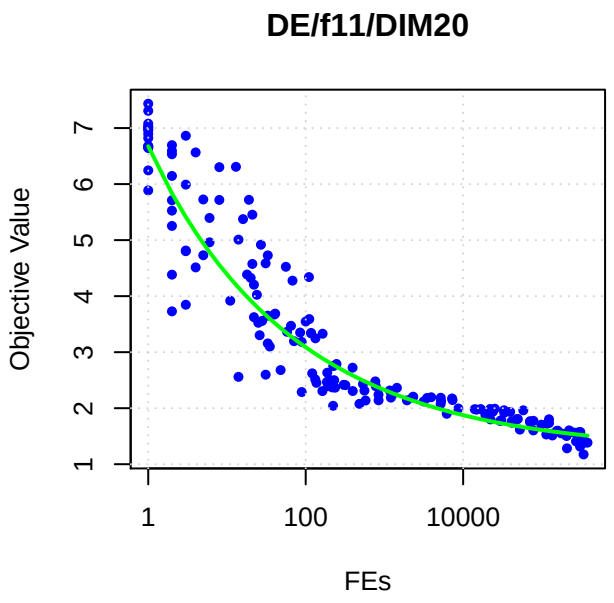
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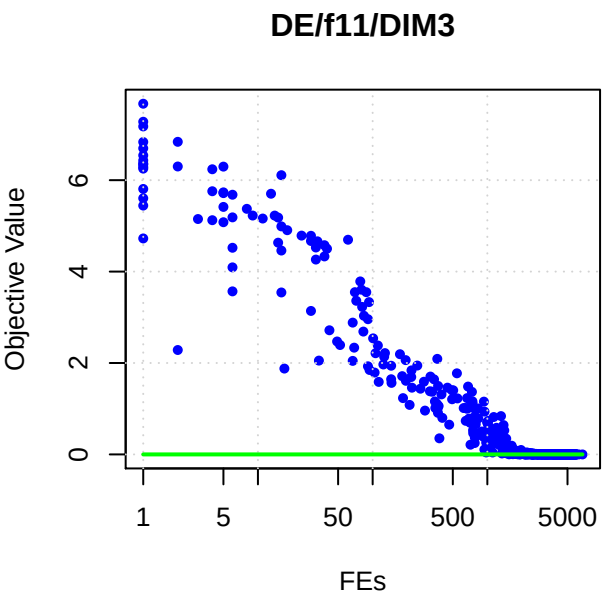
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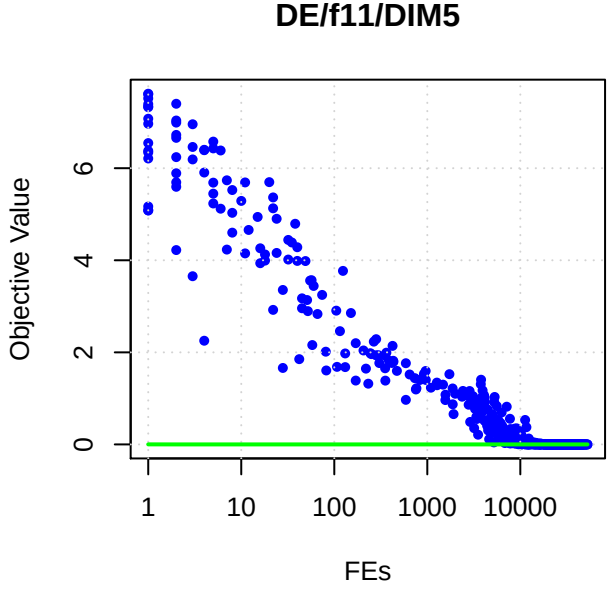
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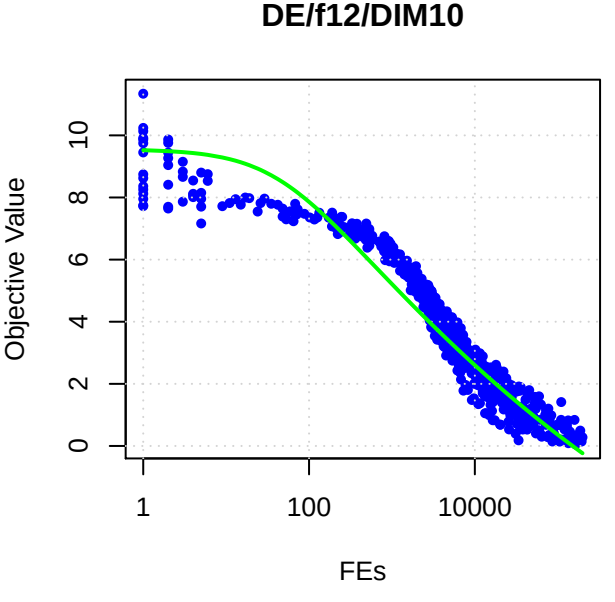
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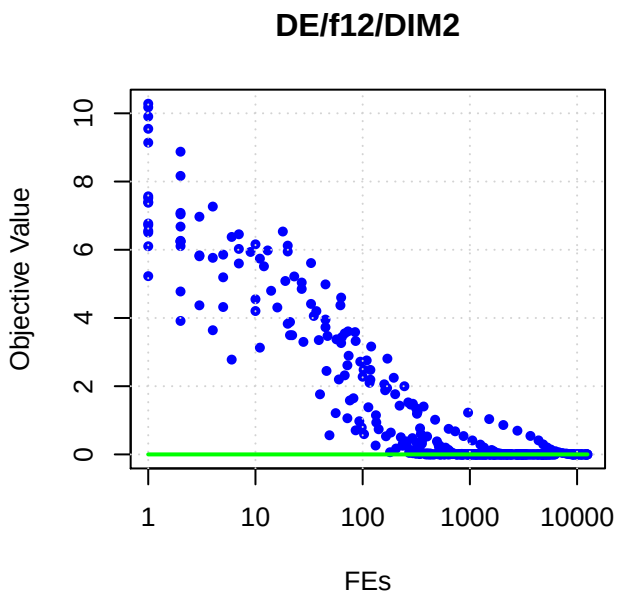
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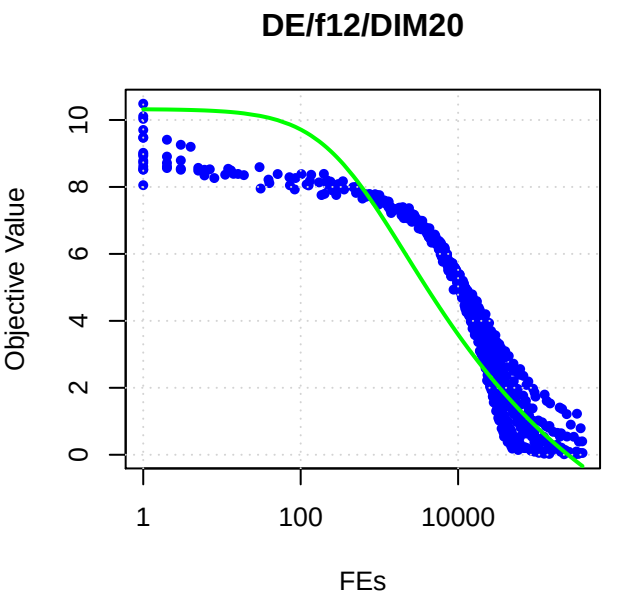
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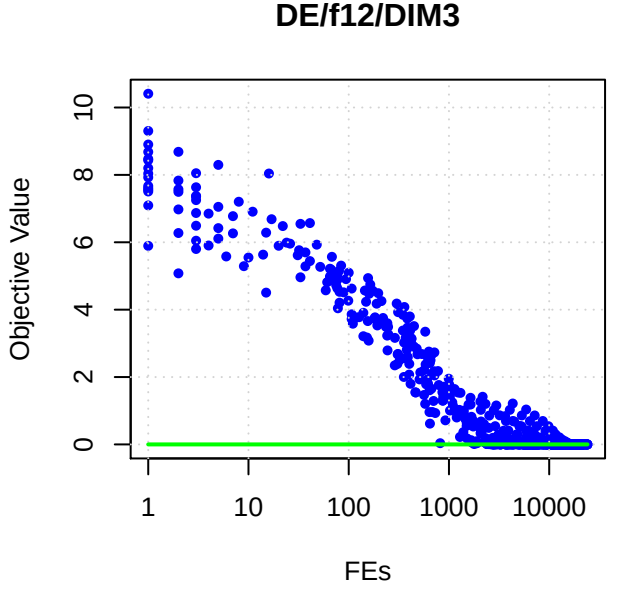
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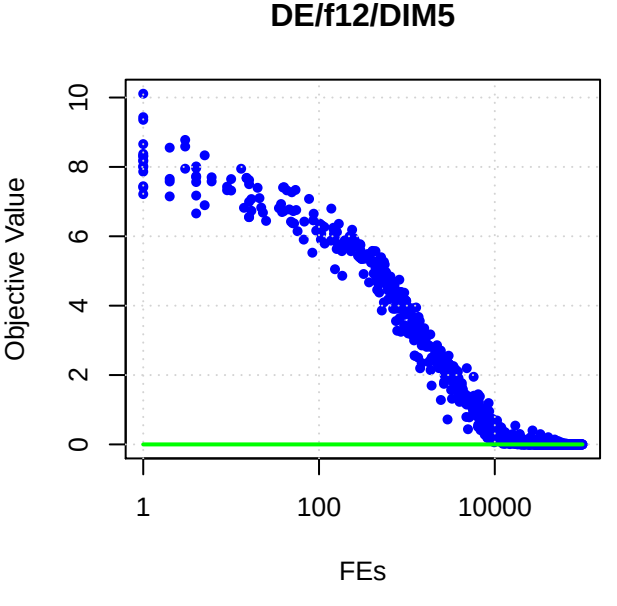
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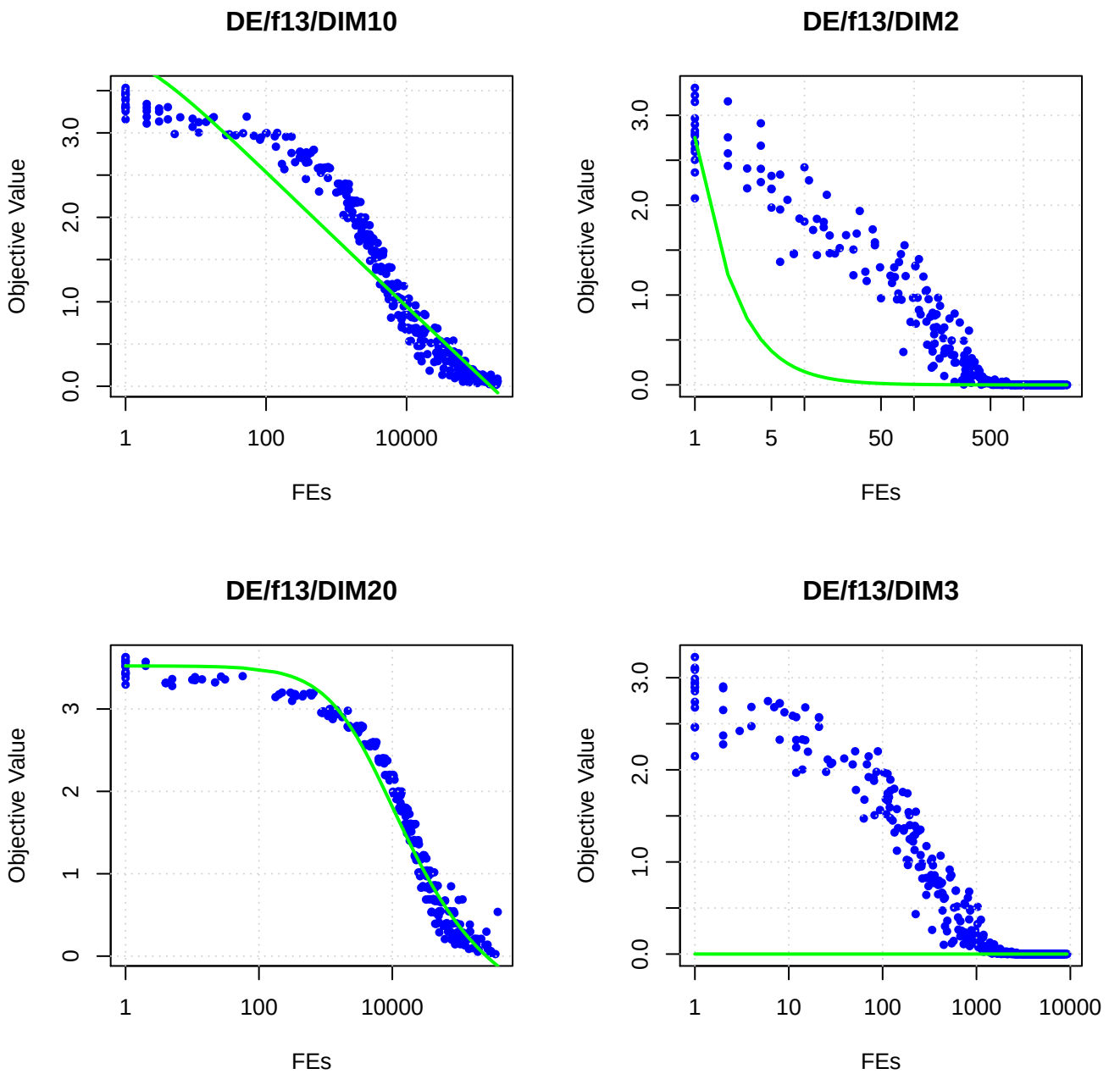
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FEs
DE/f13/DIM2
Objective Value
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2.0
3.0
1
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500
FEs
DE/f13/DIM20
Objective Value
0
1
2
3
1
100
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FEs
DE/f13/DIM3
Objective Value
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2.0
3.0
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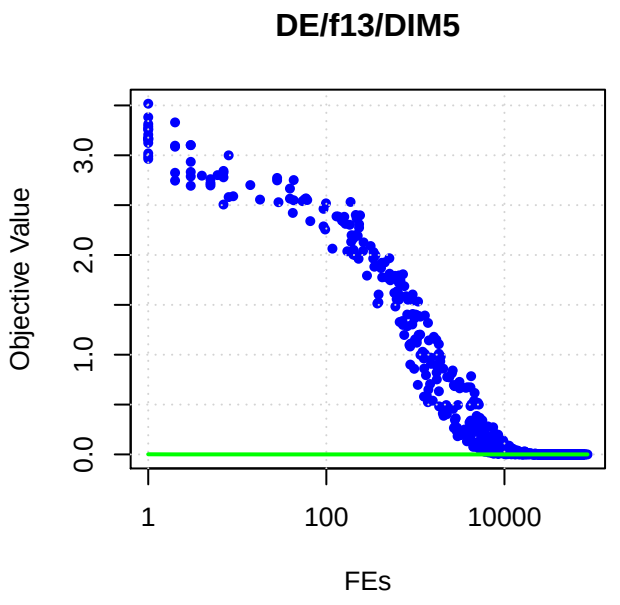
FEs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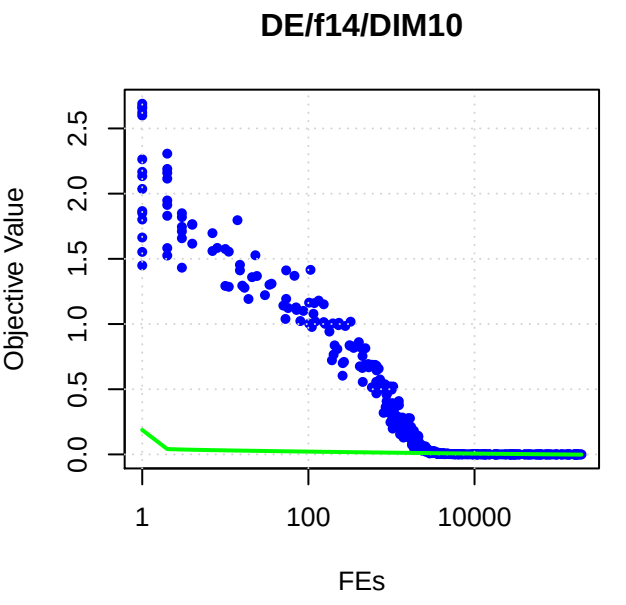
FEs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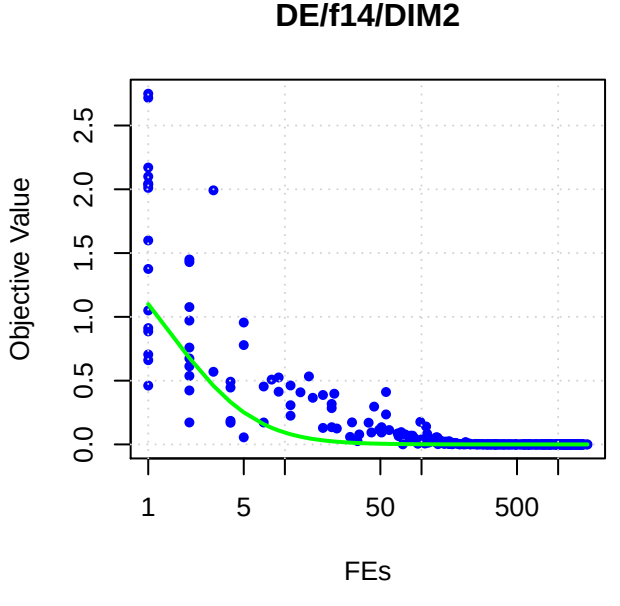
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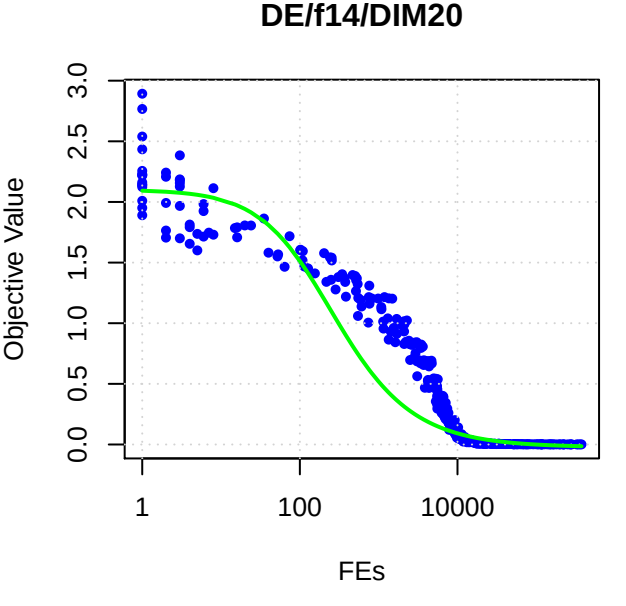
FEs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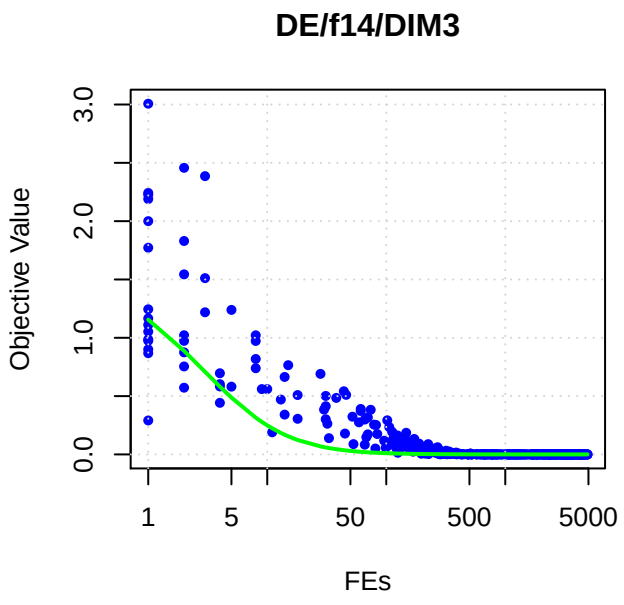
FEs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3.0
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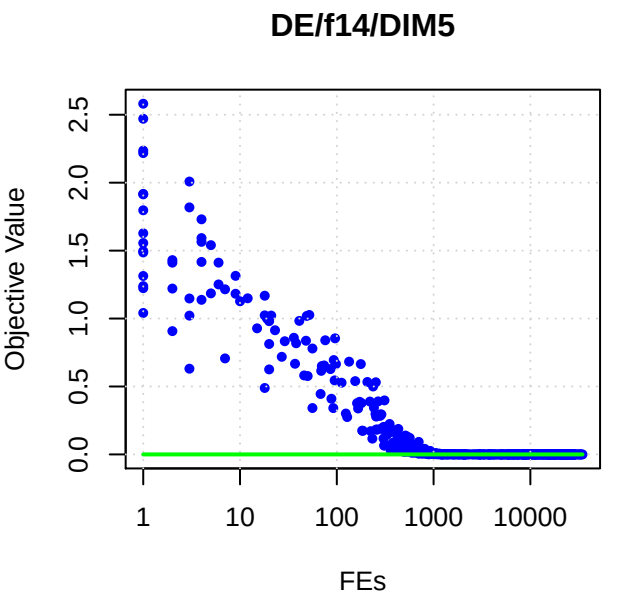
500
5000
FEs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1000
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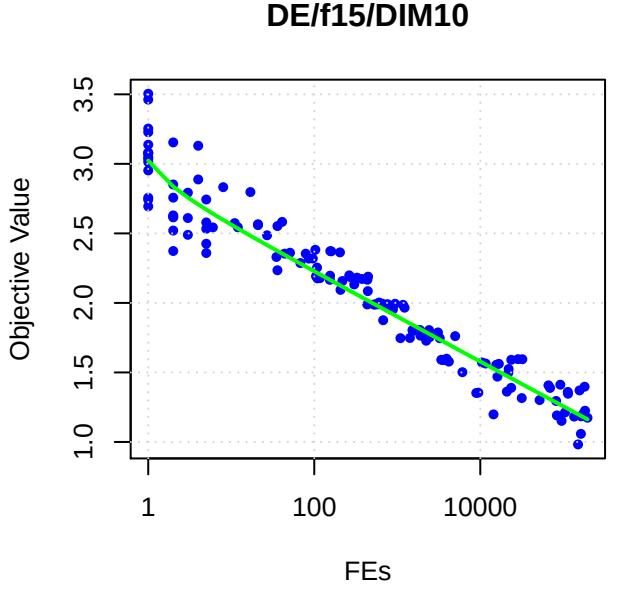
FEs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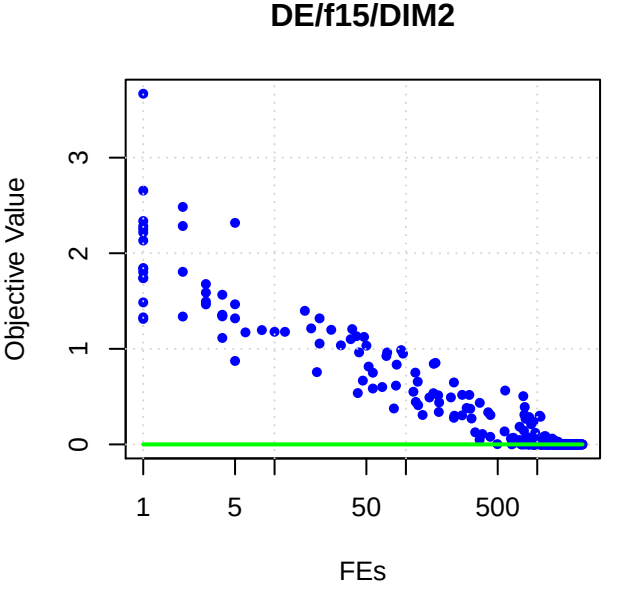
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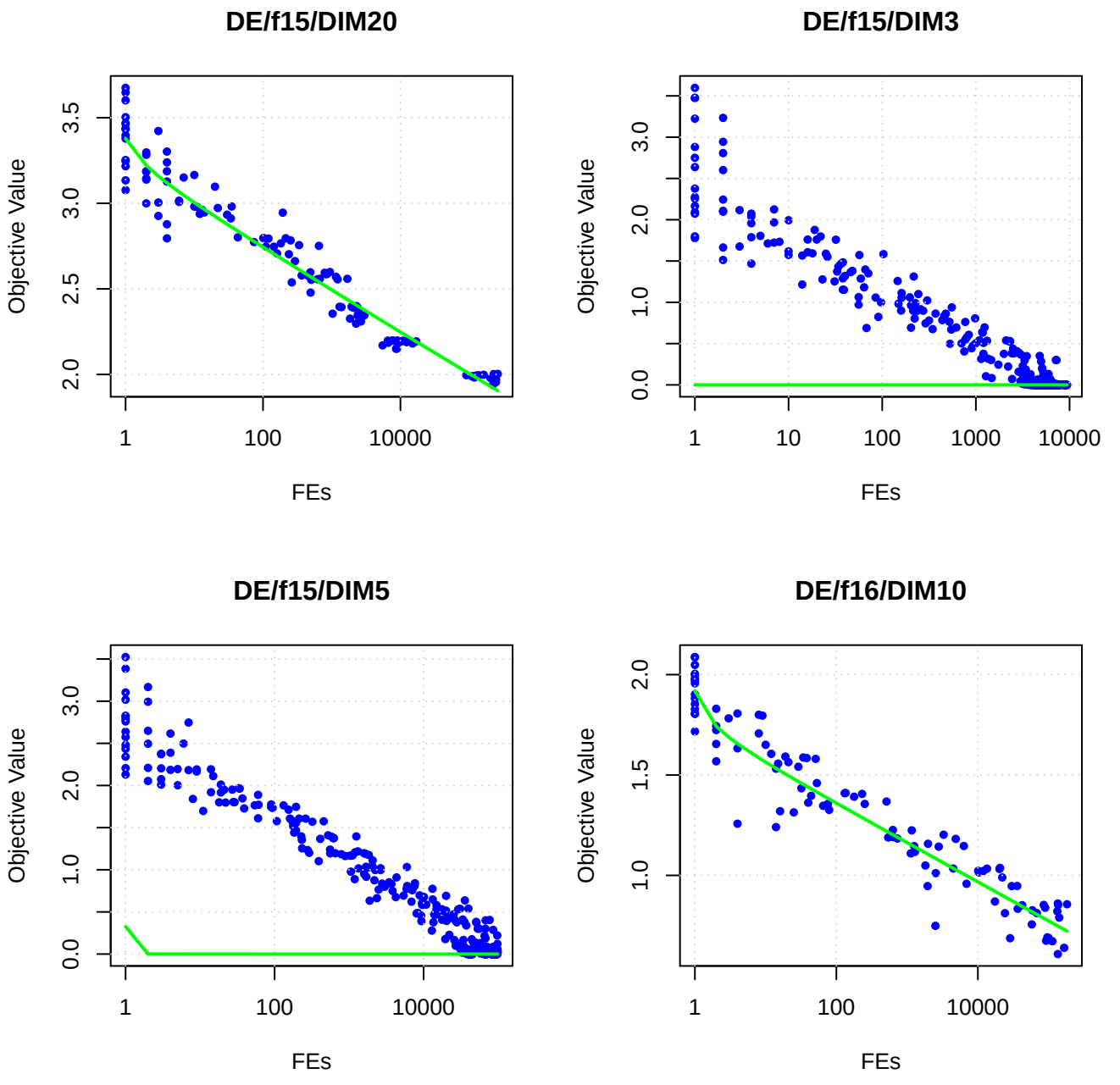
FEs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FEs
DE/f15/DIM3
Objective Value
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2.0
1.0
0.0
1
10
100
1000
10000
FEs
DE/f15/DIM5
Objective Value
3.0
2.0
1.0
0.0
1
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10000
FEs
DE/f16/DIM10
Objective Value
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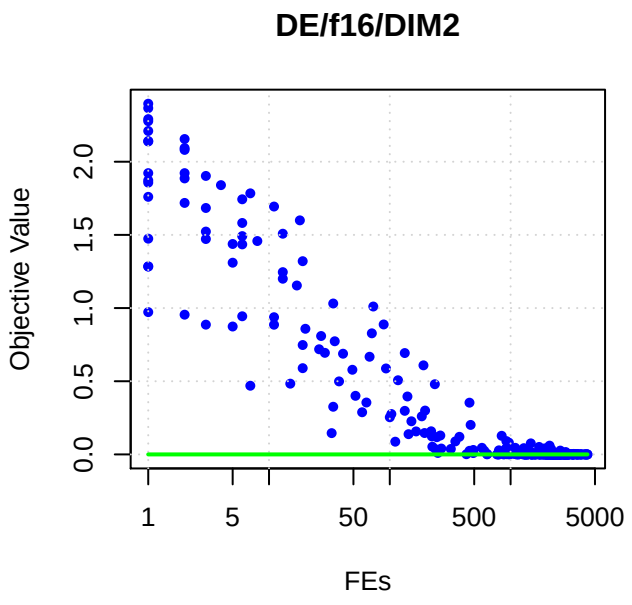
1.5
1.0
1
100
10000
FEs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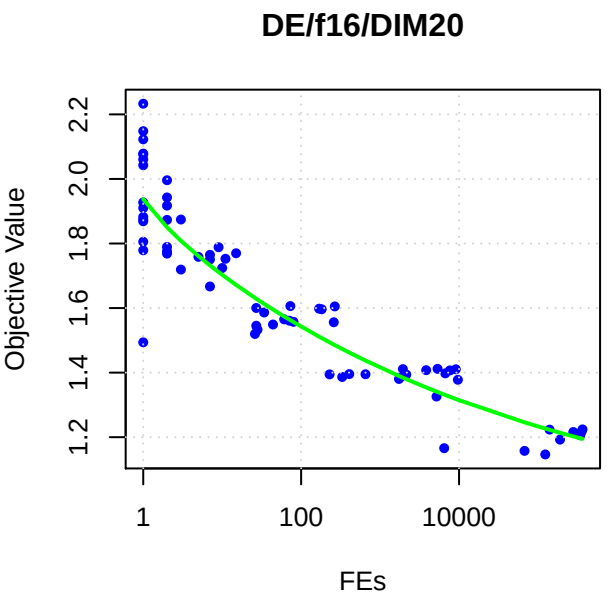
FEs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Objective Value
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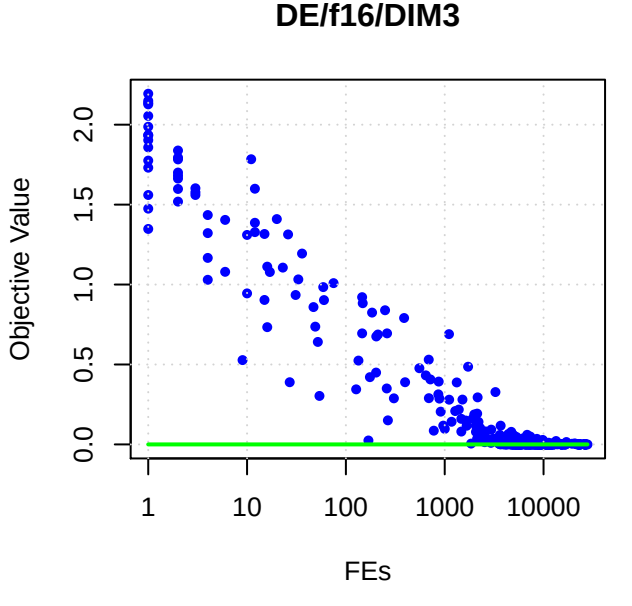
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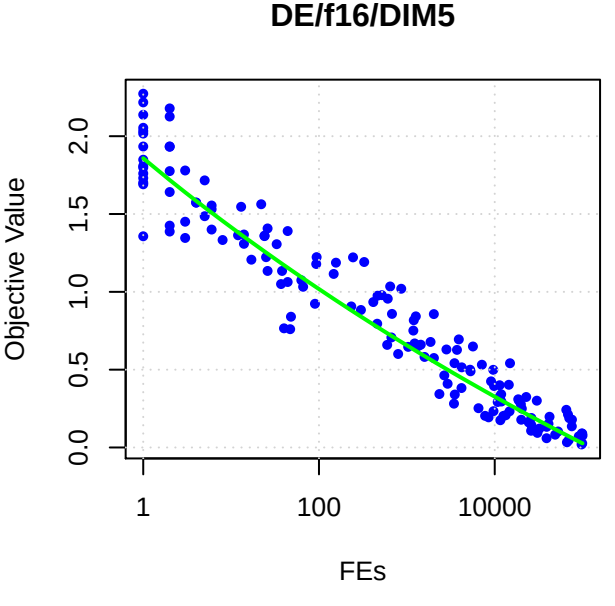
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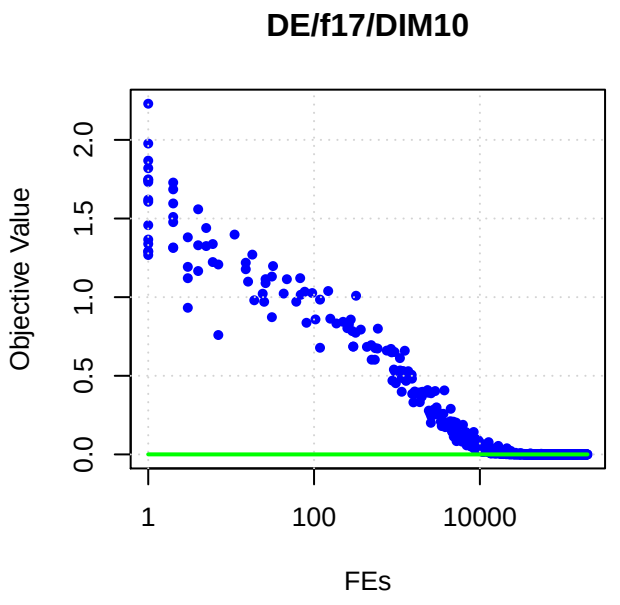
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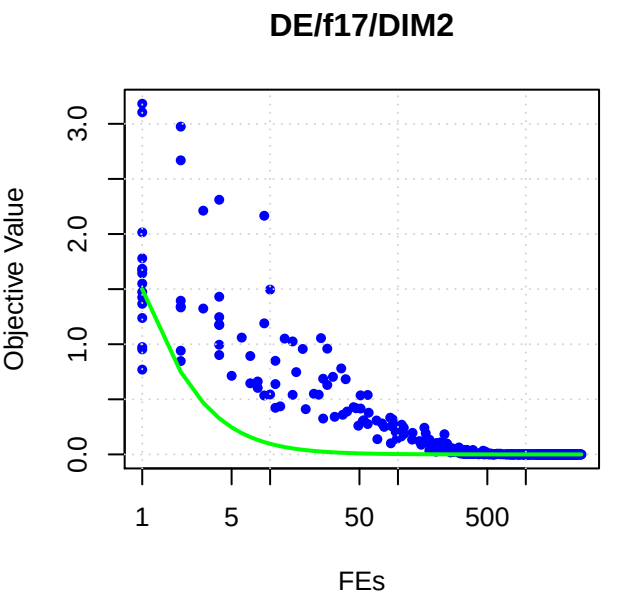
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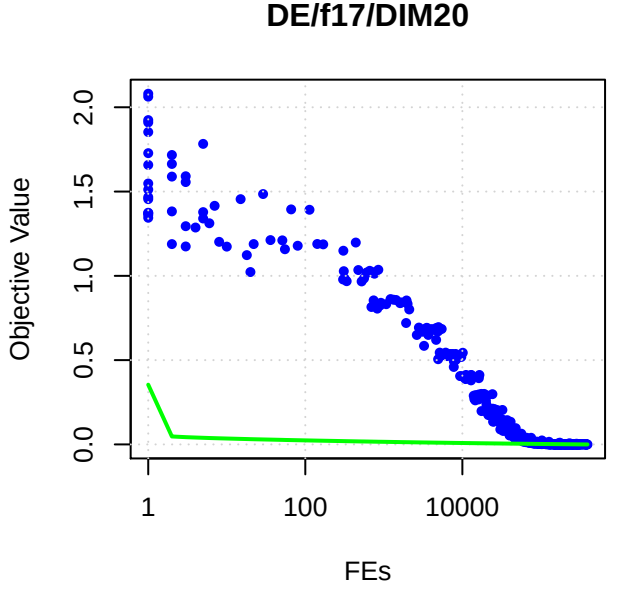
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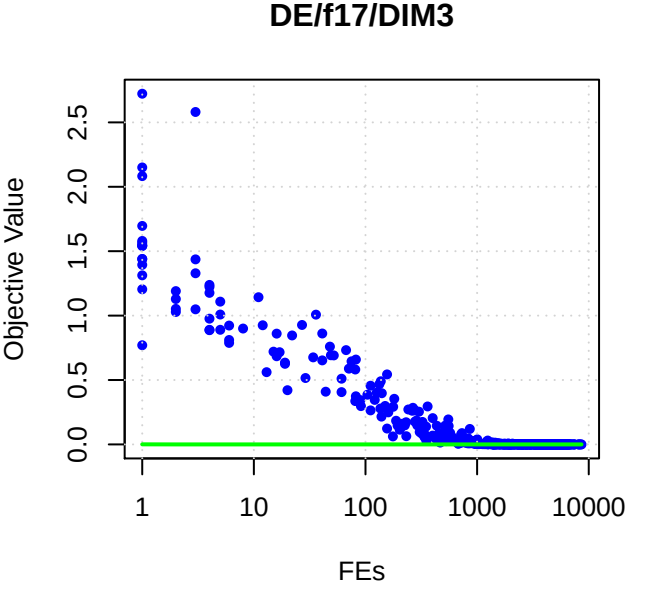
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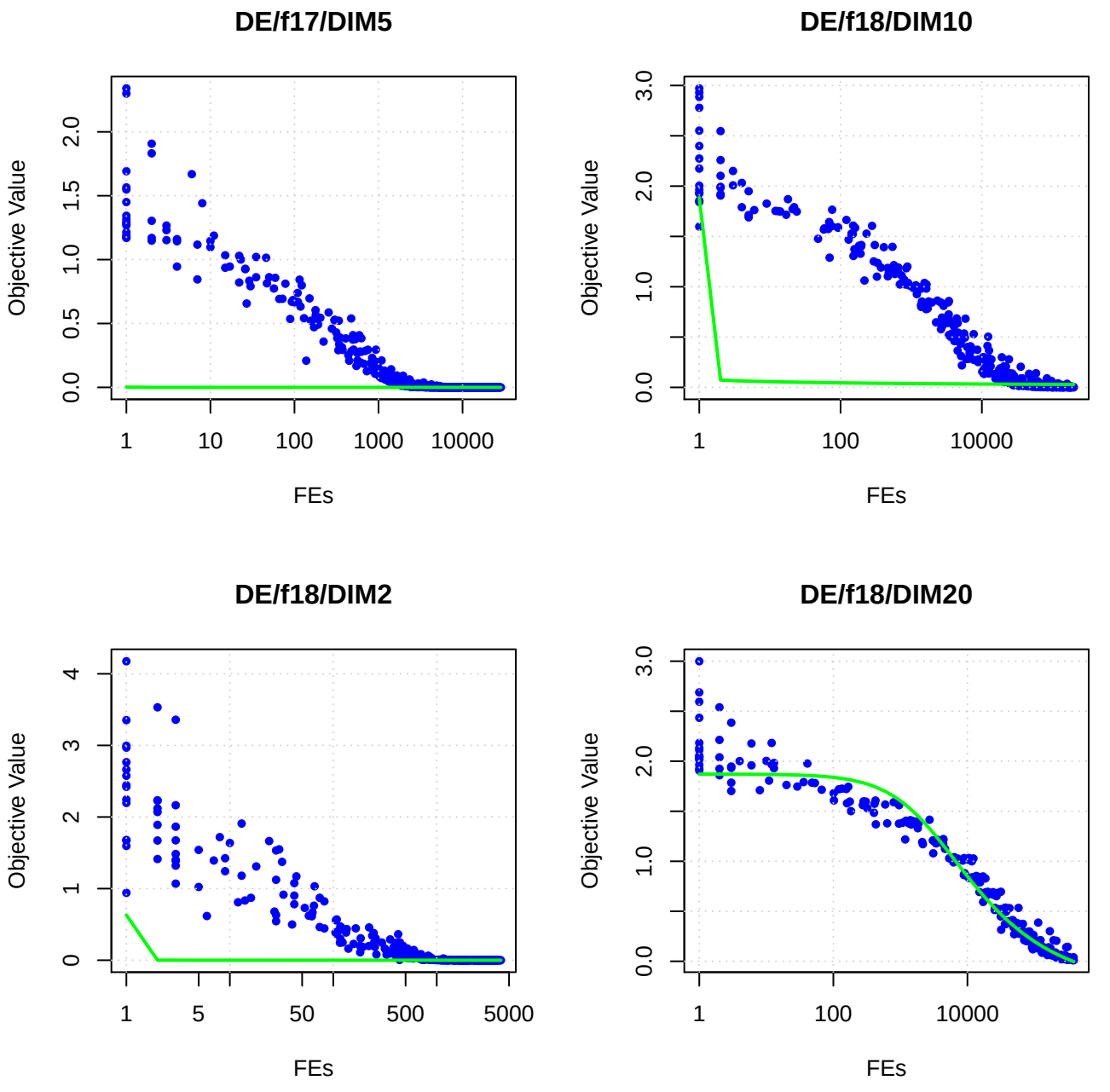
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FEs
DE/f18/DIM10
Objective Value
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1.0
2.0
3.0
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100
10000
FEs
DE/f18/DIM2
Objective Value
0
1
2
3
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DE/f18/DIM20
Objective Value
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2.0
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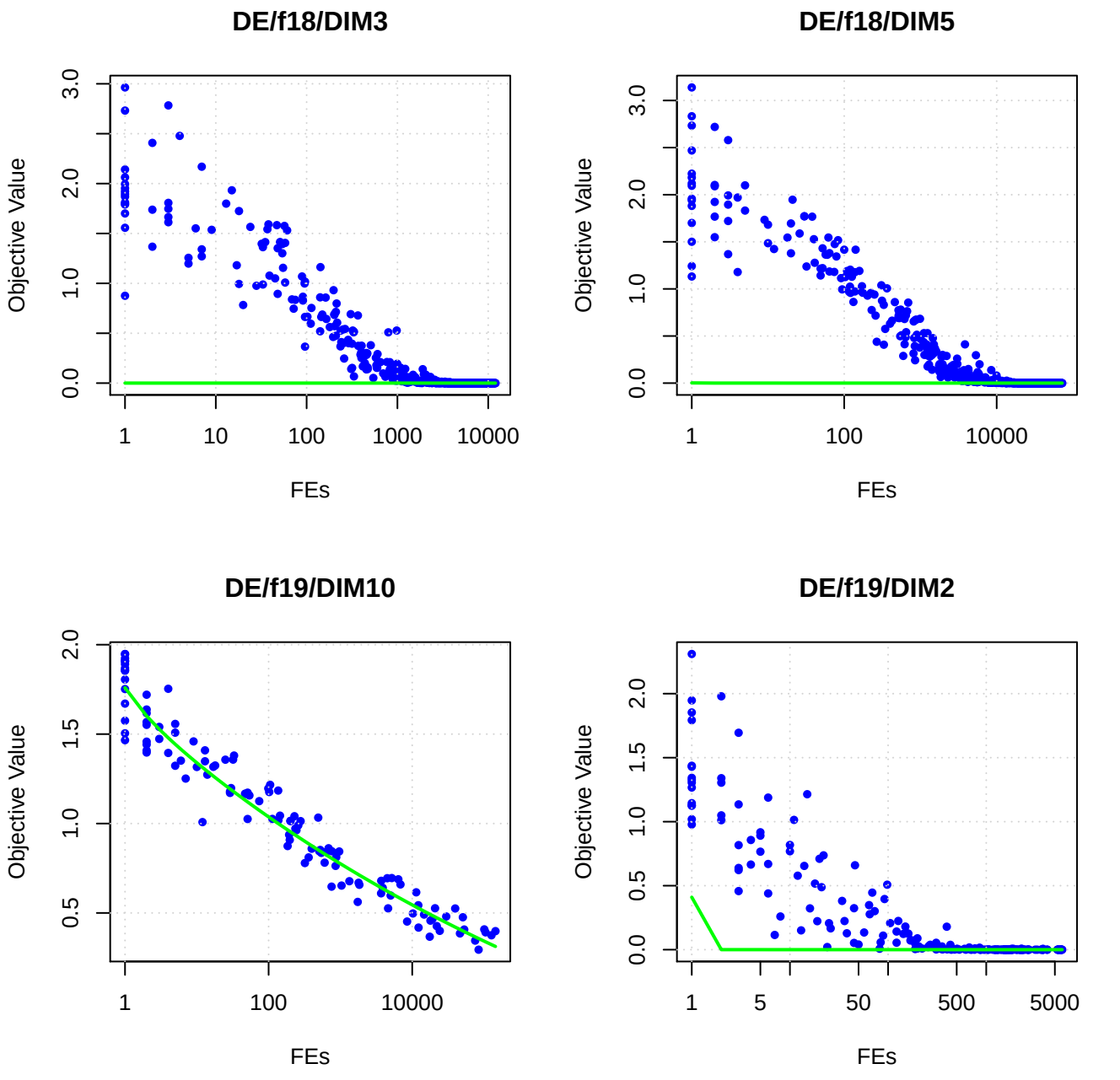
FEs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DE/f18/DIM5
Objective Value
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1.0
2.0
3.0
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10000
FEs
DE/f19/DIM10
Objective Value
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1.0
1.5
2.0
1
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10000
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DE/f19/DIM2
Objective Value
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1.5
2.0
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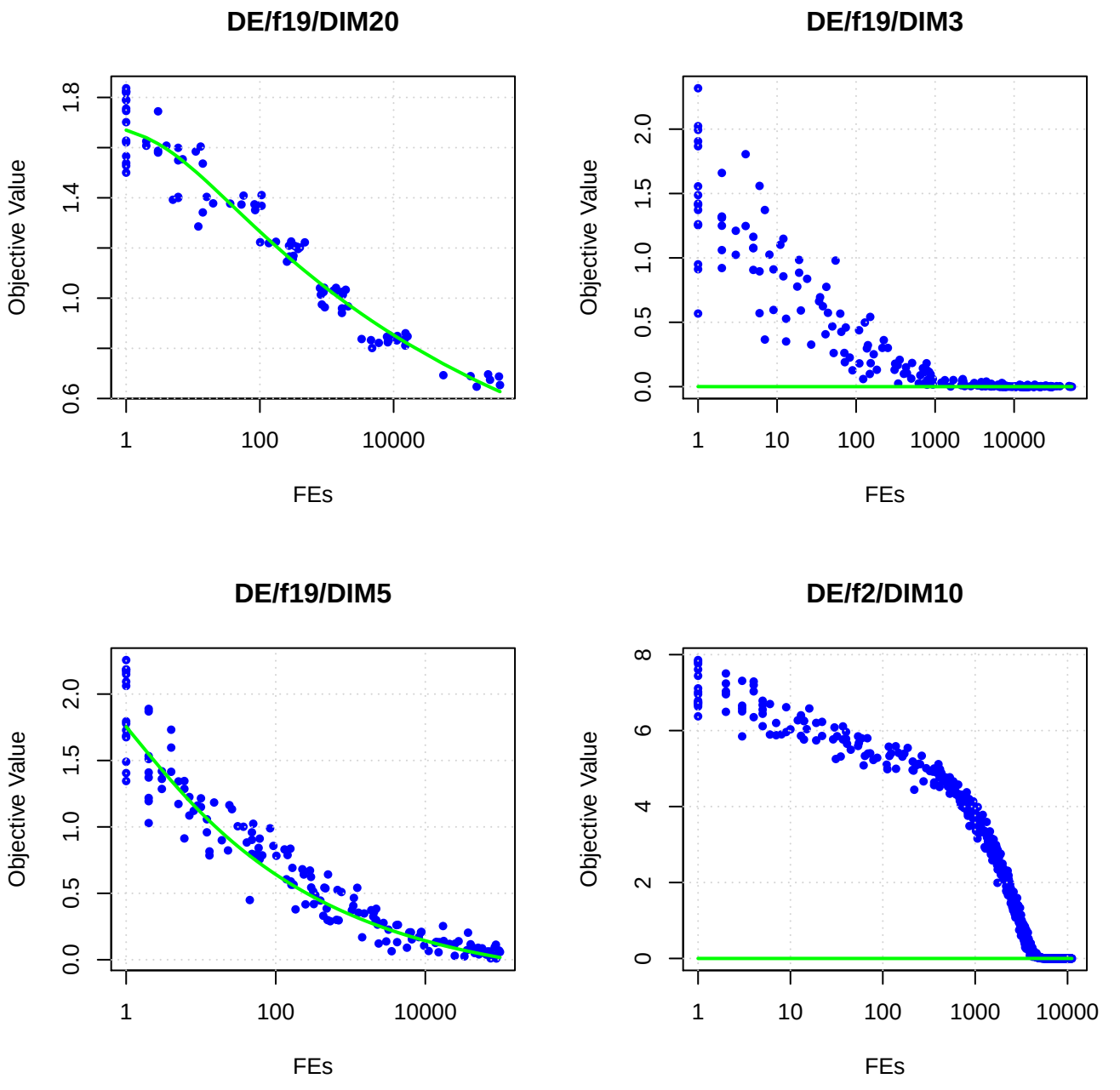
500
5000
FEs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FEs
DE/f19/DIM3
Objective Value
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FEs
DE/f19/DIM5
Objective Value
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2.0
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Objective Value
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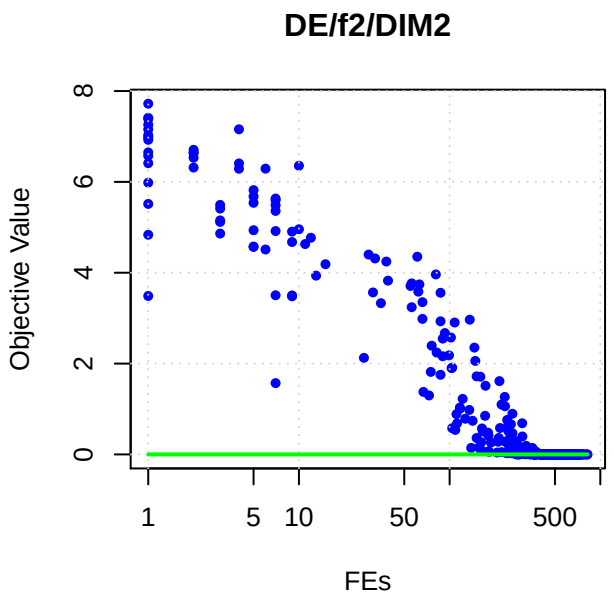
FEs


DE/f2/DIM2
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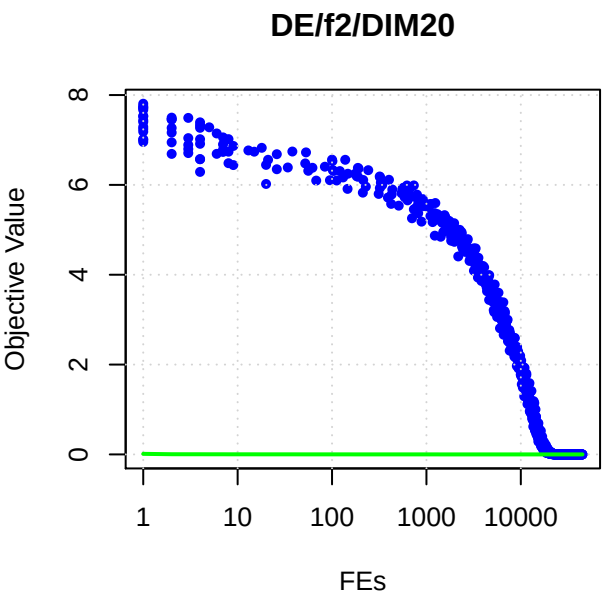
FEs


DE/f2/DIM20
Objective Value
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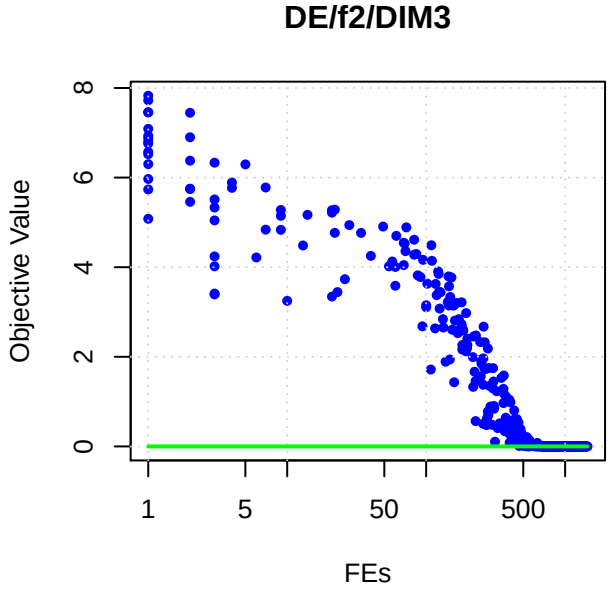
1000
10000
FEs


DE/f2/DIM3
Objective Value
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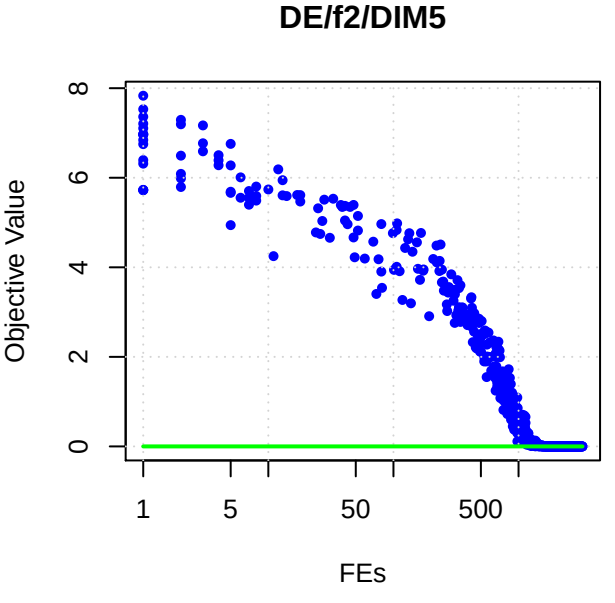
FEs


DE/f2/DIM5
Objective Value
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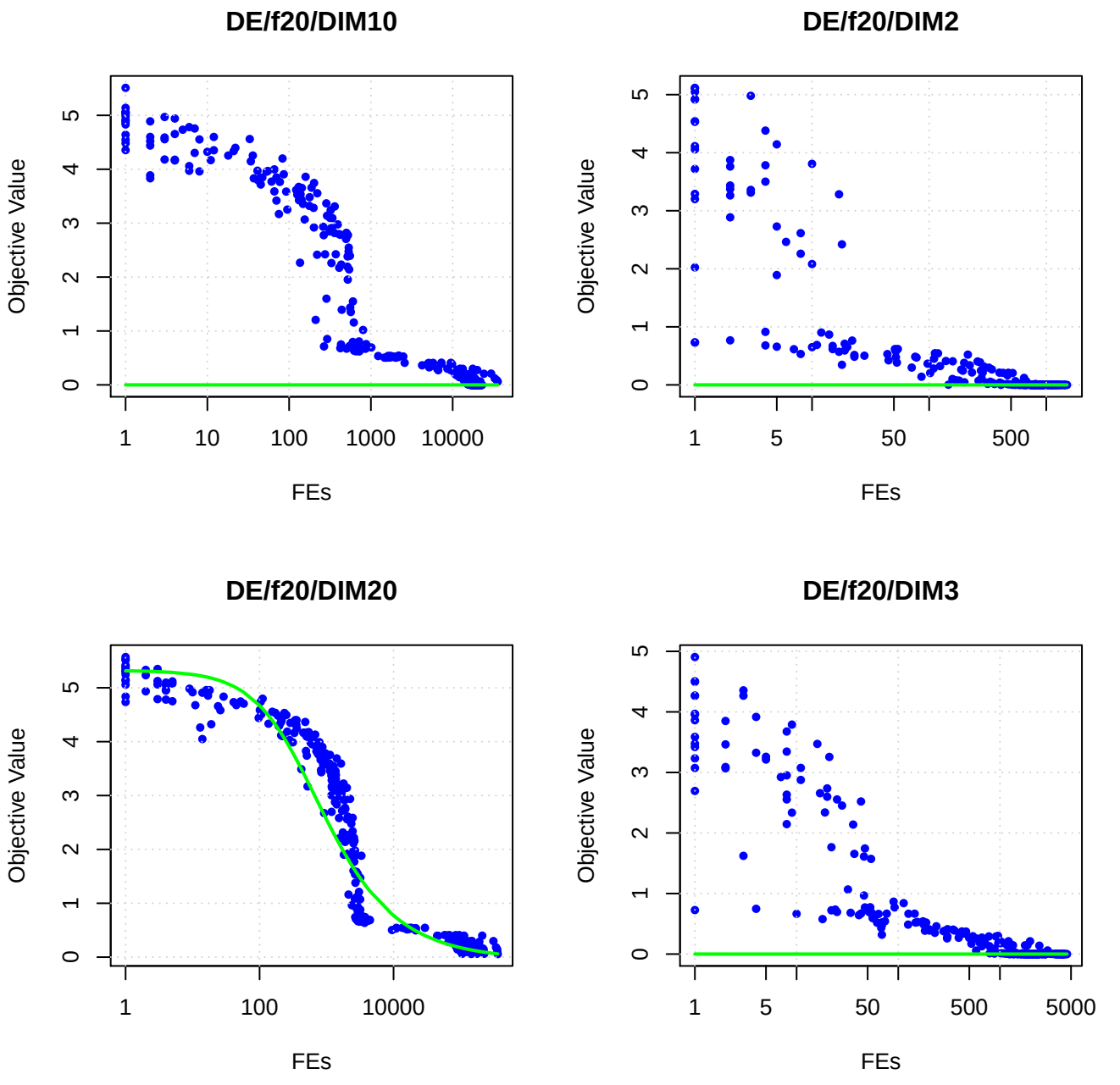
DE/f20/DIM10
Objective Value
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1000
10000
FEs
DE/f20/DIM2
Objective Value
0
1
2
3
4
5
1
5
50
500
FEs
DE/f20/DIM20
Objective Value
0
1
2
3
4
5
1
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FEs
DE/f20/DIM3
Objective Value
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2
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4
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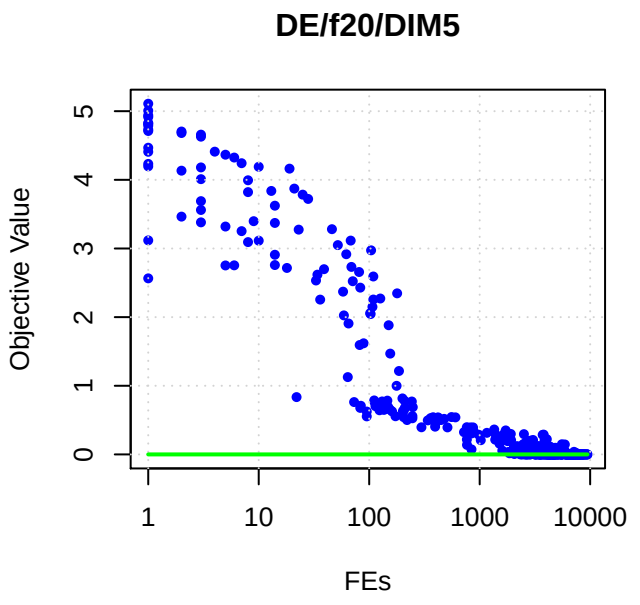
50
500
5000
FEs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Objective Value
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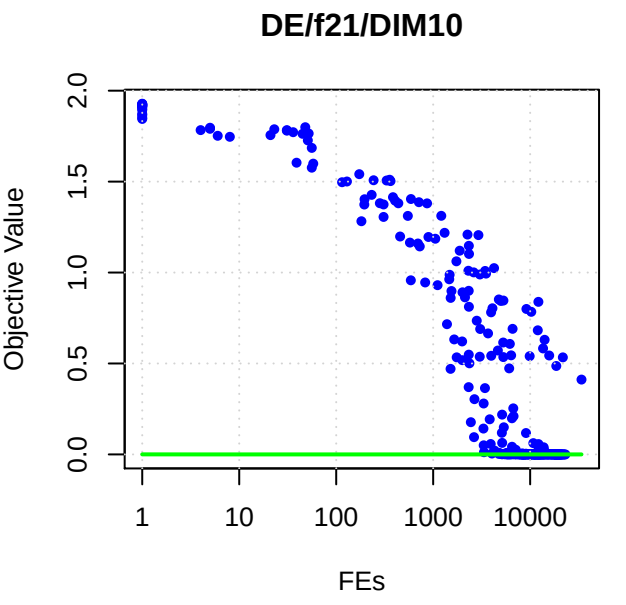
1000
10000
FEs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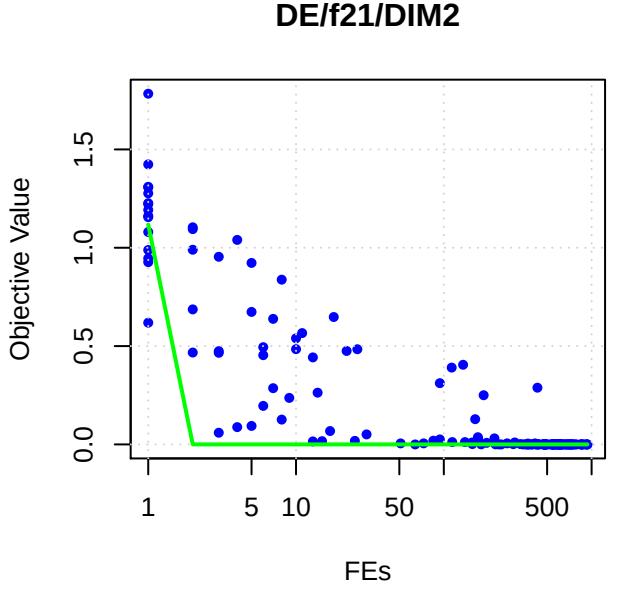
1000
10000
FEs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Objective Value
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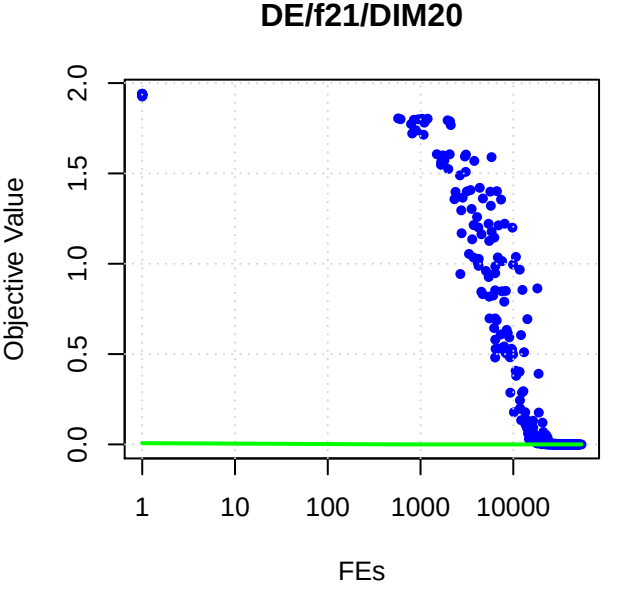
FEs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1000
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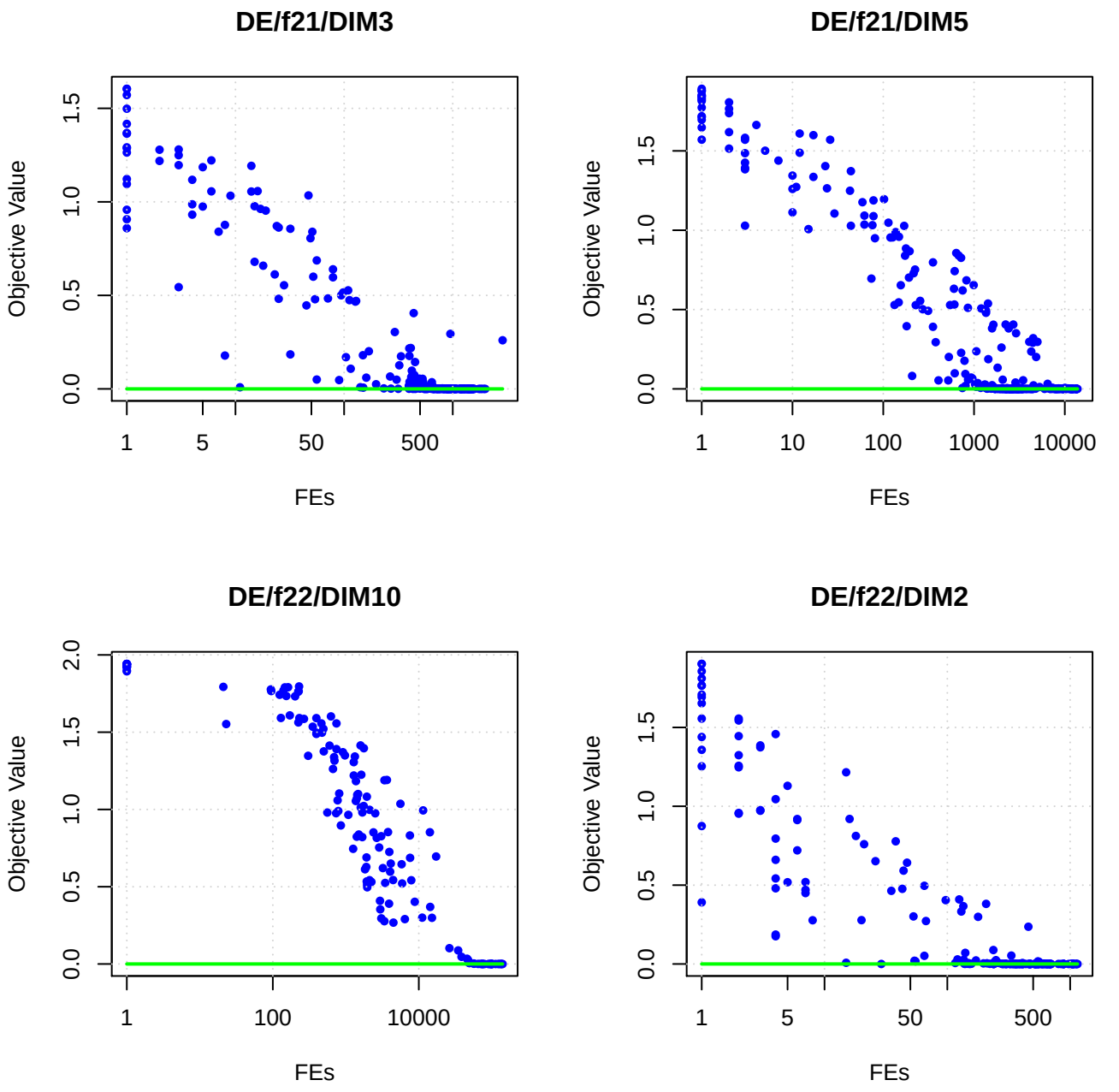
DE/f21/DIM3
Objective Value
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0.5
1.0
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FEs
DE/f21/DIM5
Objective Value
0.0
0.5
1.0
1.5
1
10
100
1000
10000
FEs
DE/f22/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
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FEs
DE/f22/DIM2
Objective Value
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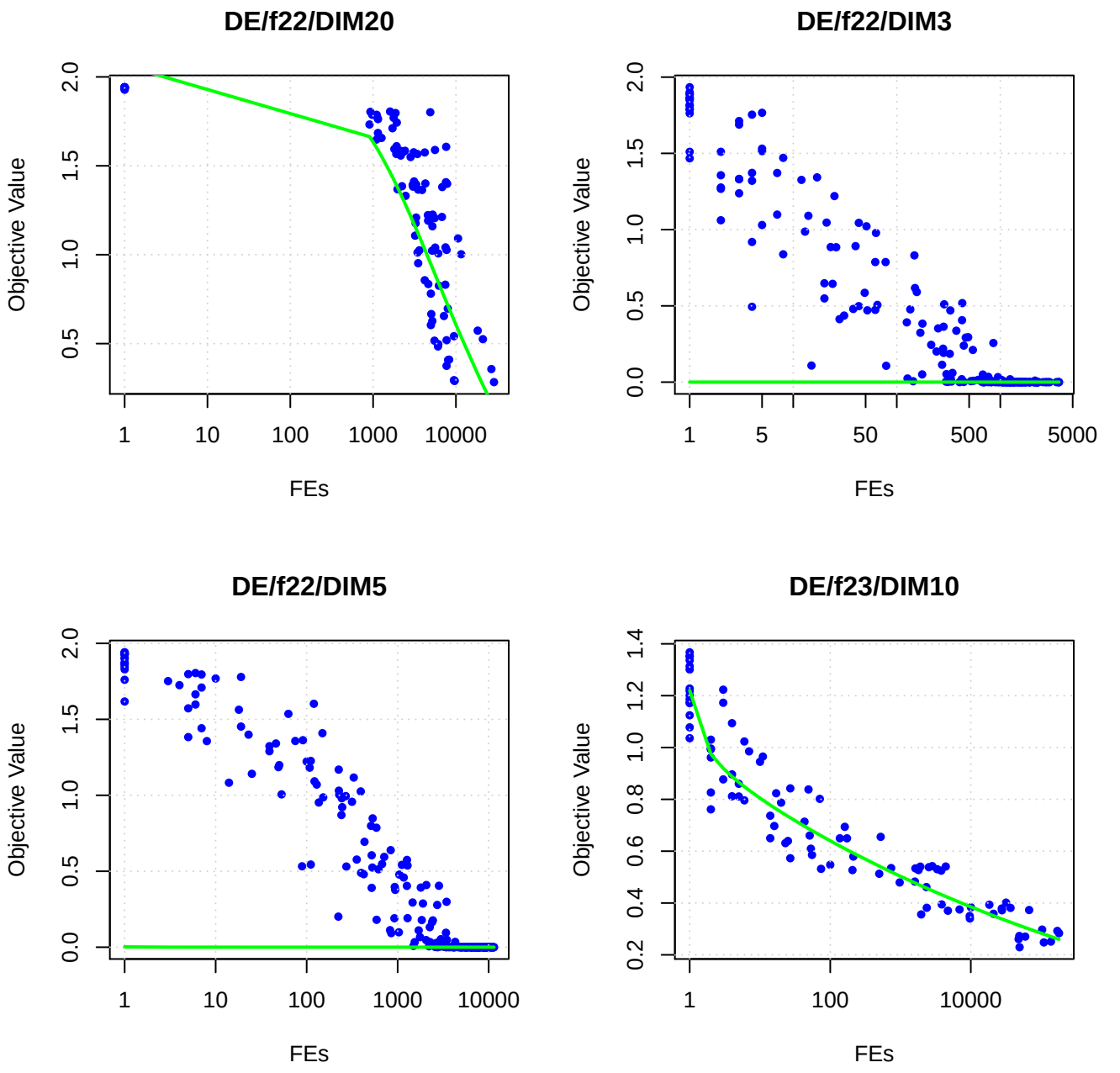
1.0
1.5
1
5
50
500
FEs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Objective Value
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1.0
0.5
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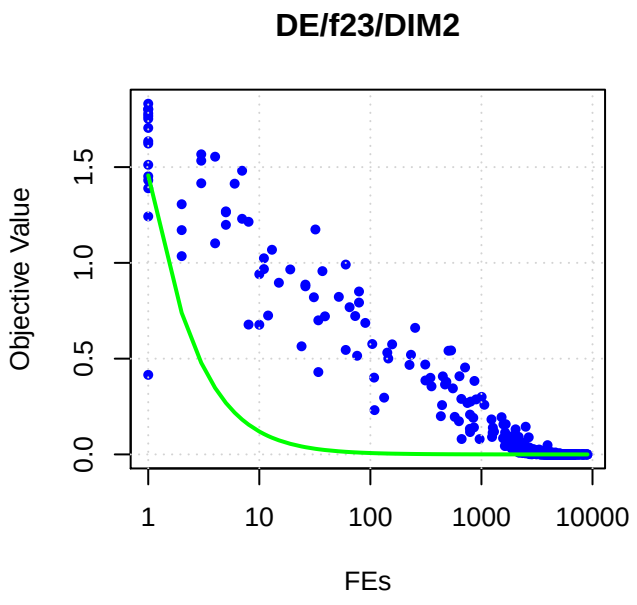
1000
10000
FEs
DE/f22/DIM3
Objective Value
2.0
1.5
1.0
0.5
0.0
1
5
50
500
5000
FEs
DE/f22/DIM5
Objective Value
2.0
1.5
1.0
0.5
0.0
1
10
100
1000
10000
FEs
DE/f23/DIM10
Objective Value
1.4
1.2
1.0
0.8
0.6
0.4
0.2
1
100
10000
FEs


DE/f23/DIM2
Objective Value
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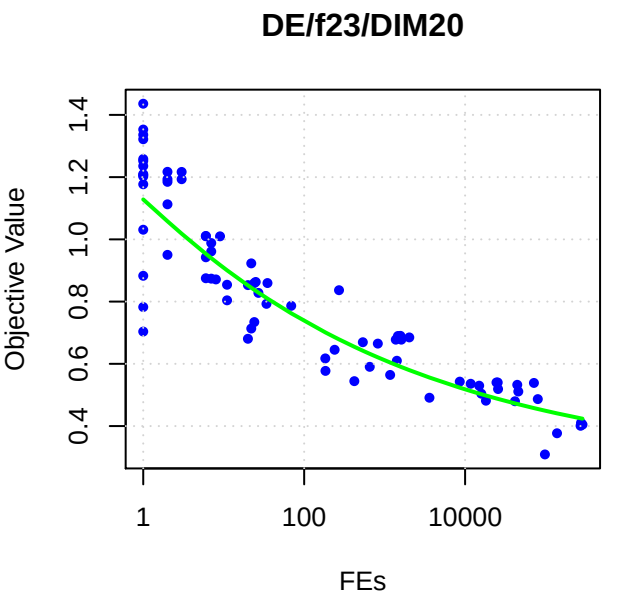
0.5
1.0
1.5
1
10
100
1000
10000
FEs


DE/f23/DIM20
Objective Value
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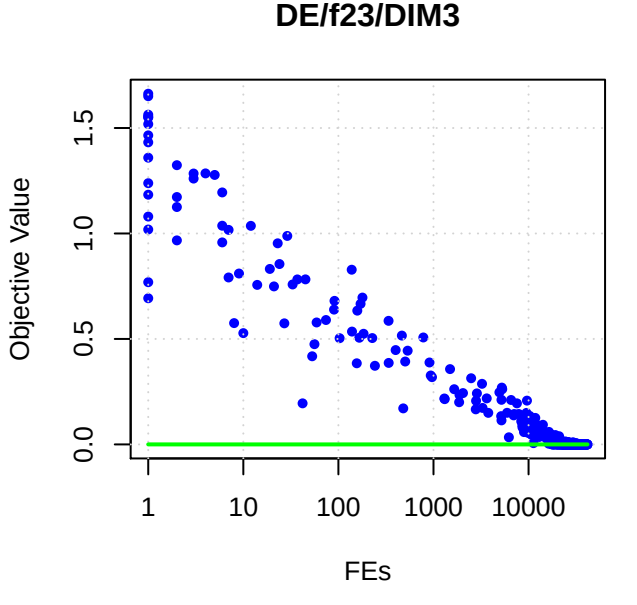
0.6
0.8
1.0
1.2
1.4
1
100
10000
FEs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1.5
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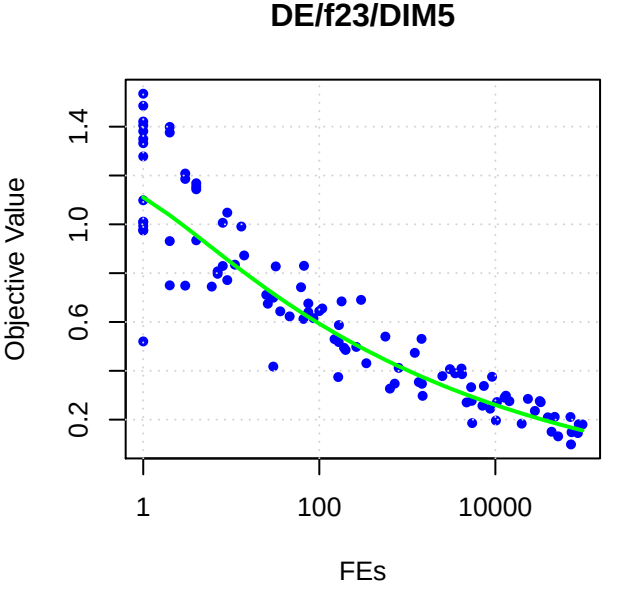
1000
10000
FEs


DE/f23/DIM5
Objective Value
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0.6
1.0
1.4
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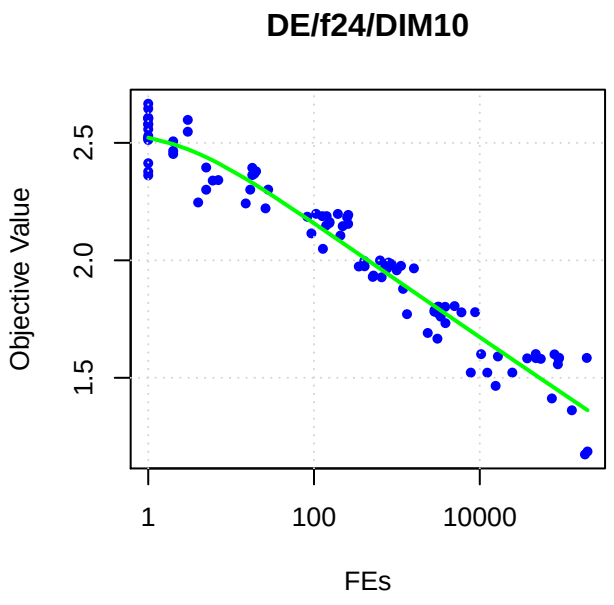
100
10000
FEs


DE/f24/DIM10
Objective Value
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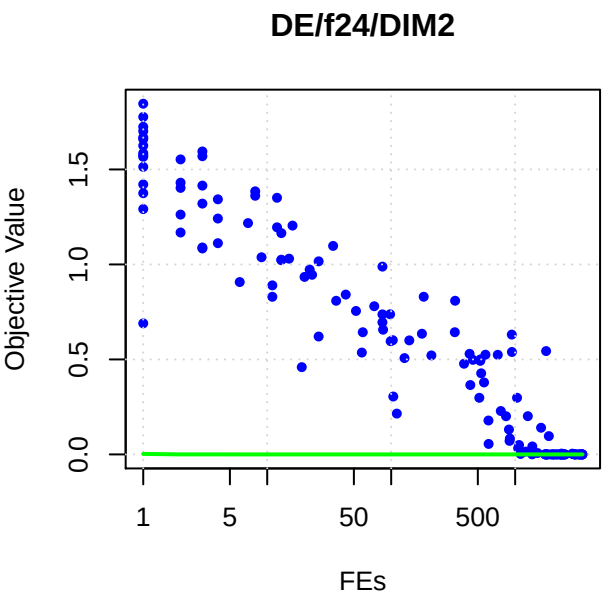
1.5
1
100
10000
FEs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Objective Value
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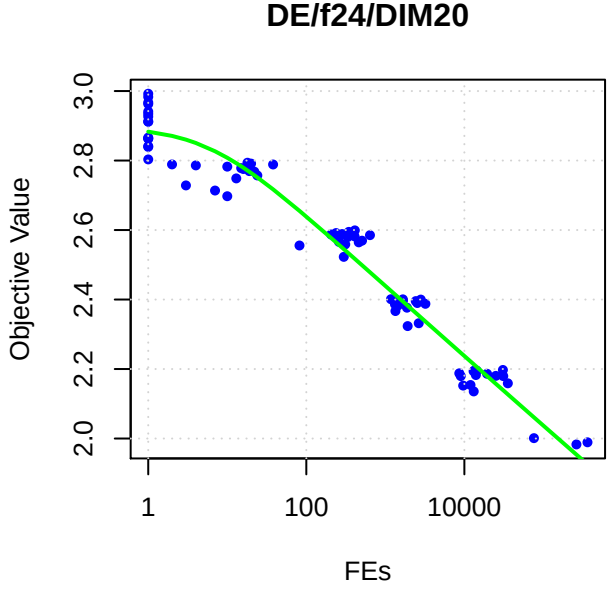
1.0
0.5
0.0
1
5
50
500
FEs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Objective Value
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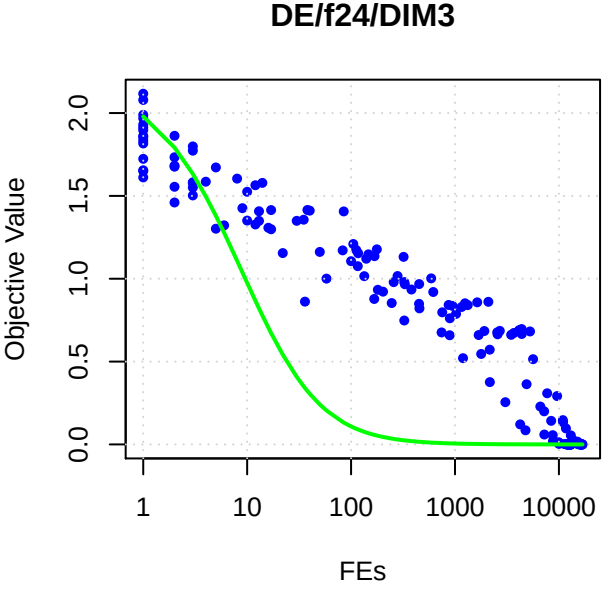
2.6
2.4
2.2
2.0
1
100
10000
FEs


DE/f24/DIM3
Objective Value
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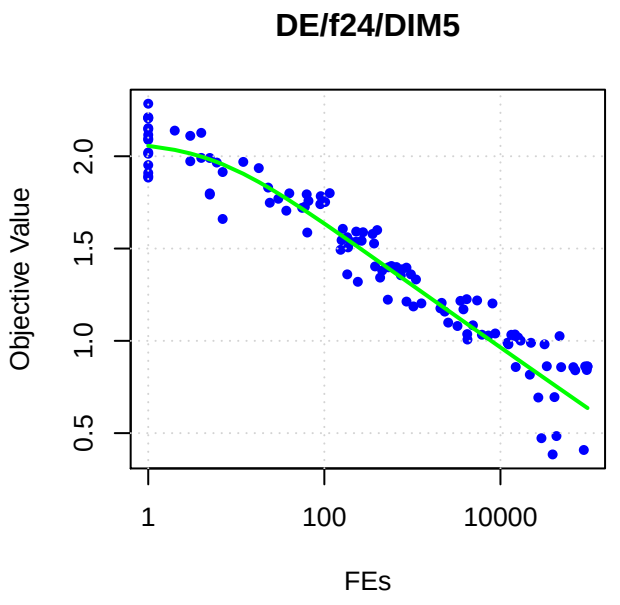
1.0
0.5
0.0
1
10
100
1000
10000
FEs


DE/f24/DIM5
Objective Value
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1.5
2.0
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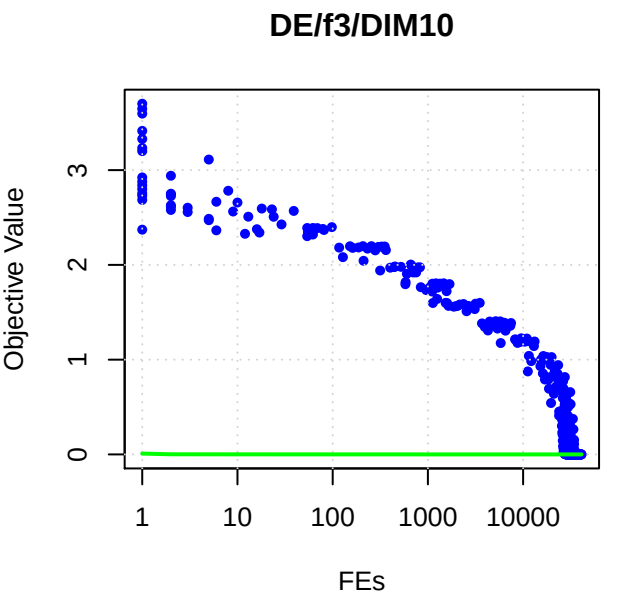
100
10000
FEs


DE/f3/DIM10
Objective Value
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2
3
1
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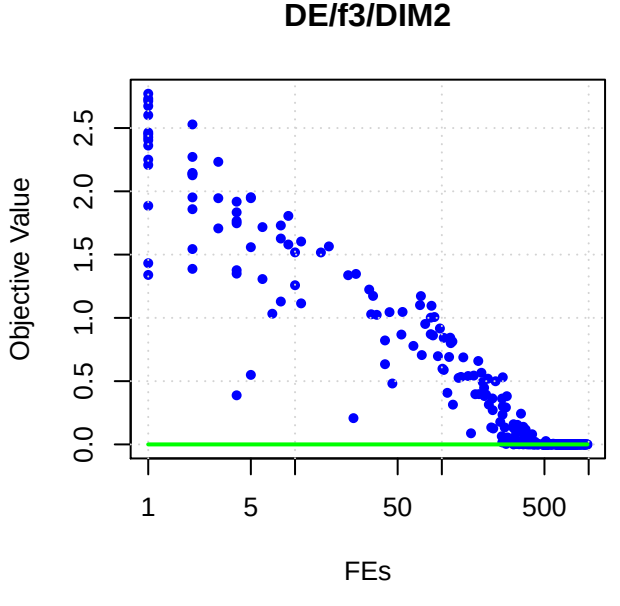
1000
10000
FEs


DE/f3/DIM2
Objective Value
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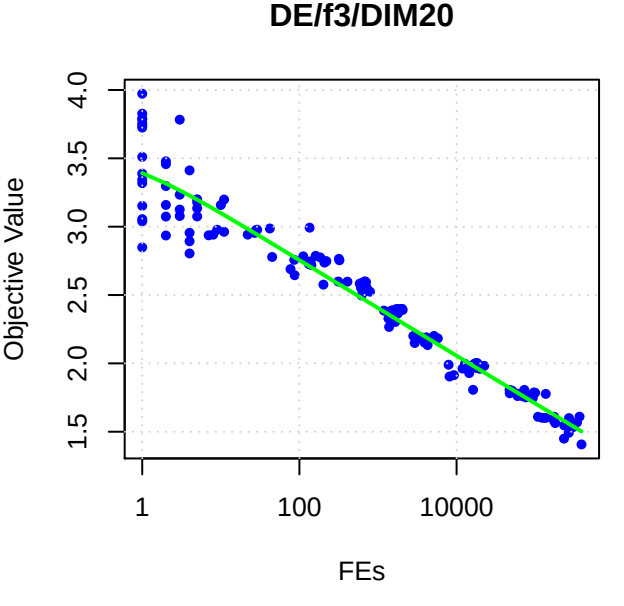
1.0
1.5
2.0
2.5
1
5
50
500
FEs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Objective Value
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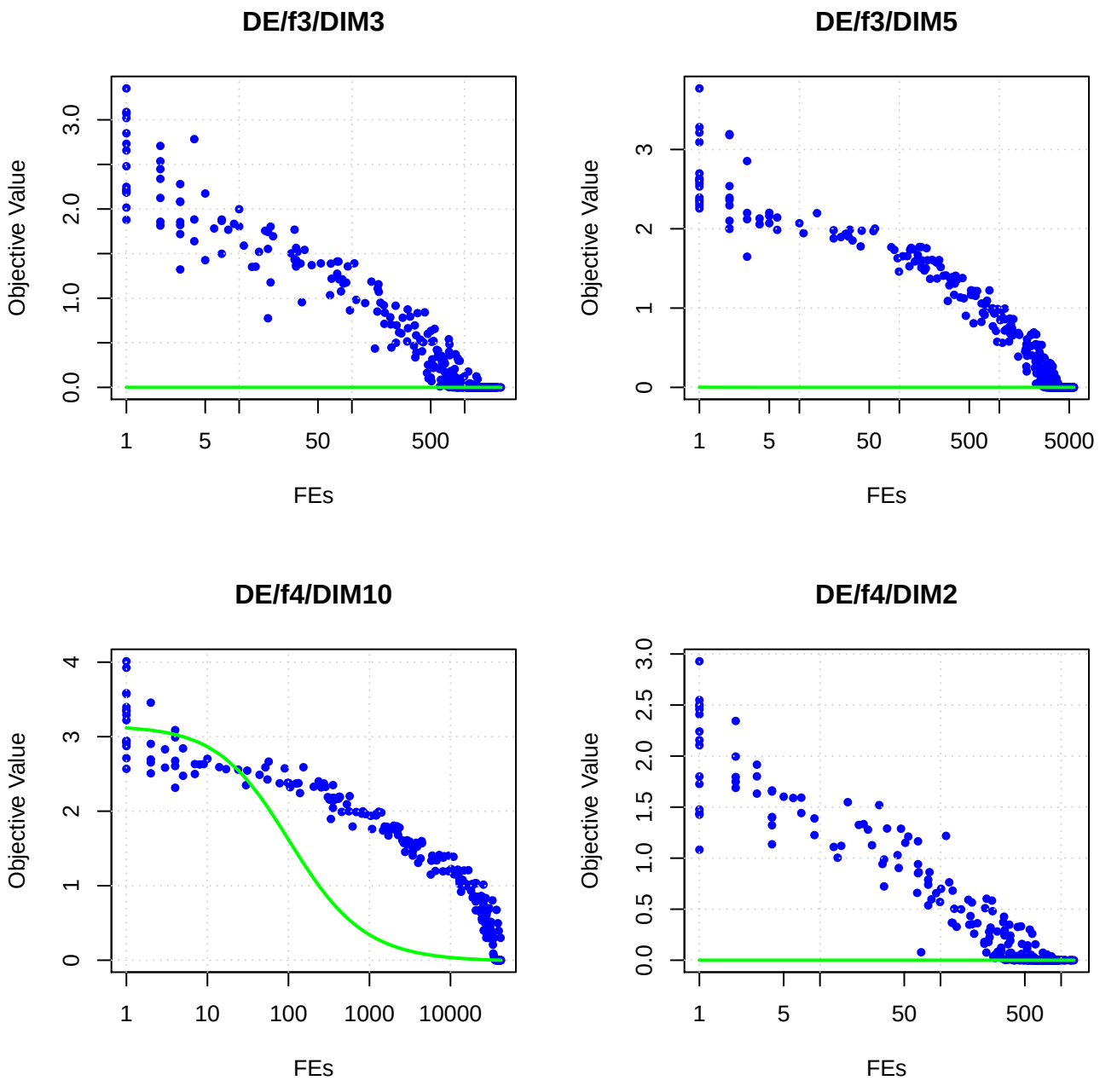
100
10000
FEs


DE/f3/DIM3
Objective Value
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2.0
3.0
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5
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500
FEs
DE/f3/DIM5
Objective Value
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1
2
3
1
5
50
500
5000
FEs
DE/f4/DIM10
Objective Value
0
1
2
3
4
1
10
100
1000
10000
FEs
DE/f4/DIM2
Objective Value
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1.0
1.5
2.0
2.5
3.0
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5
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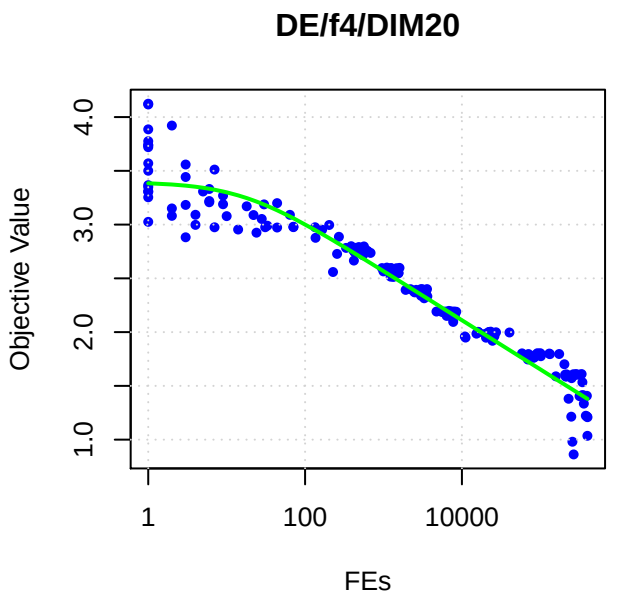
500
FEs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10000
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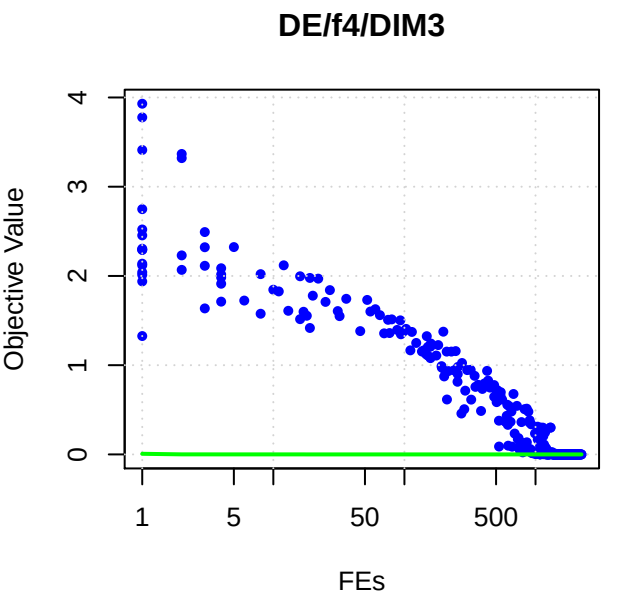
DE/f4/DIM3
Objective Value
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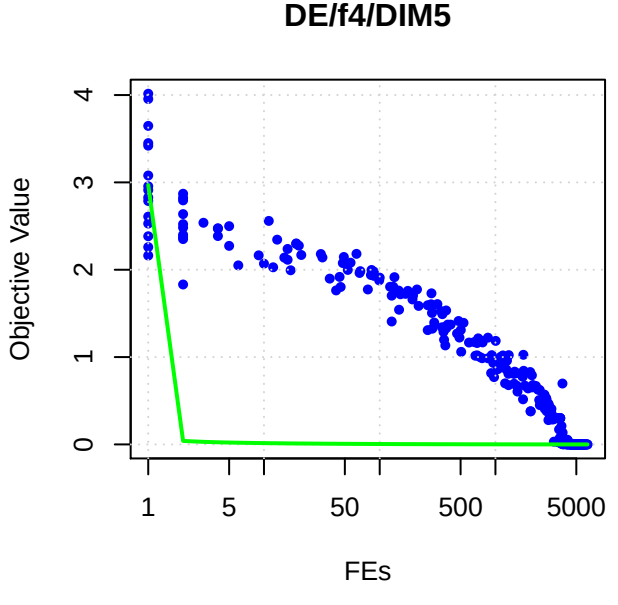
500
FEs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Objective Value
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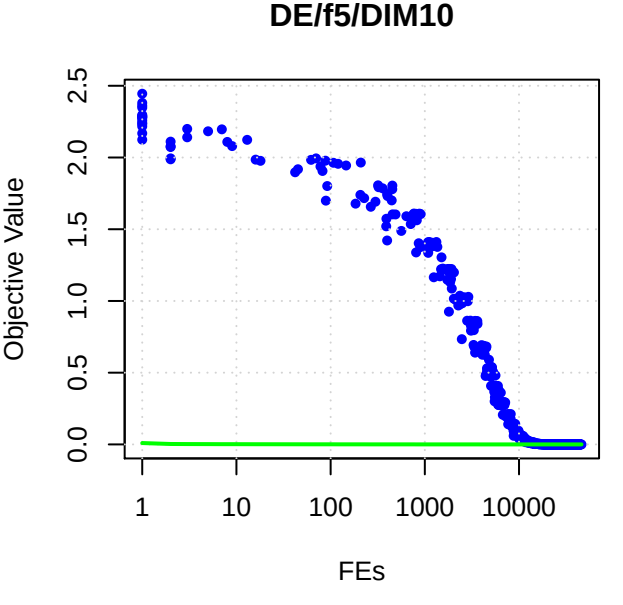
5000
FEs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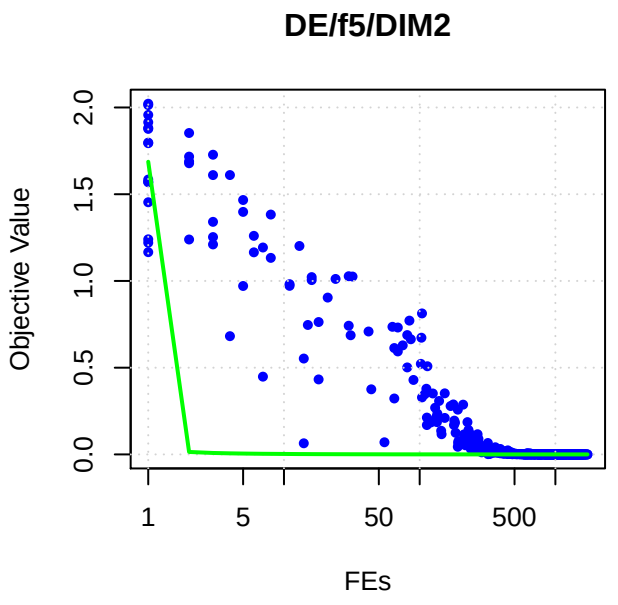
FEs


DE/f5/DIM2
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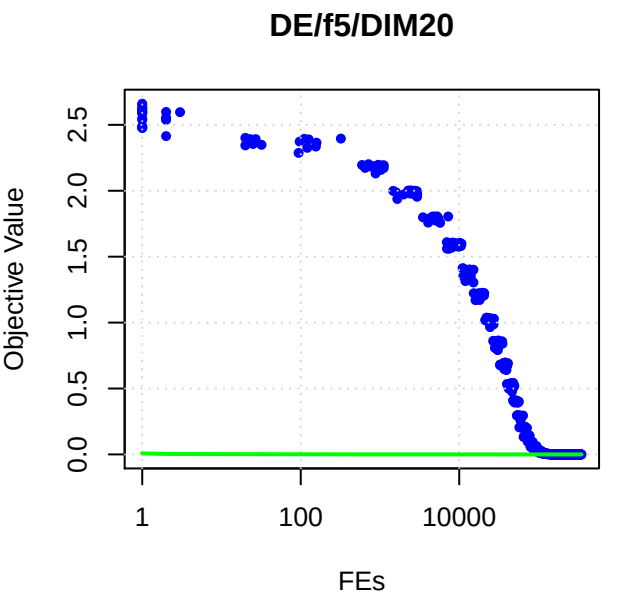
FEs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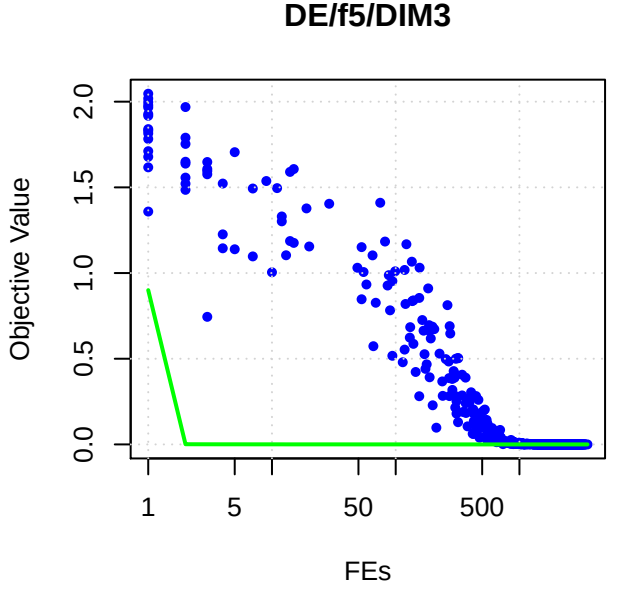
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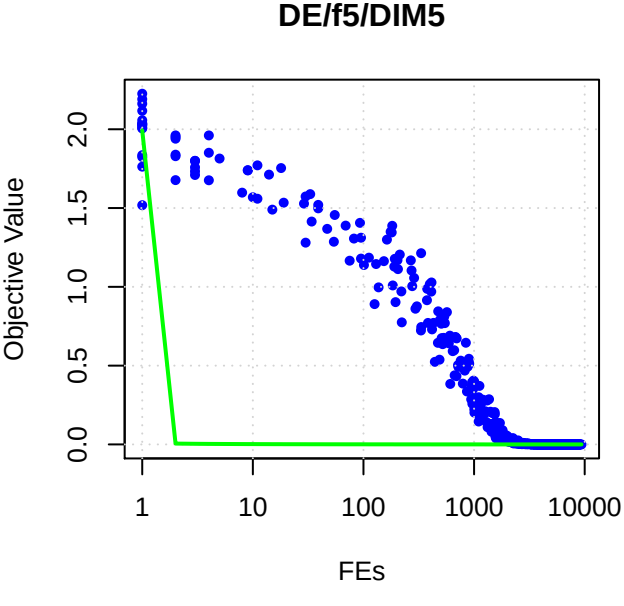
FEs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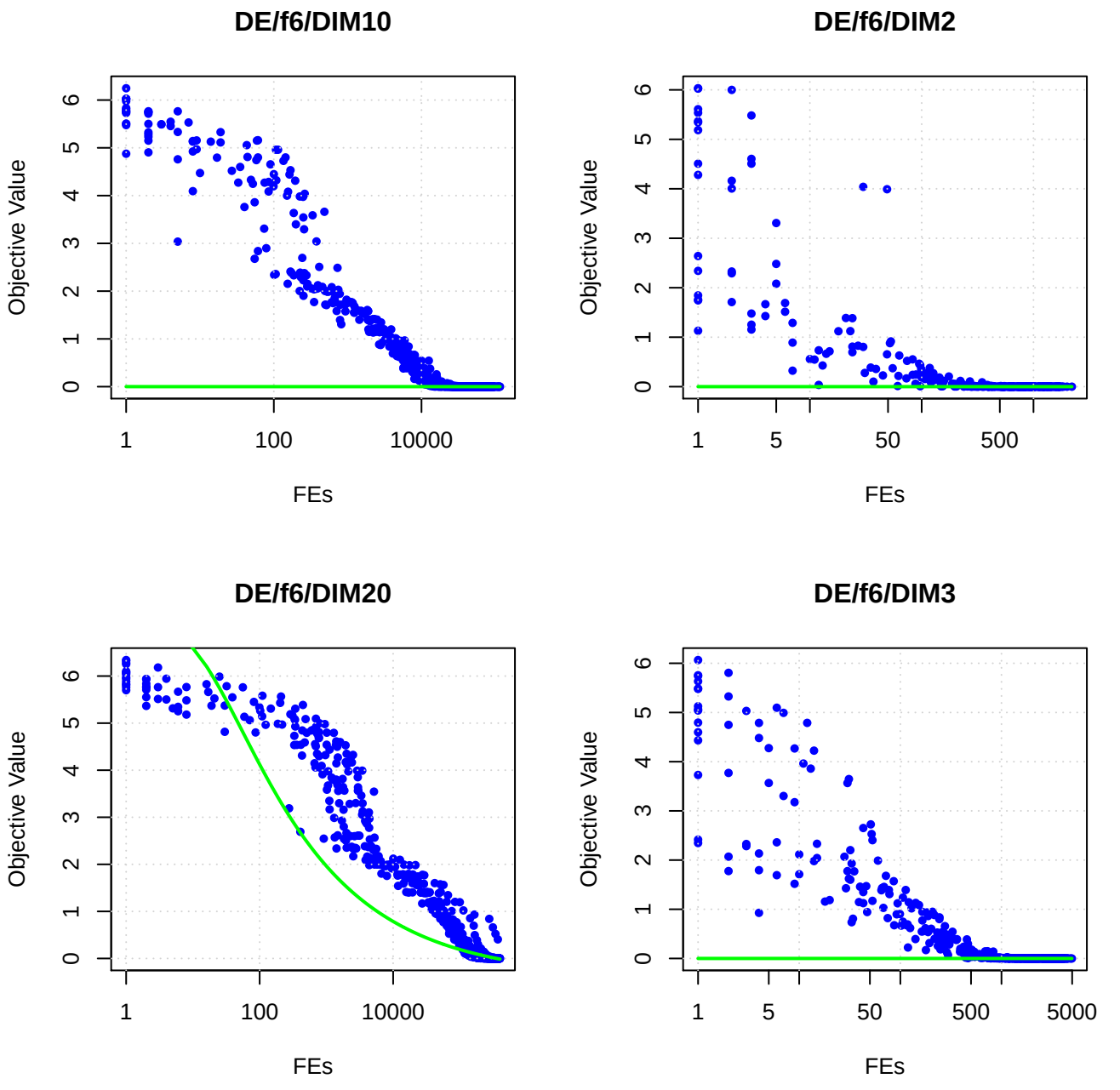
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Objective Value
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DE/f6/DIM20
Objective Value
FEs
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DE/f6/DIM3
Objective Value
FEs
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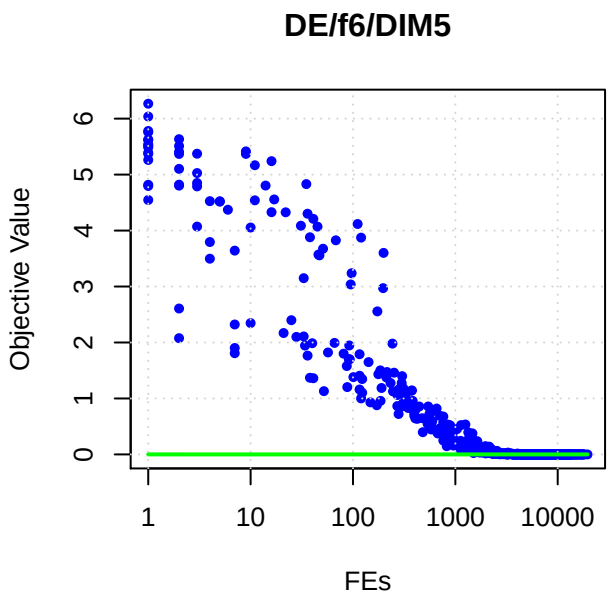
5000


DE/f6/DIM5
Objective Value
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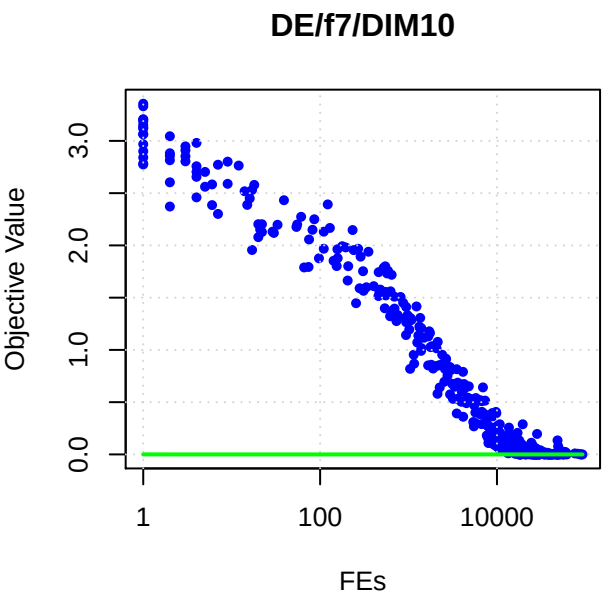
FEs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Objective Value
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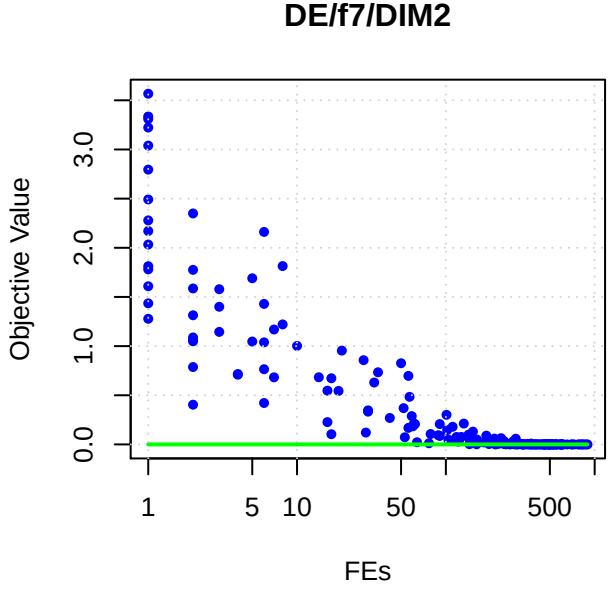
FEs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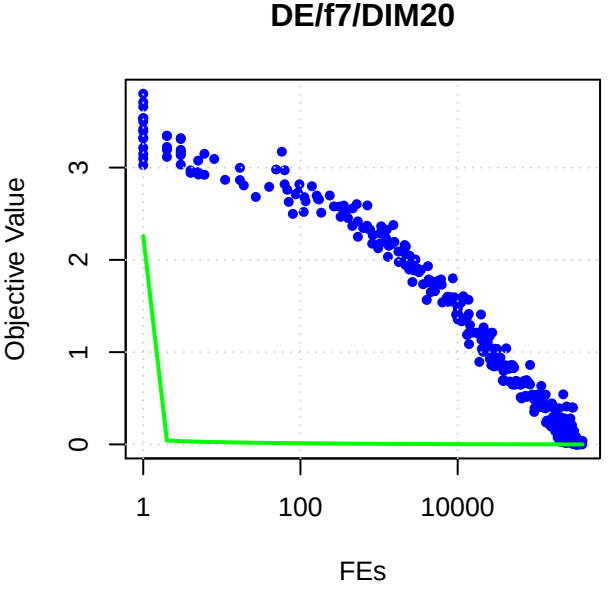
FEs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Objective Value
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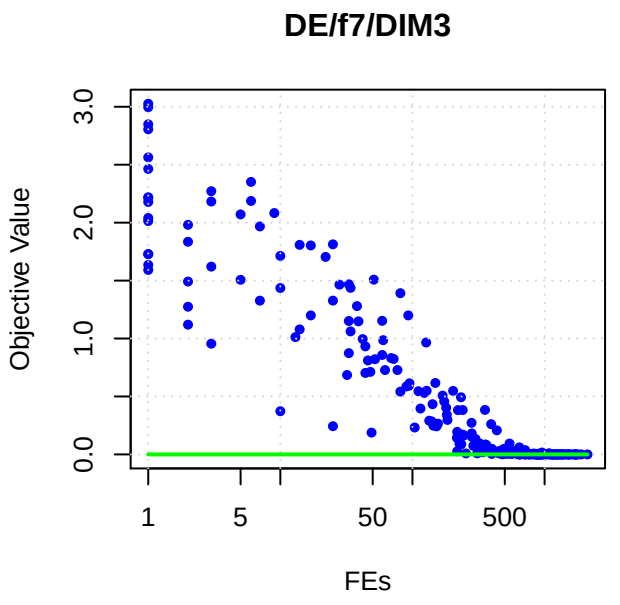
10000
FEs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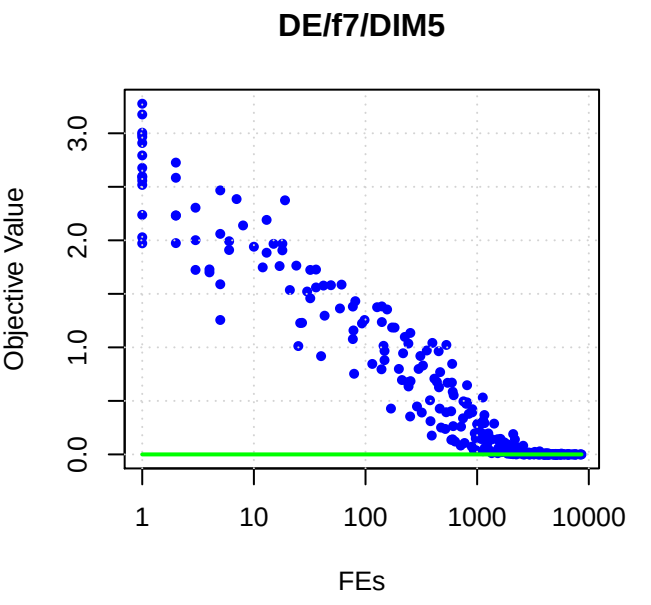
FEs


DE/f7/DIM5
Objective Value
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2.0
3.0
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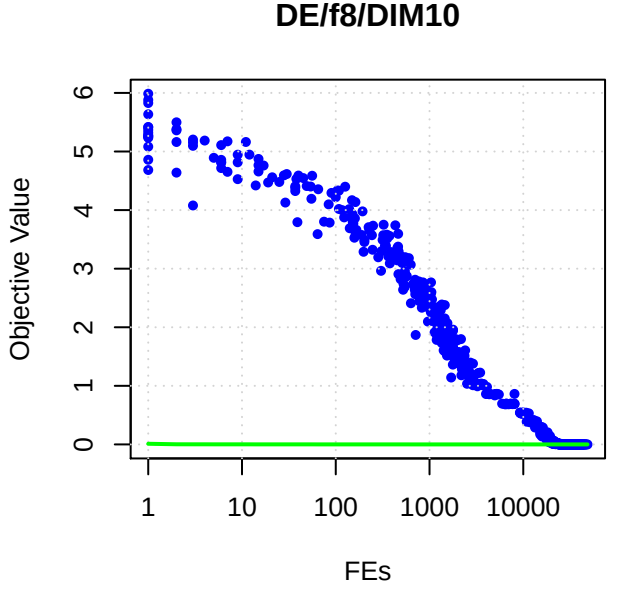
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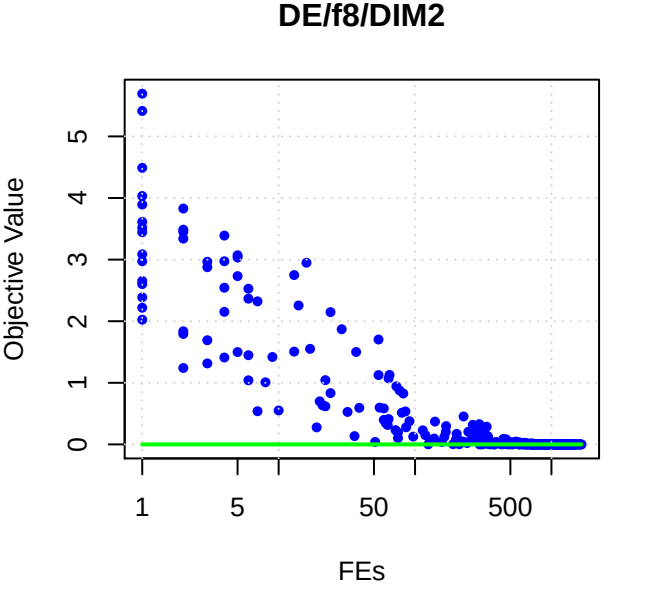
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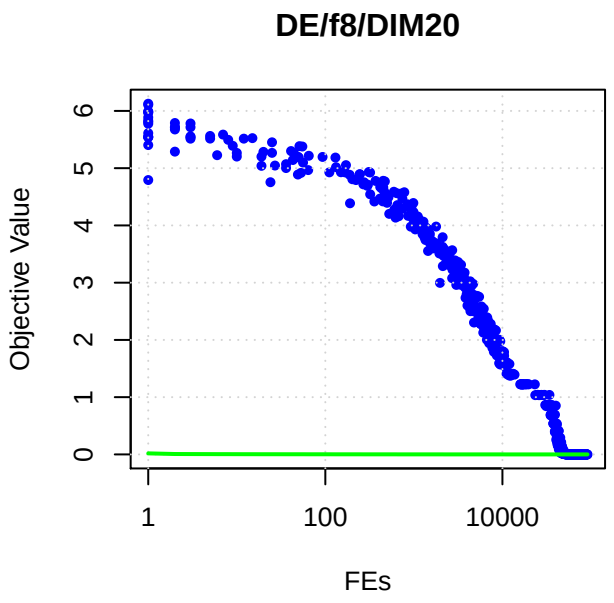
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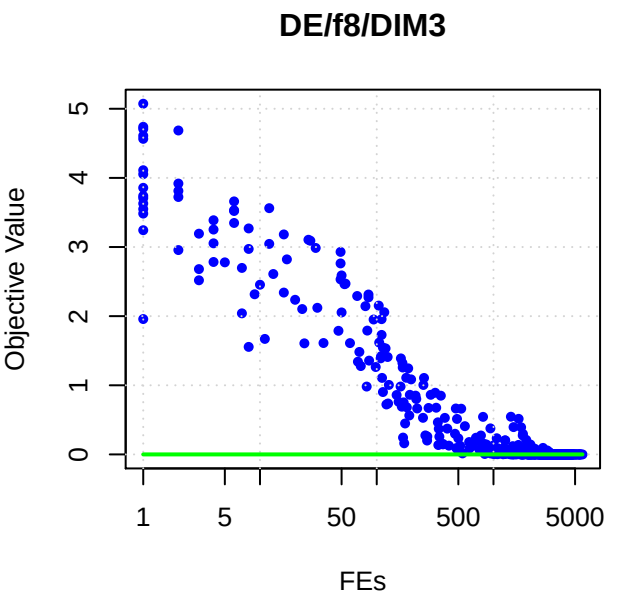
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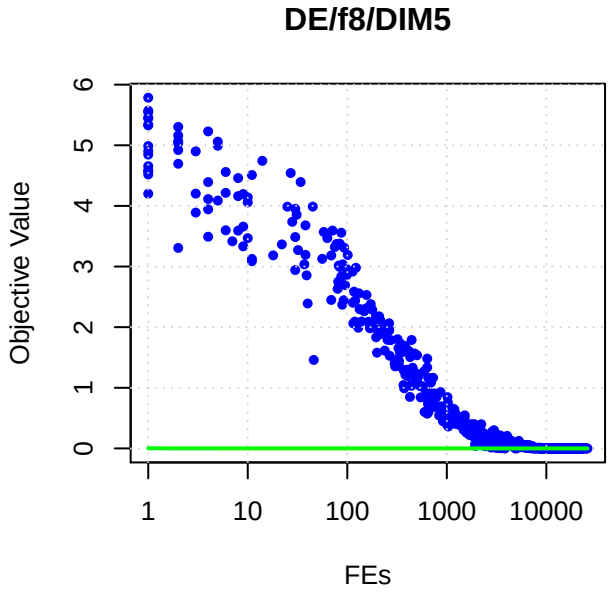
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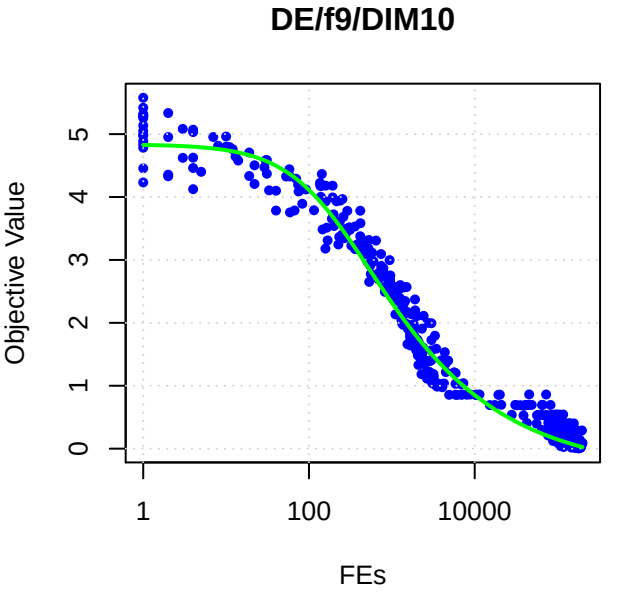
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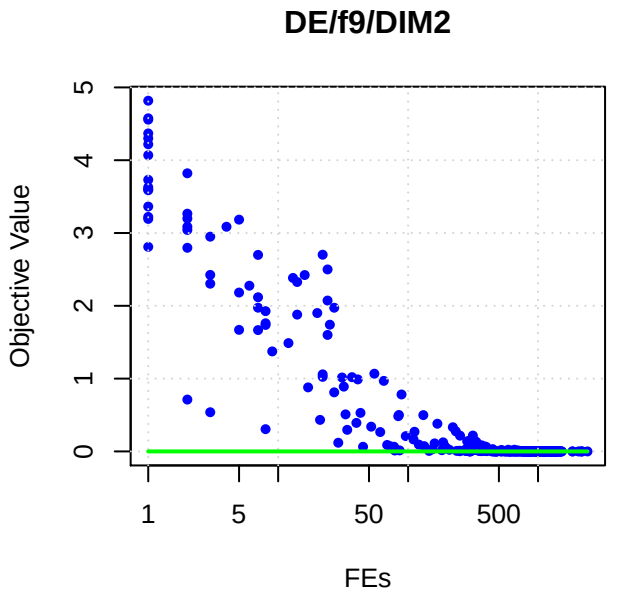
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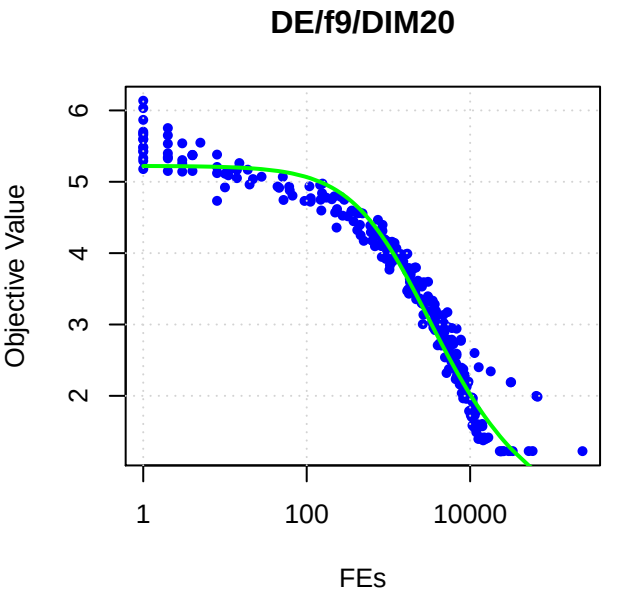
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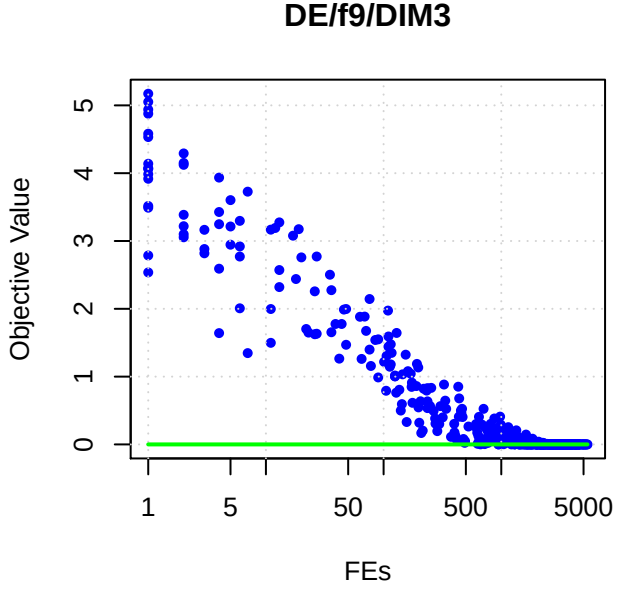
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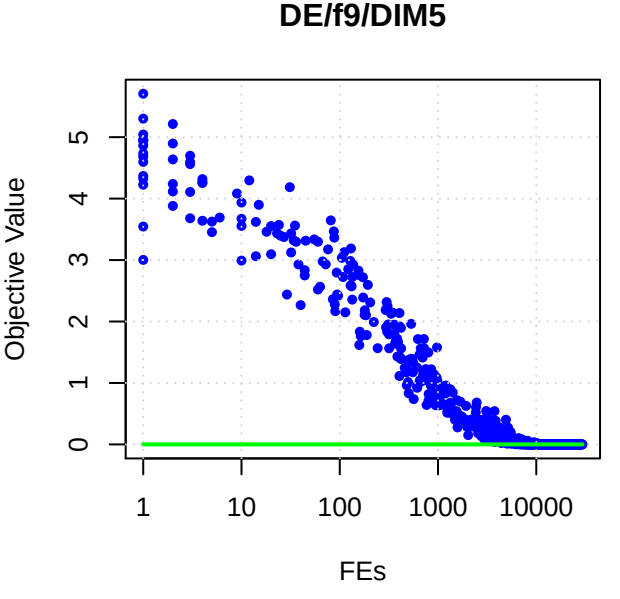
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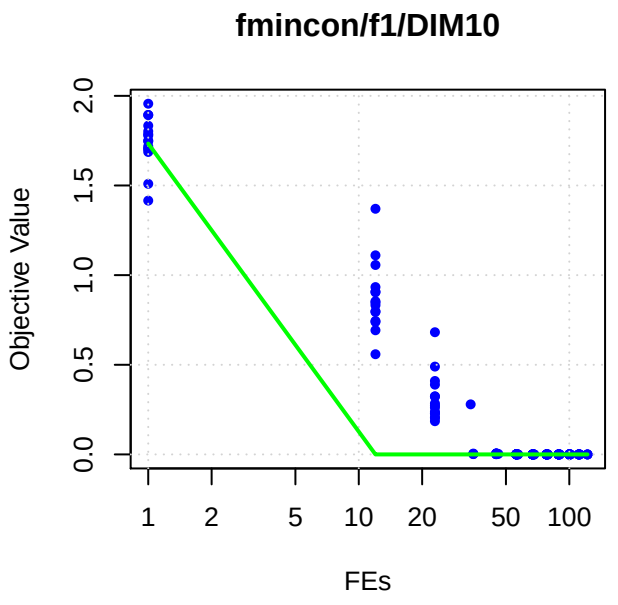
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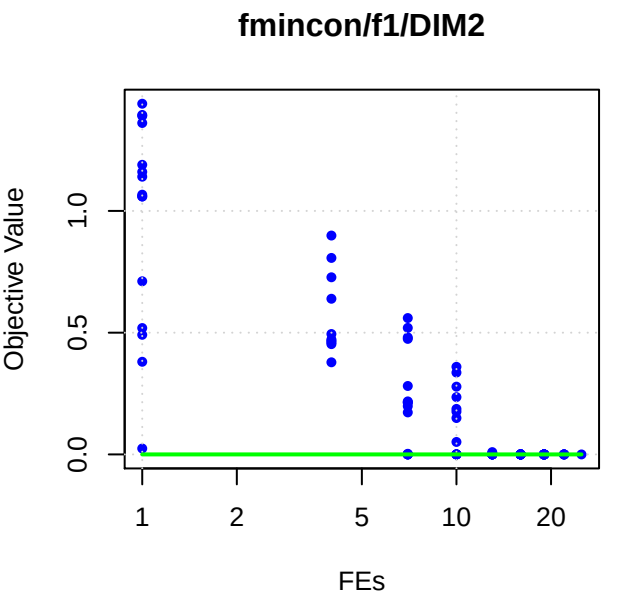
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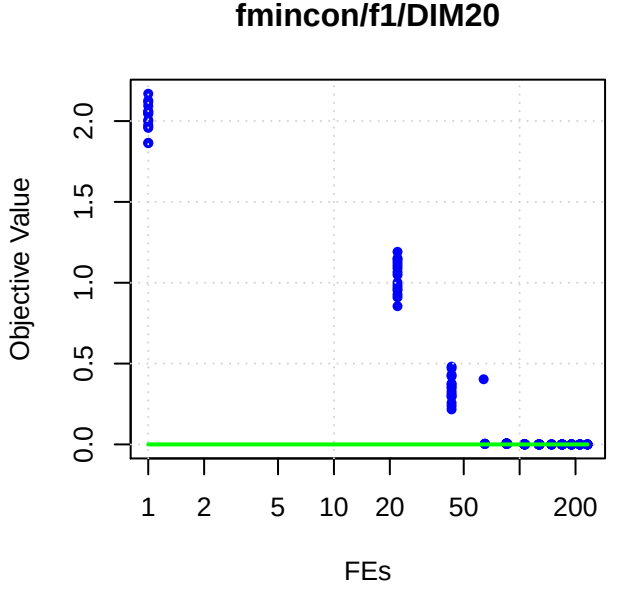
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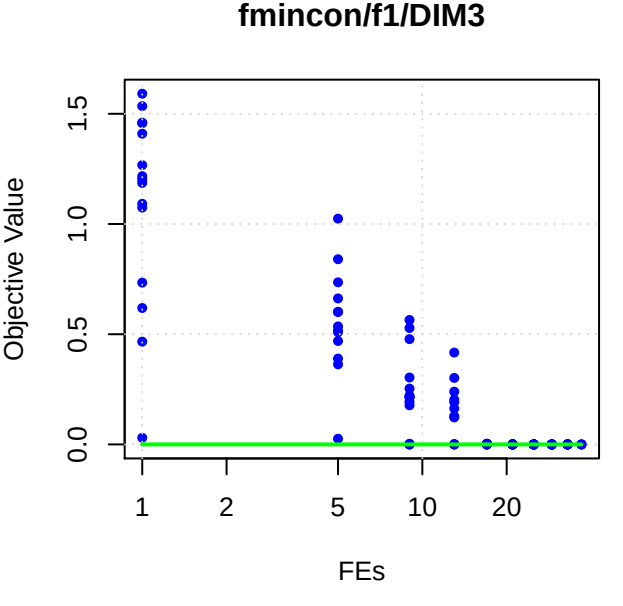
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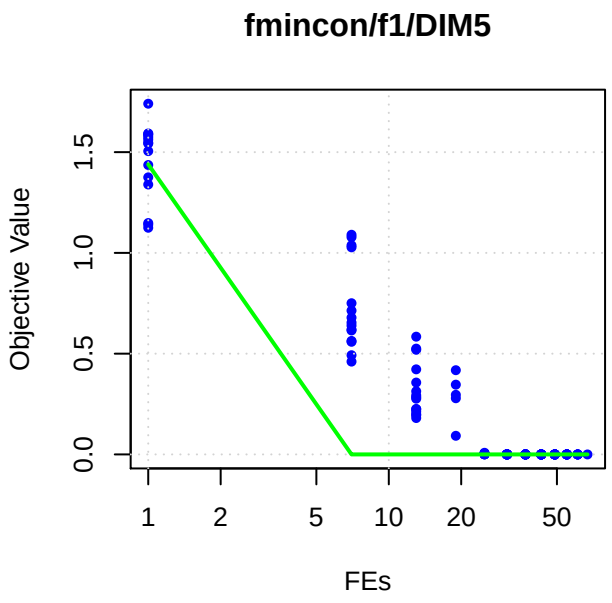
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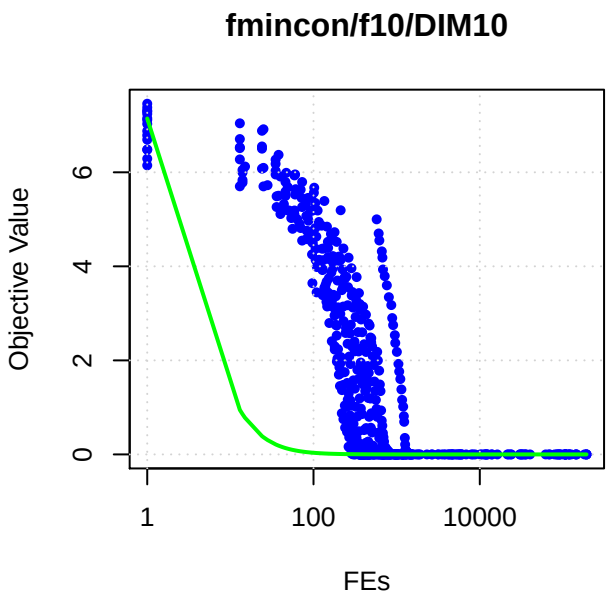
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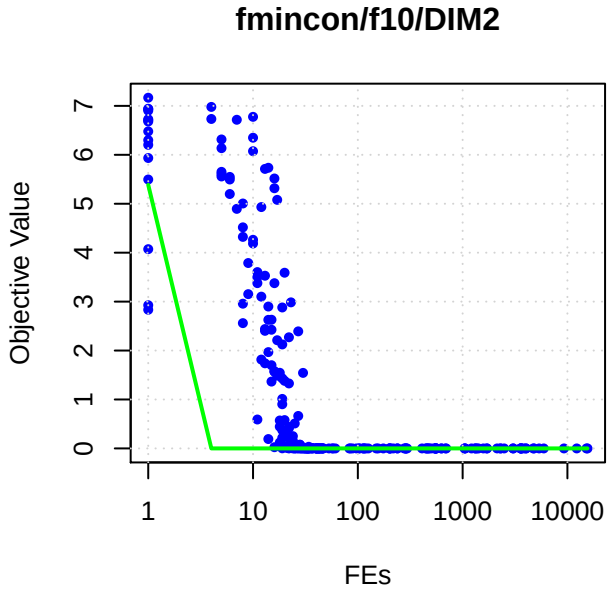
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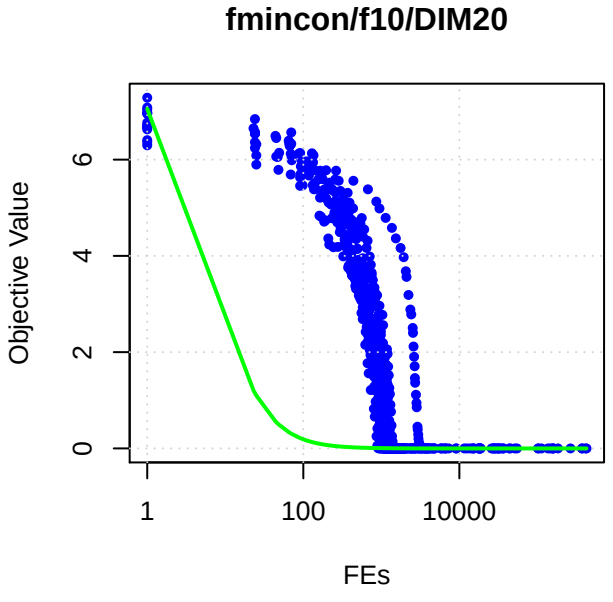
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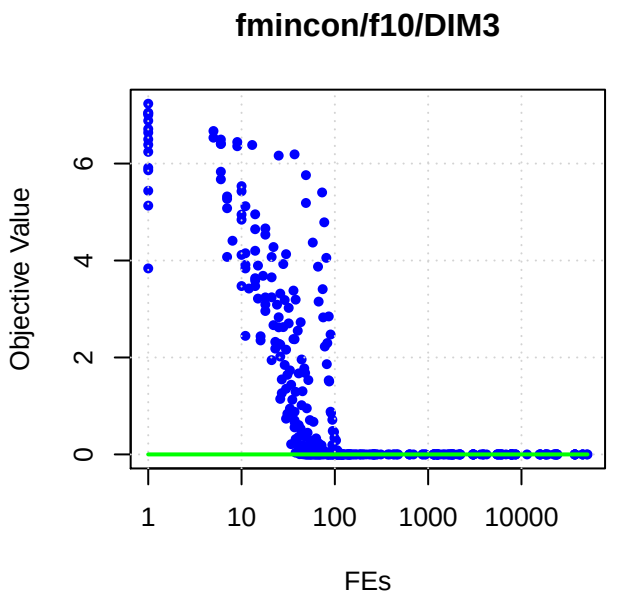
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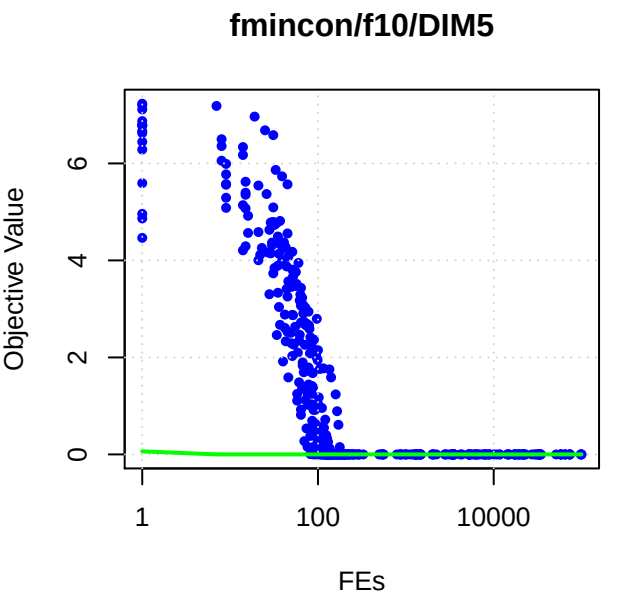
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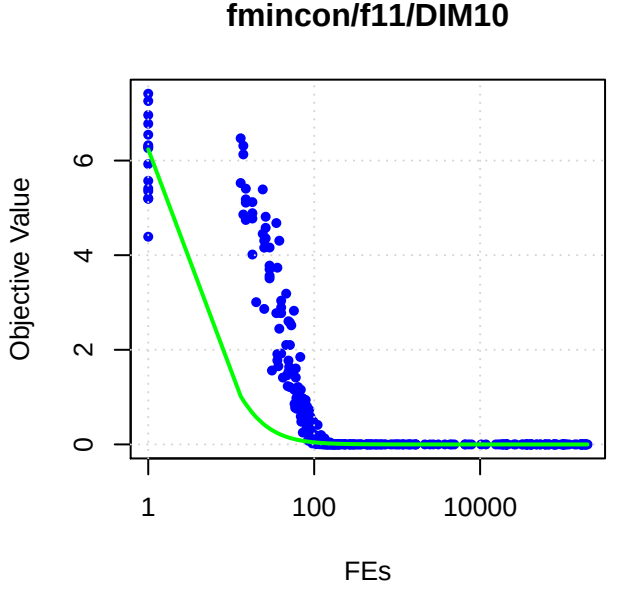
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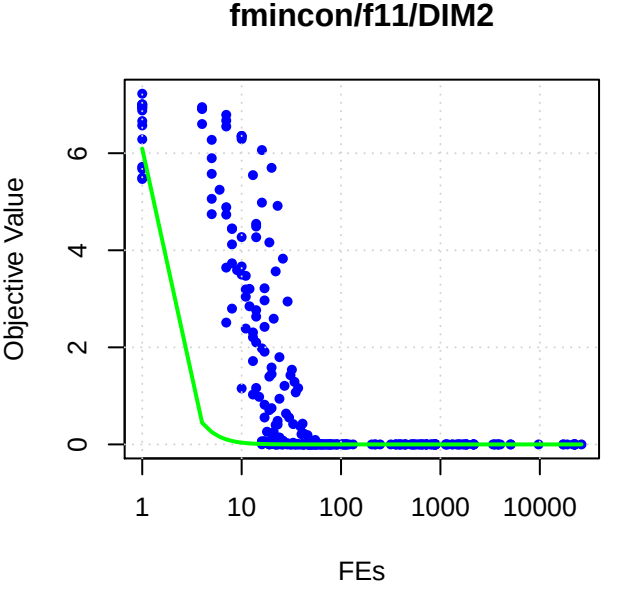
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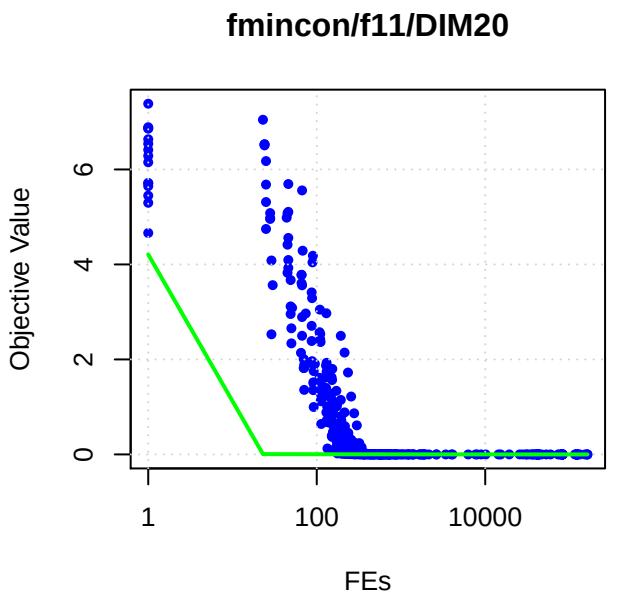
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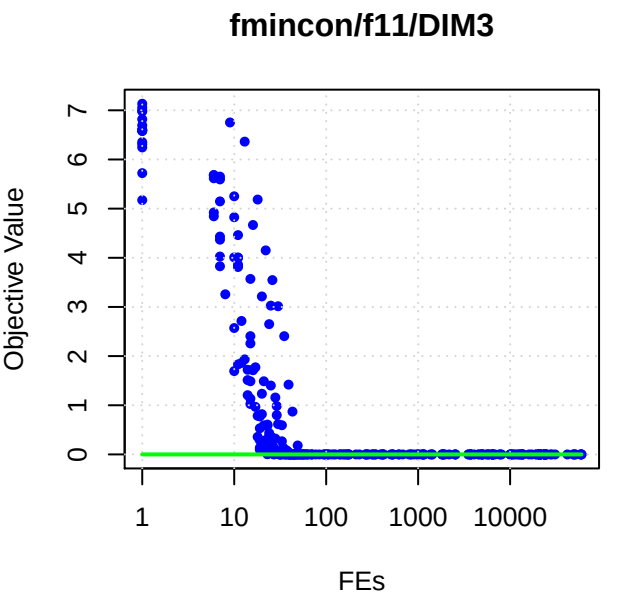
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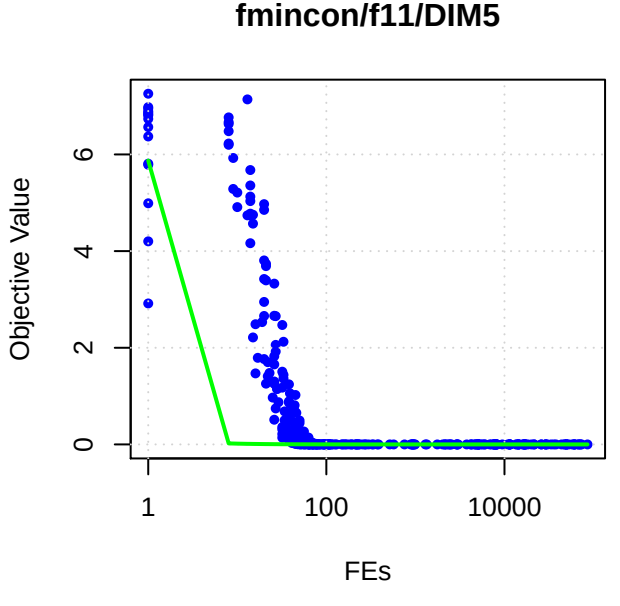
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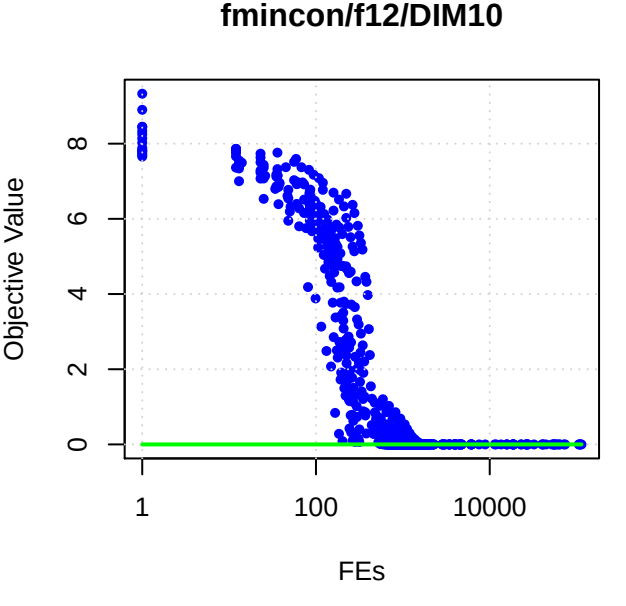
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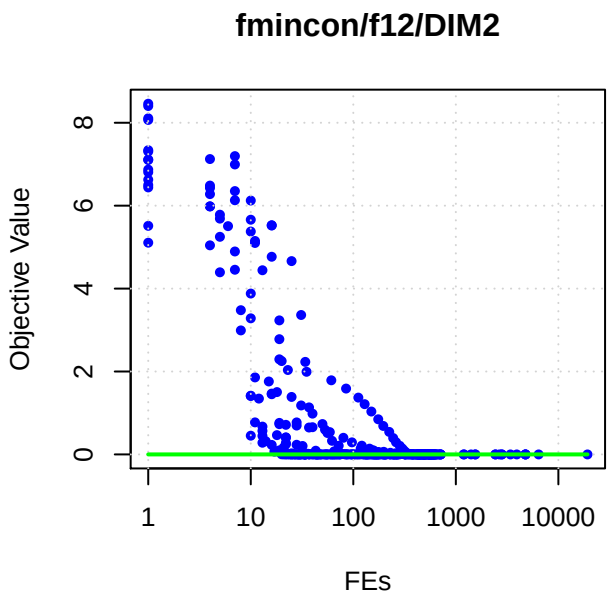
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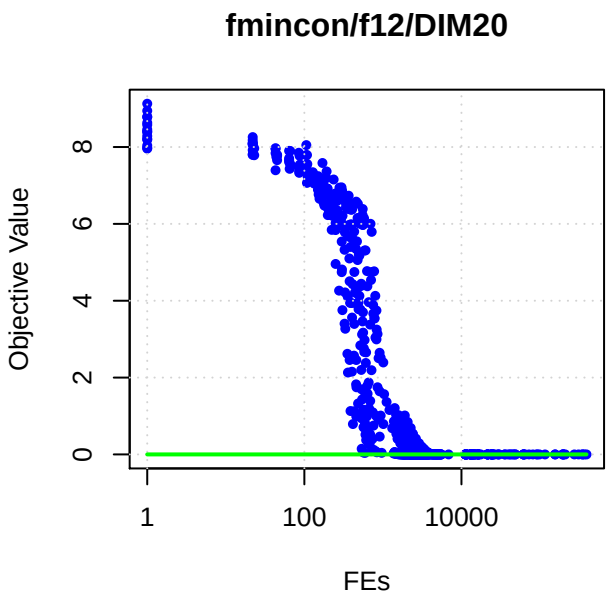
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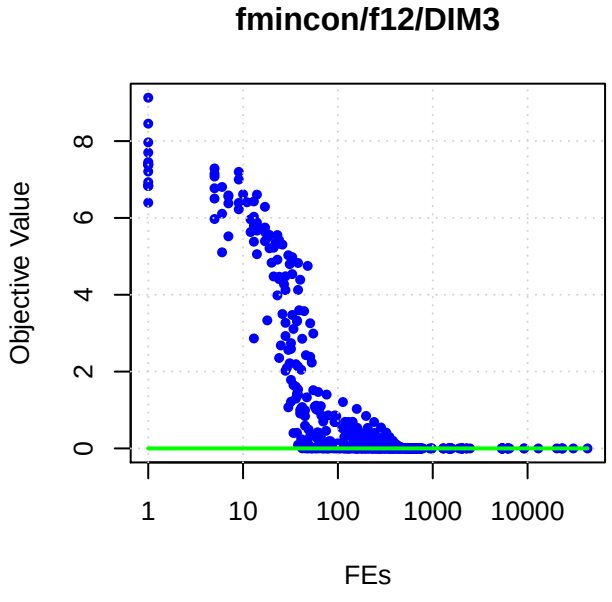
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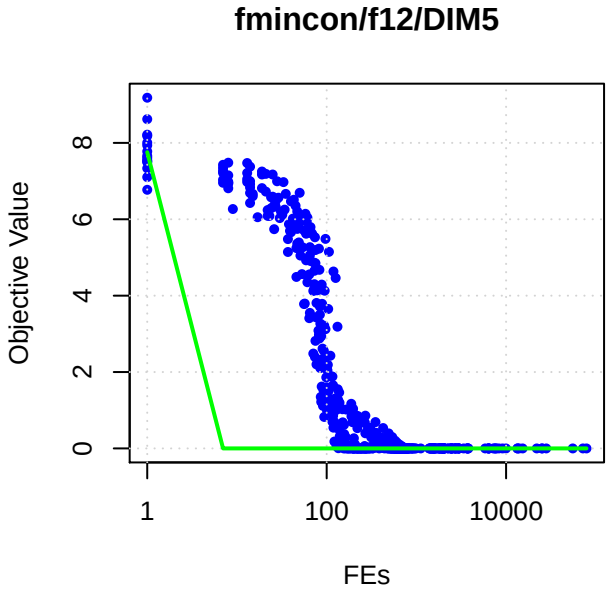
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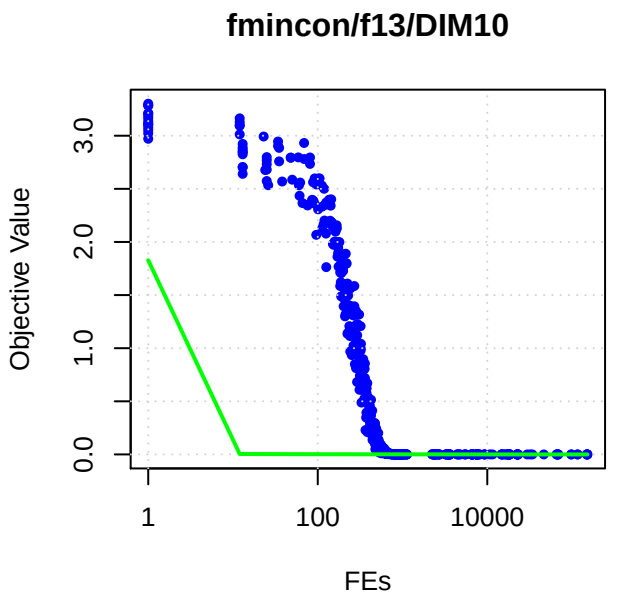
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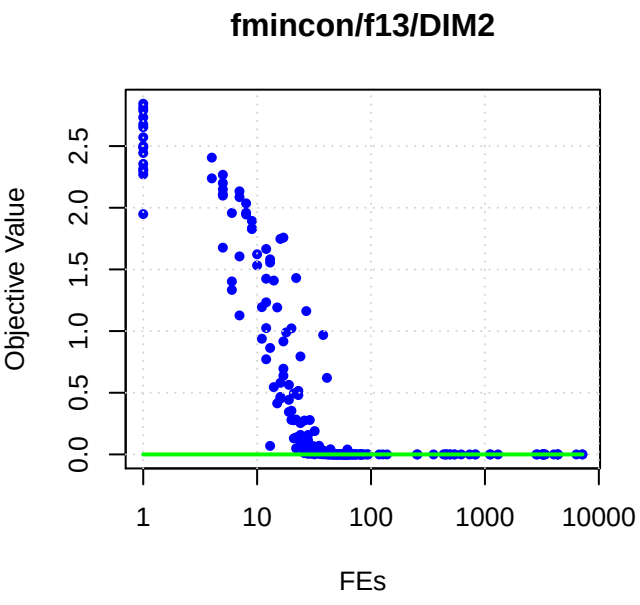
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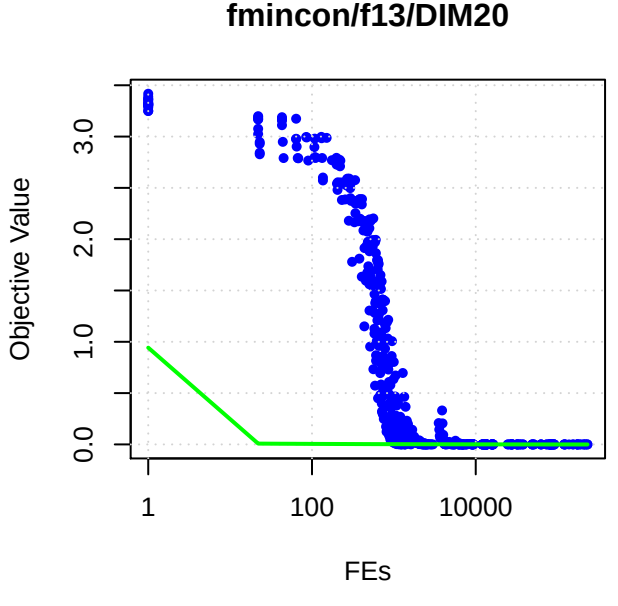
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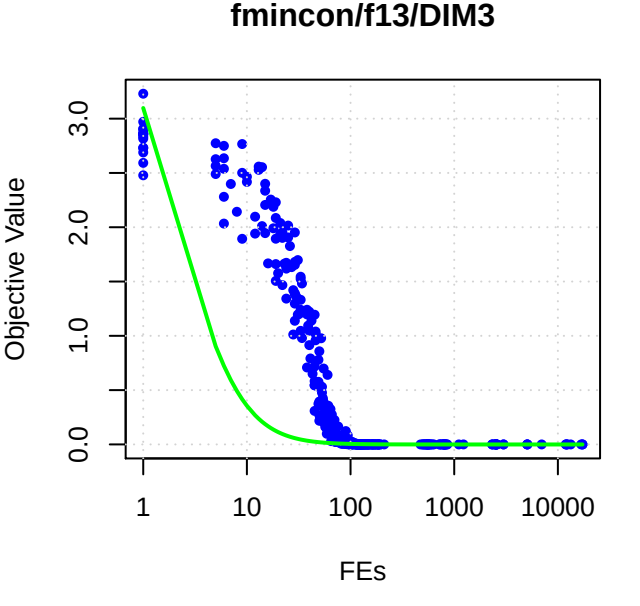
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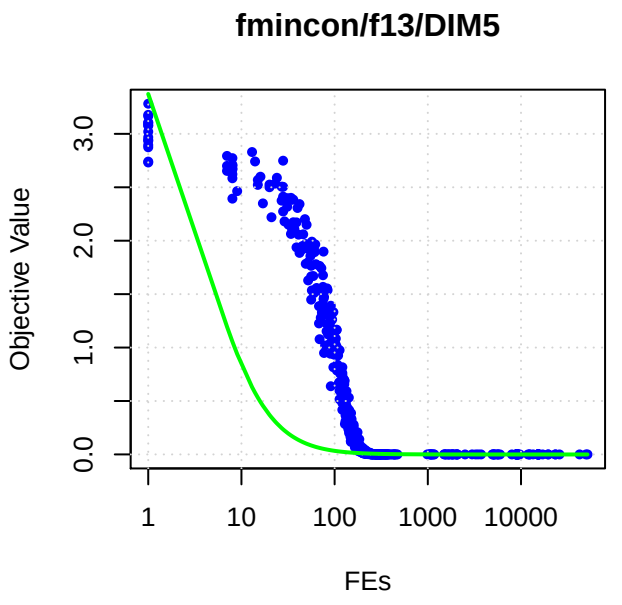
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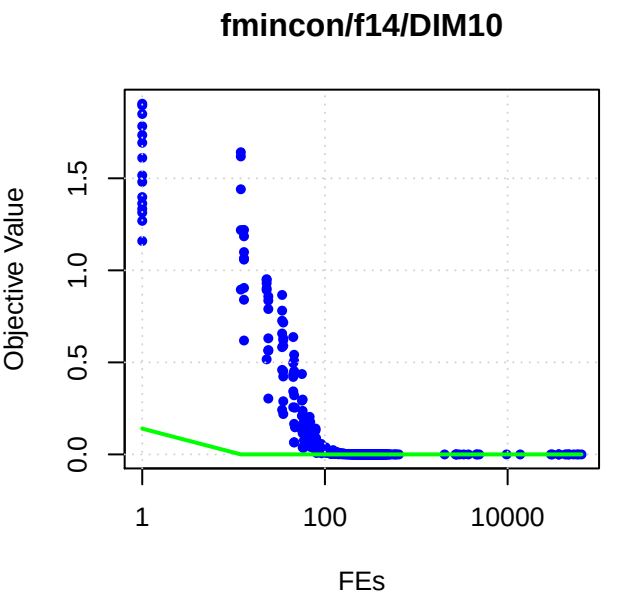
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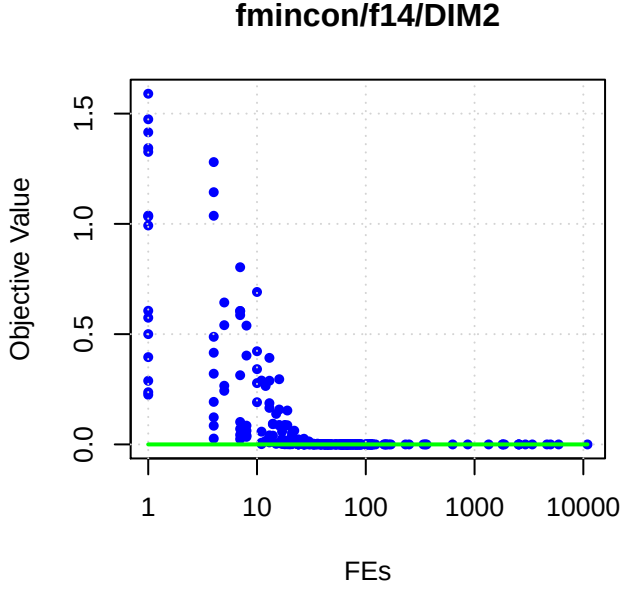
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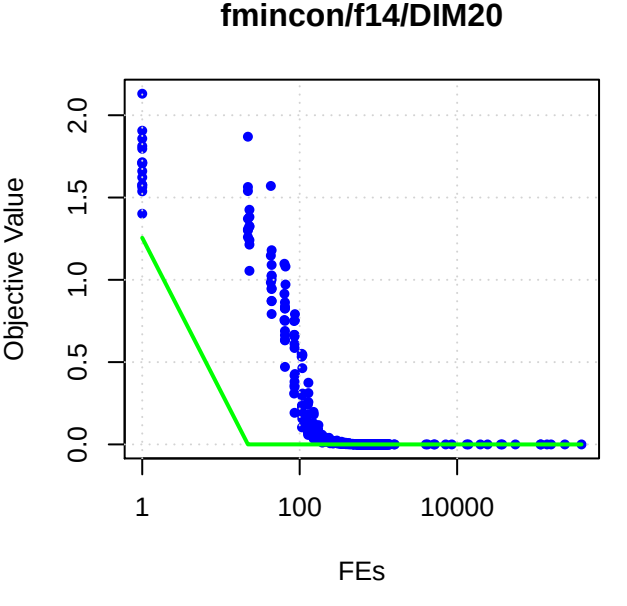
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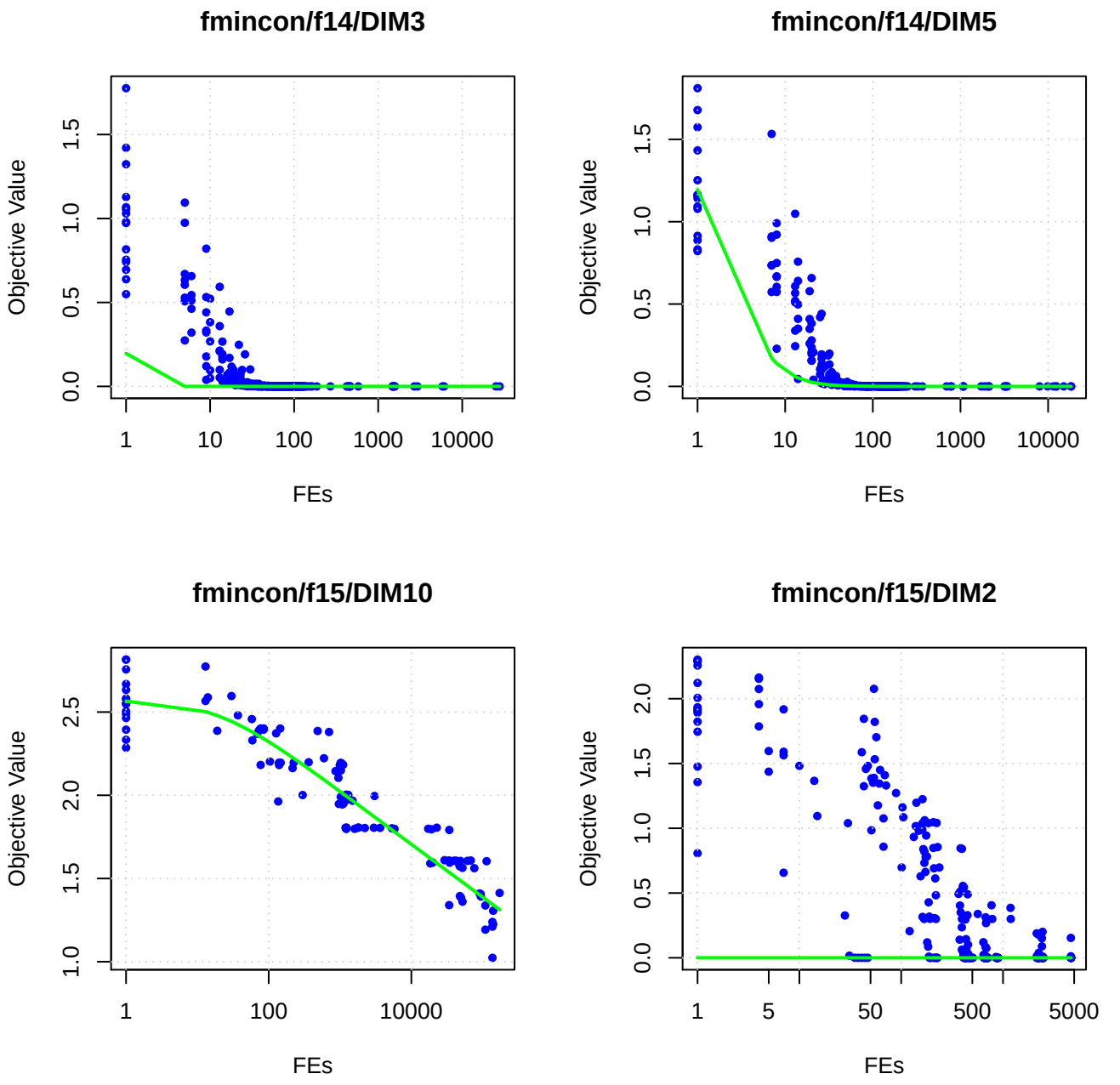
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FEs
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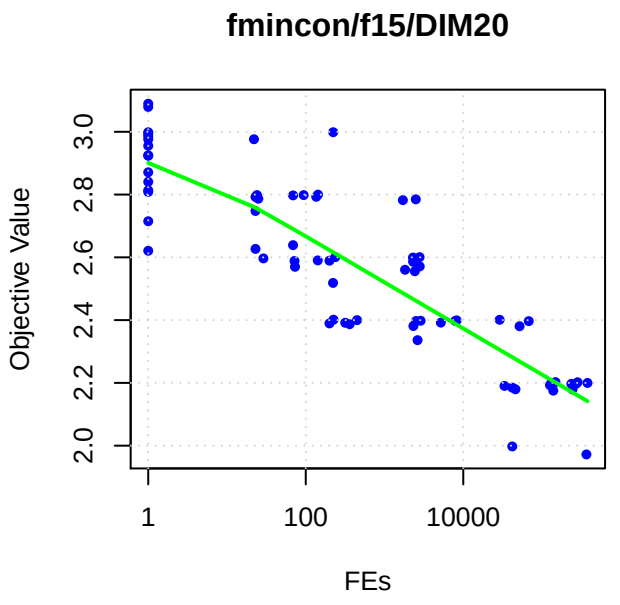
FEs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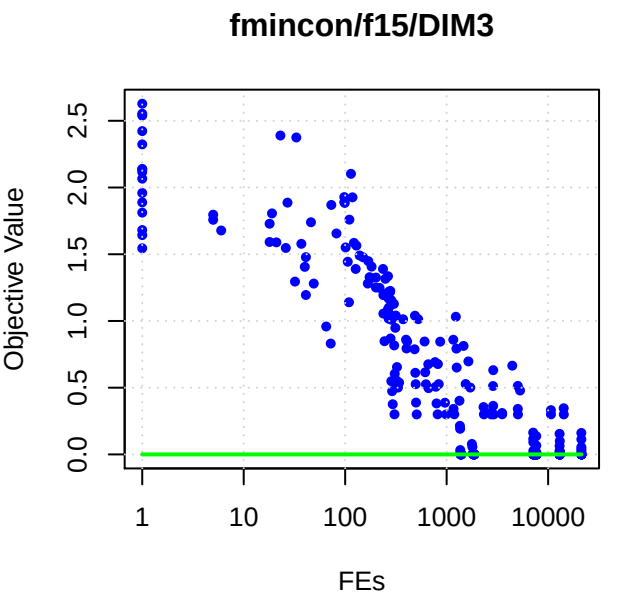
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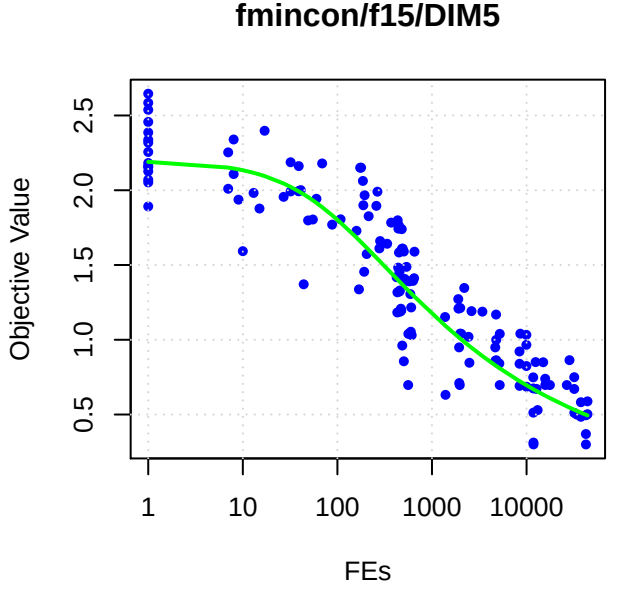
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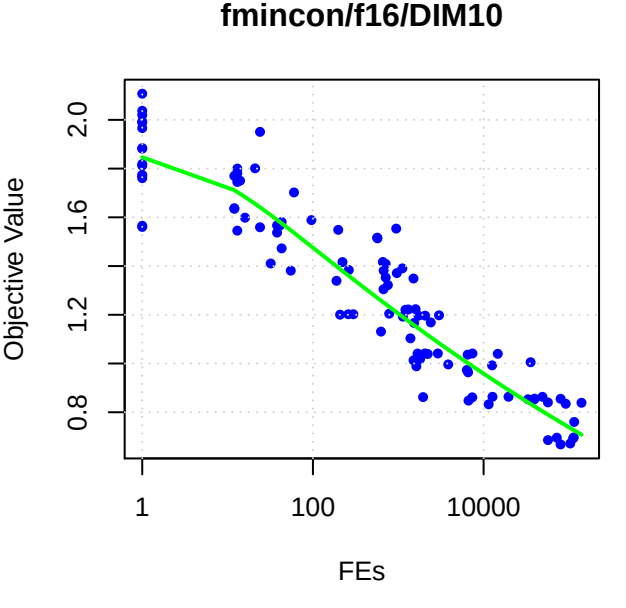
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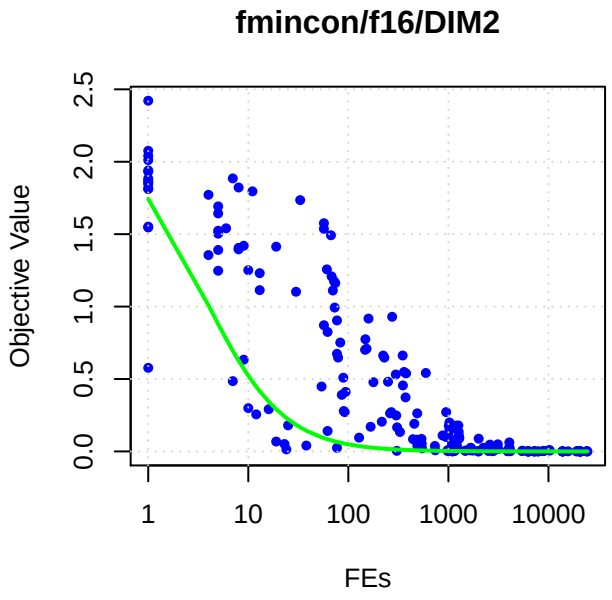
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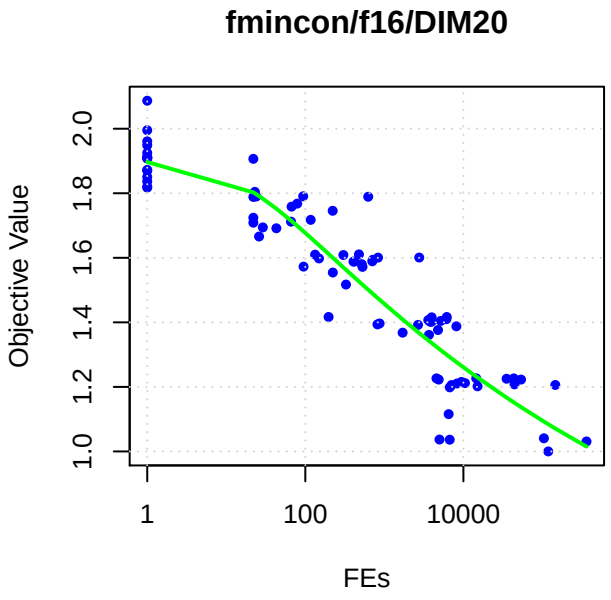
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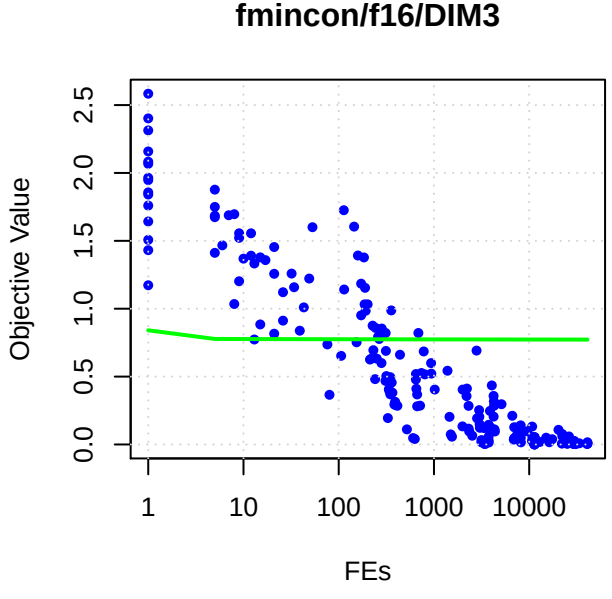
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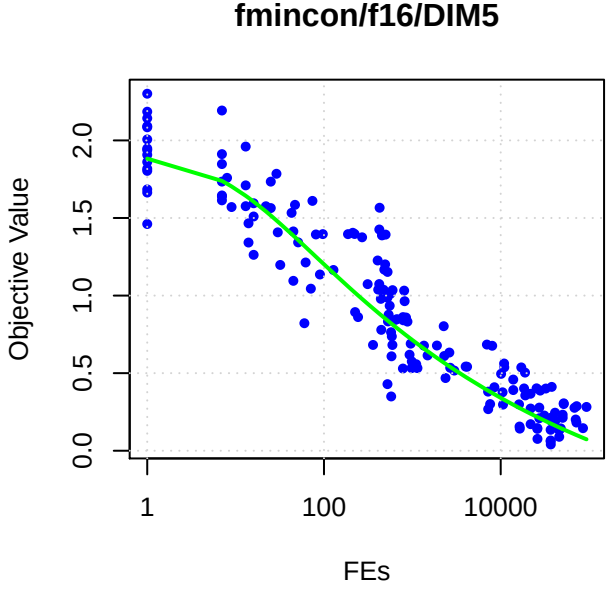
FEs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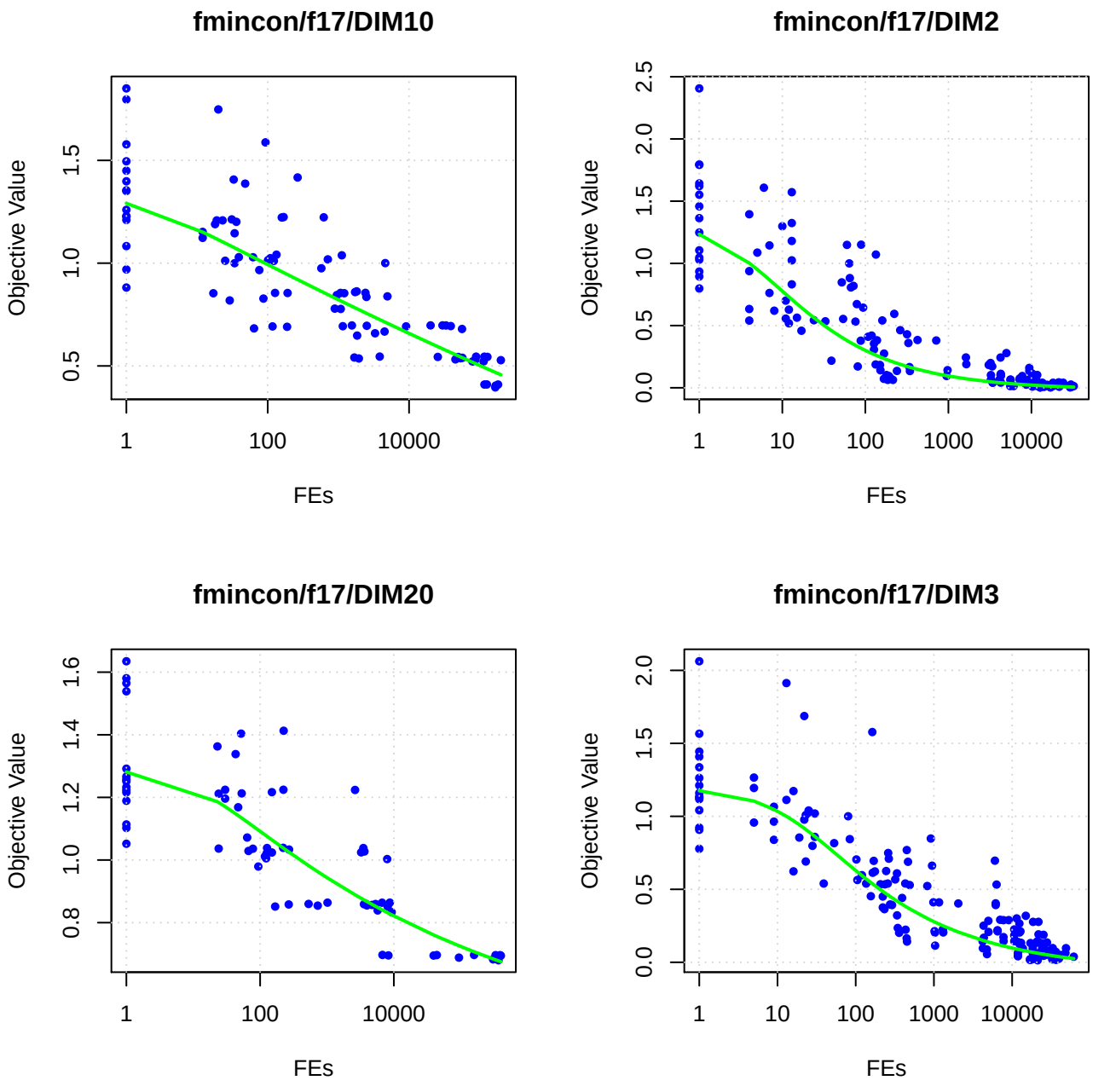
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Objective Value
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1.0
1.5
2.0
2.5
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100
1000
10000
FEs
fmincon/f17/DIM20
Objective Value
0.8
1.0
1.2
1.4
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FEs
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Objective Value
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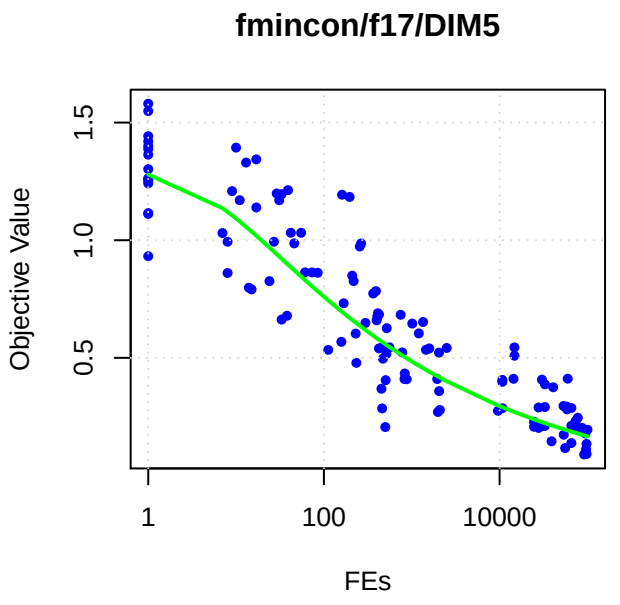
FEs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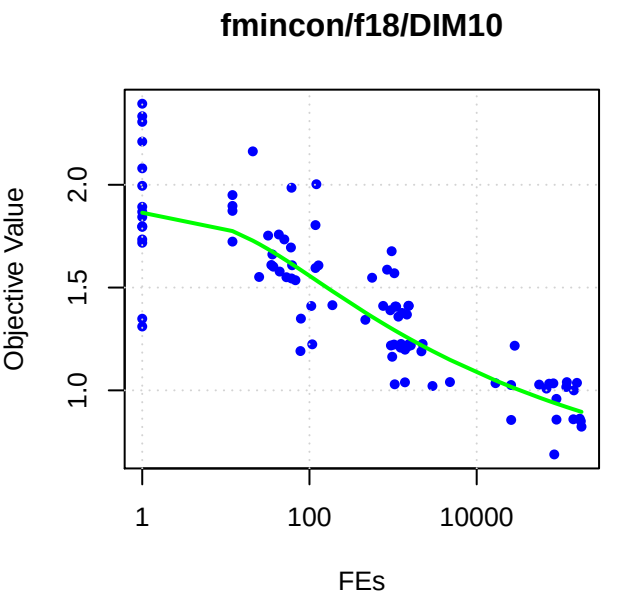
FEs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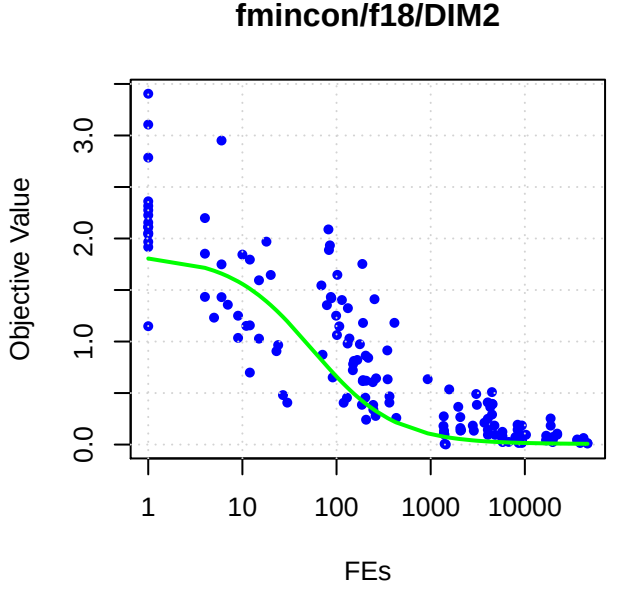
FEs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1000
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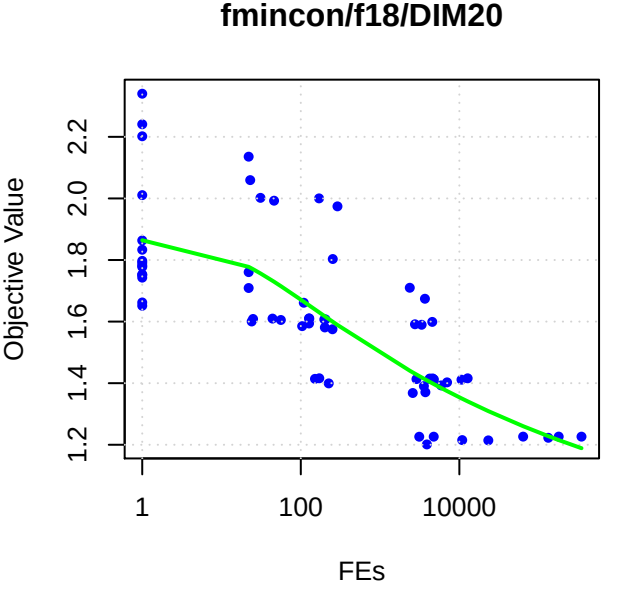
FEs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Objective Value
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1.6
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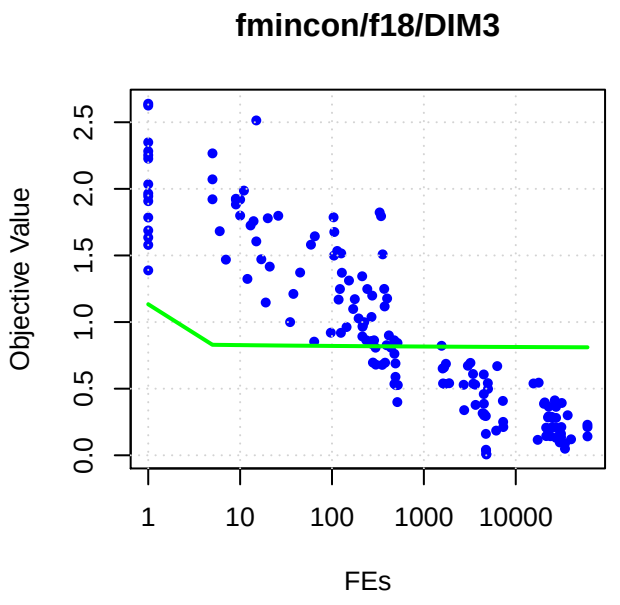
2.2
1
100
10000
FEs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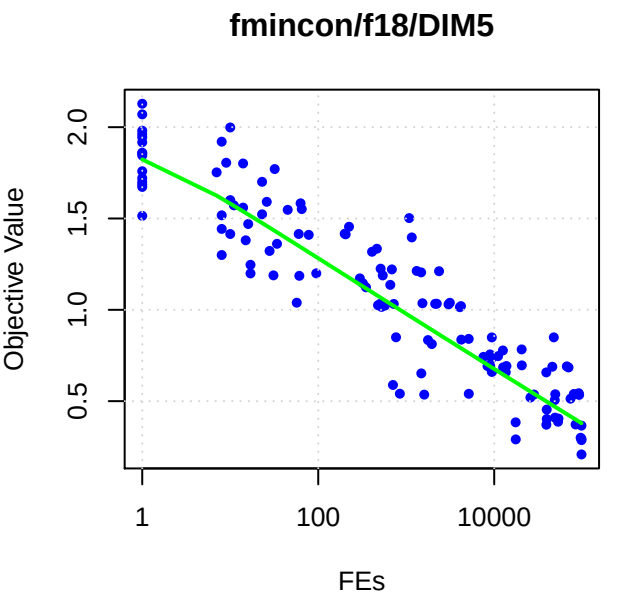
FEs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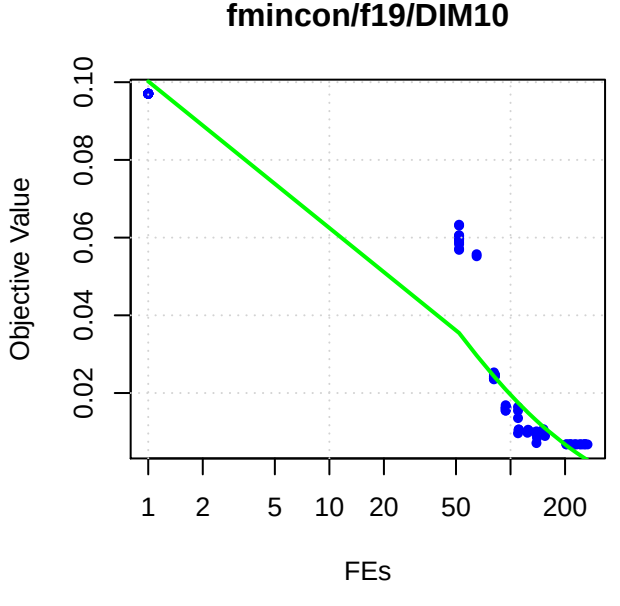
10000
FEs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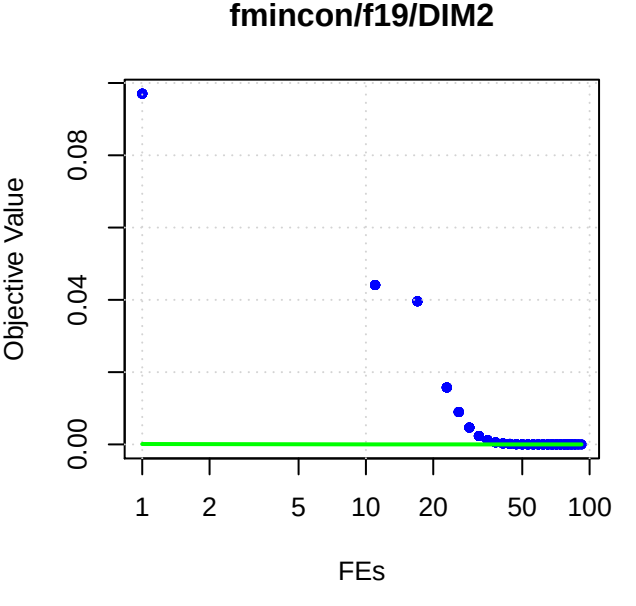
FEs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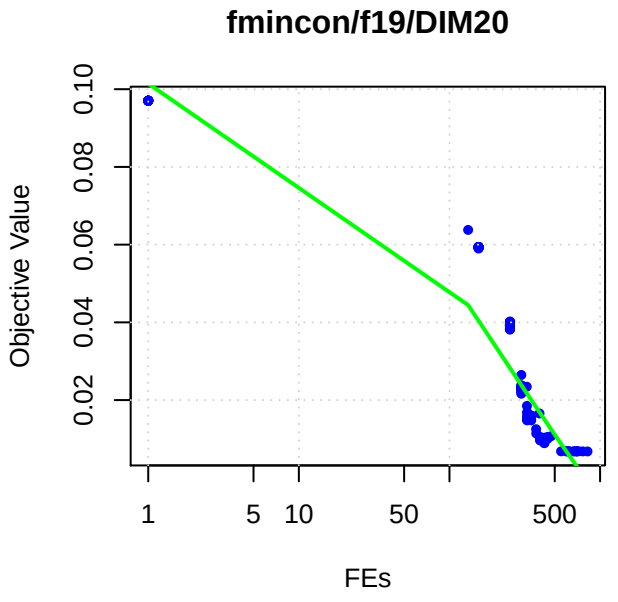
FEs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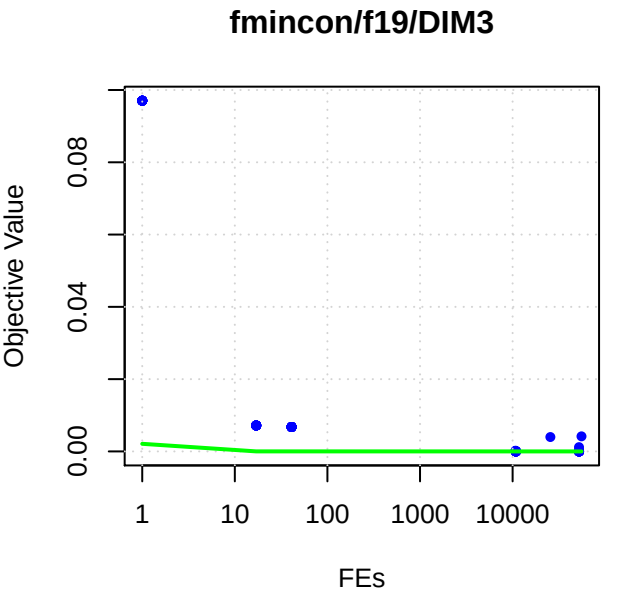
FEs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Objective Value
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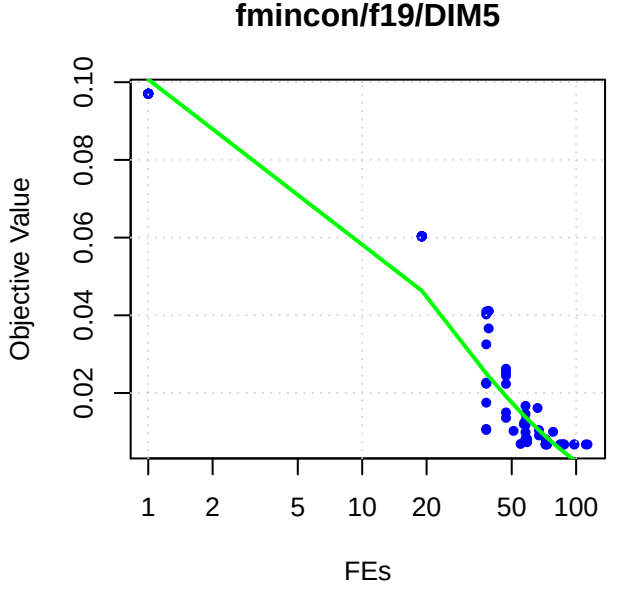
10000
FEs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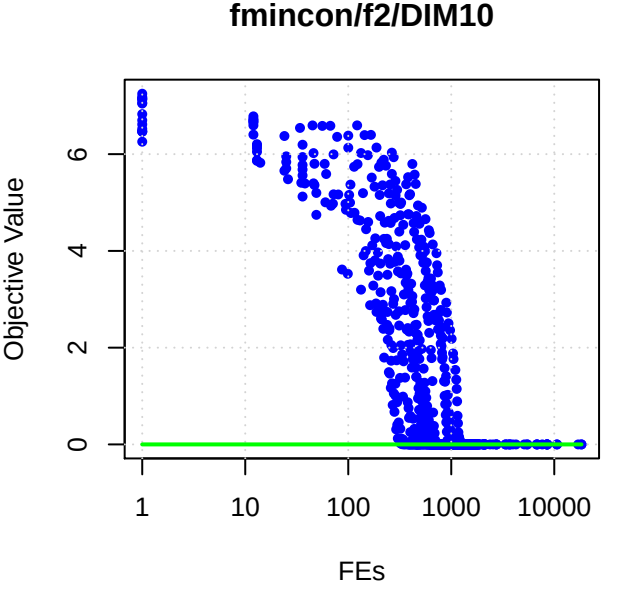
FEs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4
6
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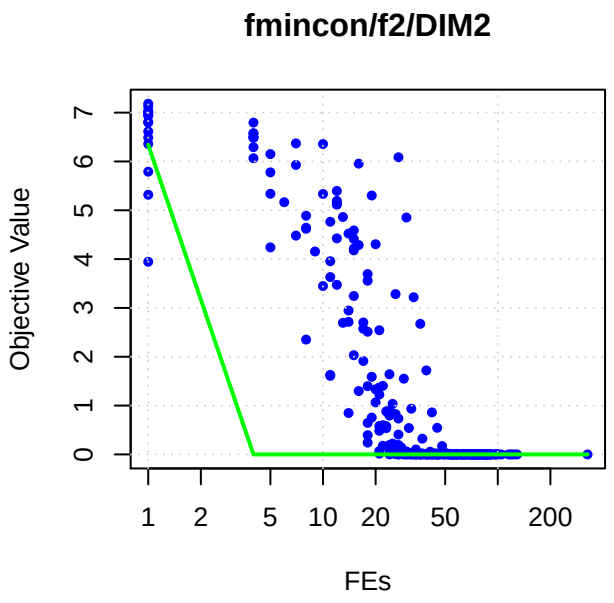
1000
10000
FEs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Objective Value
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5
10
20
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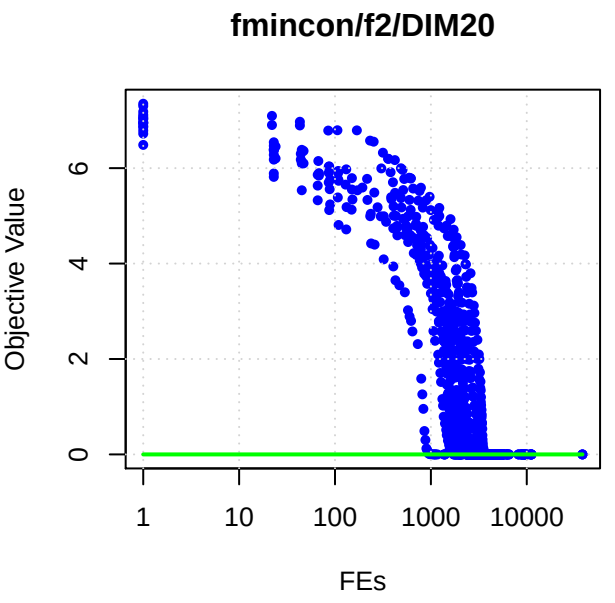
200
FEs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Objective Value
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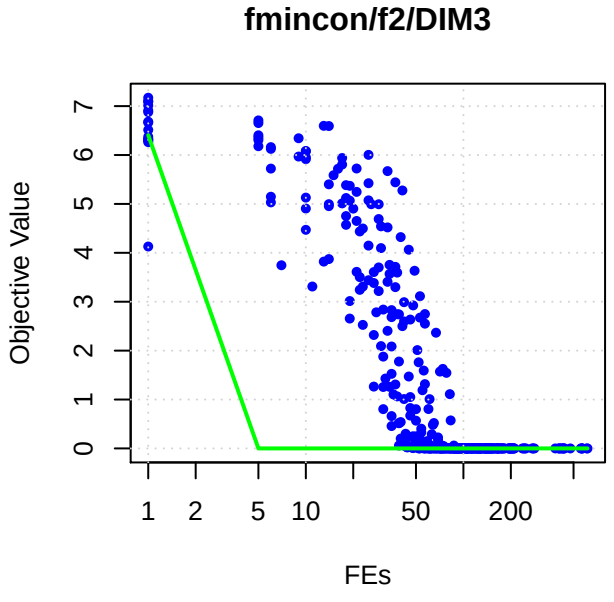
1000
10000
FEs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2
5
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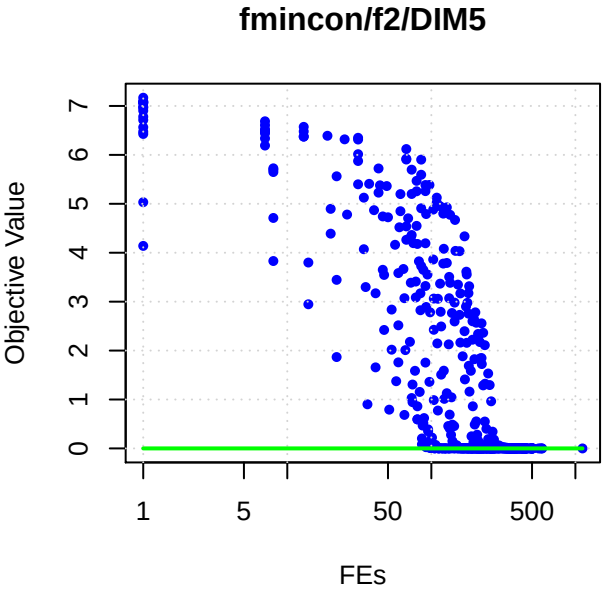
FEs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Objective Value
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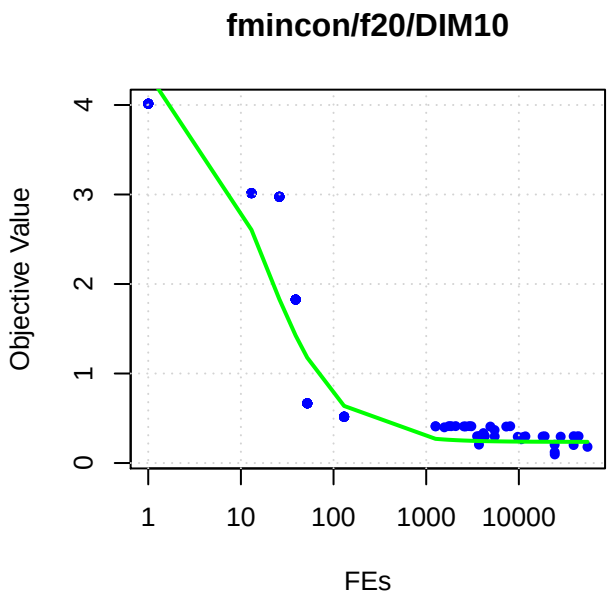
FEs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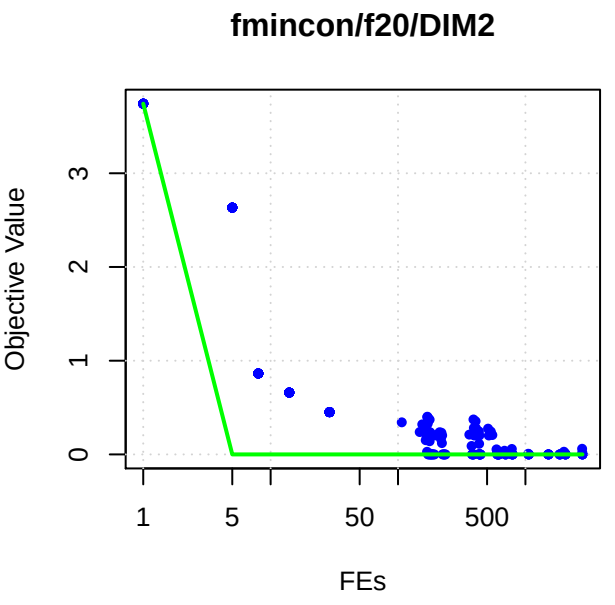
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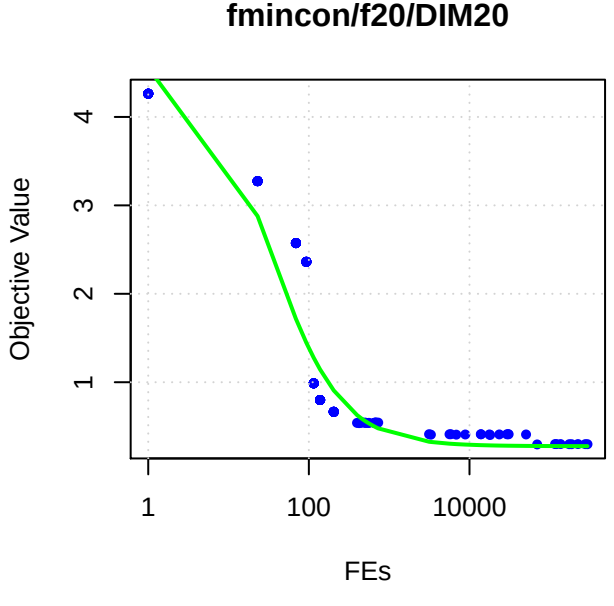
FEs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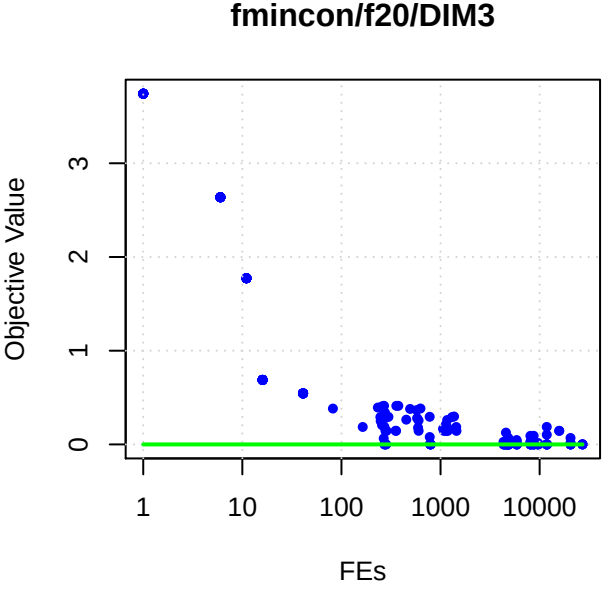
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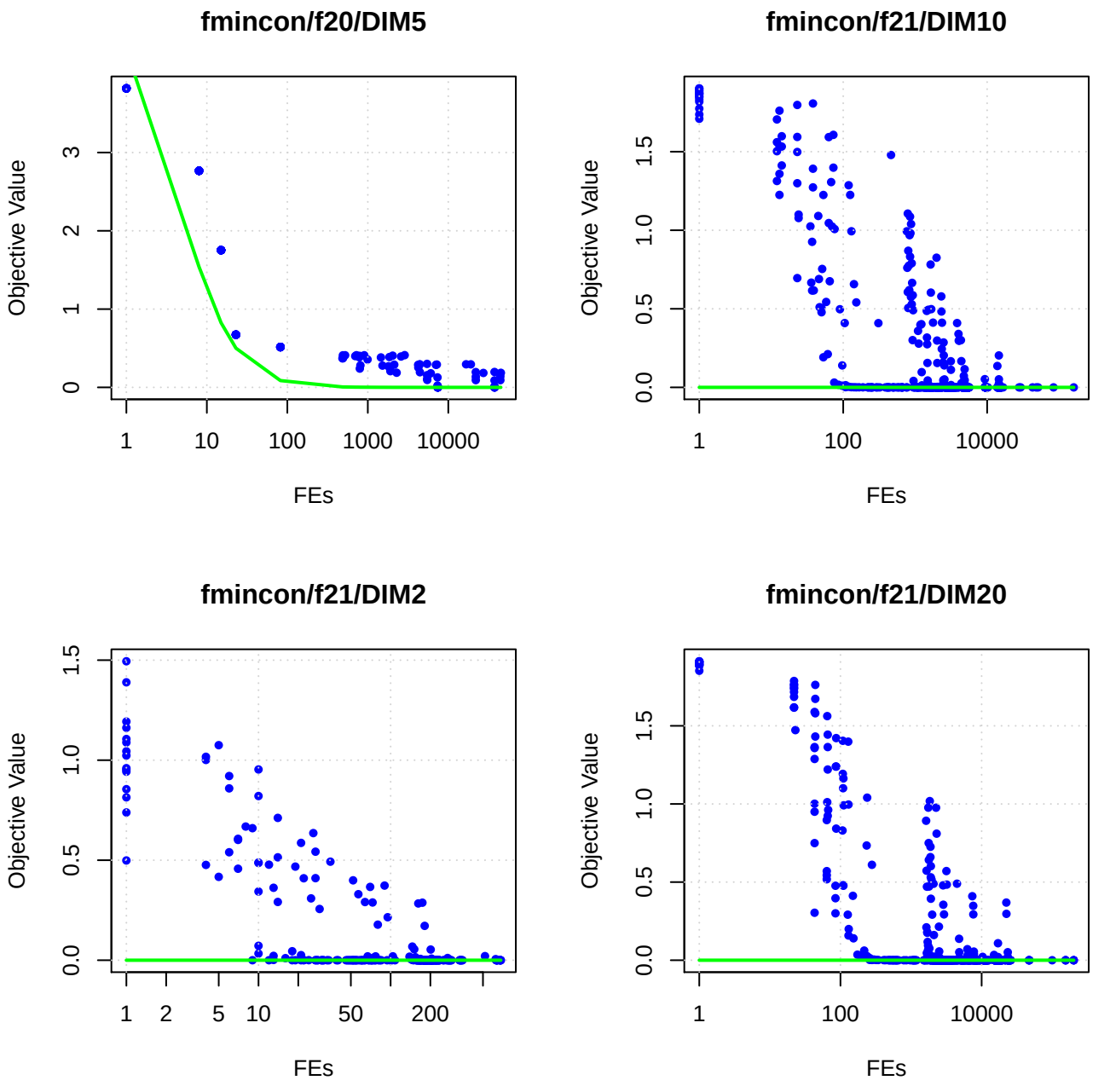
FEs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3
1
10
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1000
10000
FEs
fmincon/f21/DIM10
Objective Value
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1.0
1.5
1
100
10000
FEs
fmincon/f21/DIM2
Objective Value
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0.5
1.0
1.5
1
2
5
10
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200
FEs
fmincon/f21/DIM20
Objective Value
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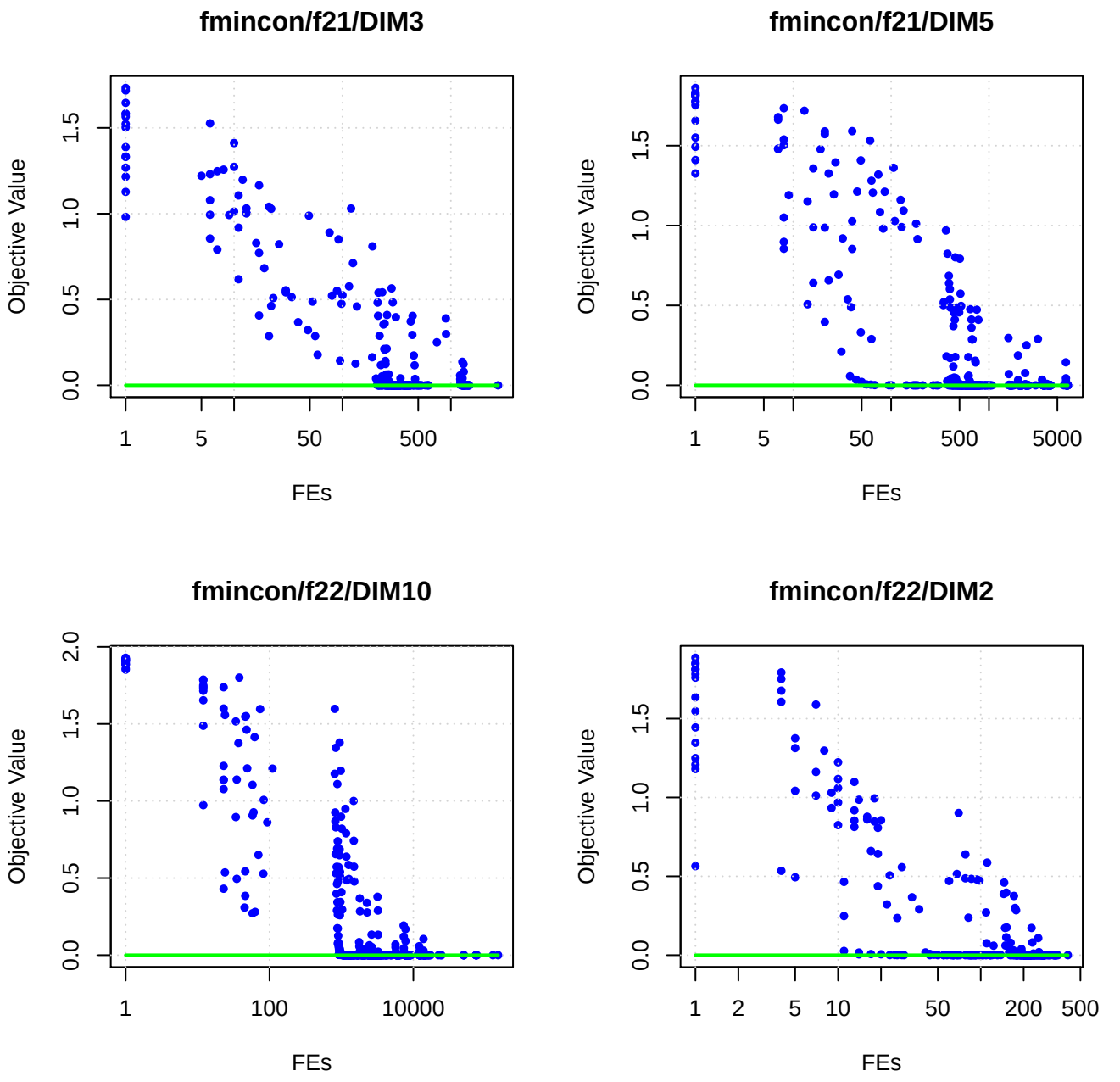
FEs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FEs
fmincon/f21/DIM5
Objective Value
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FEs
fmincon/f22/DIM10
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10000
FEs
fmincon/f22/DIM2
Objective Value
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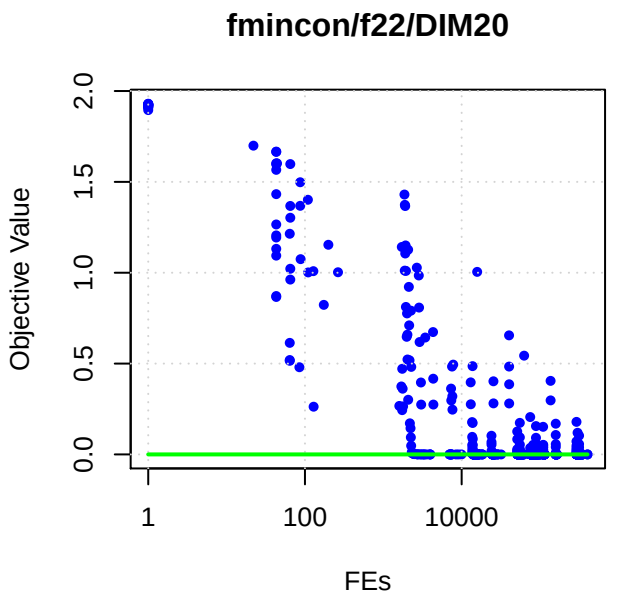
500
FEs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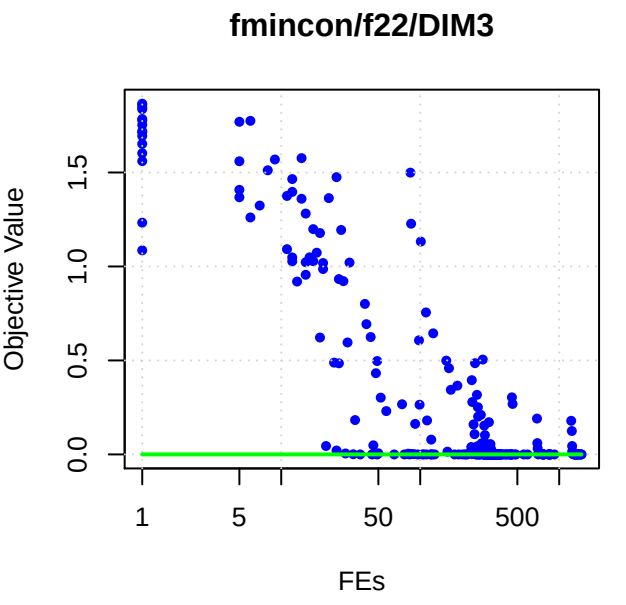
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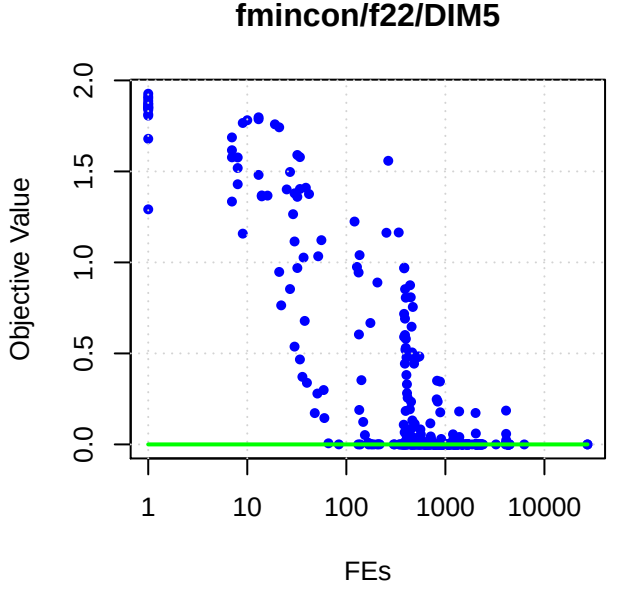
FEs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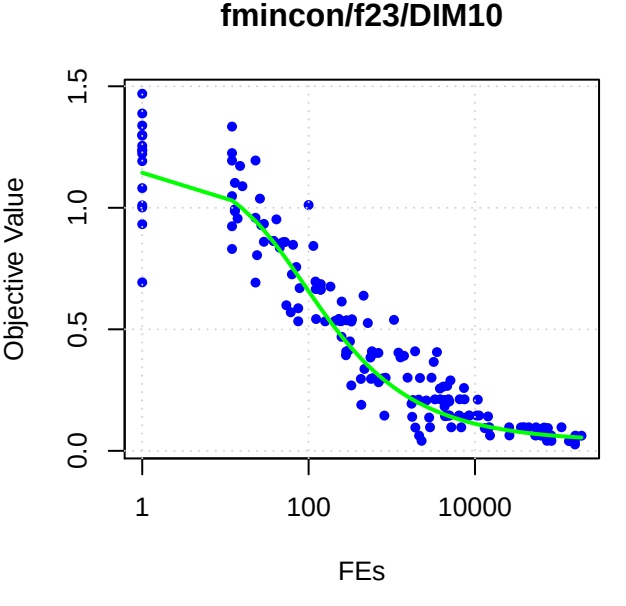
FEs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Objective Value
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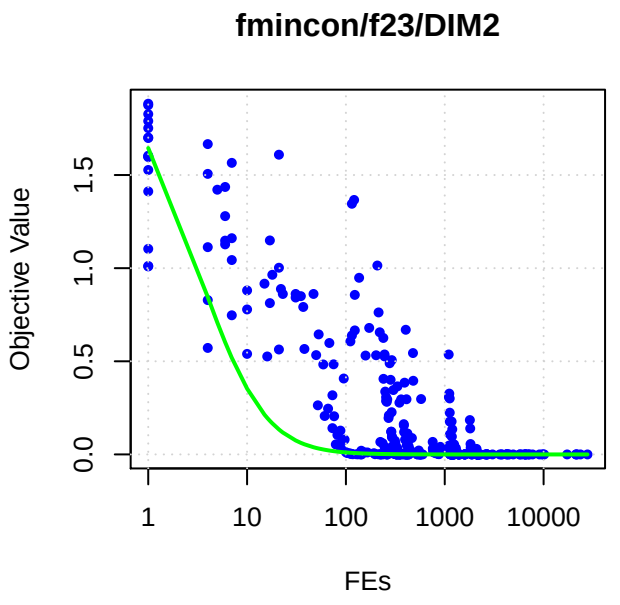
FEs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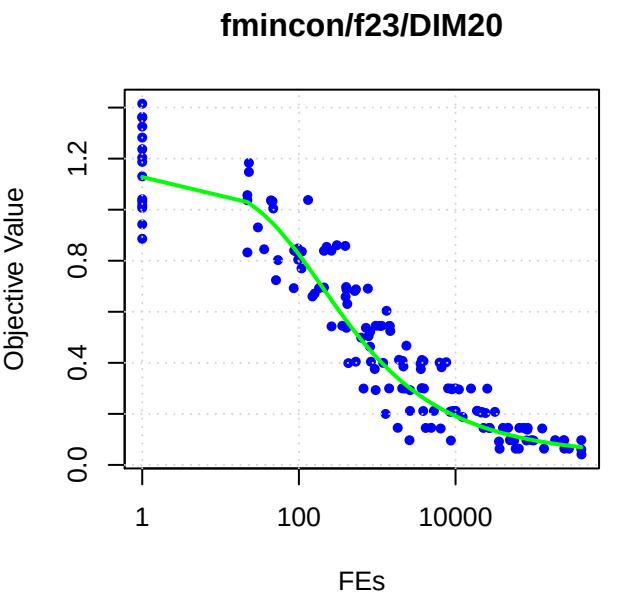
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Objective Value
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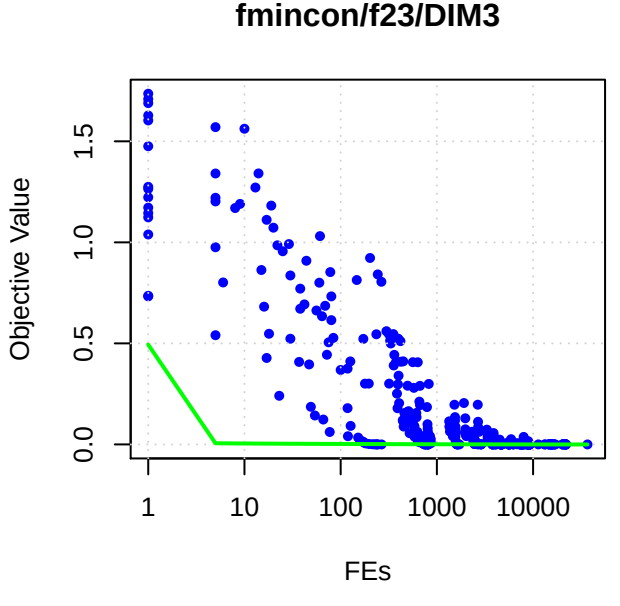
FEs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Objective Value
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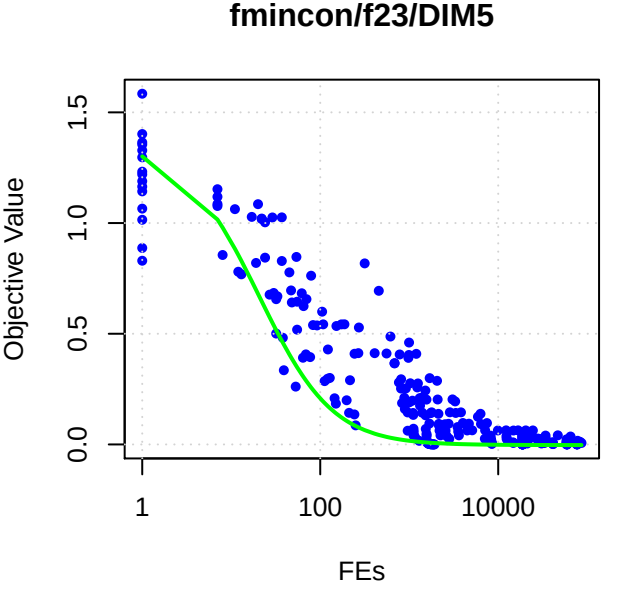
FEs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Objective Value
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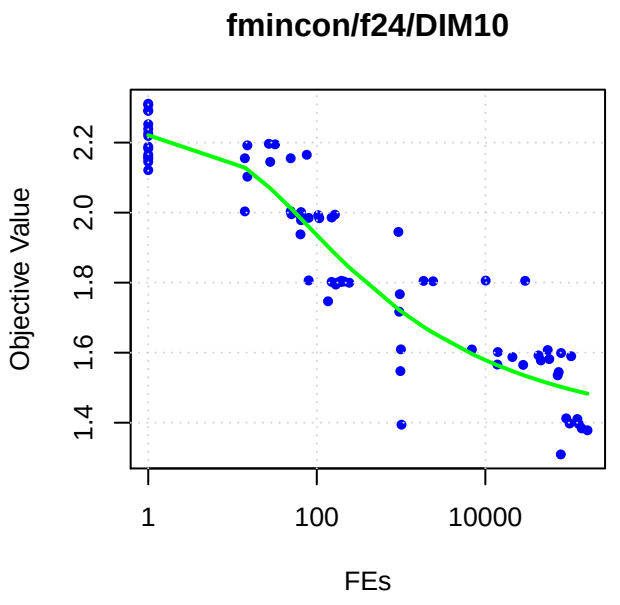
FEs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Objective Value
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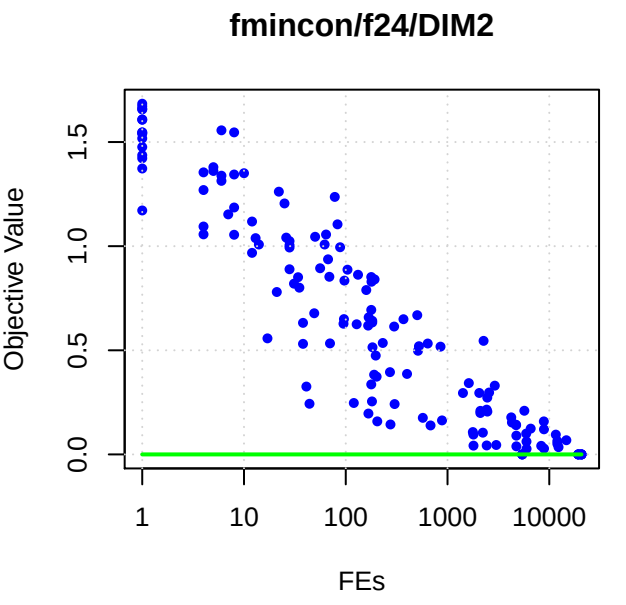
FEs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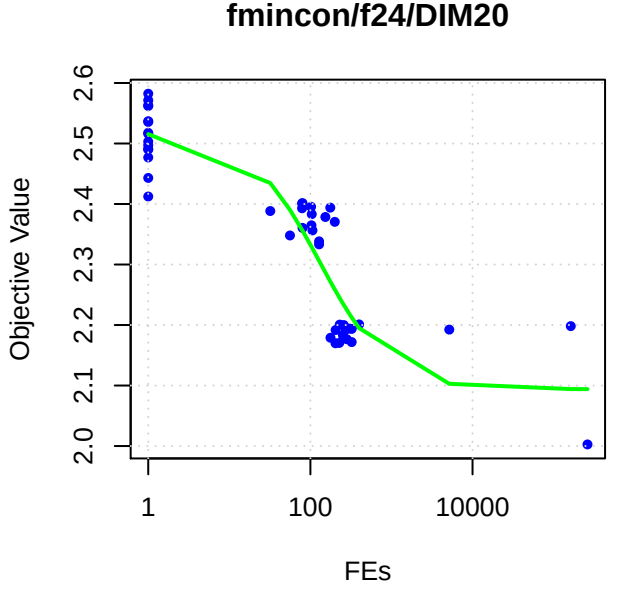
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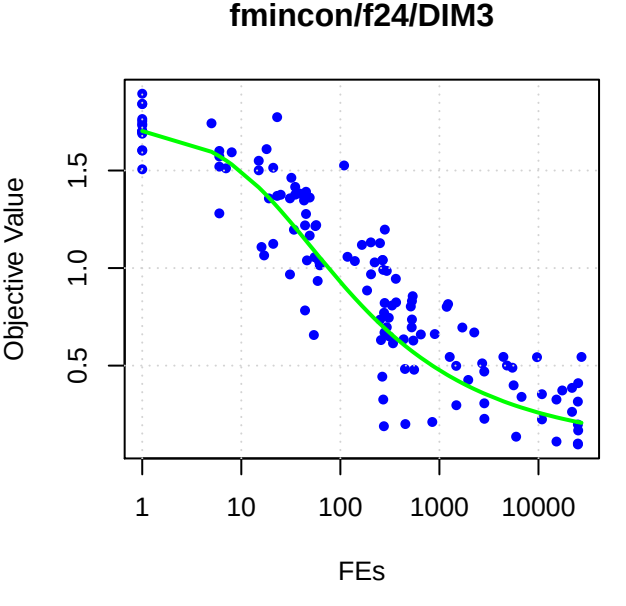
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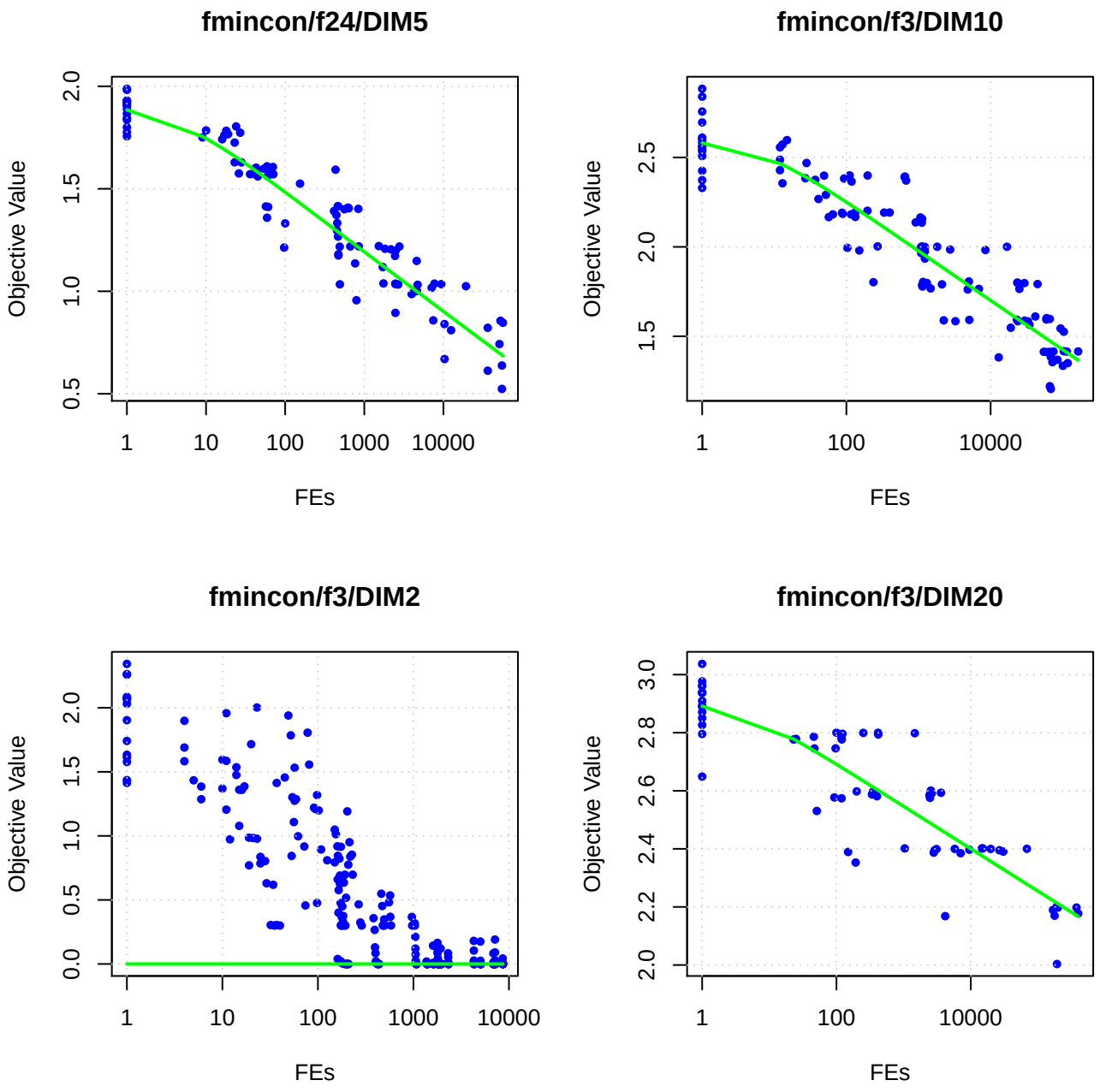
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Objective Value
1.5
2.0
2.5
1
100
10000
FEs
fmincon/f3/DIM2
Objective Value
0.0
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs
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Objective Value
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2.8
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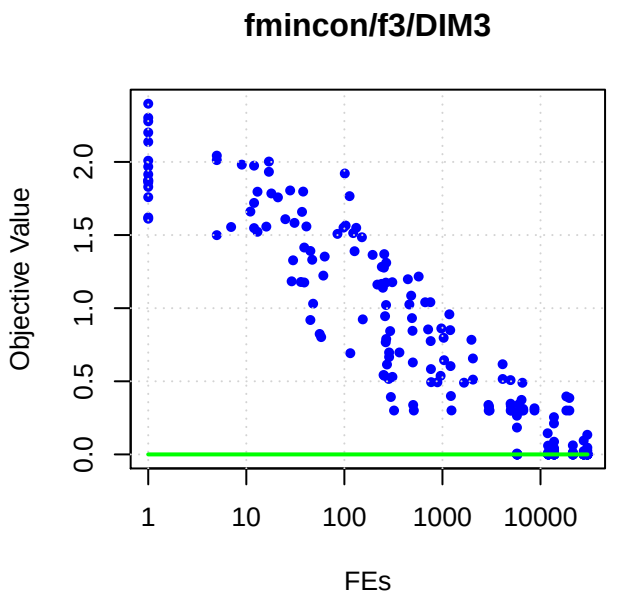
1
100
10000
FEs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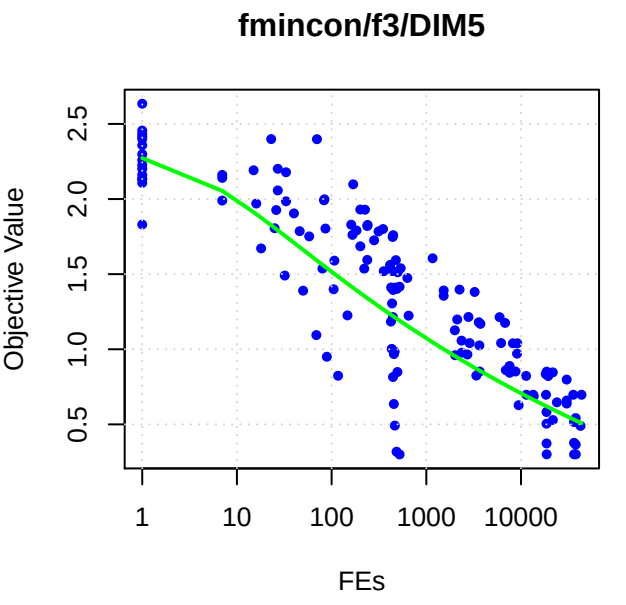
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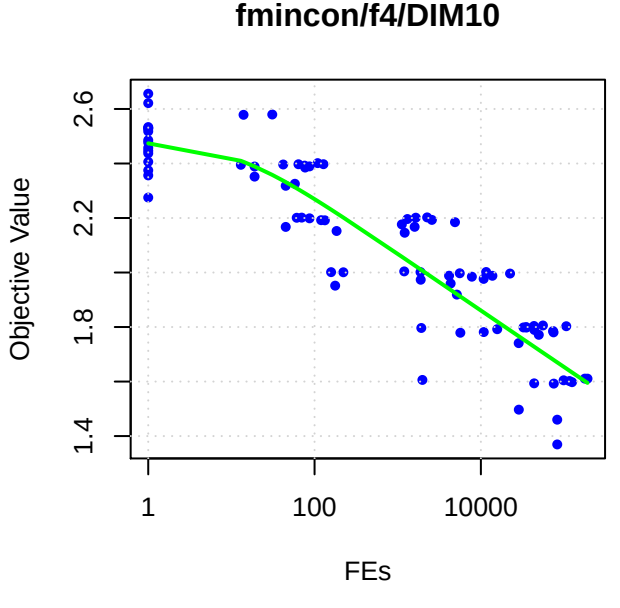
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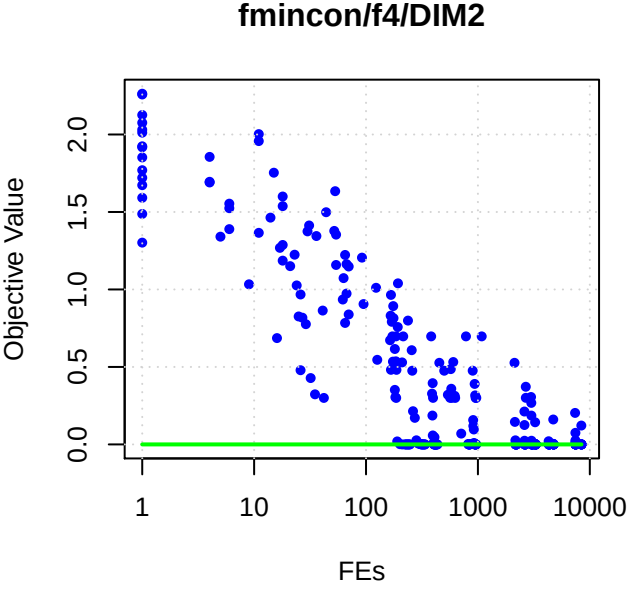
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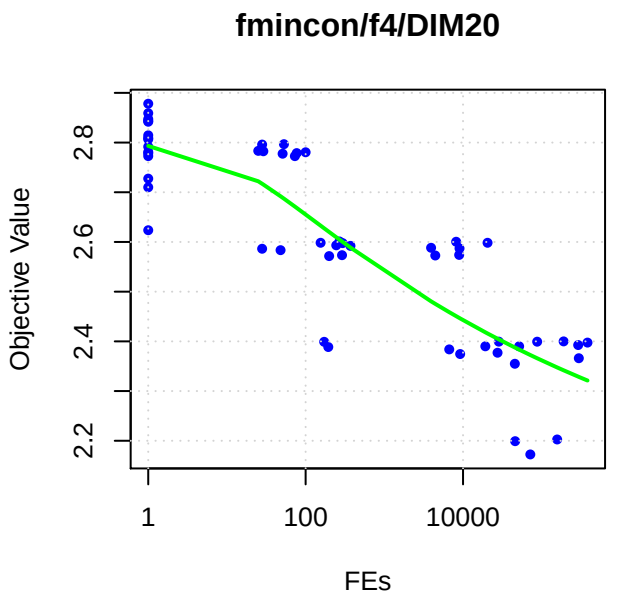
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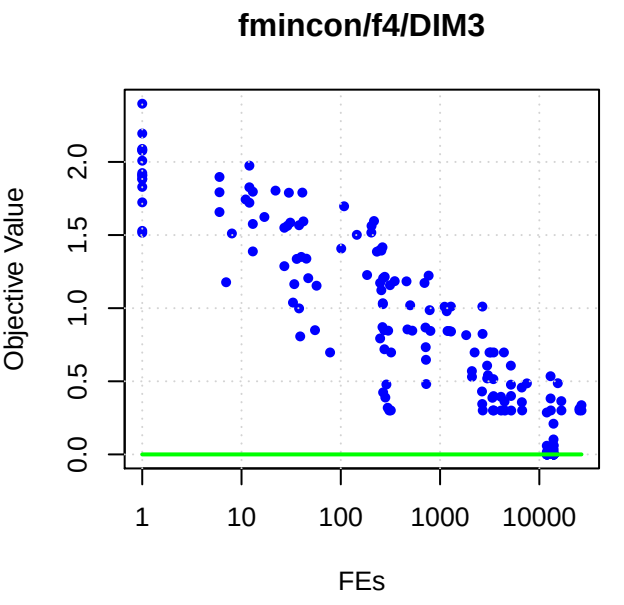
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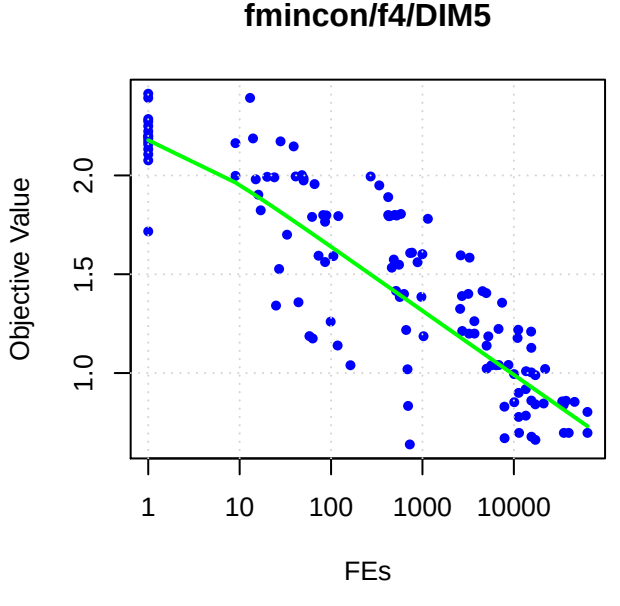
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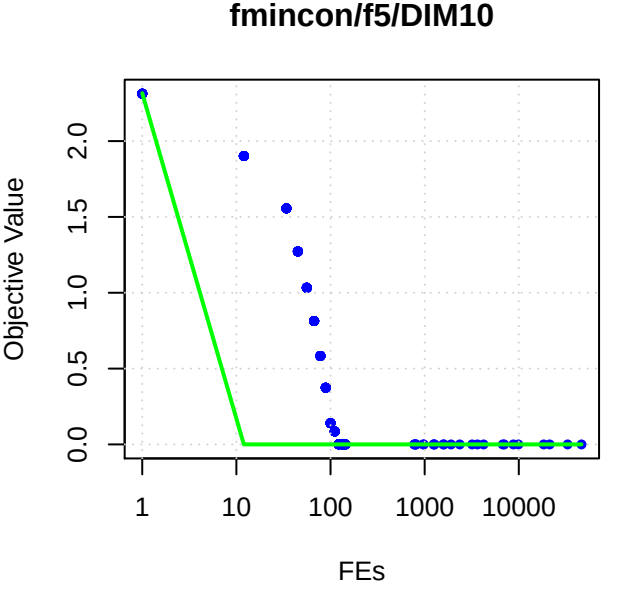
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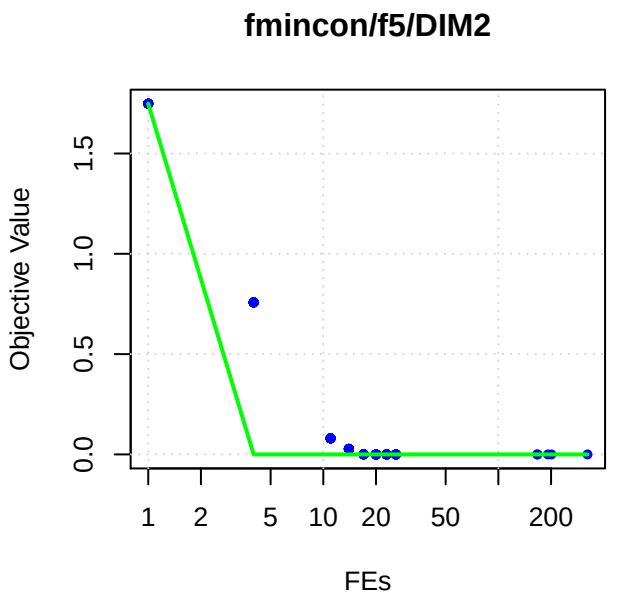
FEs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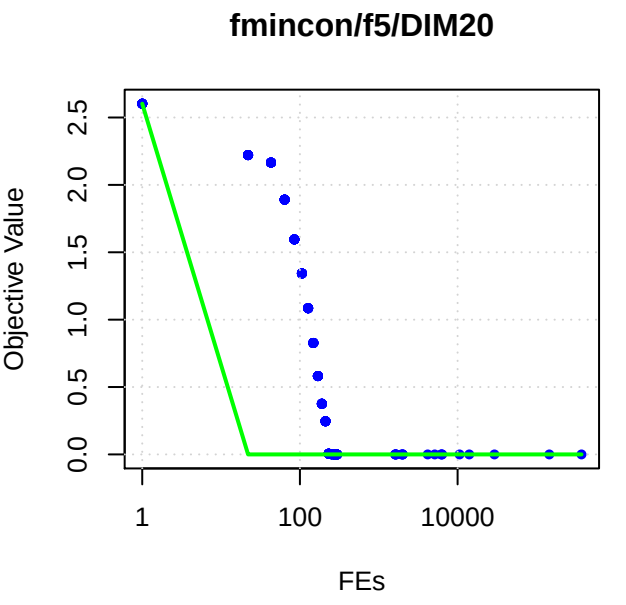
5
10
20
50
200
FEs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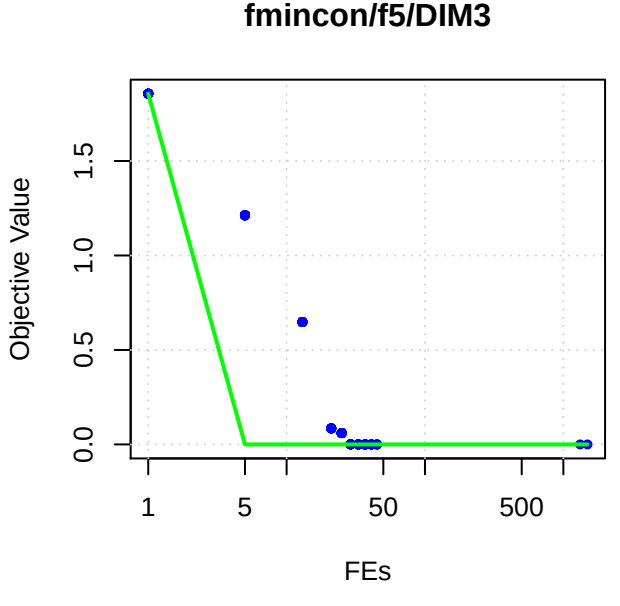
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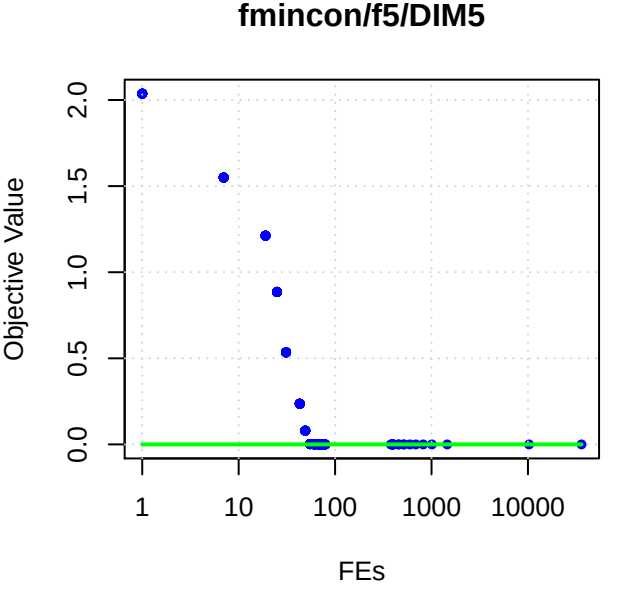
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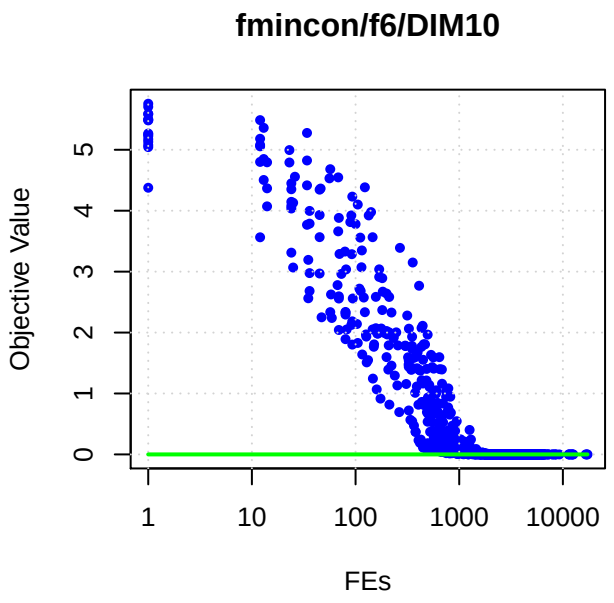
FEs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Objective Value
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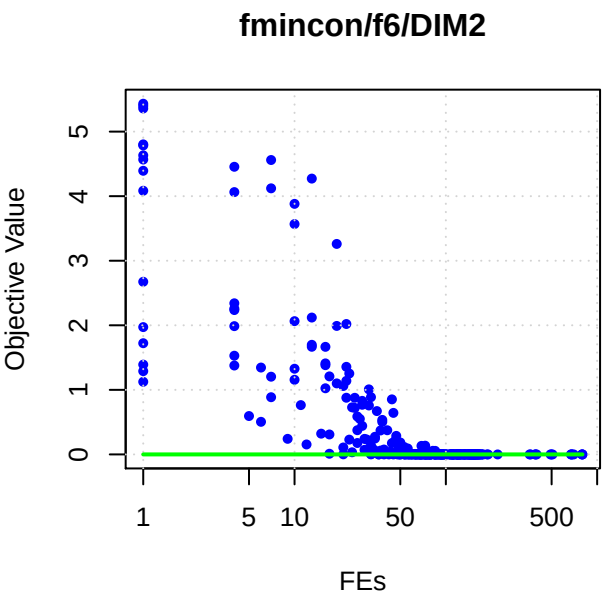
1000
10000
FEs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Objective Value
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2
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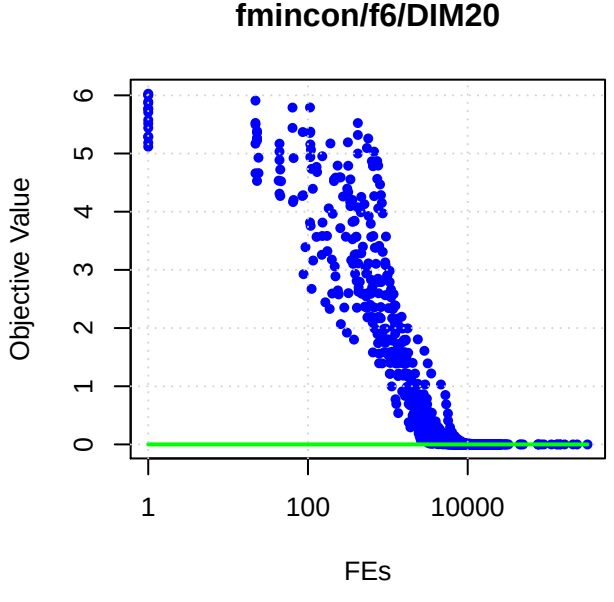
1
5
10
50
500
FEs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Objective Value
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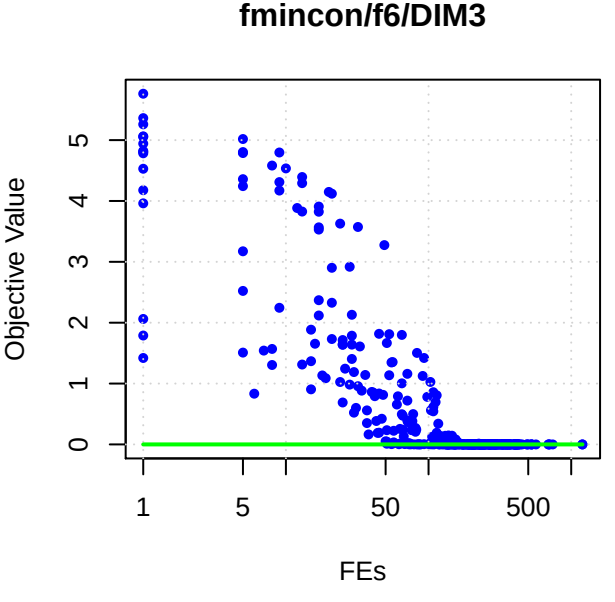
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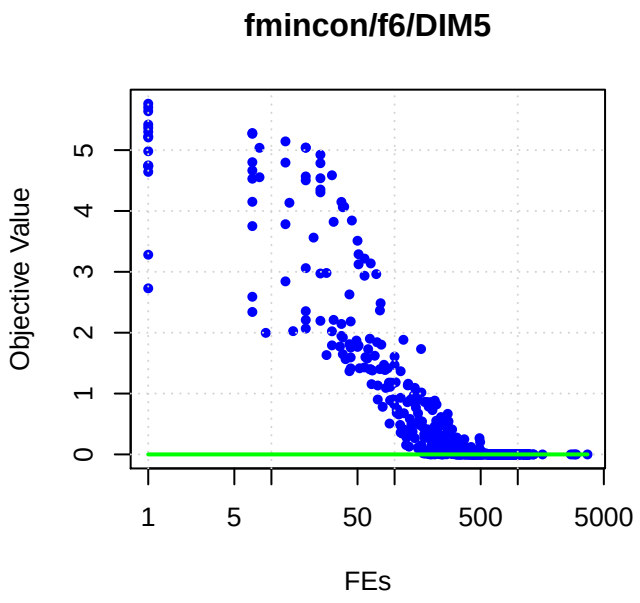
FEs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500
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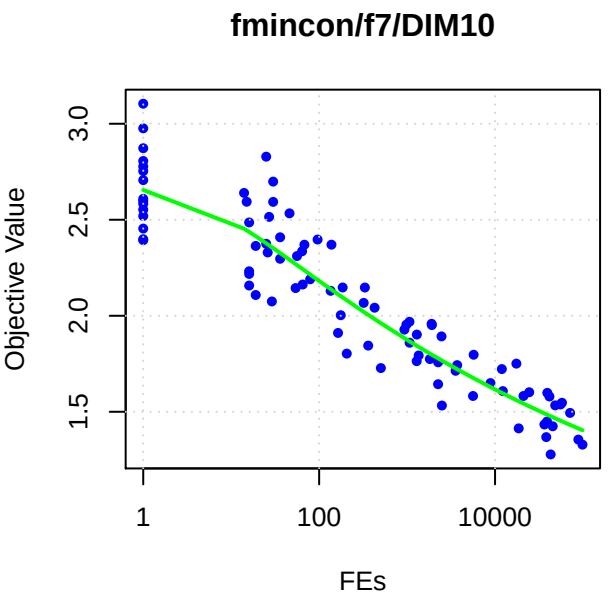
FEs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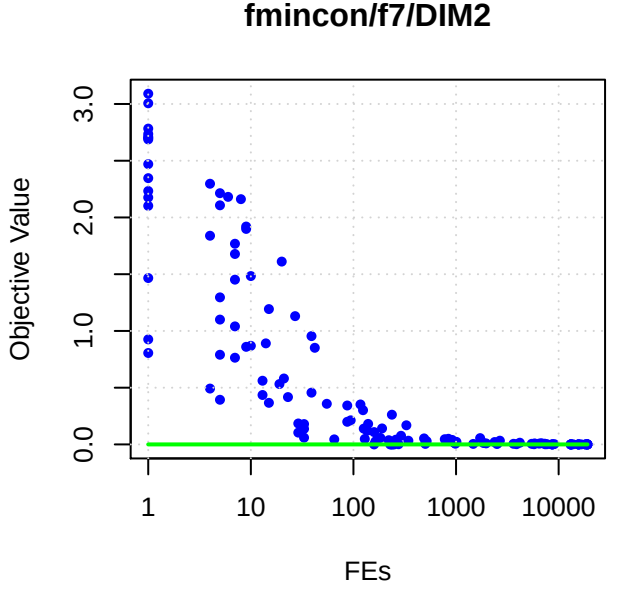
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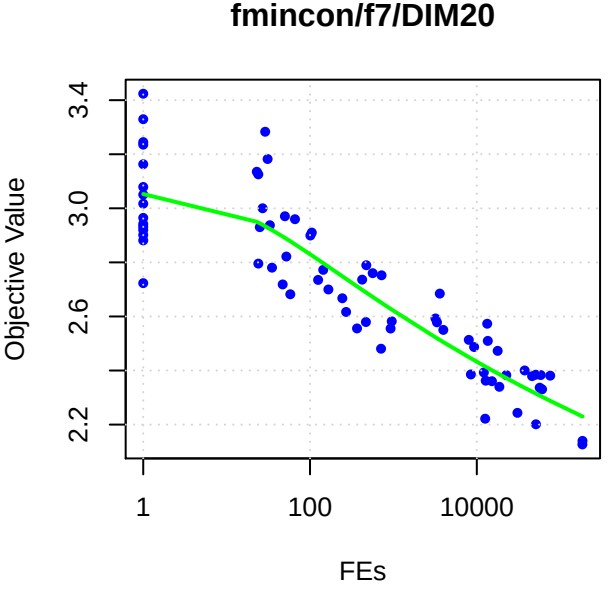
FEs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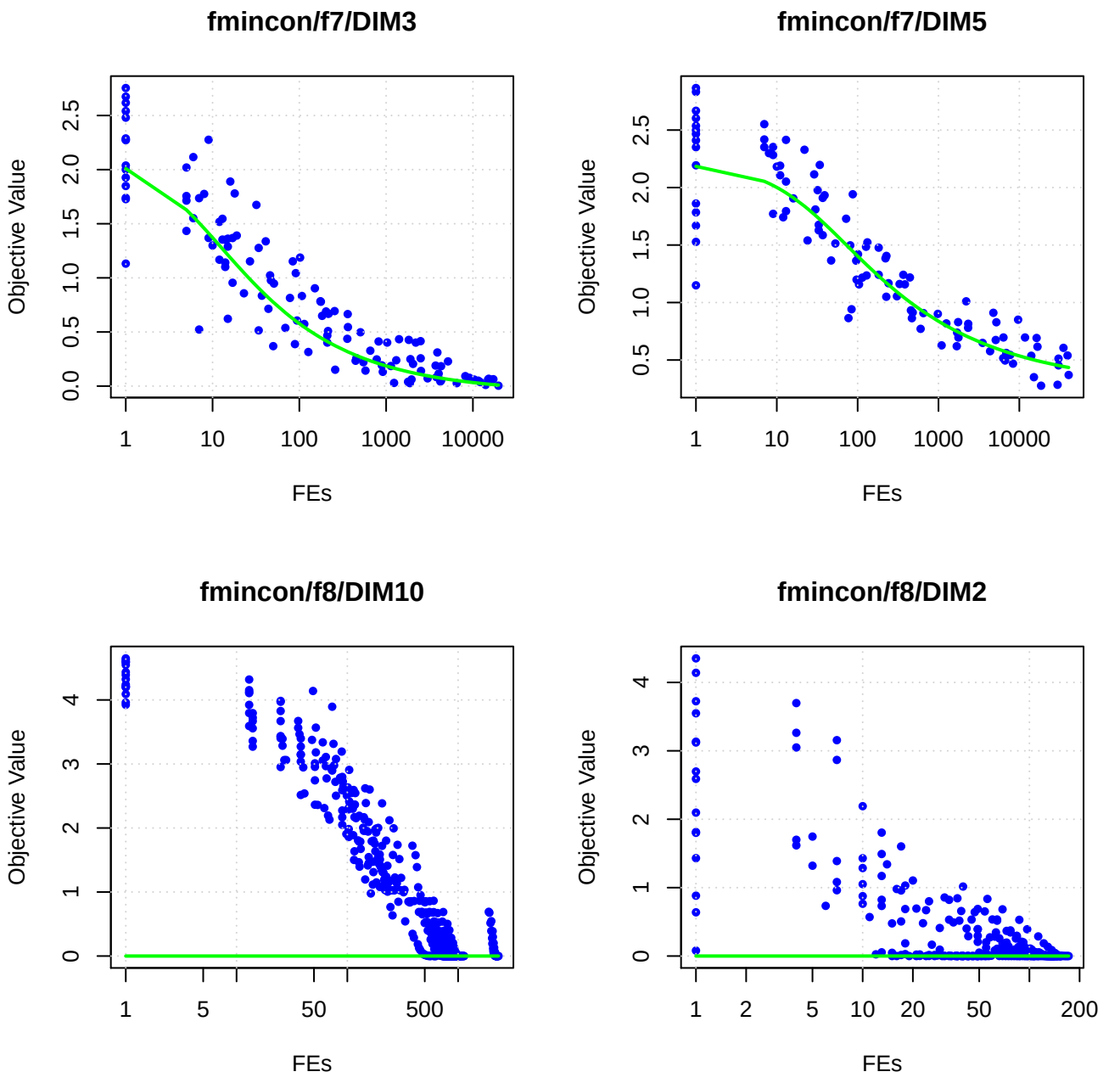
FEs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FEs
fmincon/f7/DIM5
Objective Value
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10
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FEs
fmincon/f8/DIM10
Objective Value
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2
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1
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500
FEs
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Objective Value
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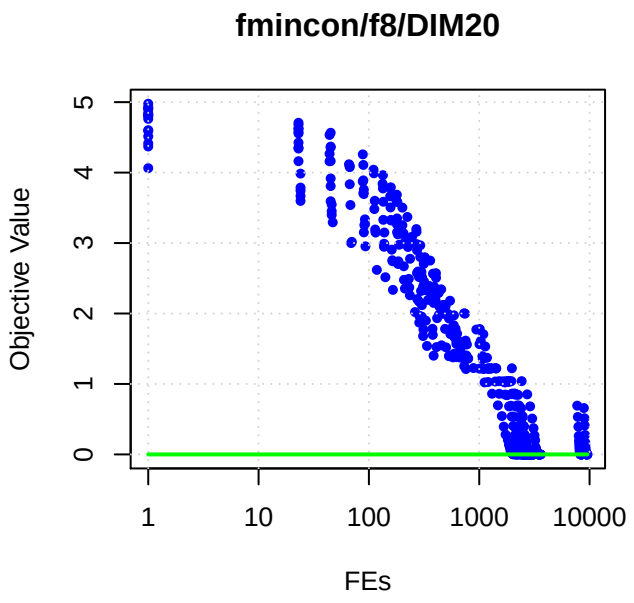
200
FEs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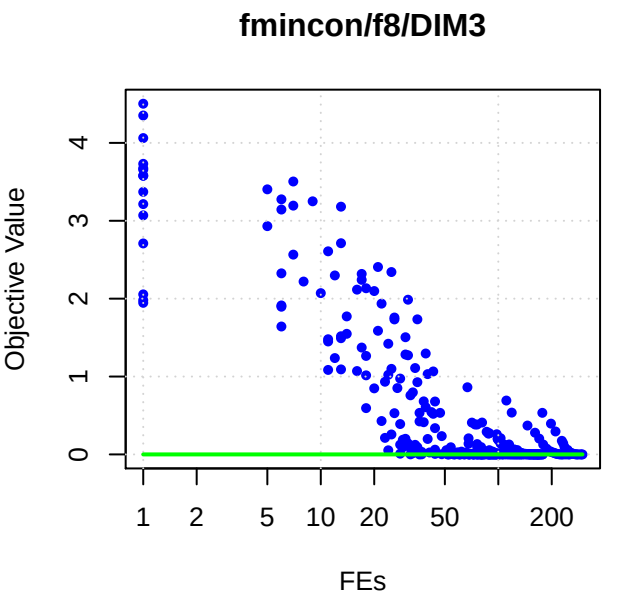
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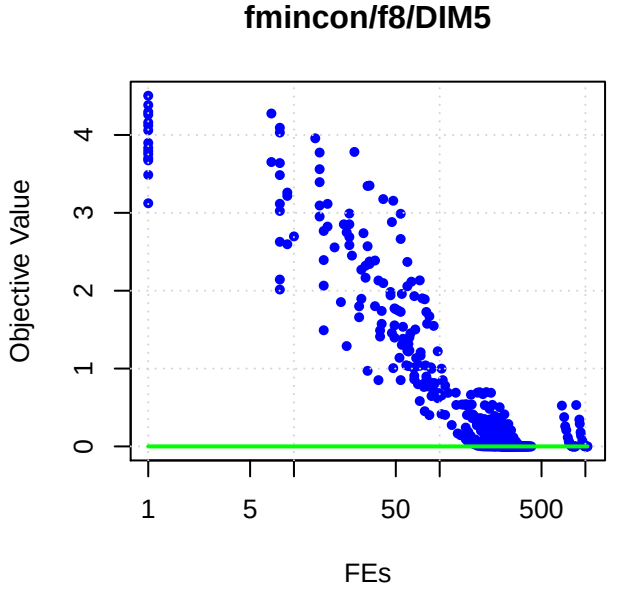
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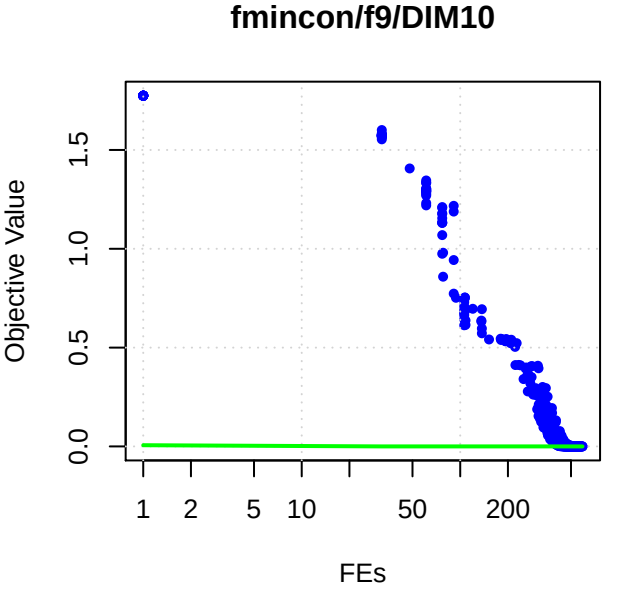
FEs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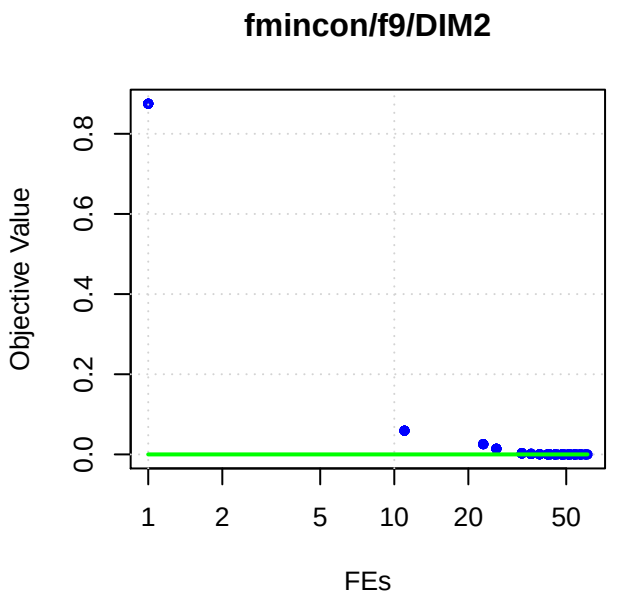
FEs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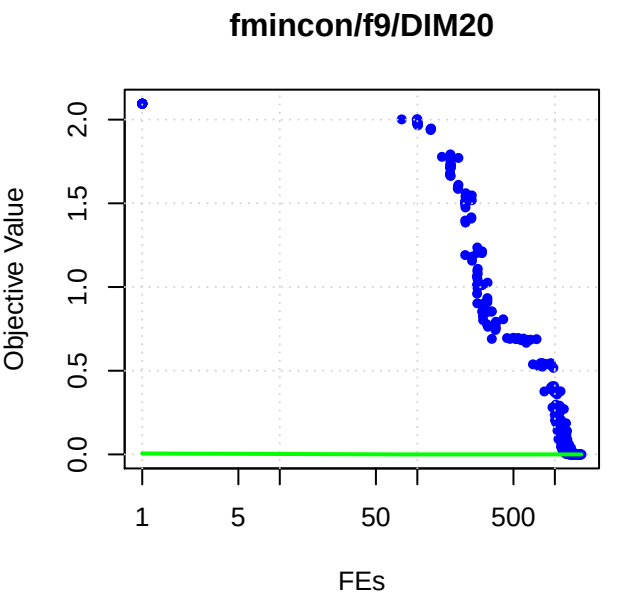
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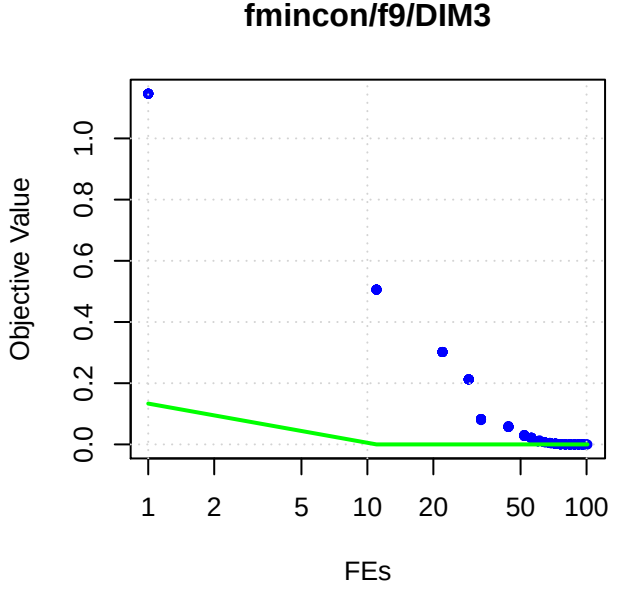
FEs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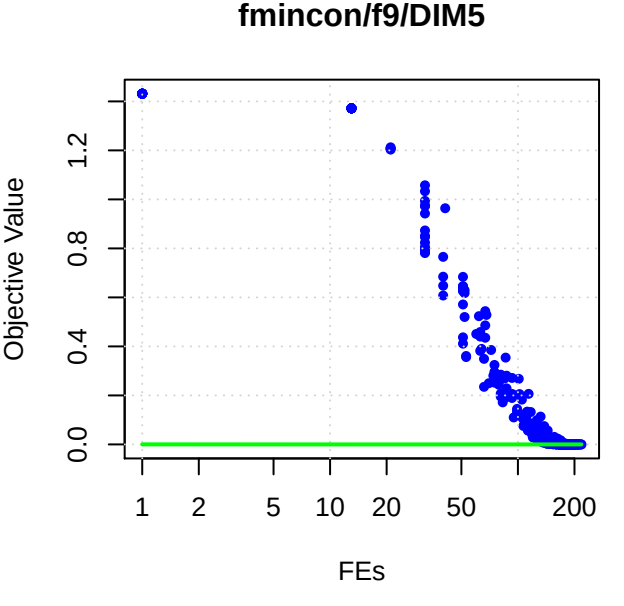
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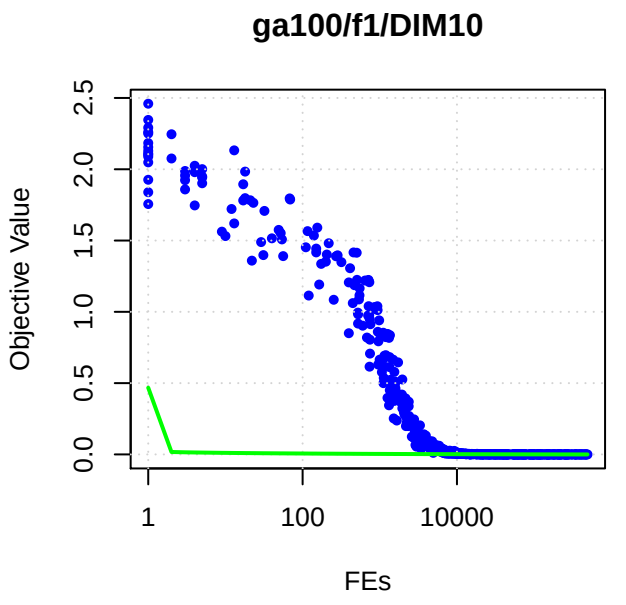
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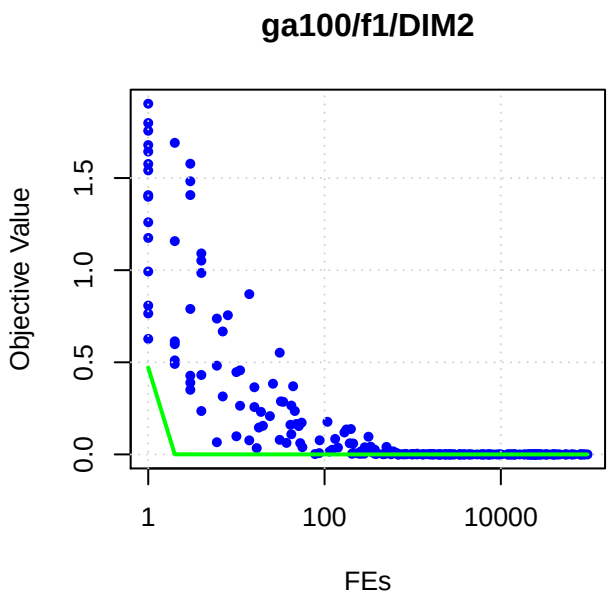
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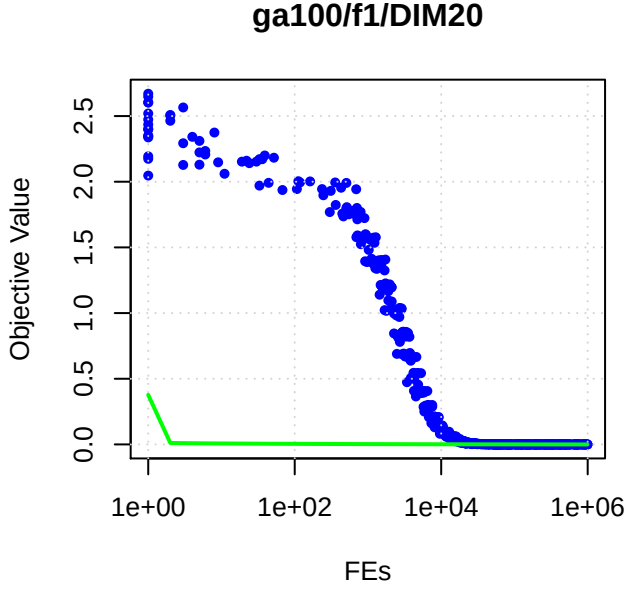
FEs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1e+02
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1e+06
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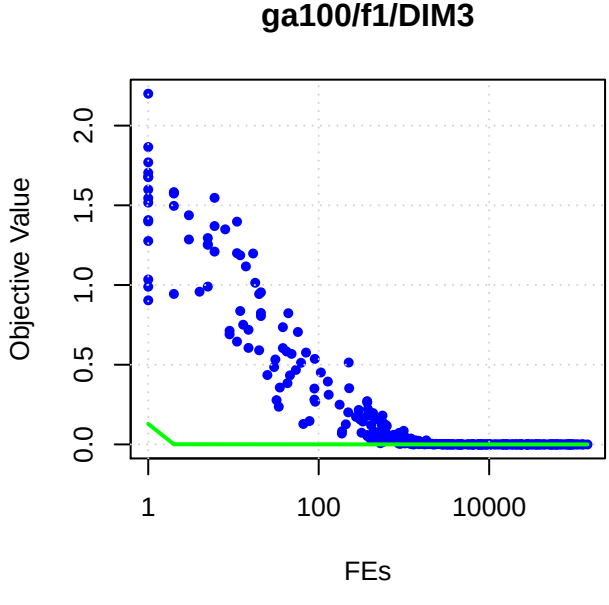
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10000
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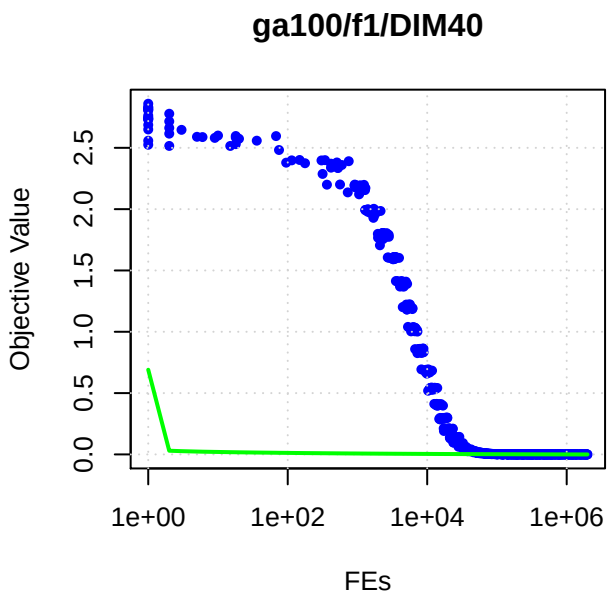
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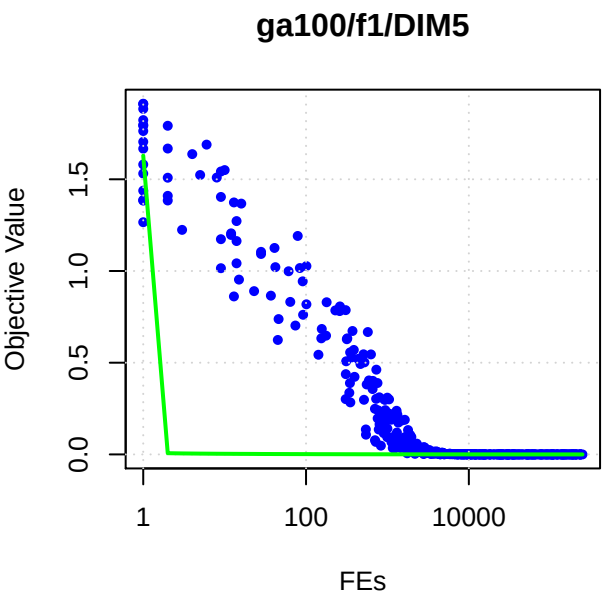
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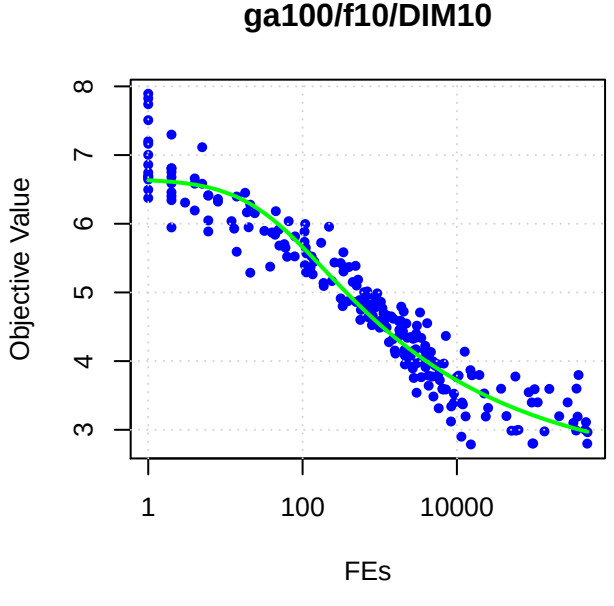
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Objective Value
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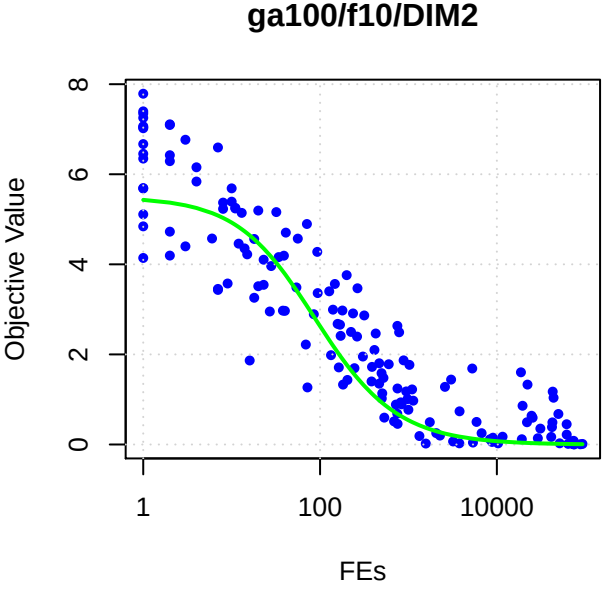
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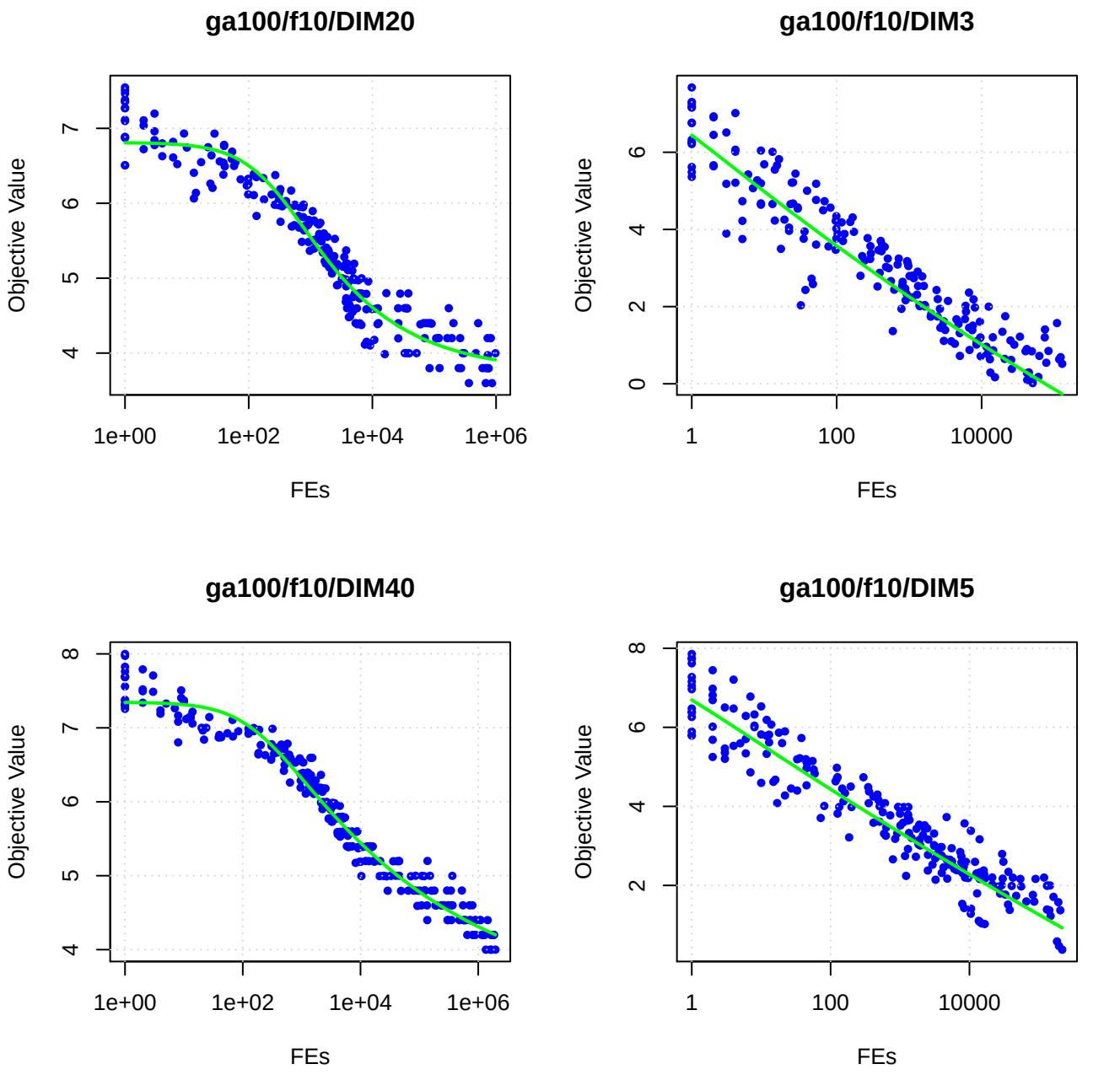
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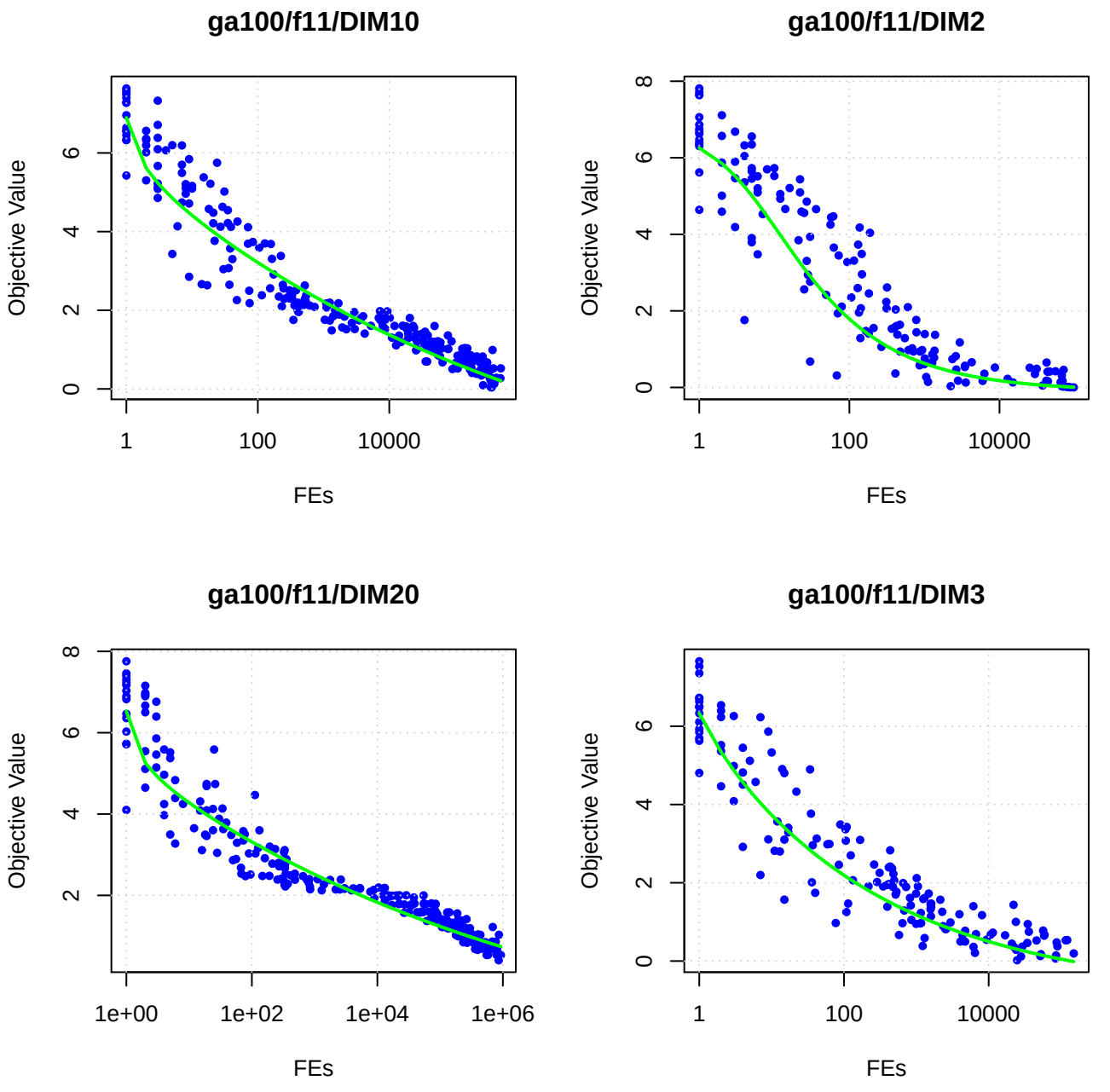
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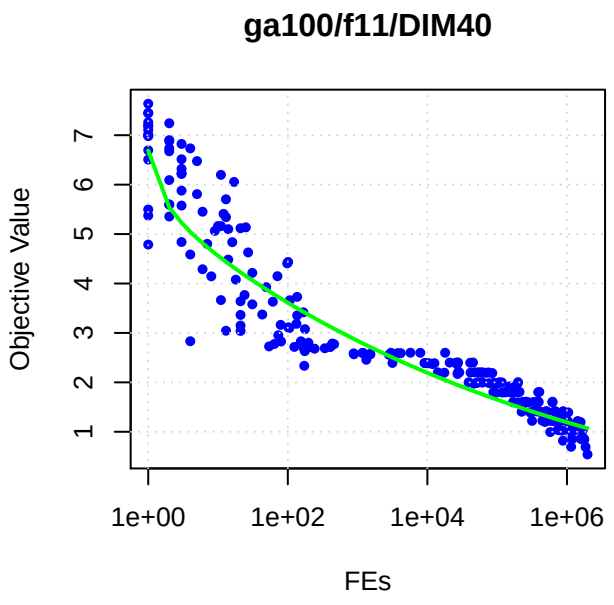
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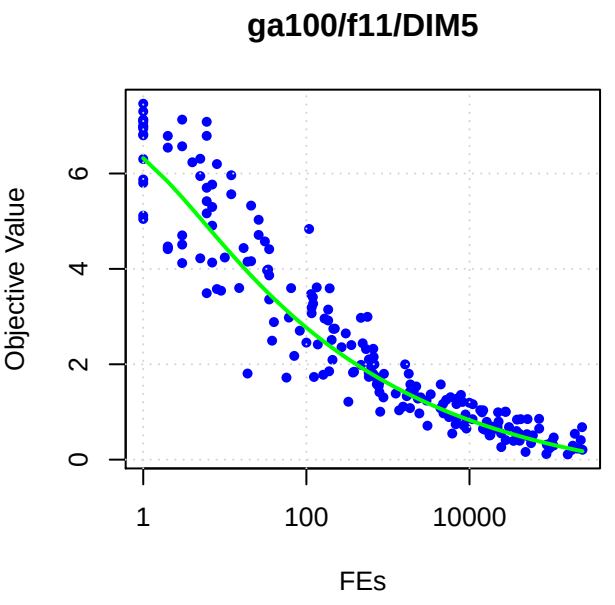
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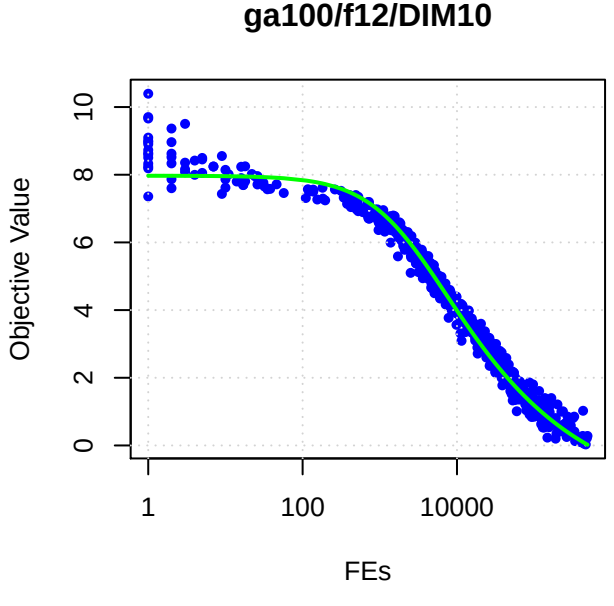
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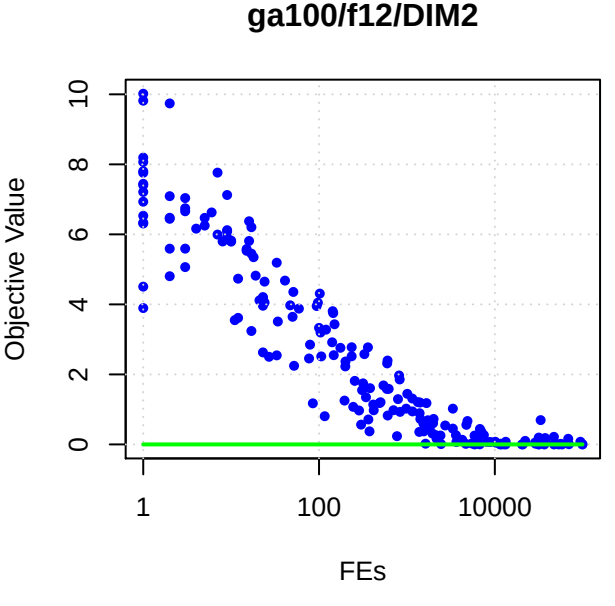
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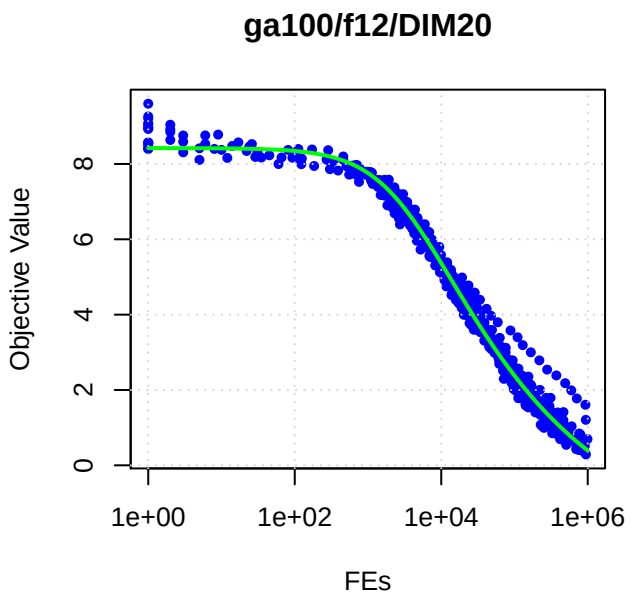
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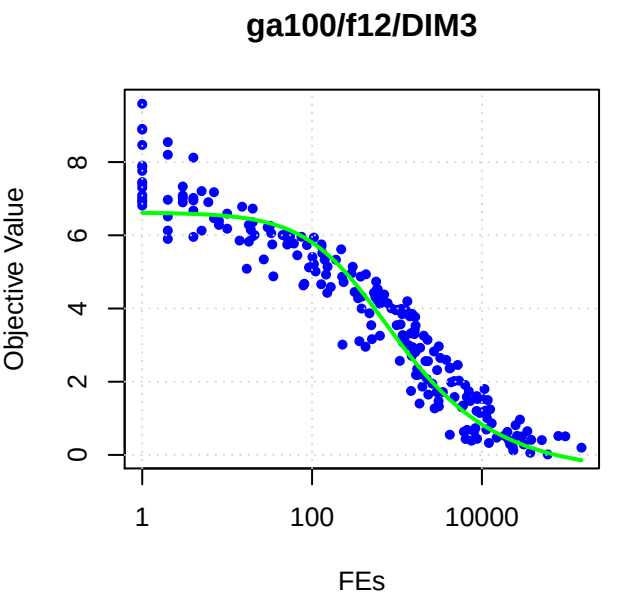
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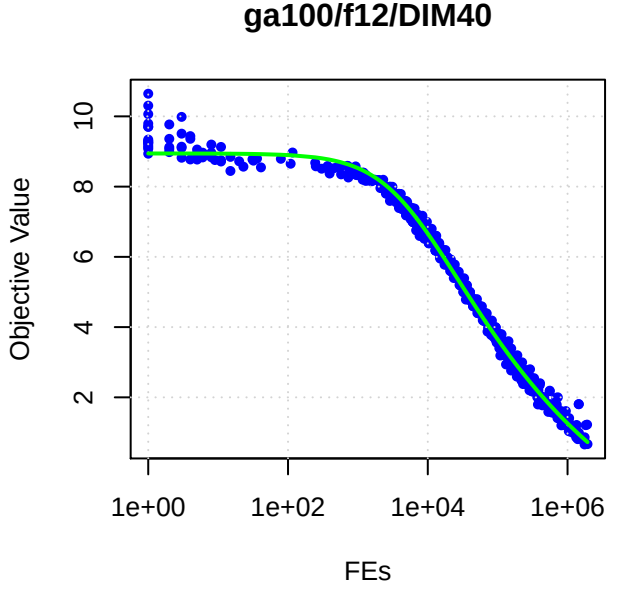
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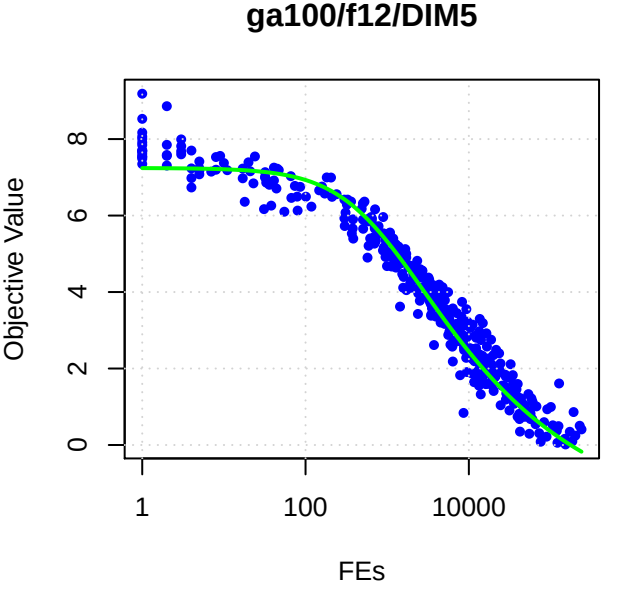
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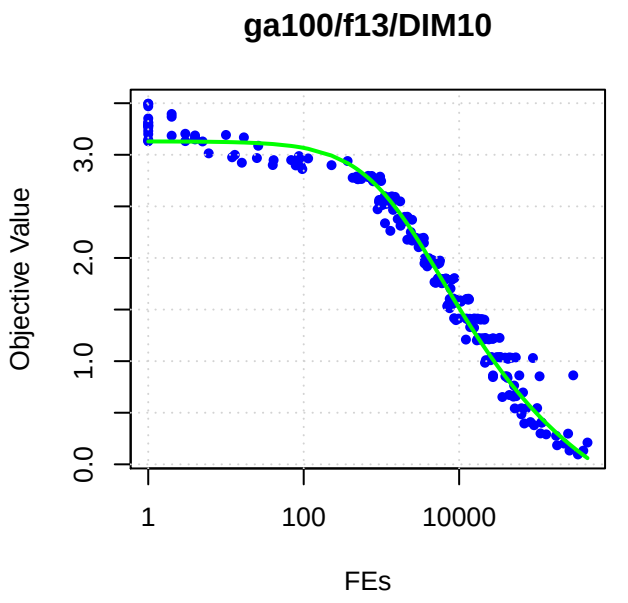
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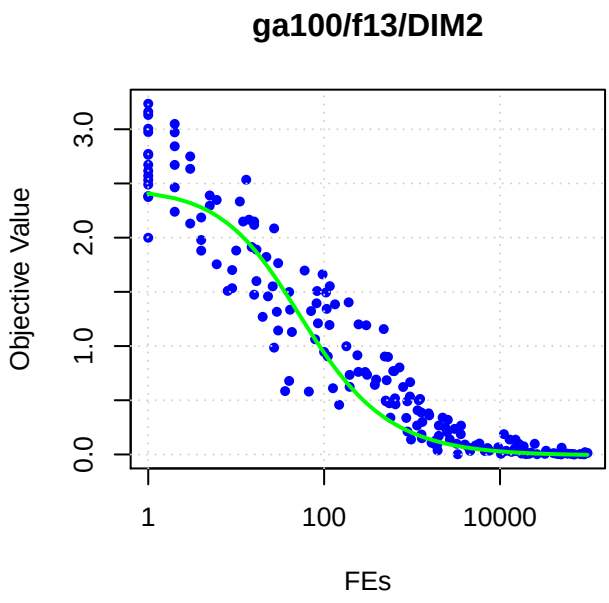
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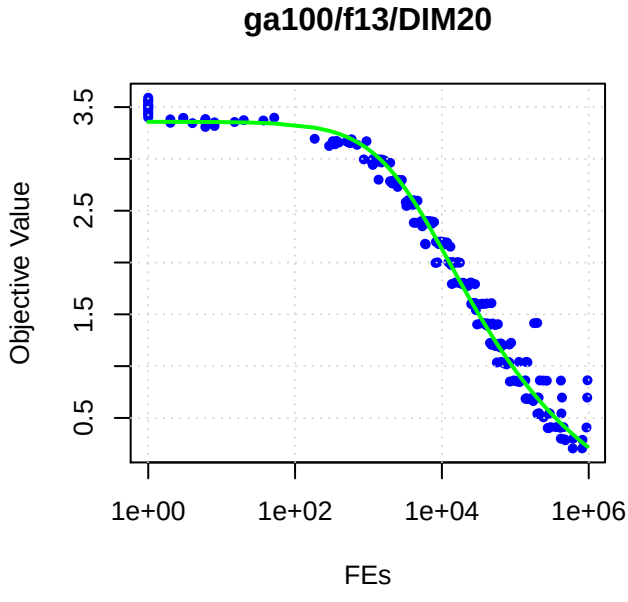
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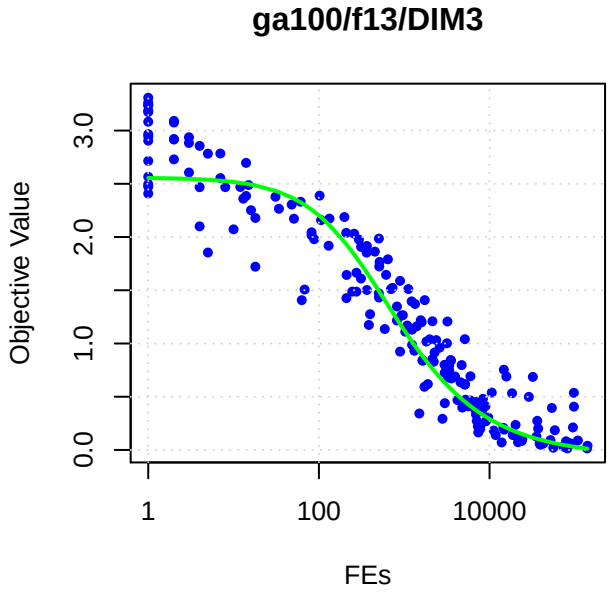
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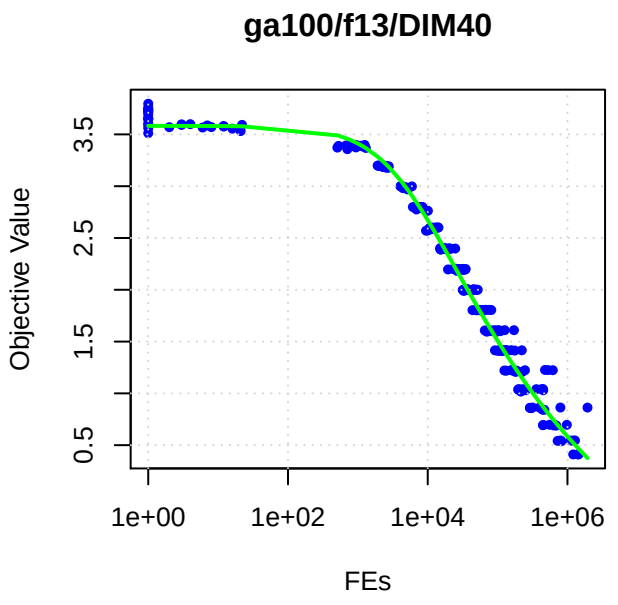
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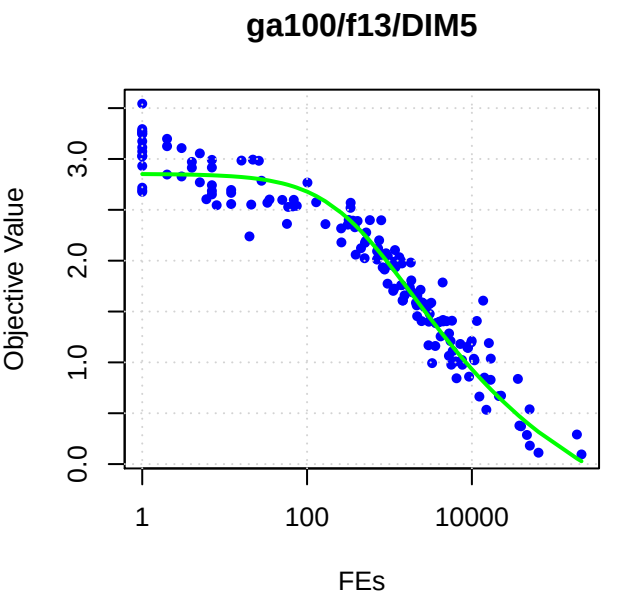
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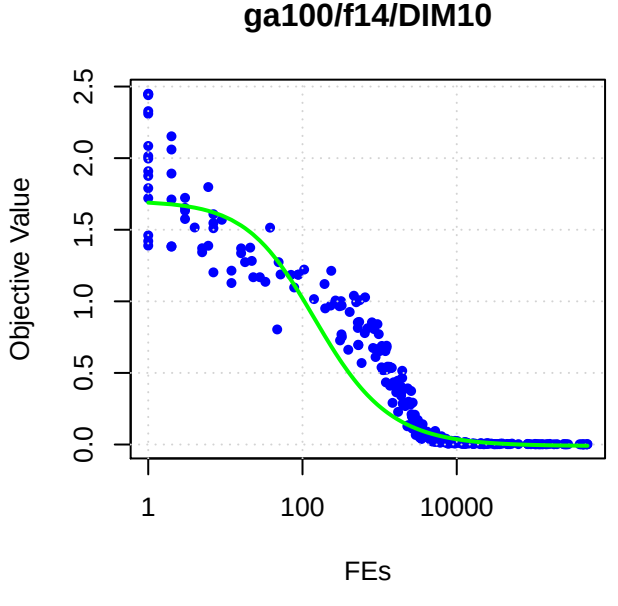
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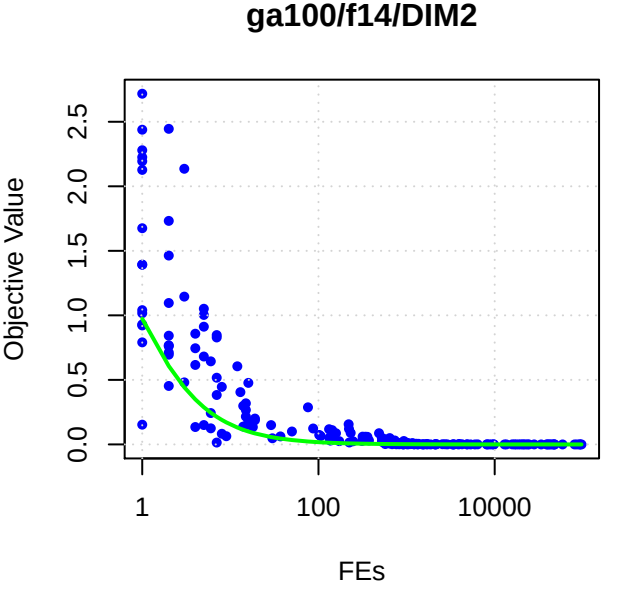
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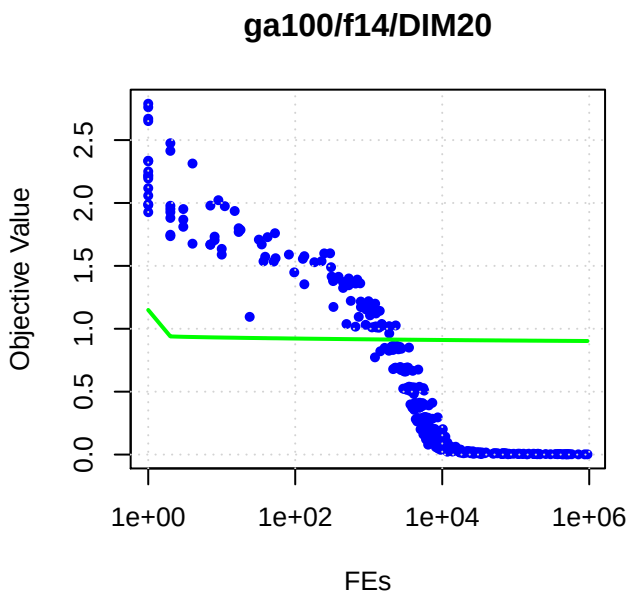
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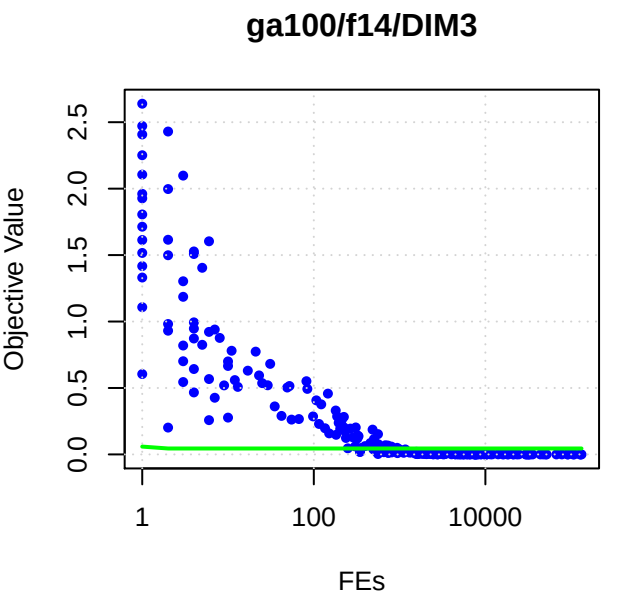
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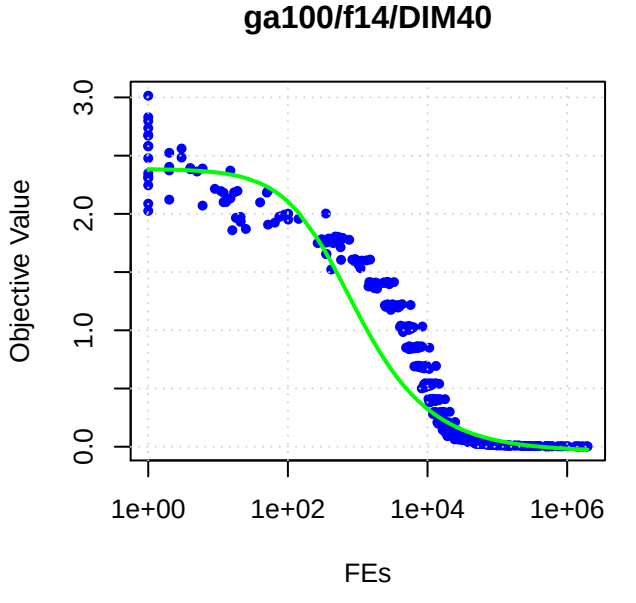
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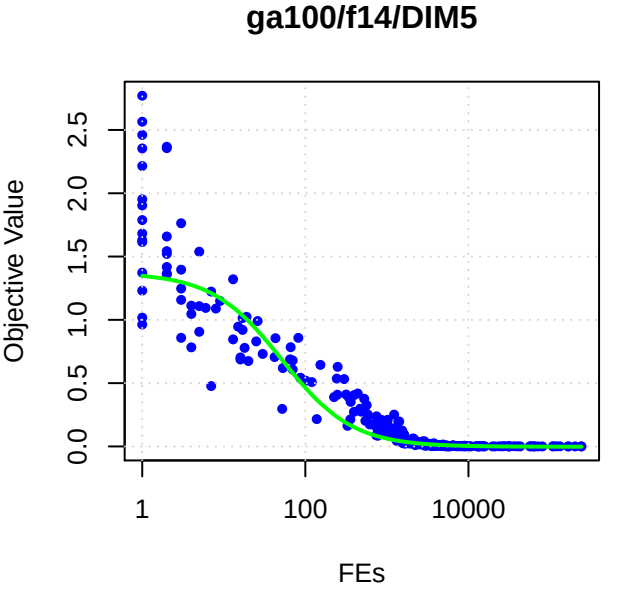
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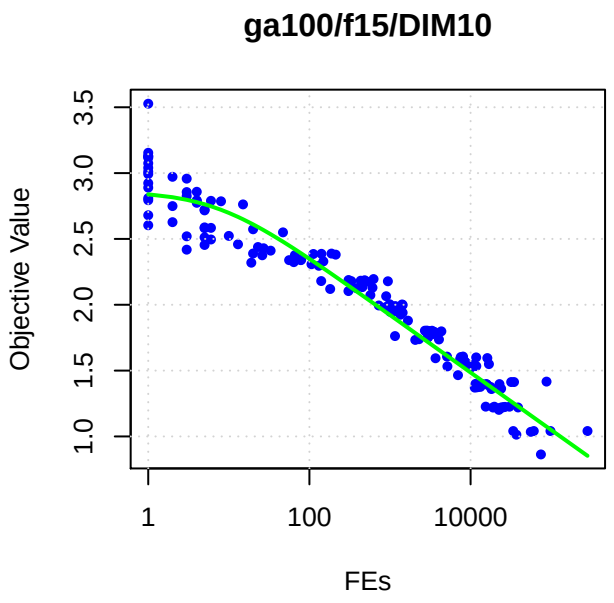
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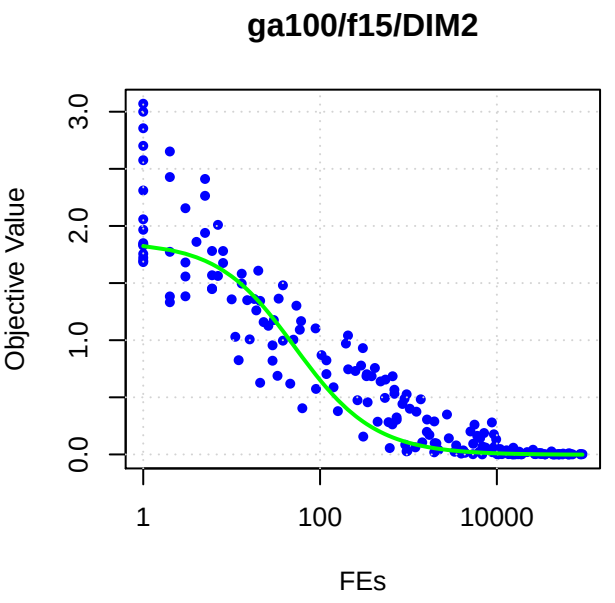
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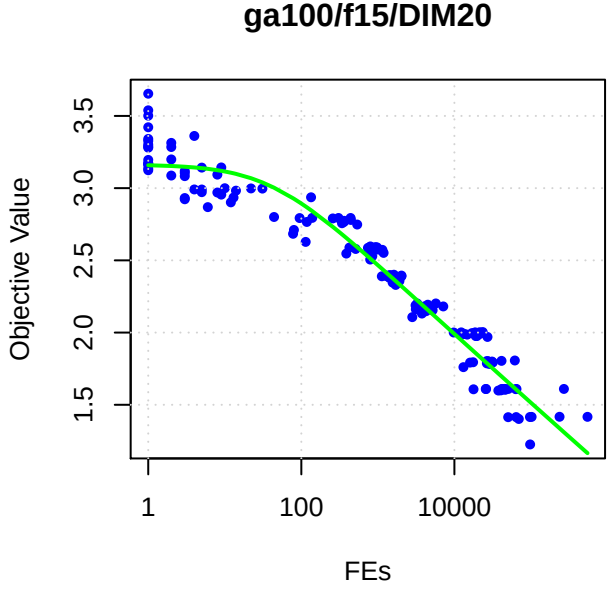
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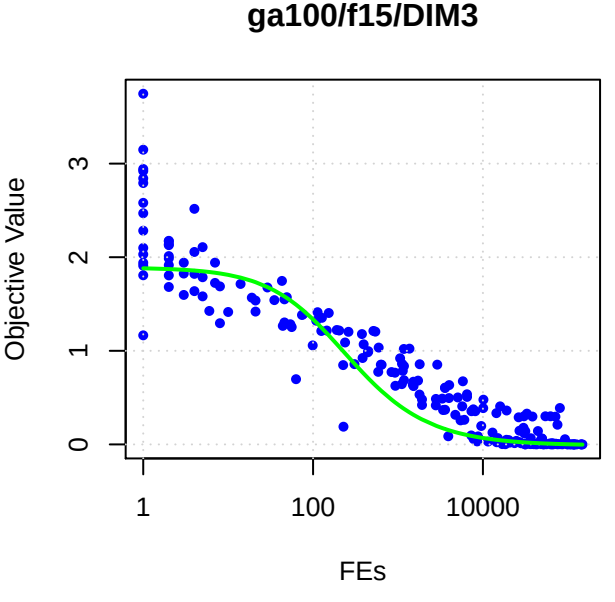
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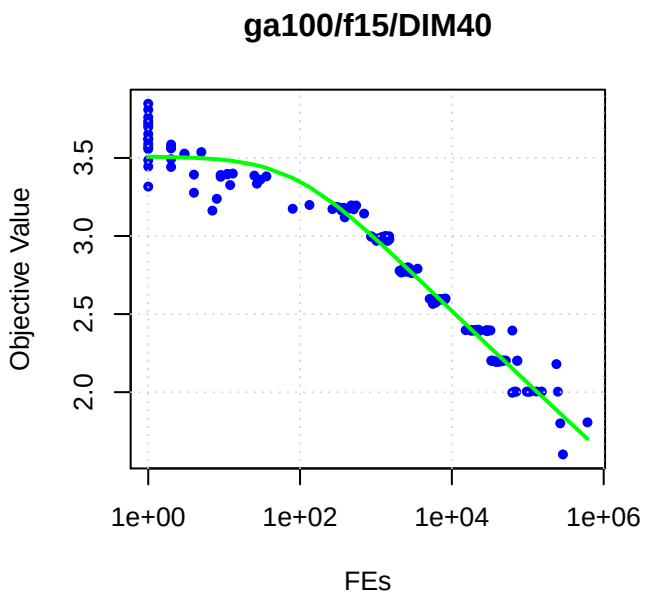
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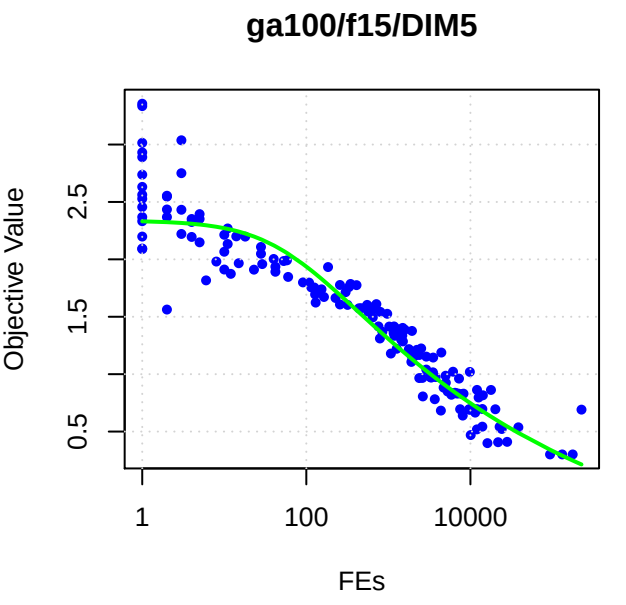
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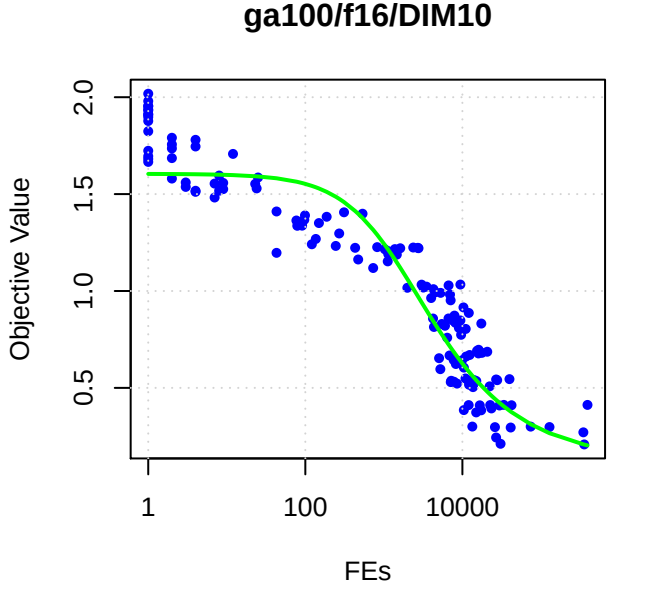
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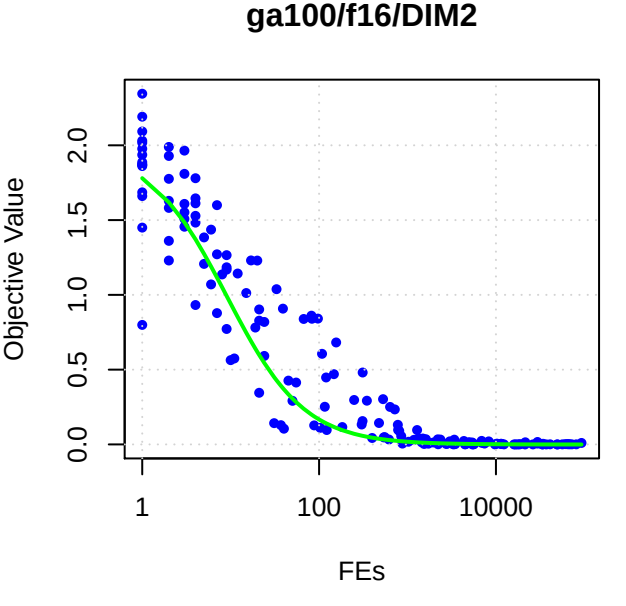
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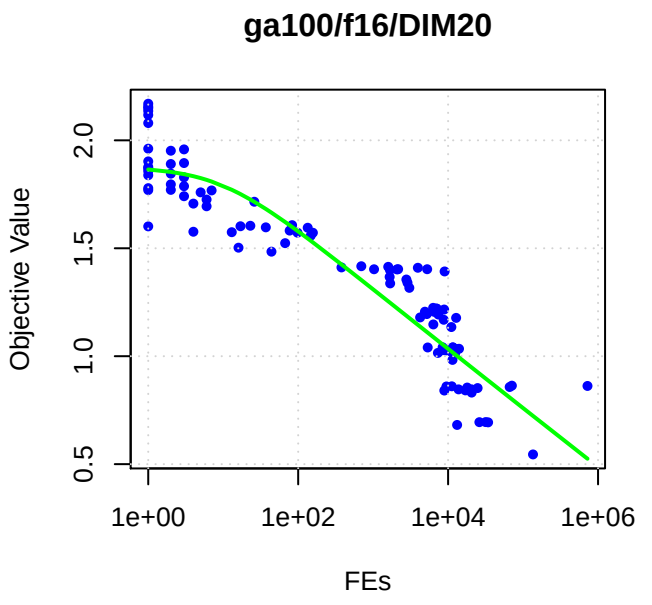
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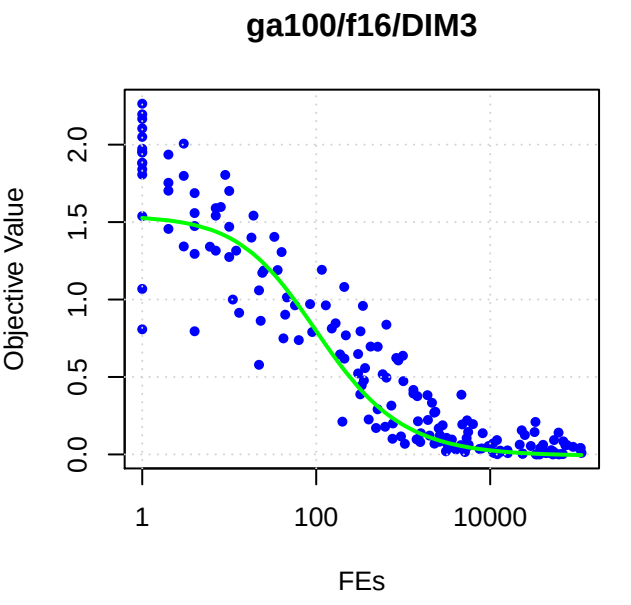
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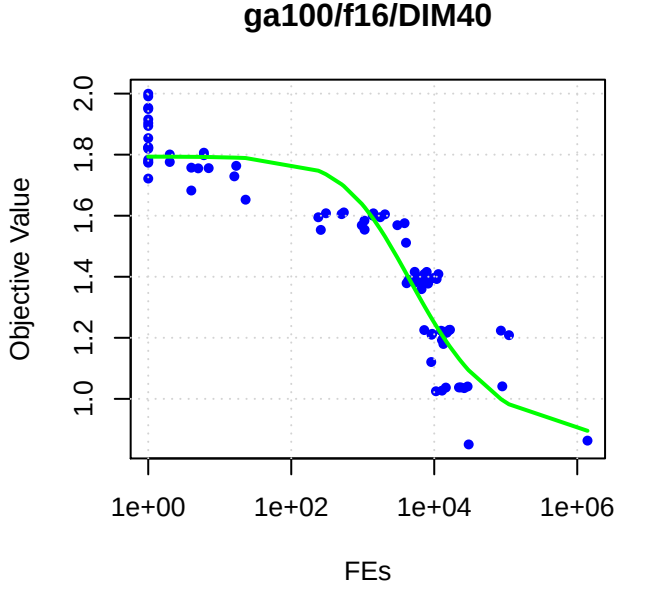
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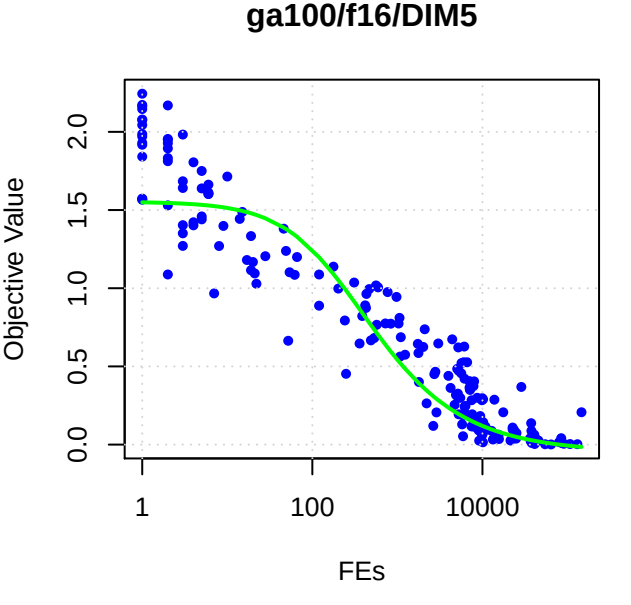
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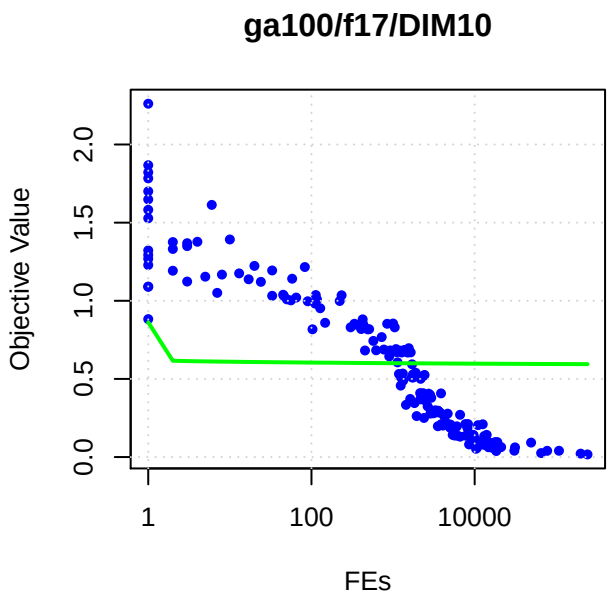
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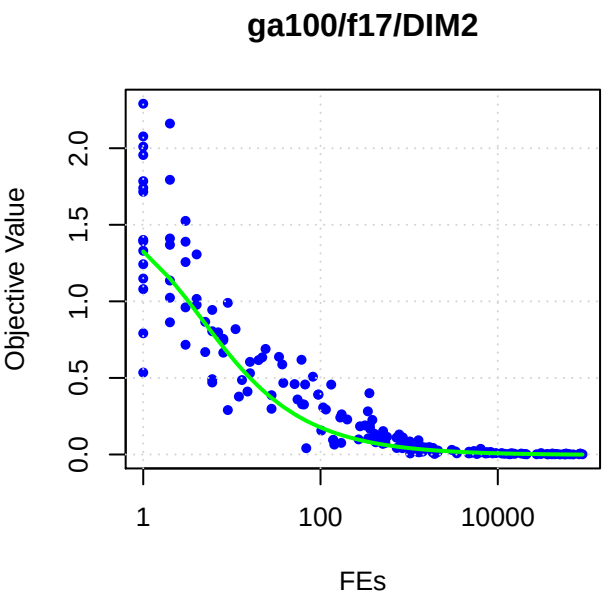
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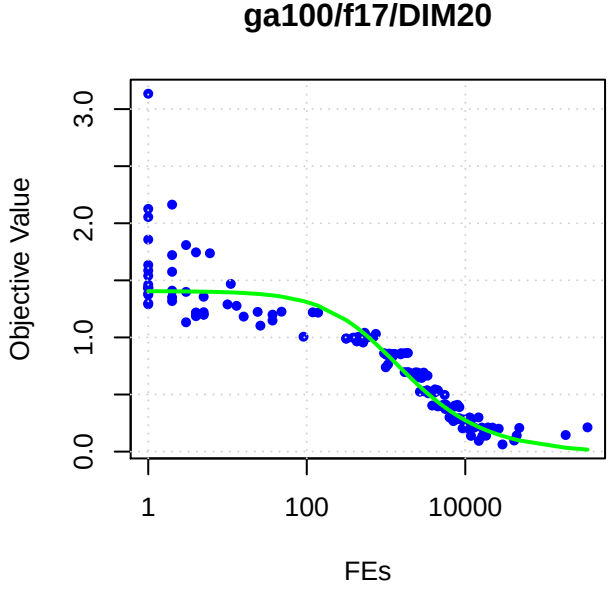
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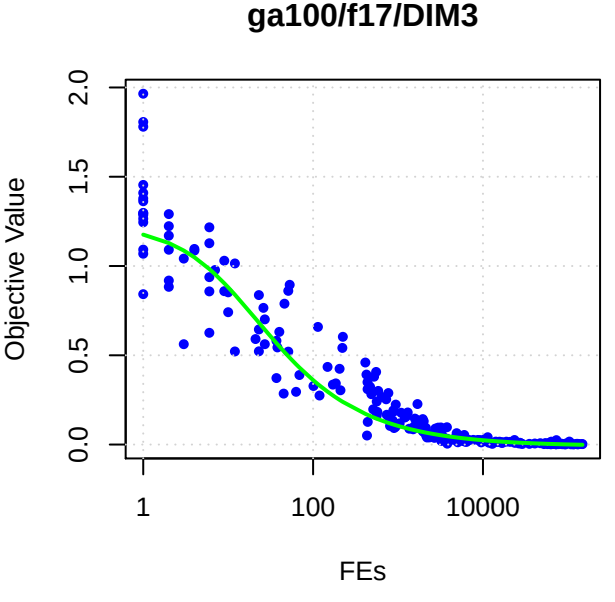
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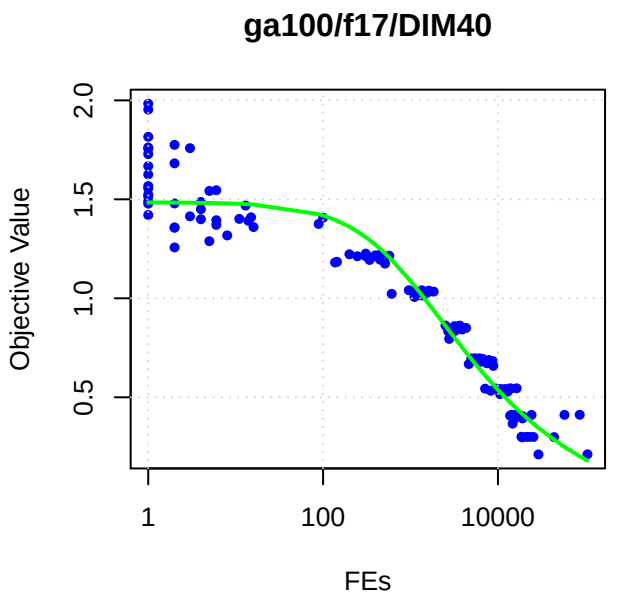
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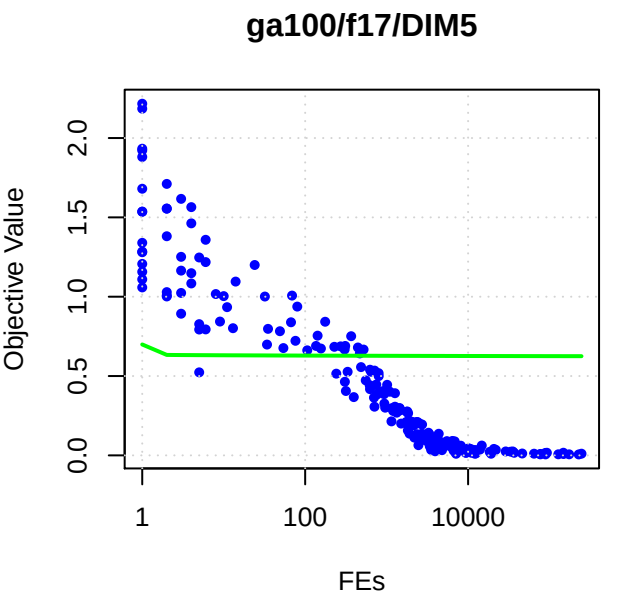
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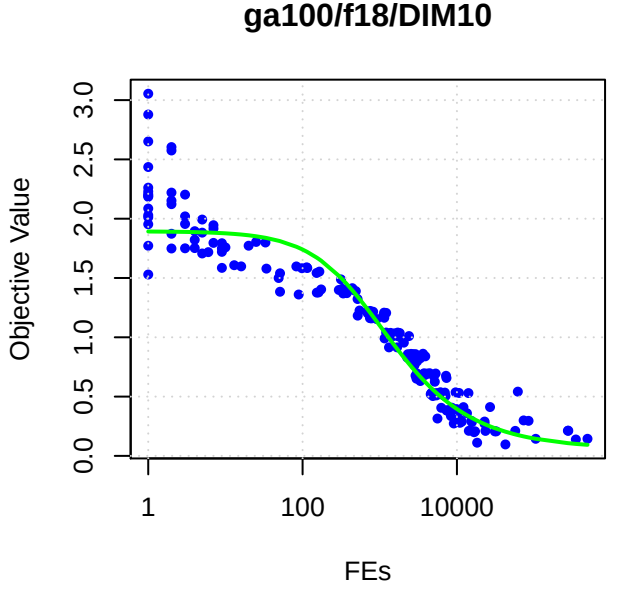
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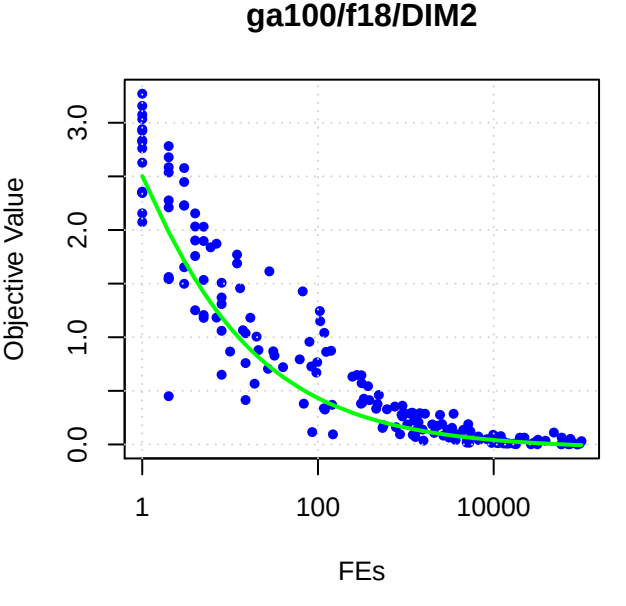
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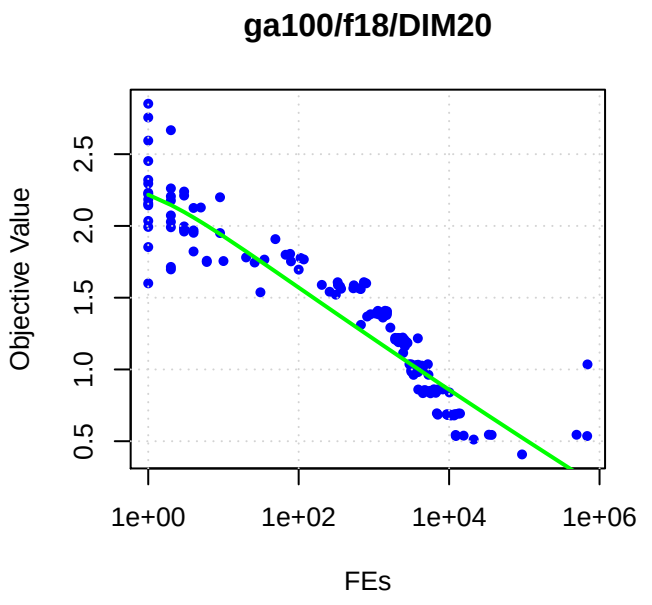
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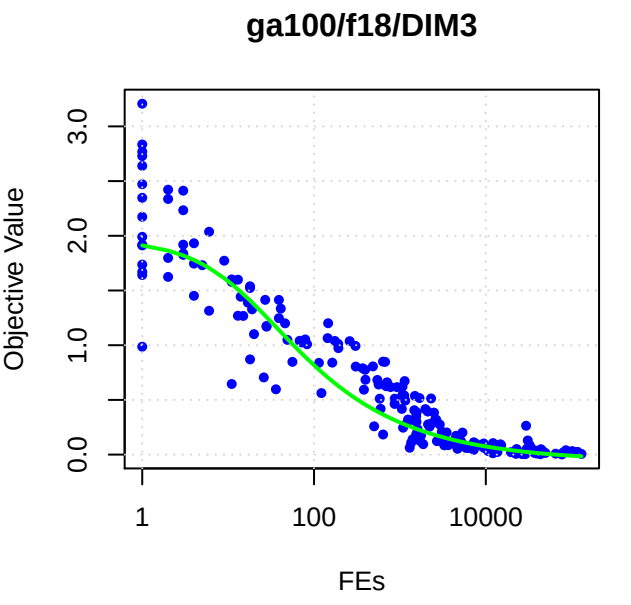
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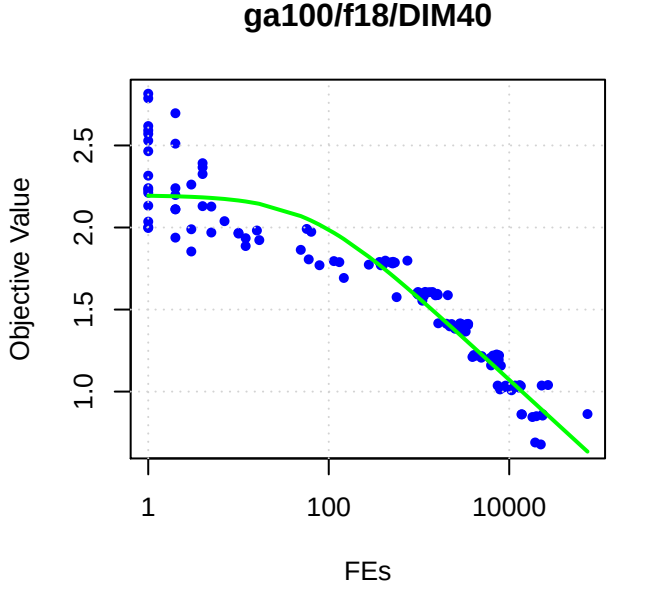
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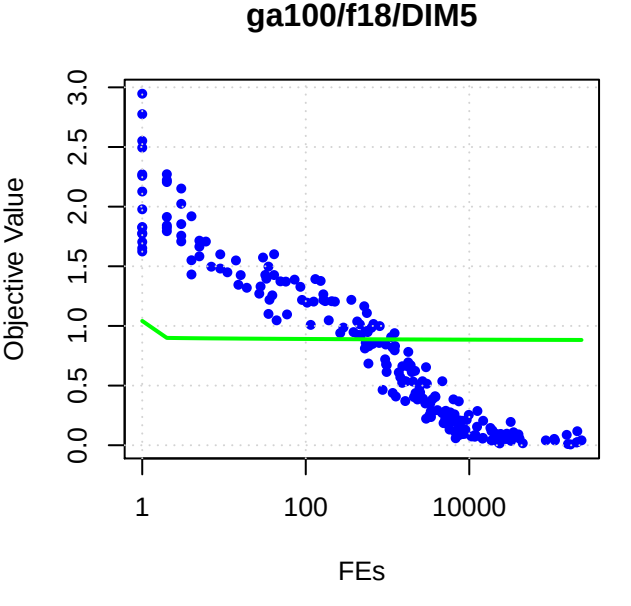
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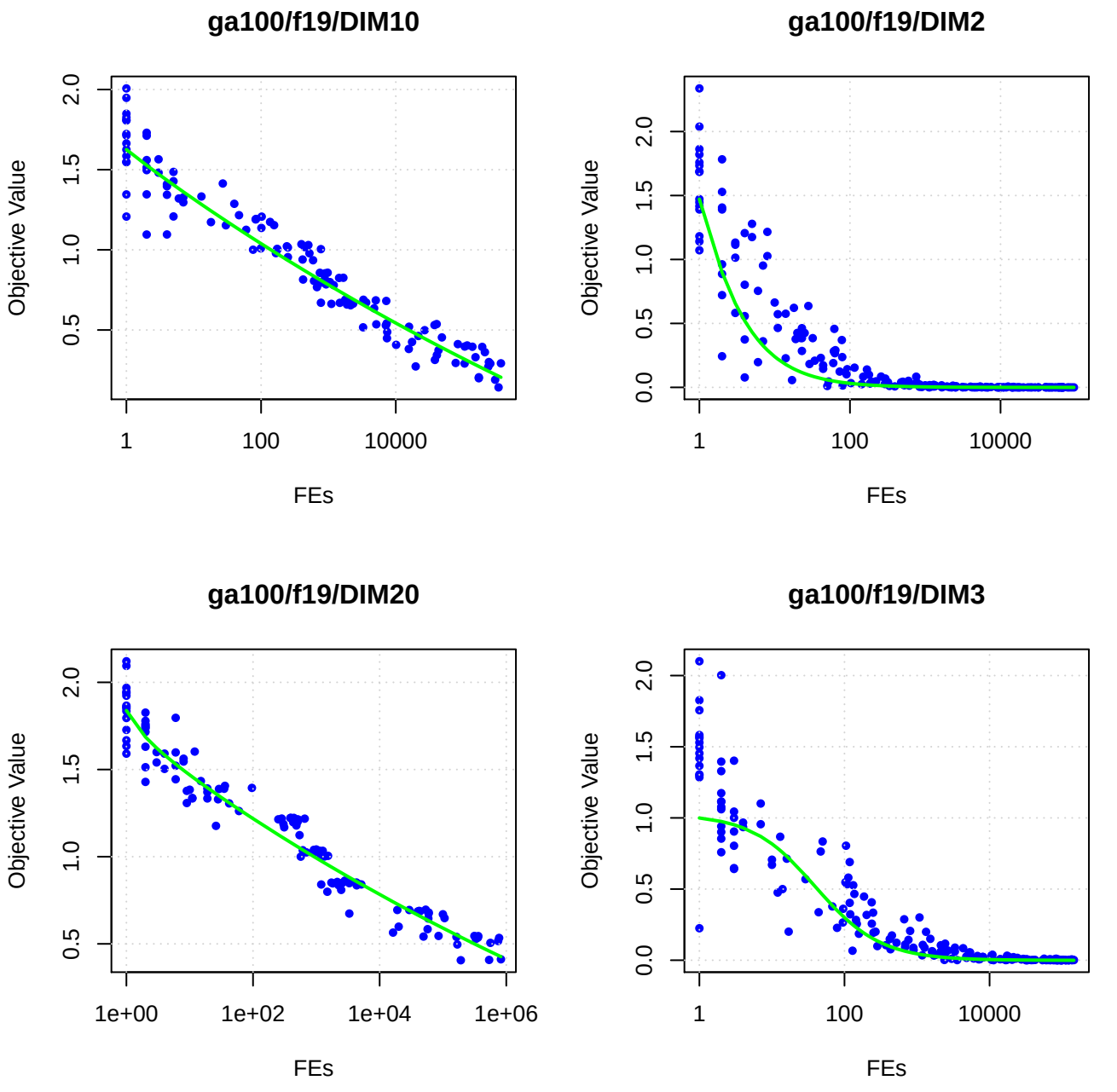
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1.5
2.0
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FEs
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Objective Value
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1.0
1.5
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1e+02
1e+04
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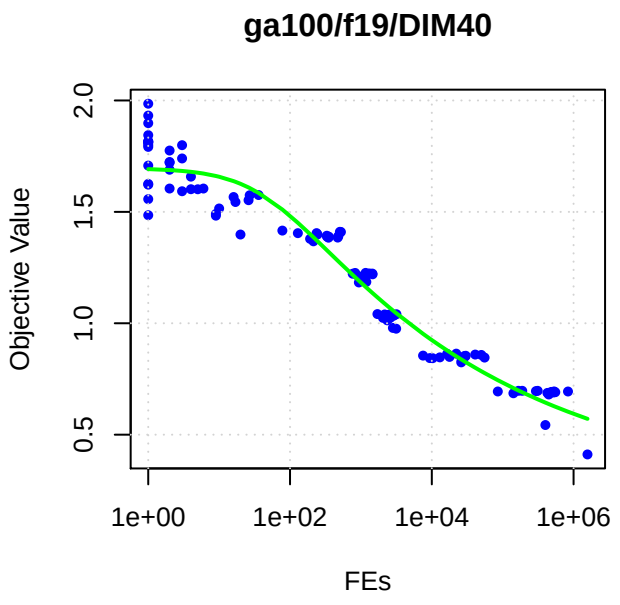
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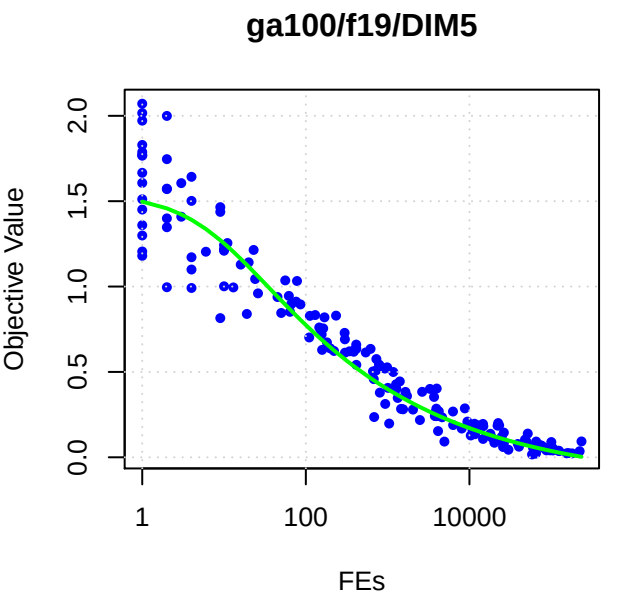
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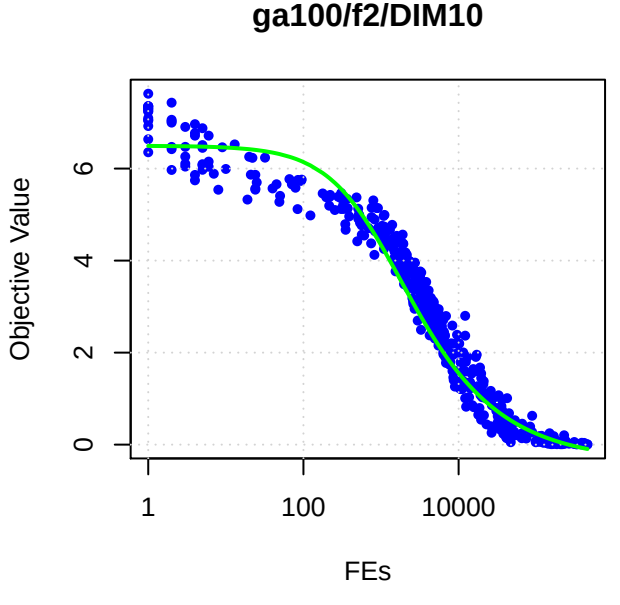
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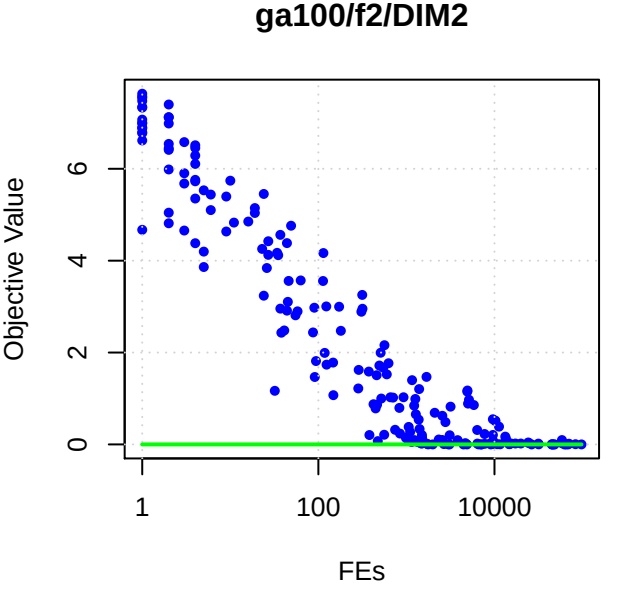
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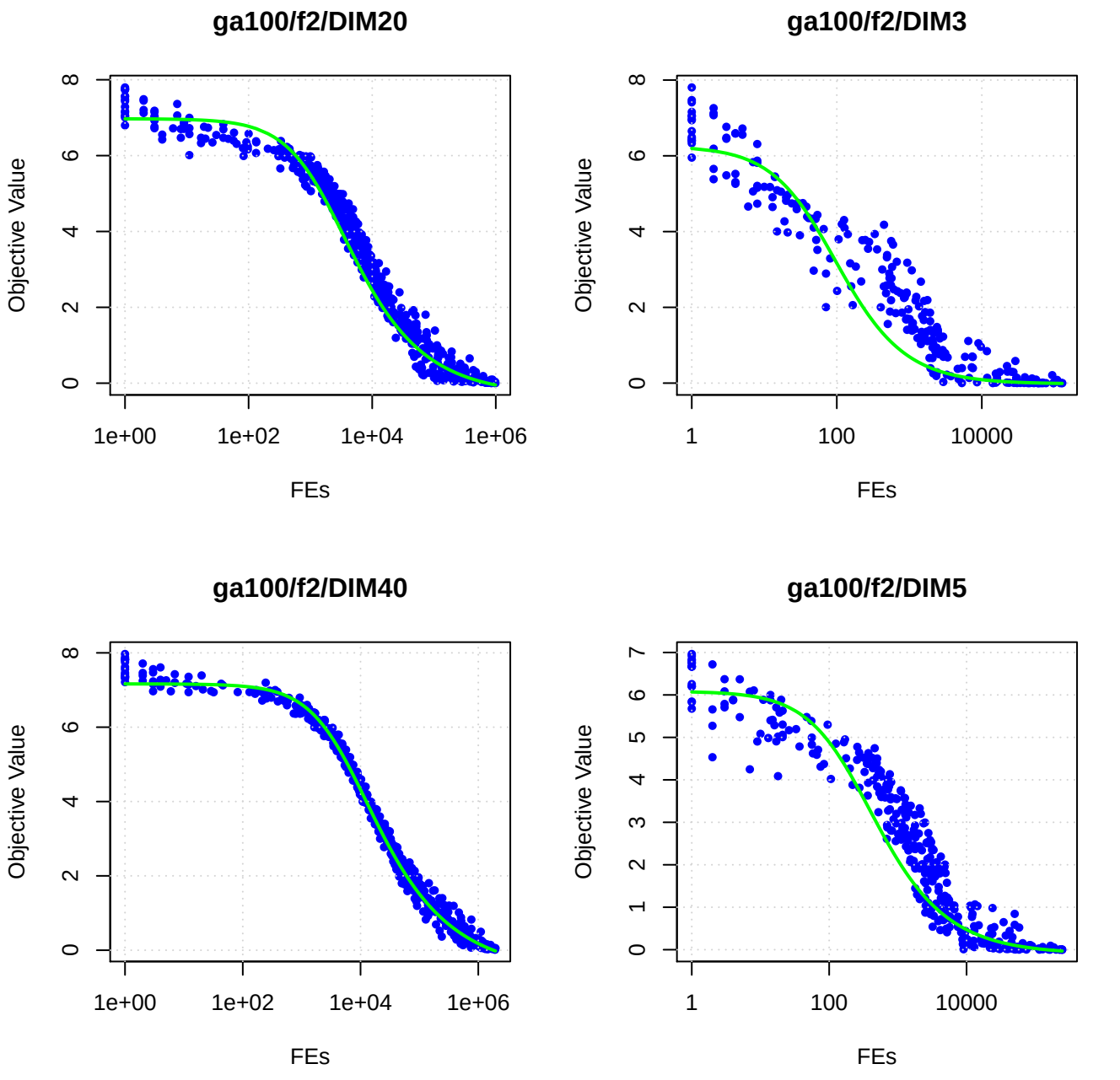
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Objective Value
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ga100/f2/DIM40
Objective Value
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4
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8
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1e+02
1e+04
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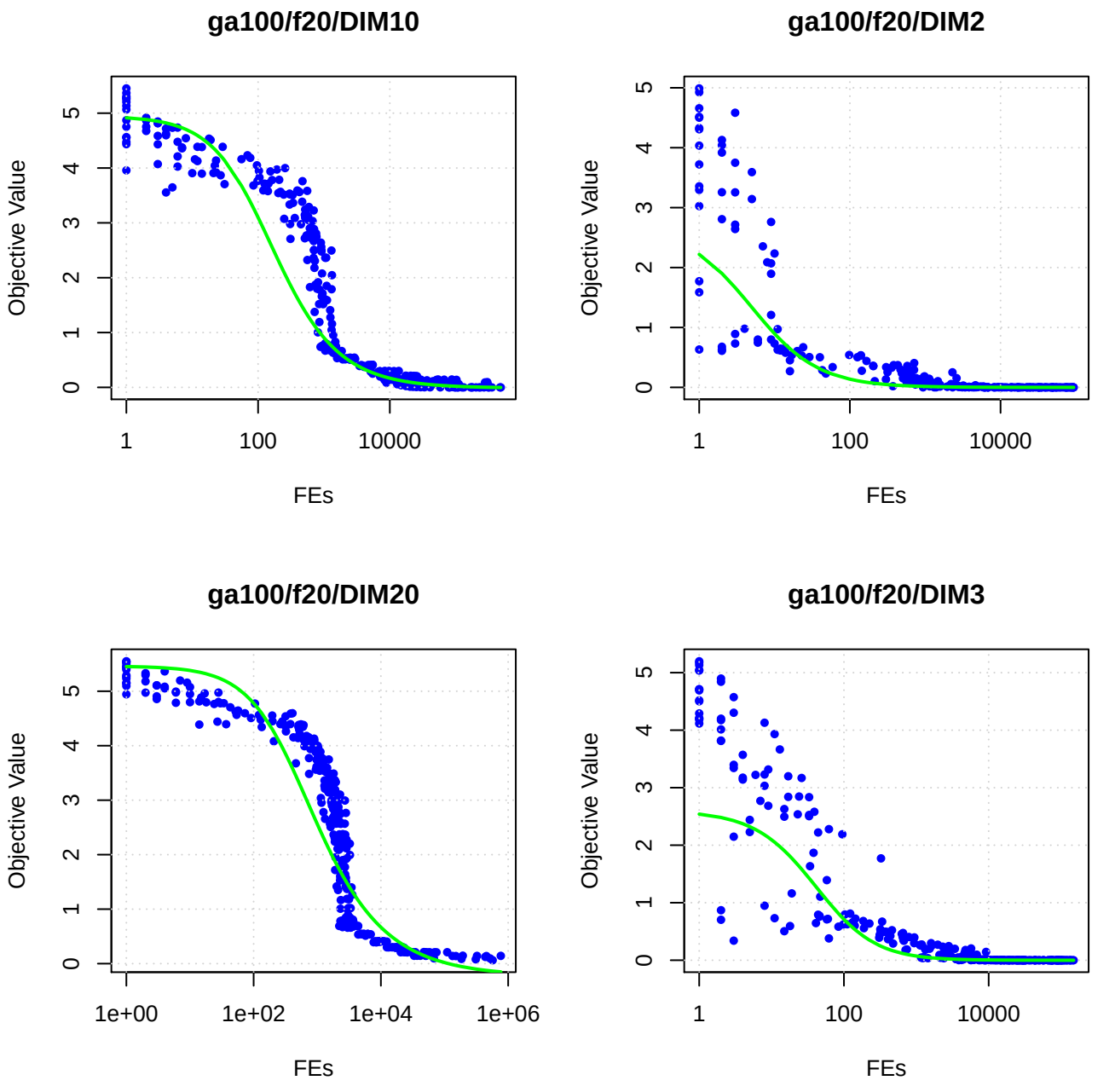
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ga100/f20/DIM20
ga100/f20/DIM3
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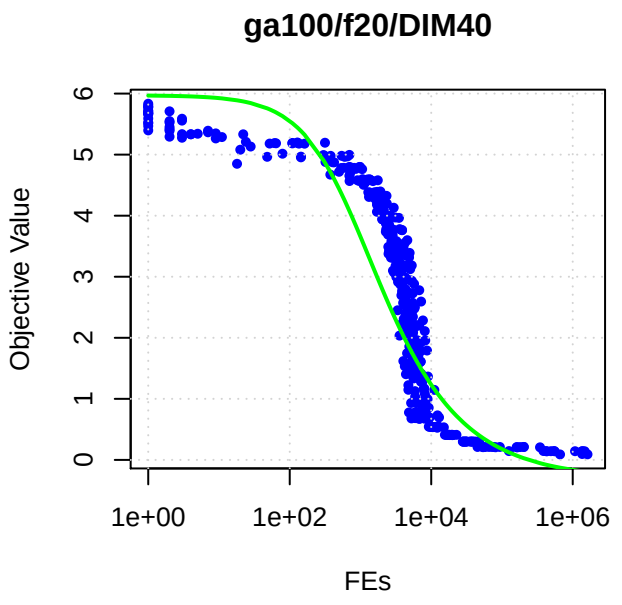
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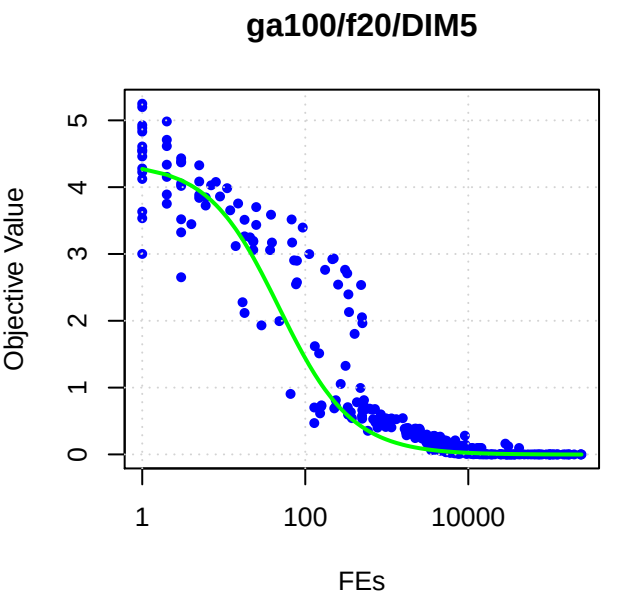
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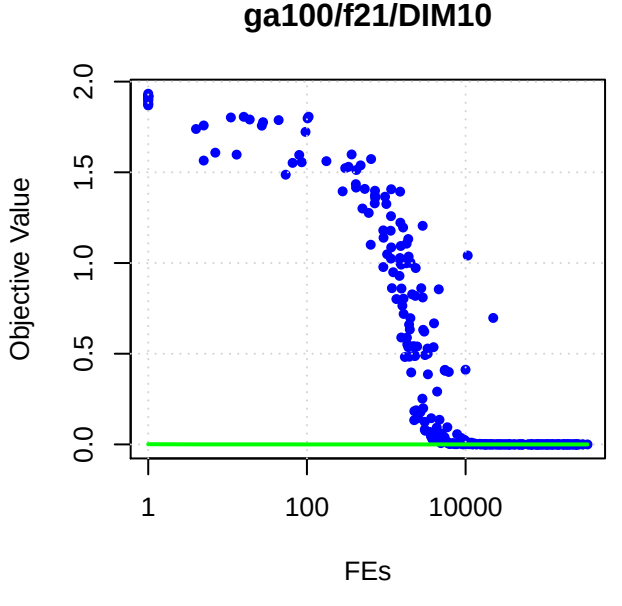
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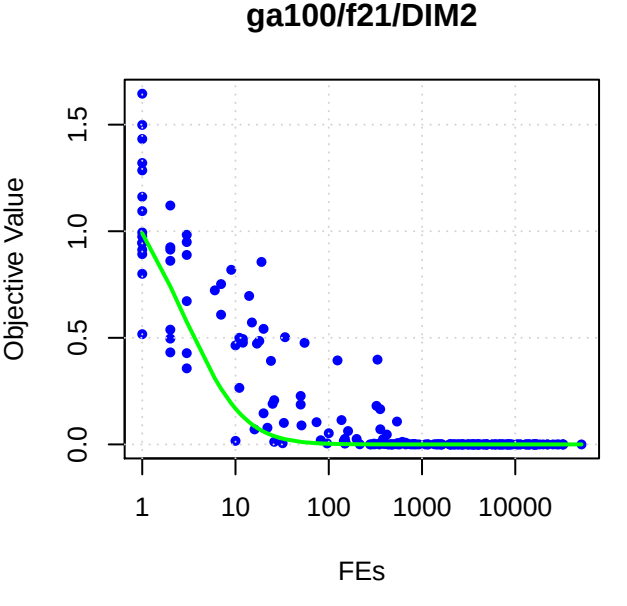
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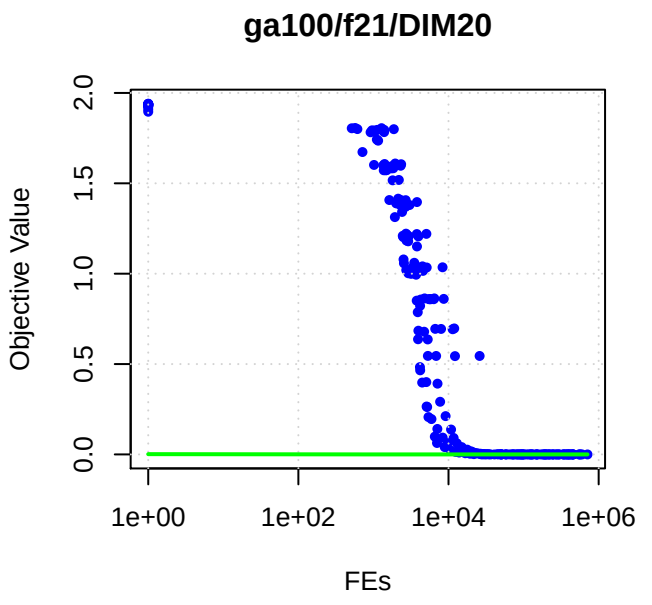
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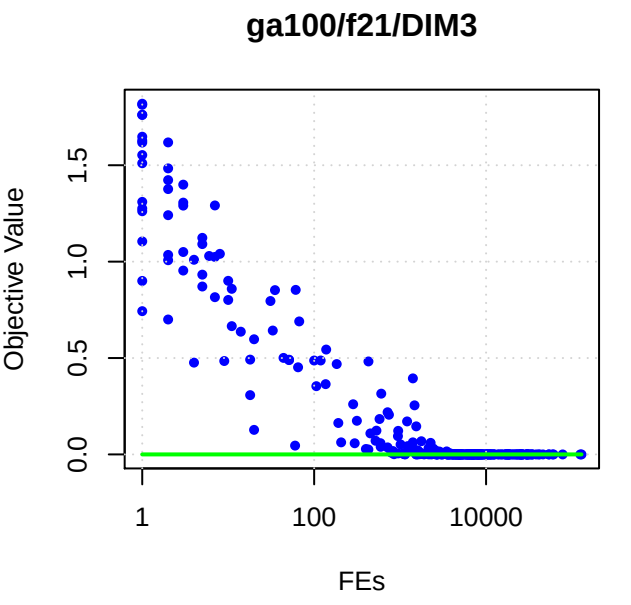
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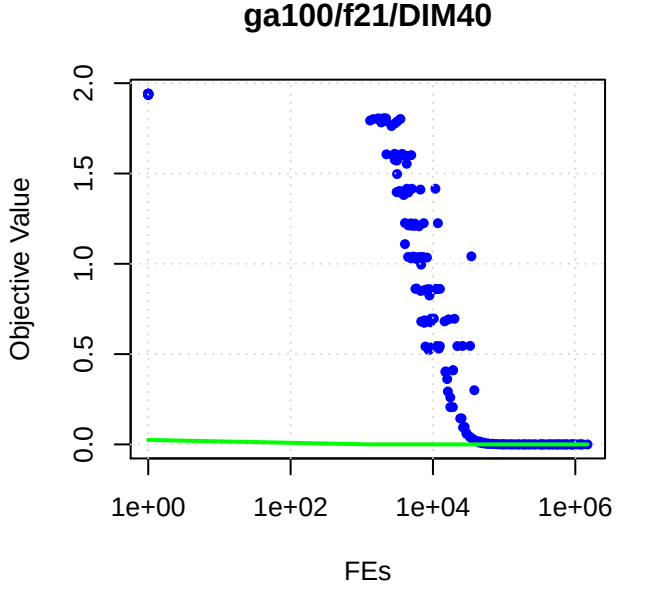
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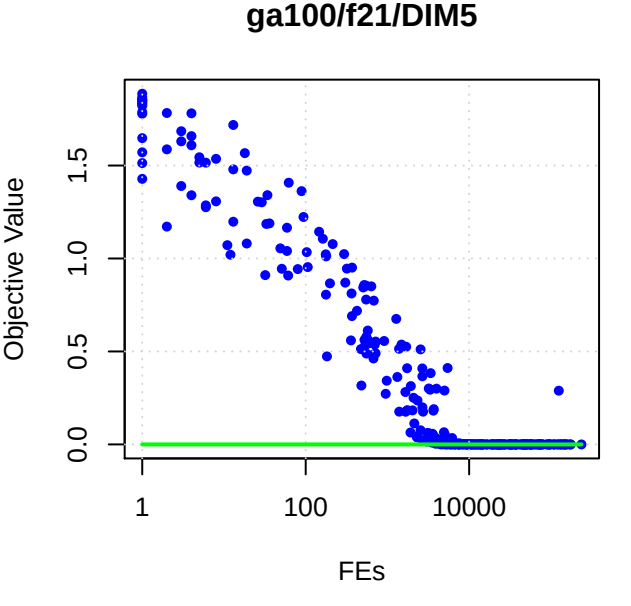
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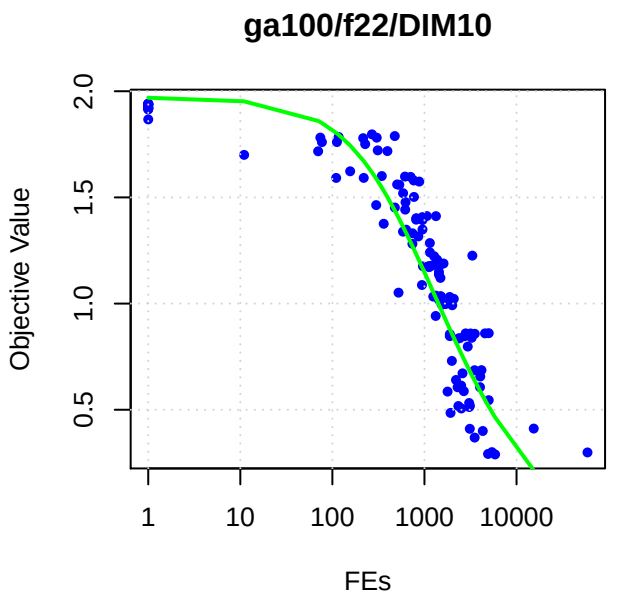
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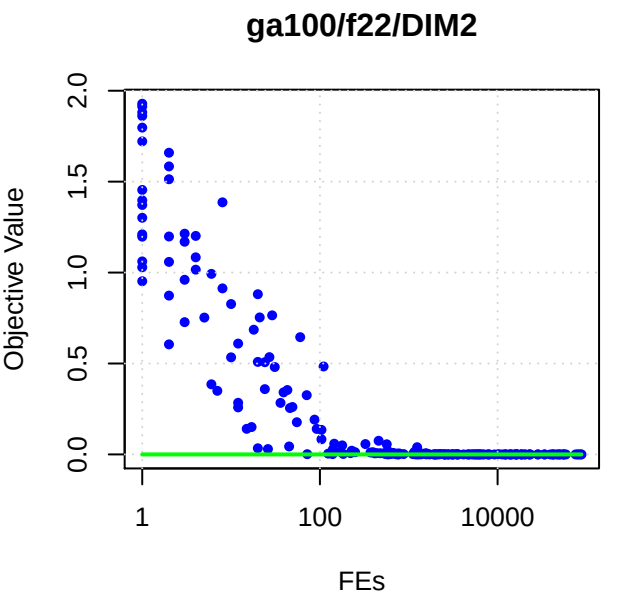
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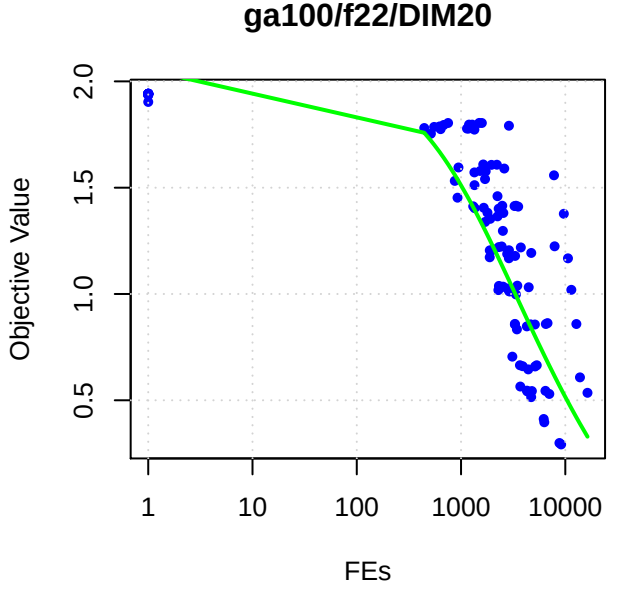
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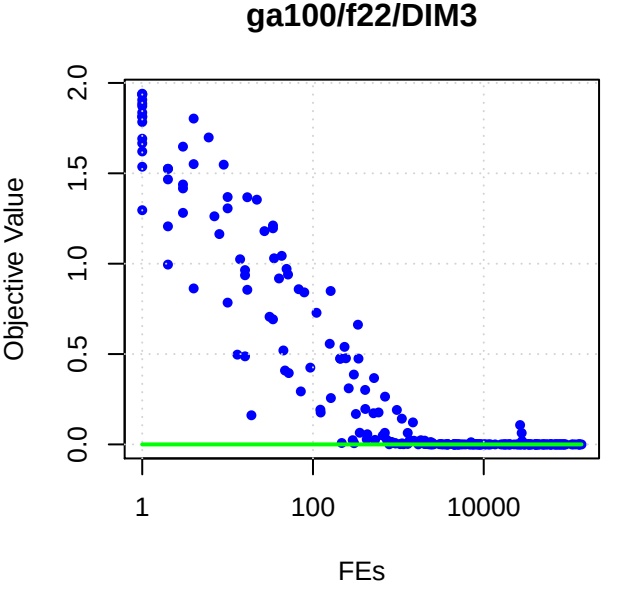
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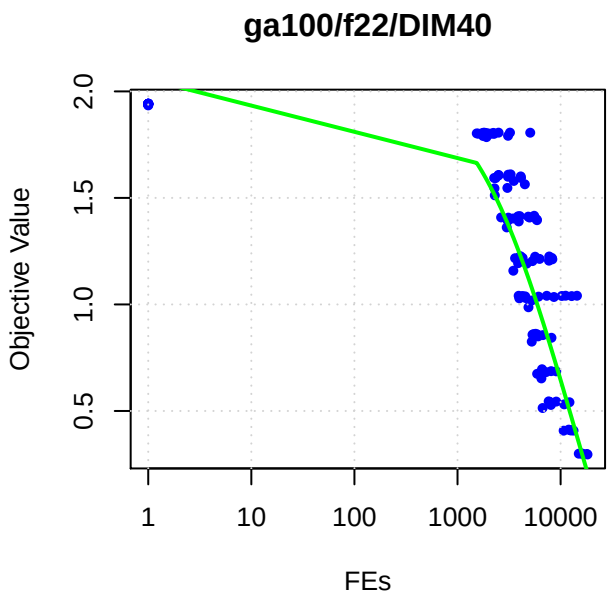
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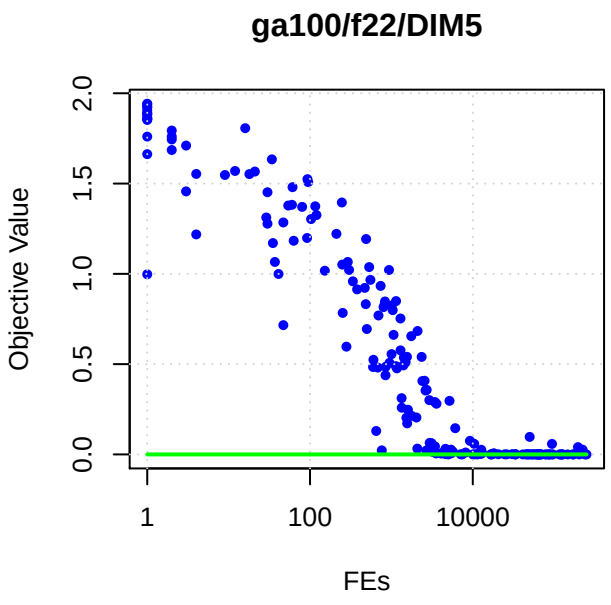
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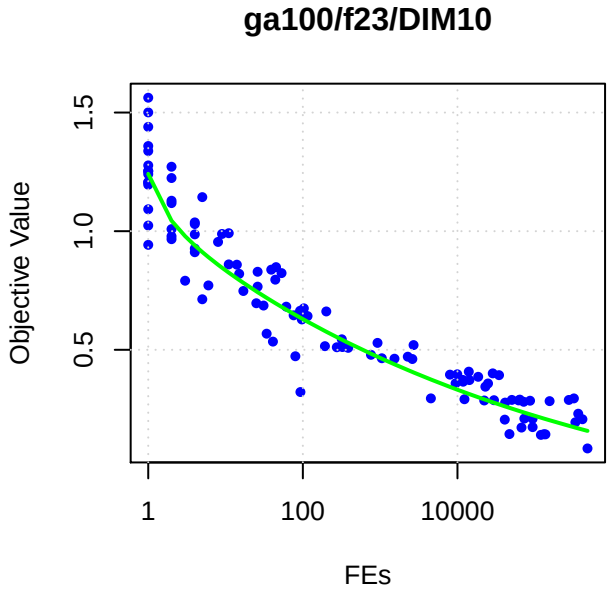
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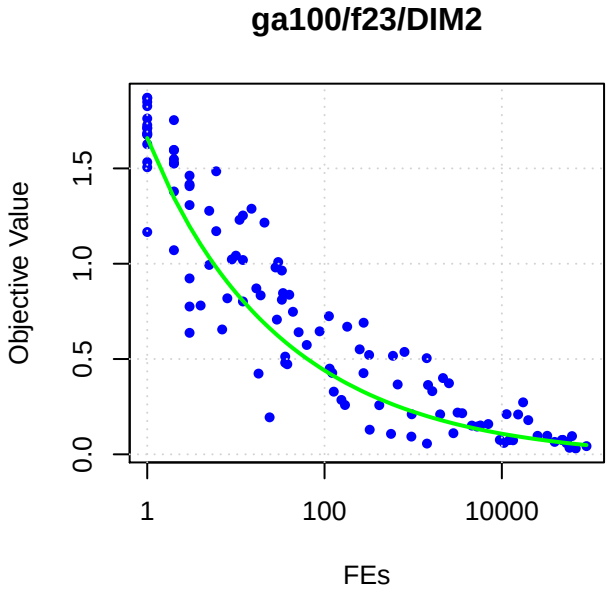
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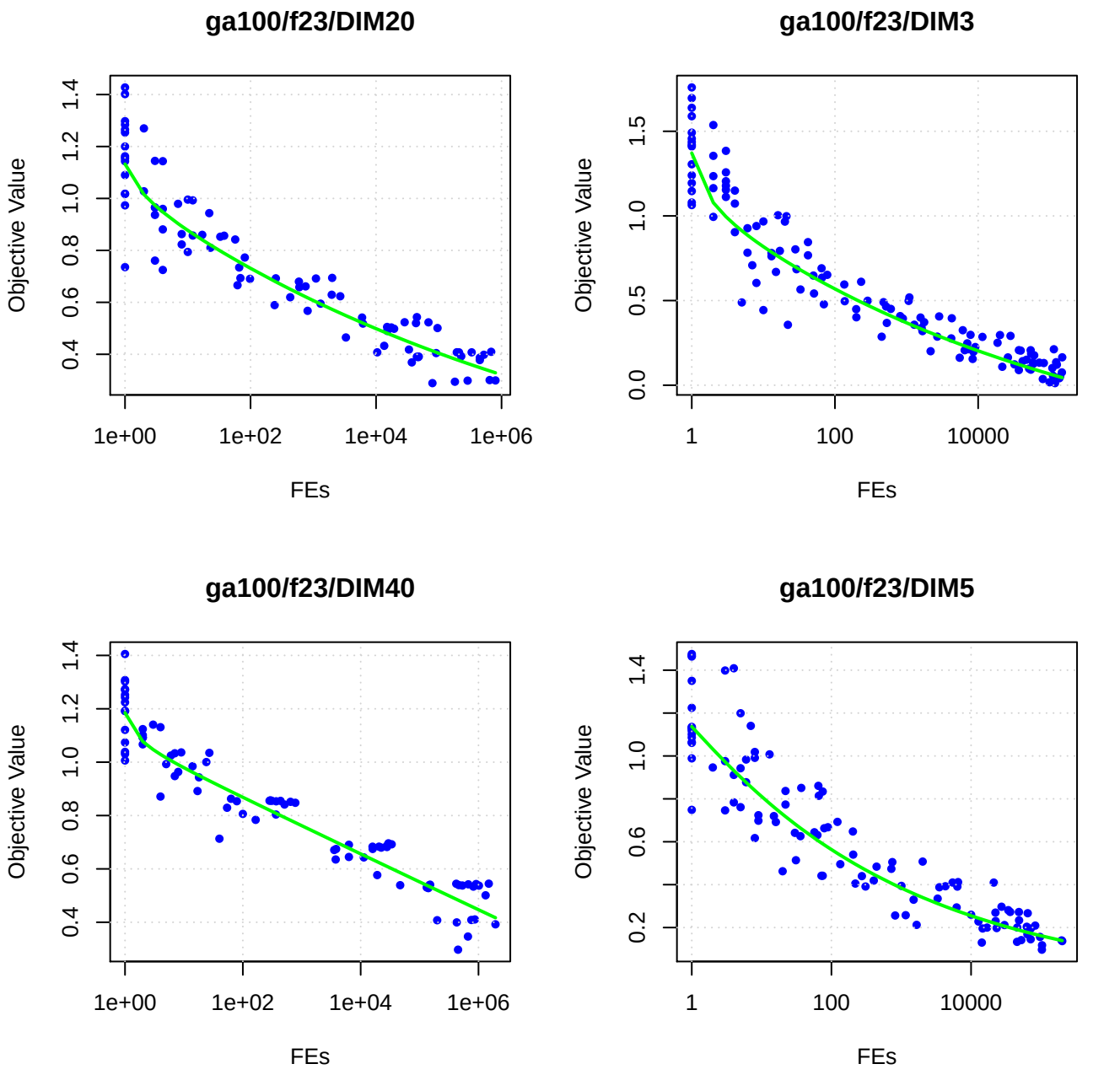
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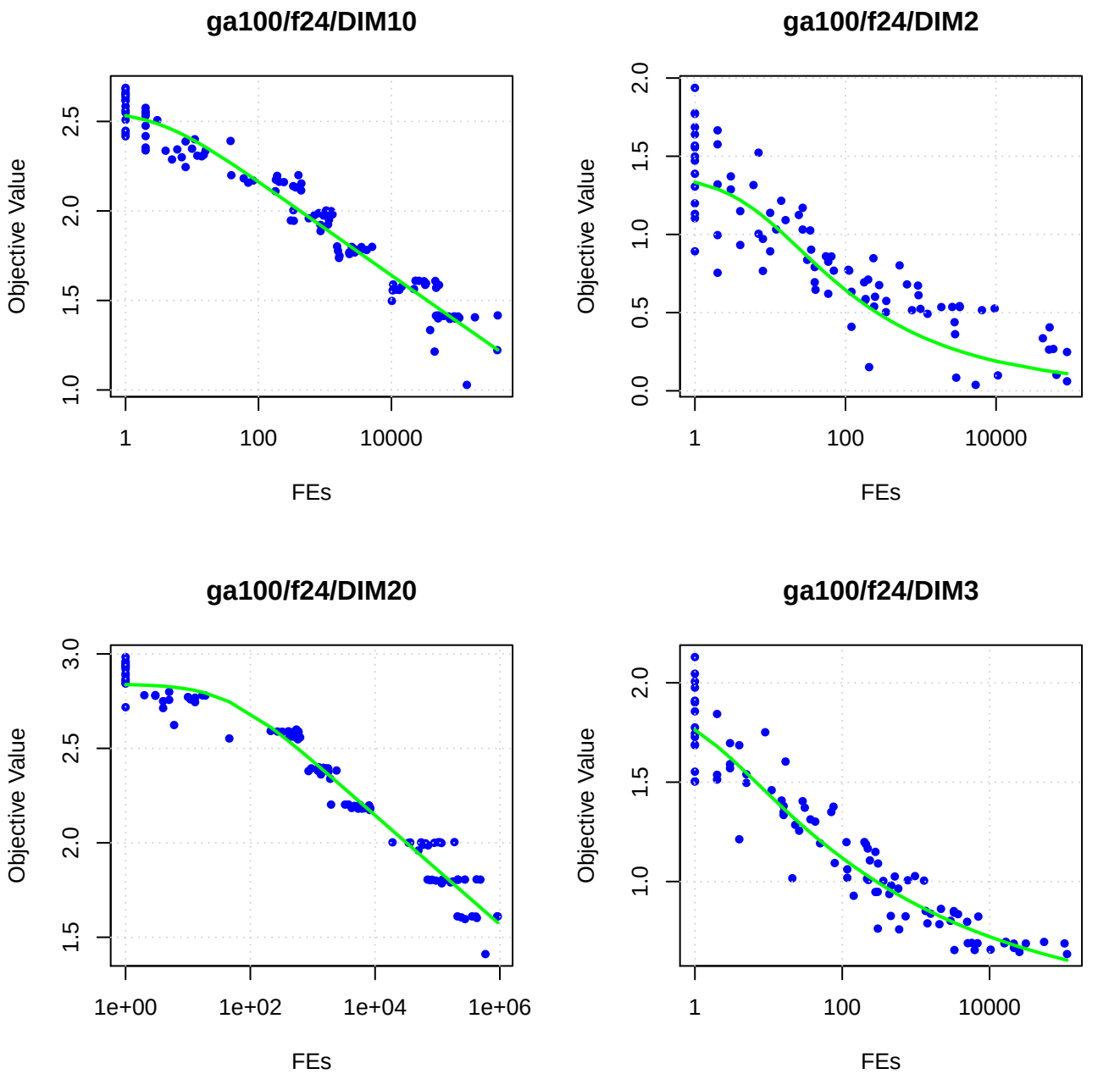
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Objective Value
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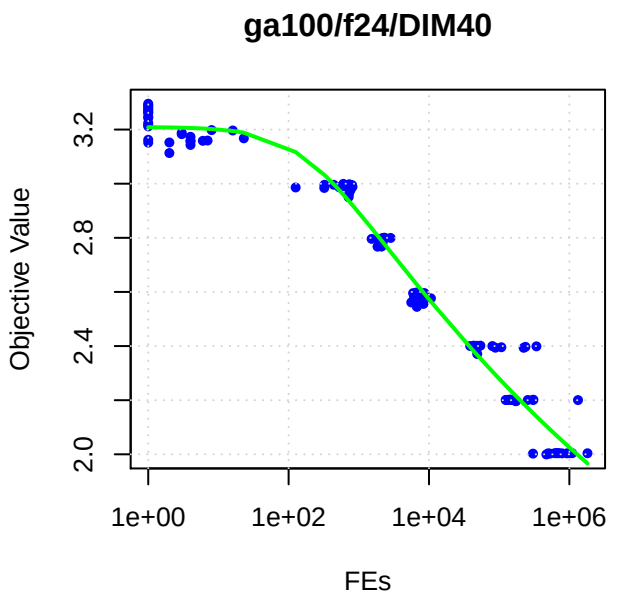
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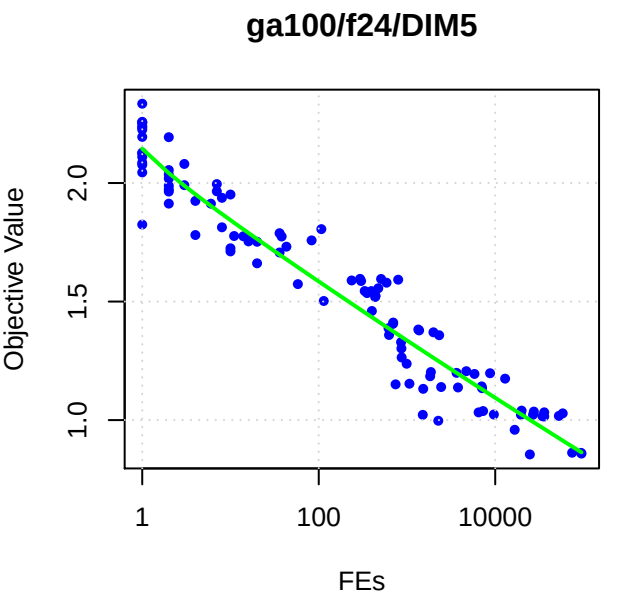
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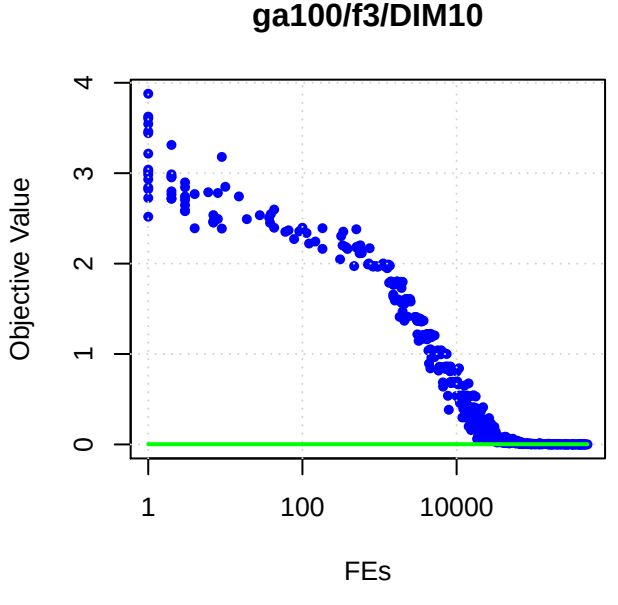
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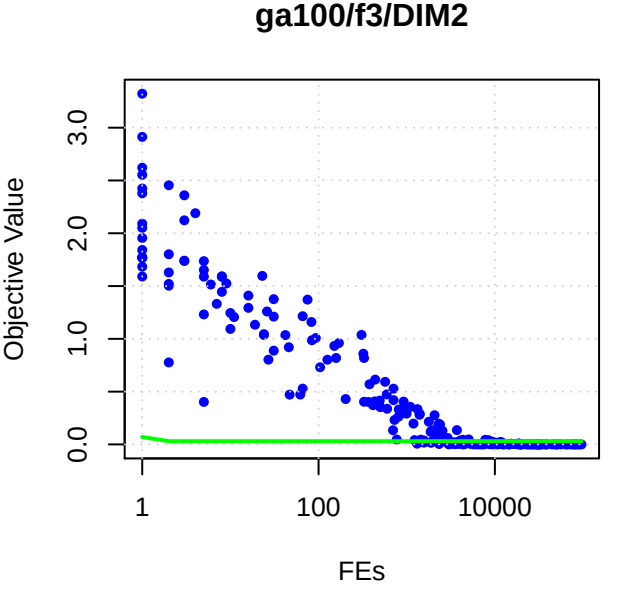
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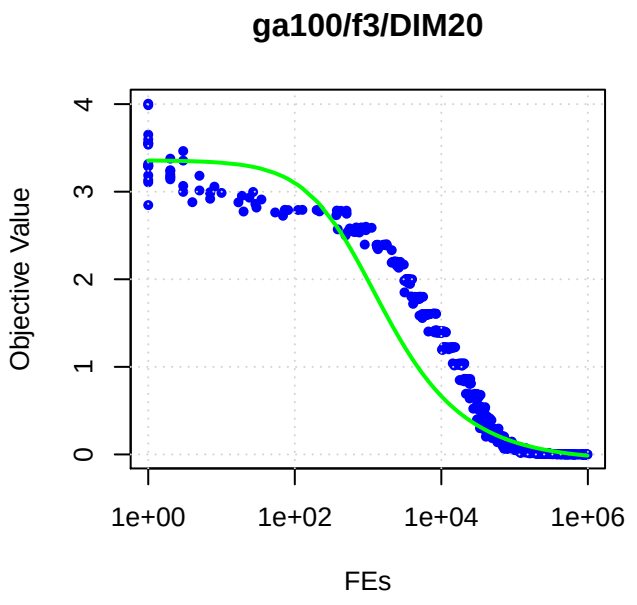
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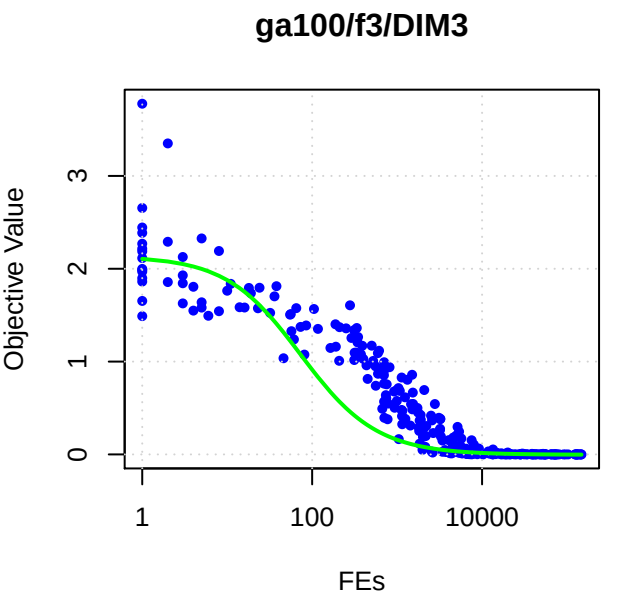
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Objective Value
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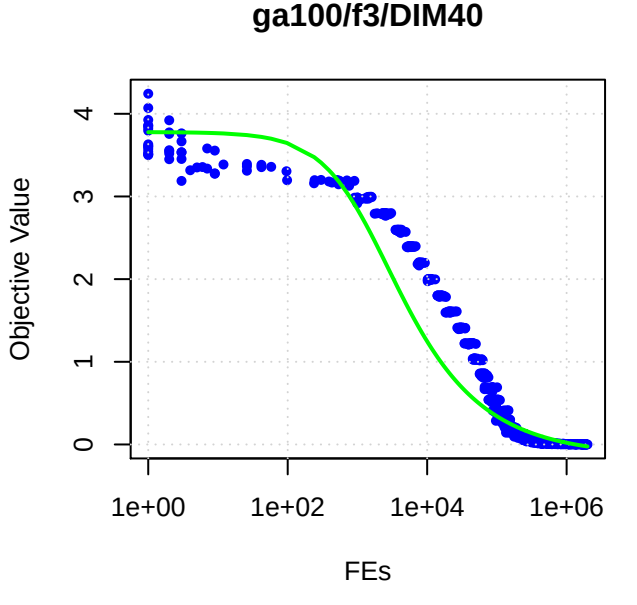
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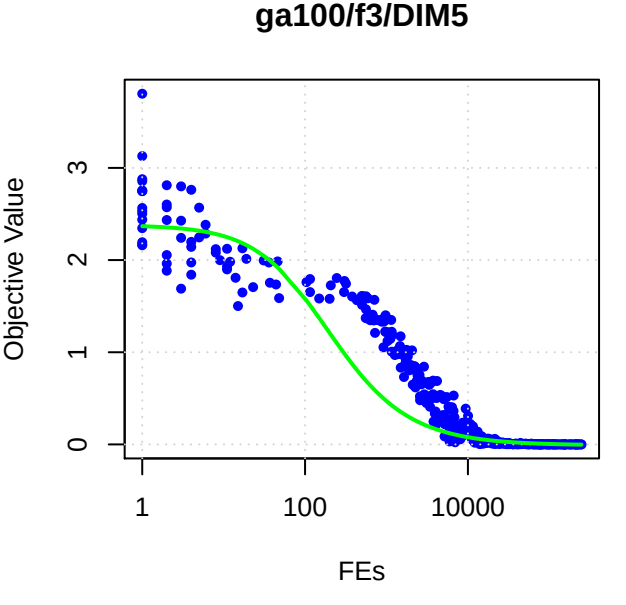
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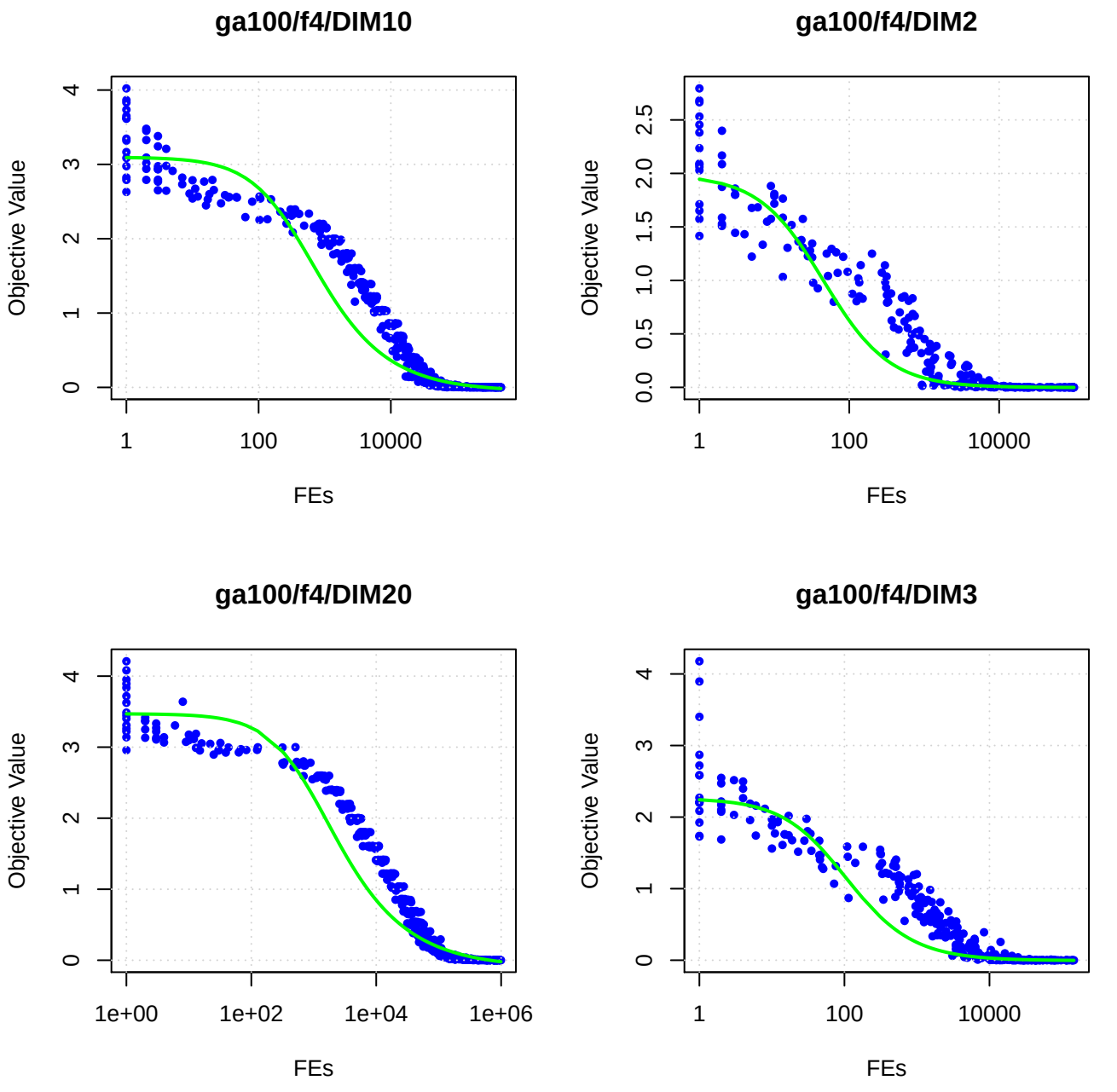
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Objective Value
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4
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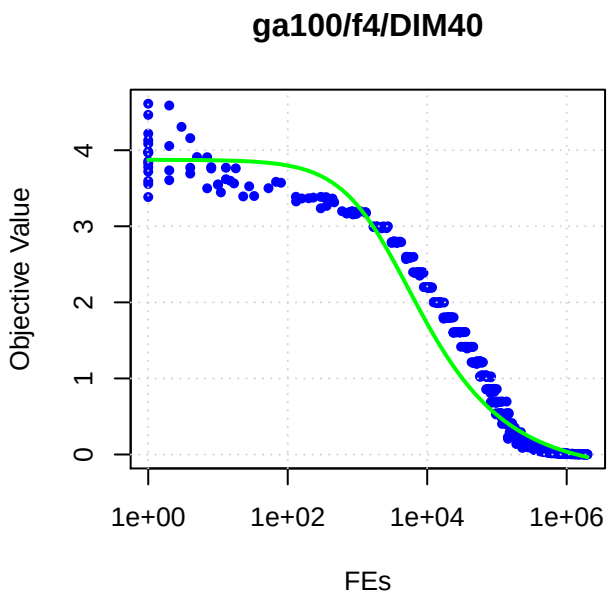
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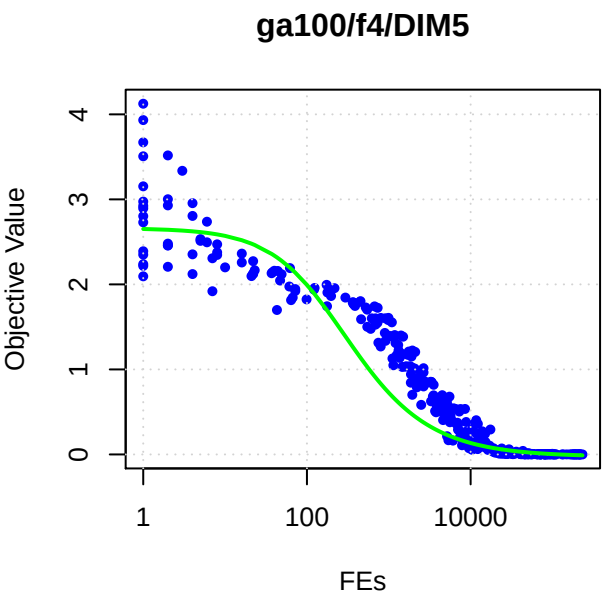
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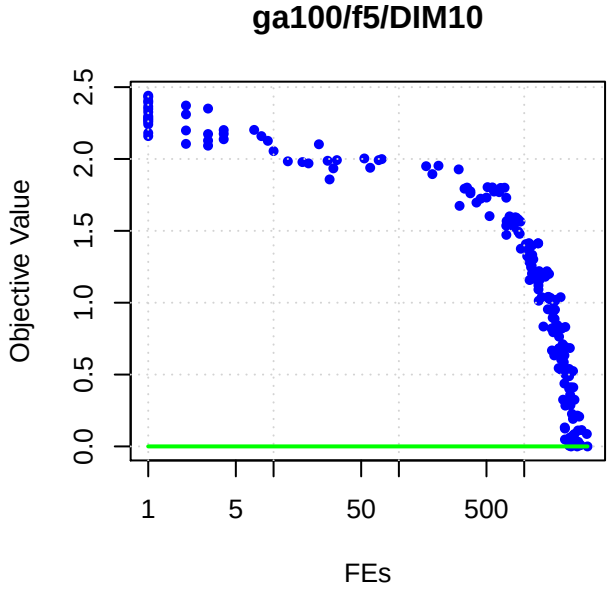
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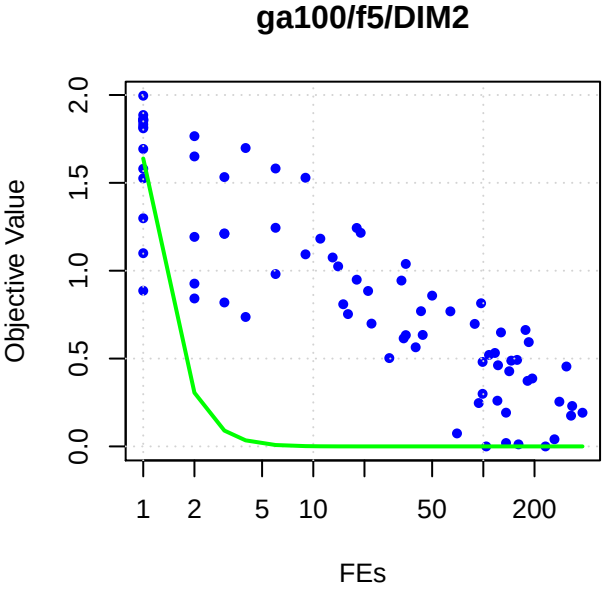
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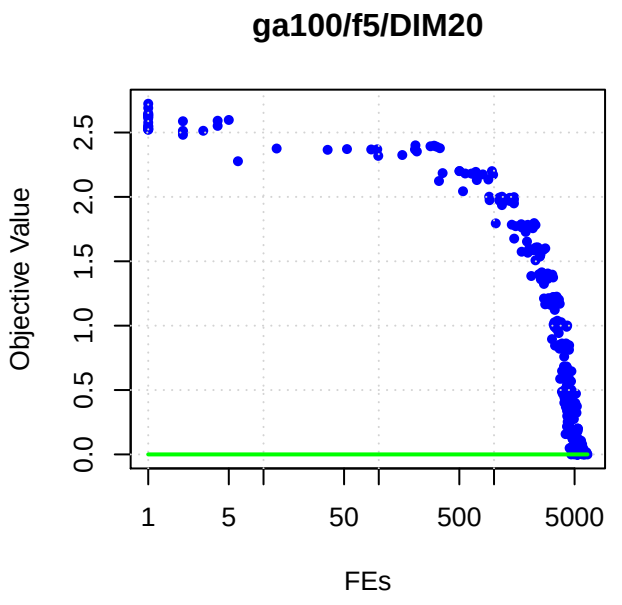
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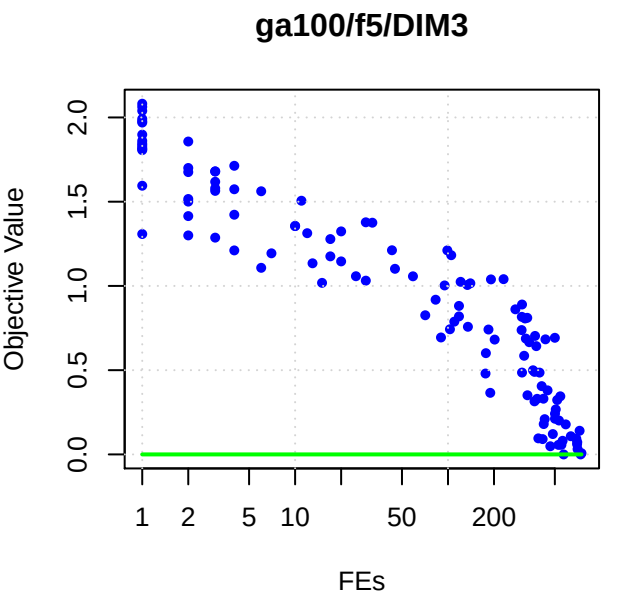
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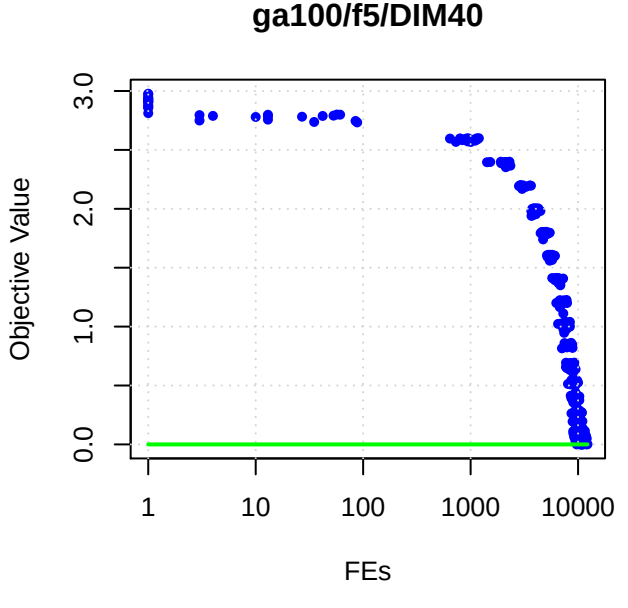
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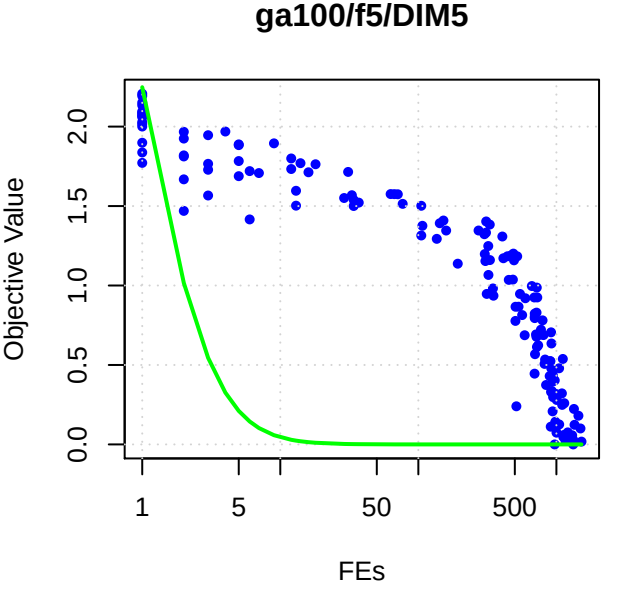
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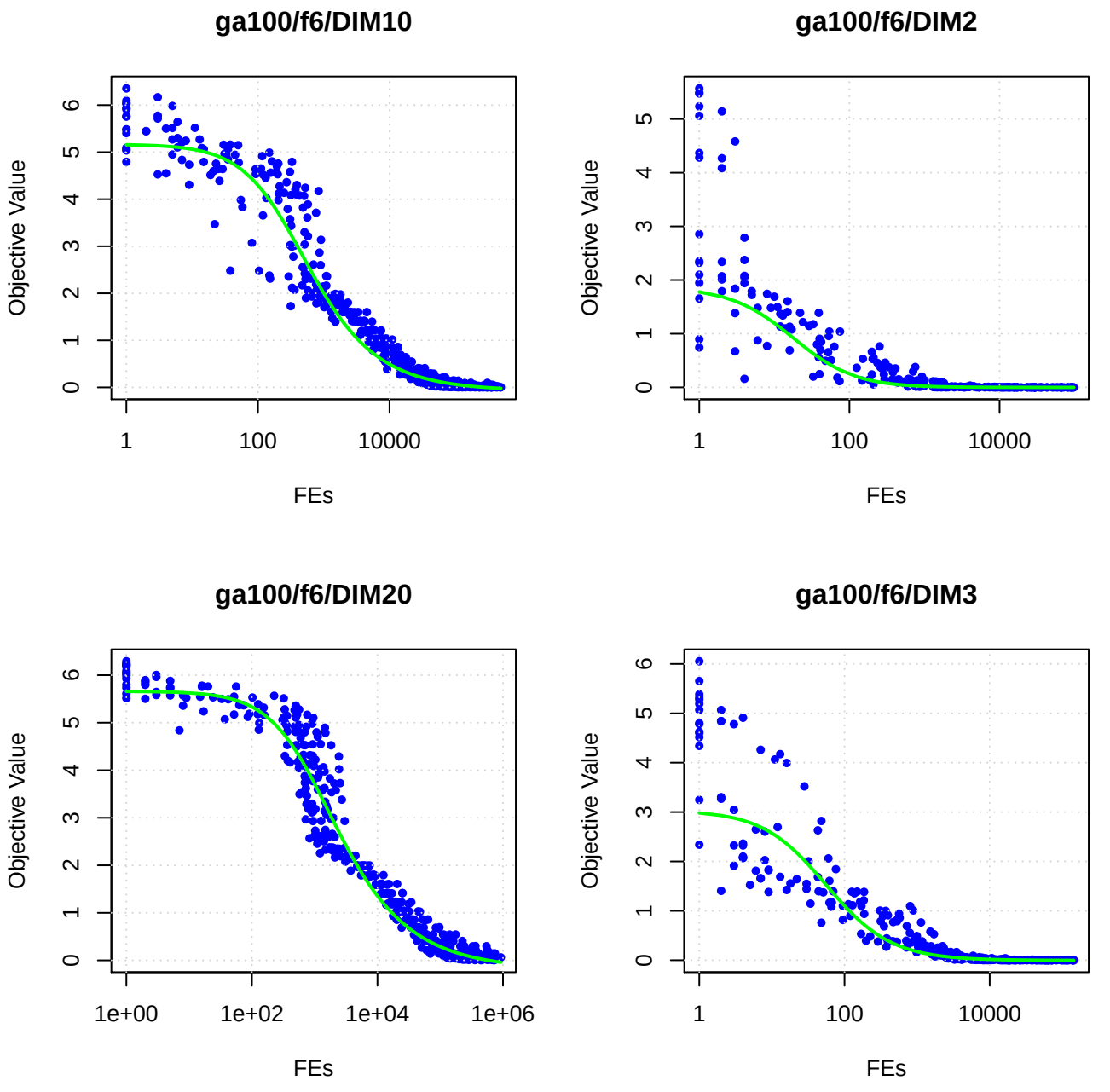
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Objective Value
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Objective Value
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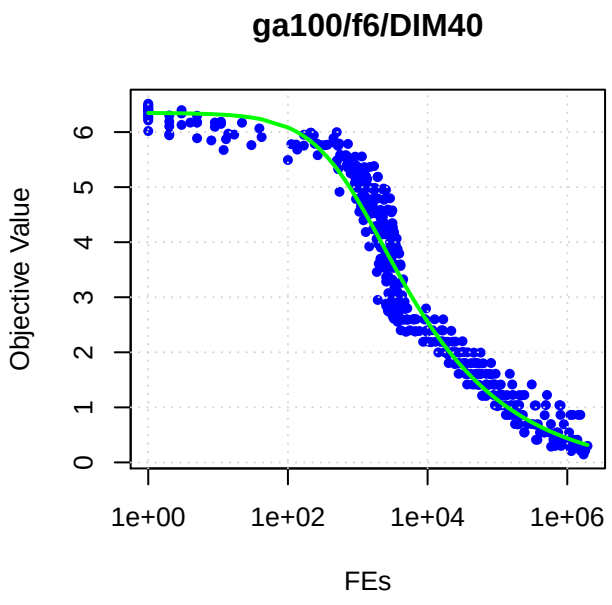
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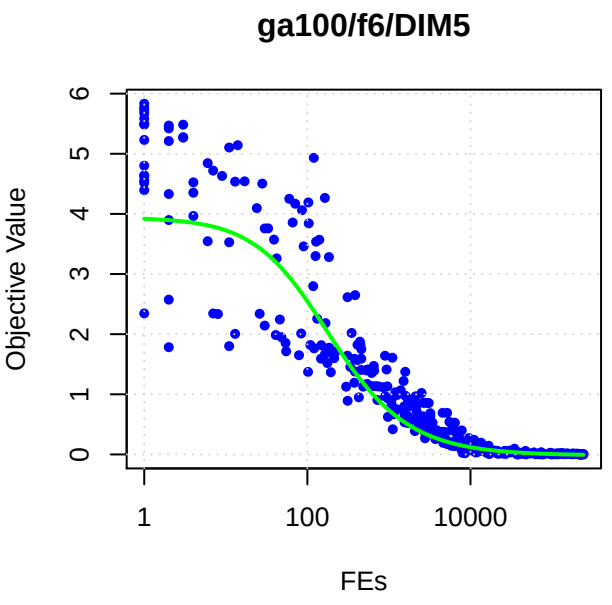
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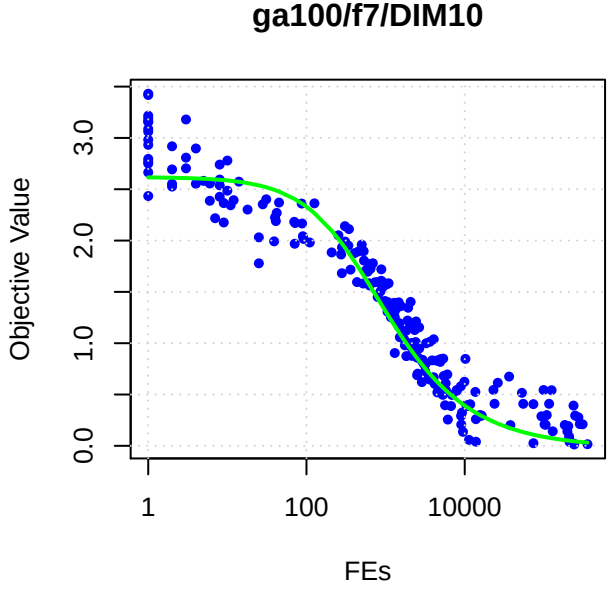
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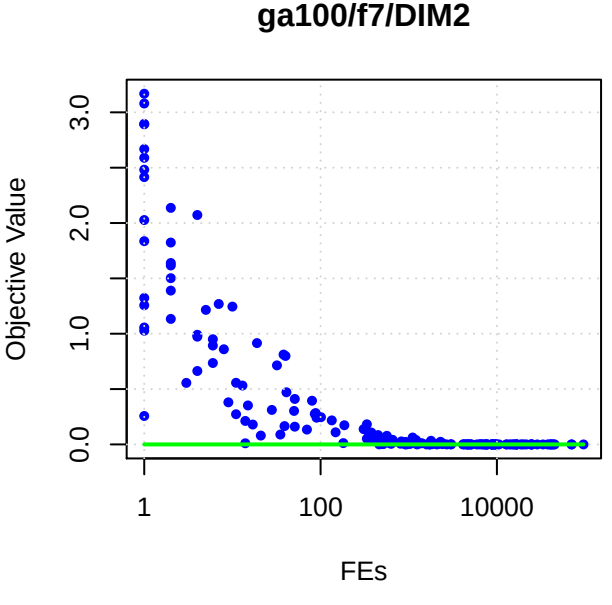
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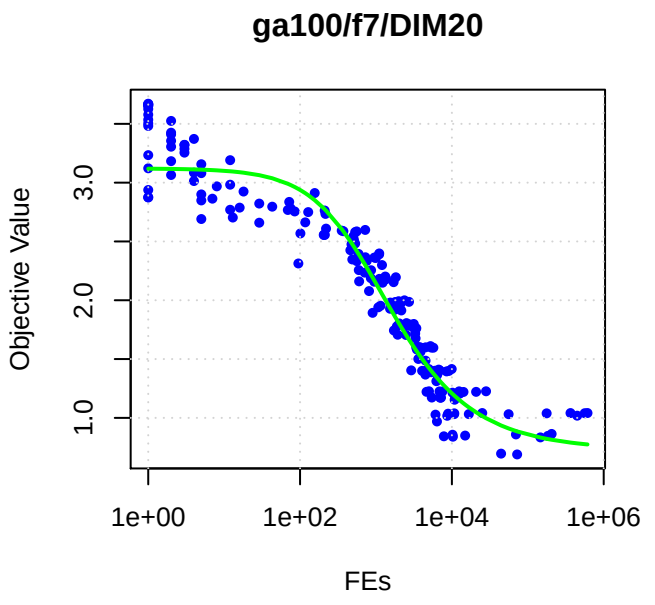
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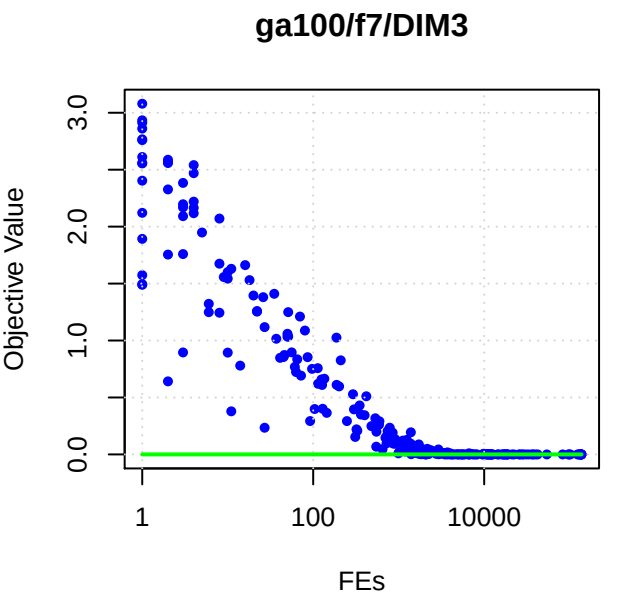
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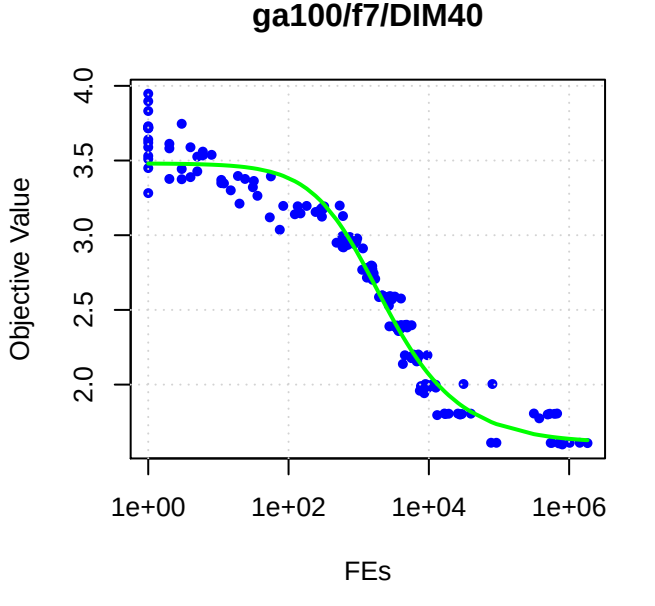
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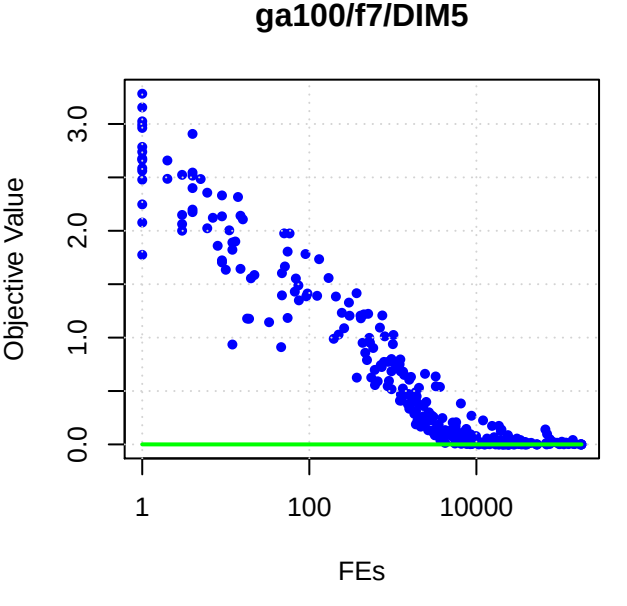
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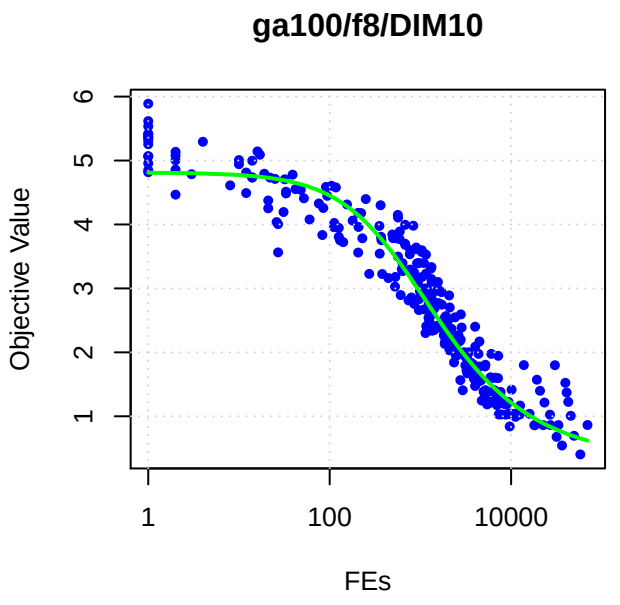
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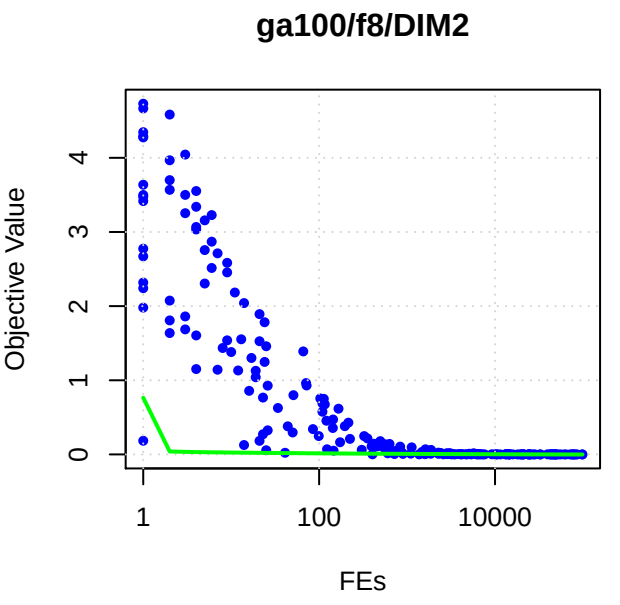
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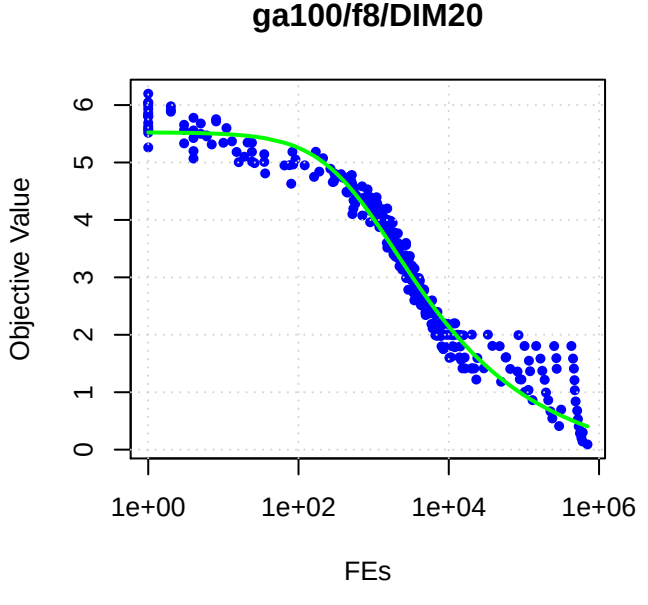
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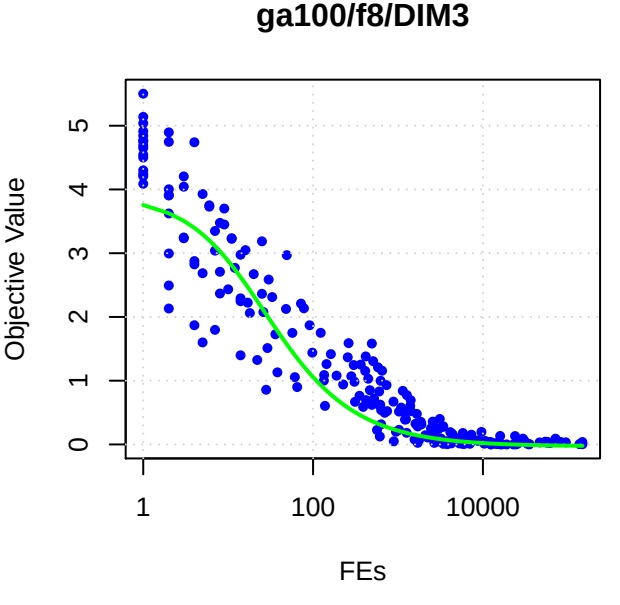
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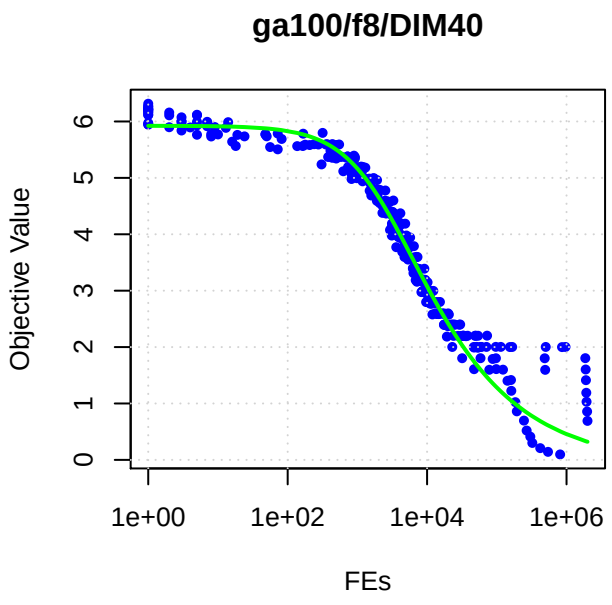
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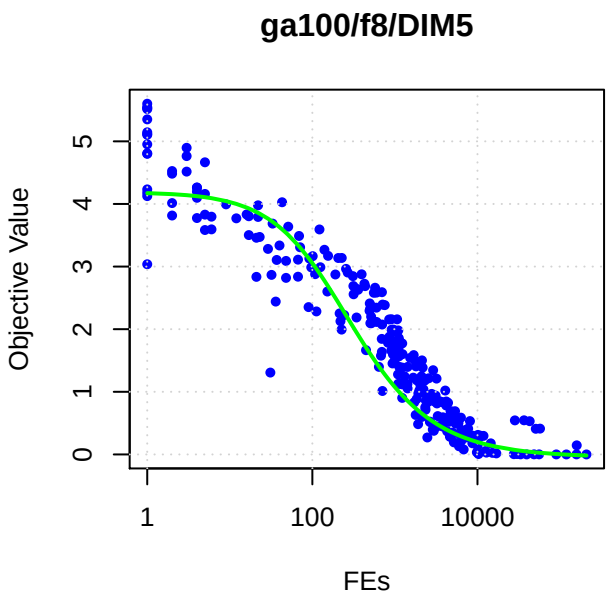
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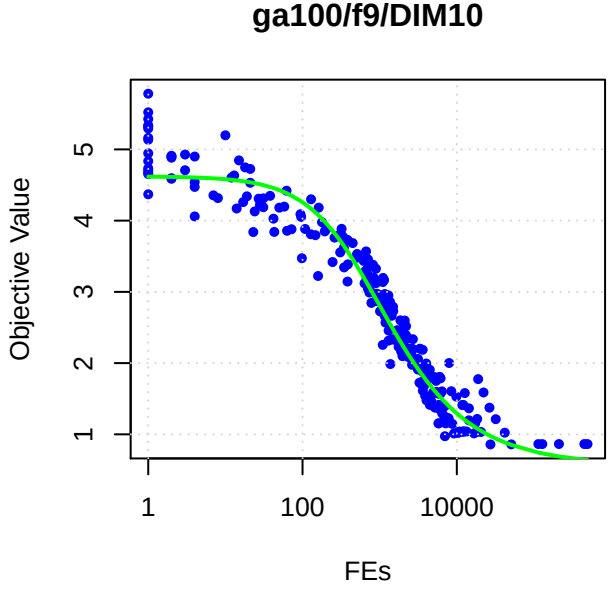
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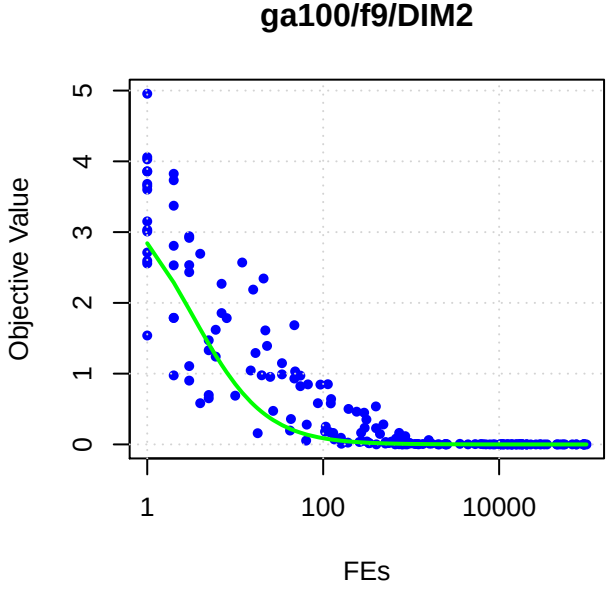
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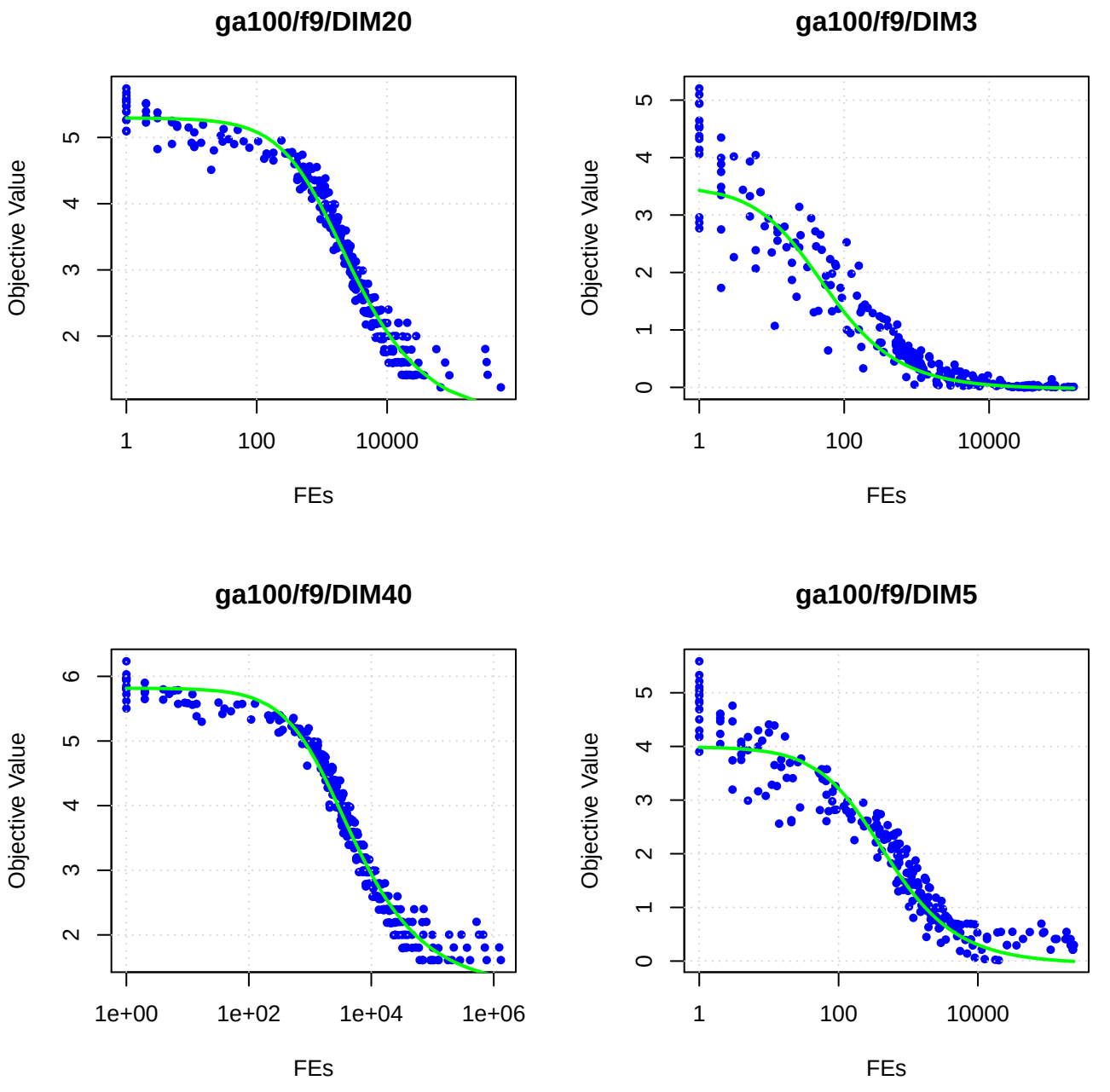
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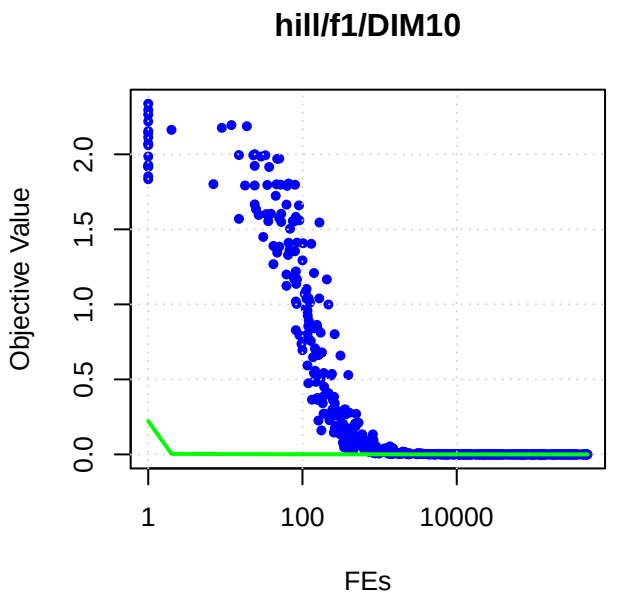
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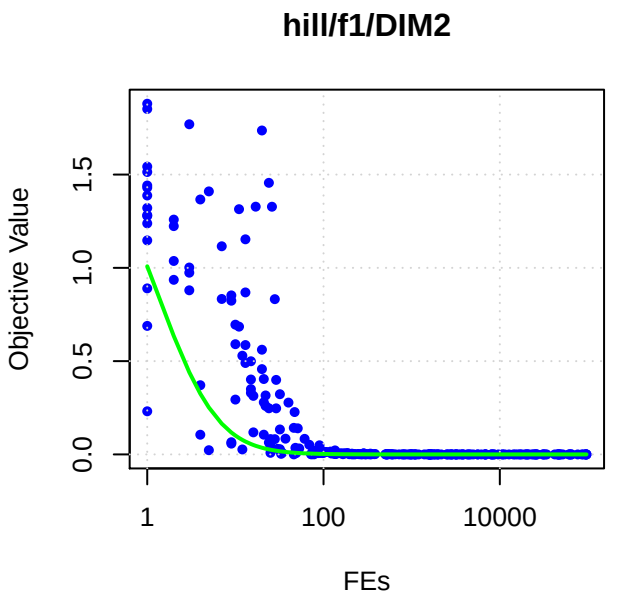
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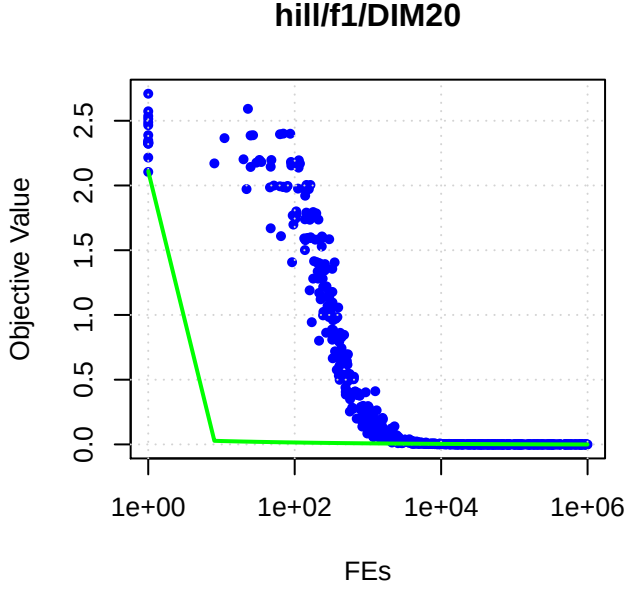
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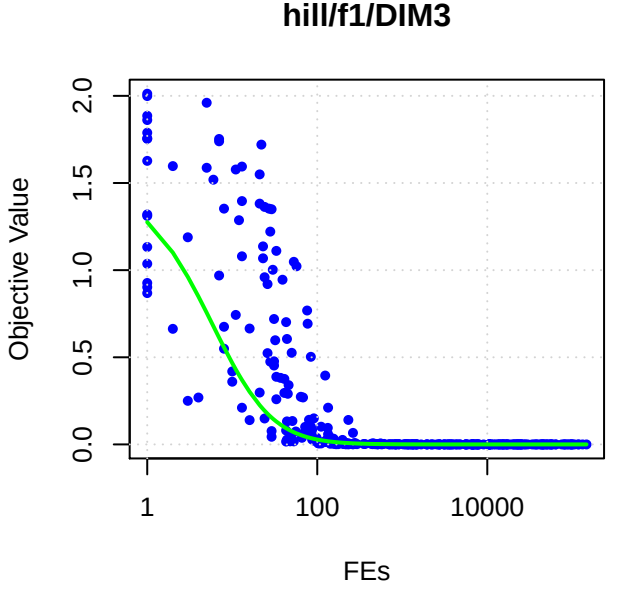
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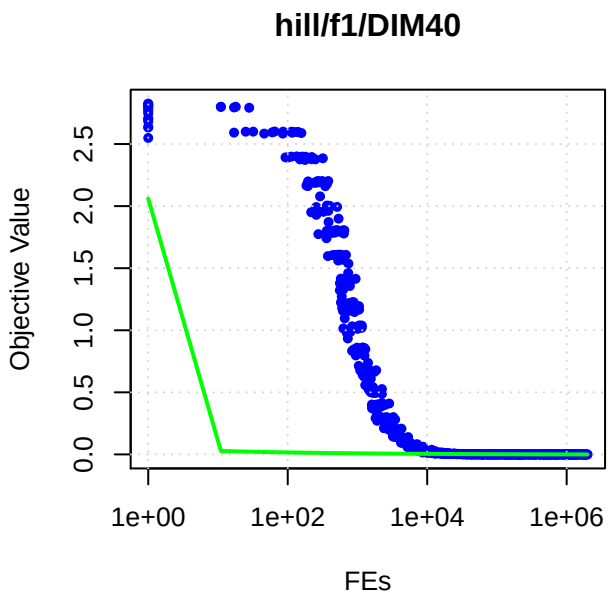
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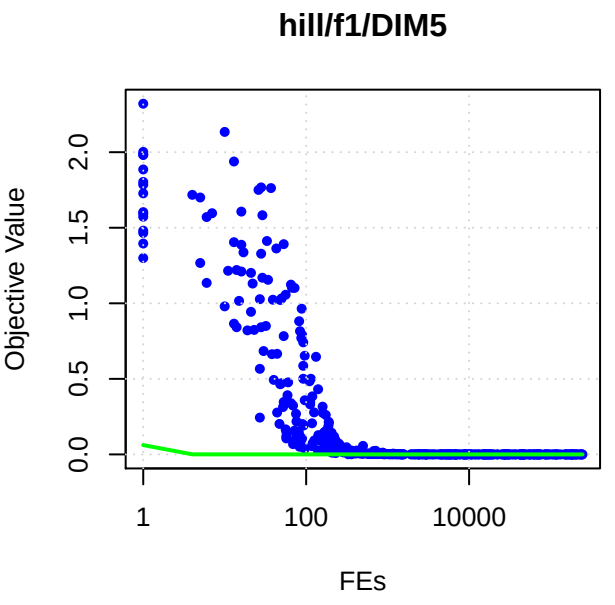
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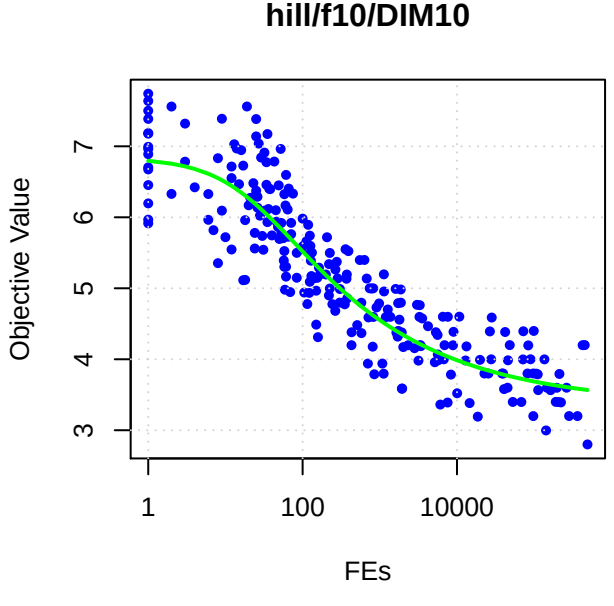
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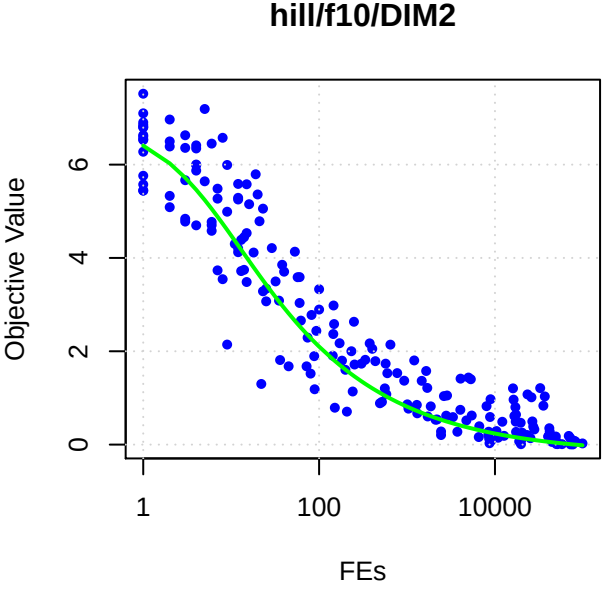
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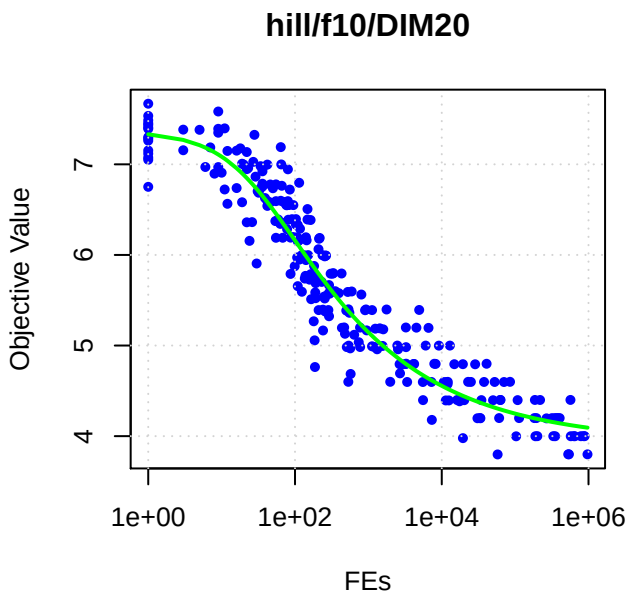
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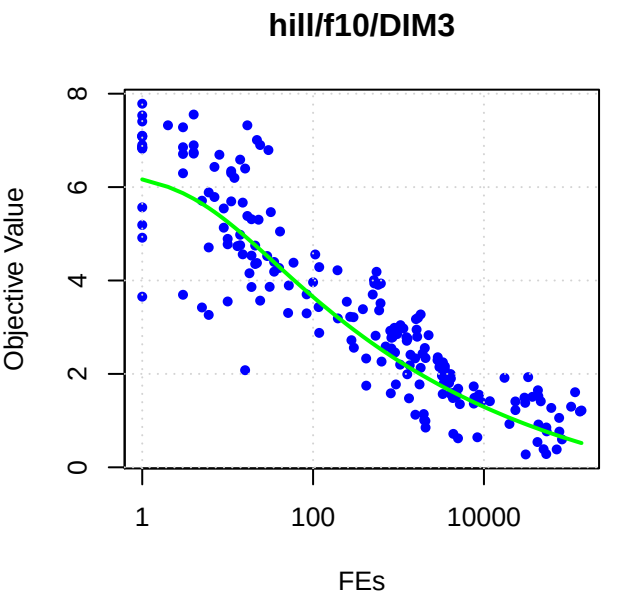
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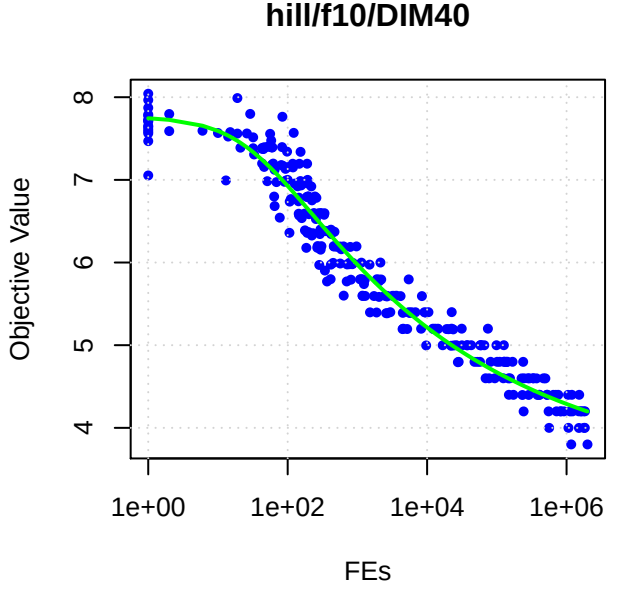
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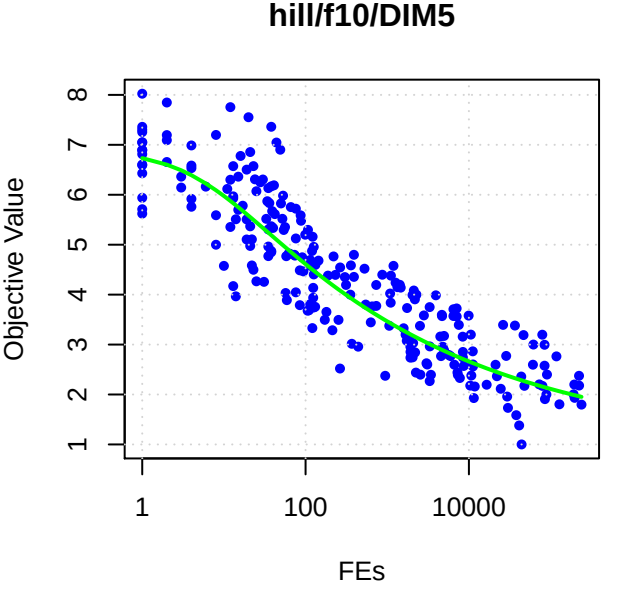
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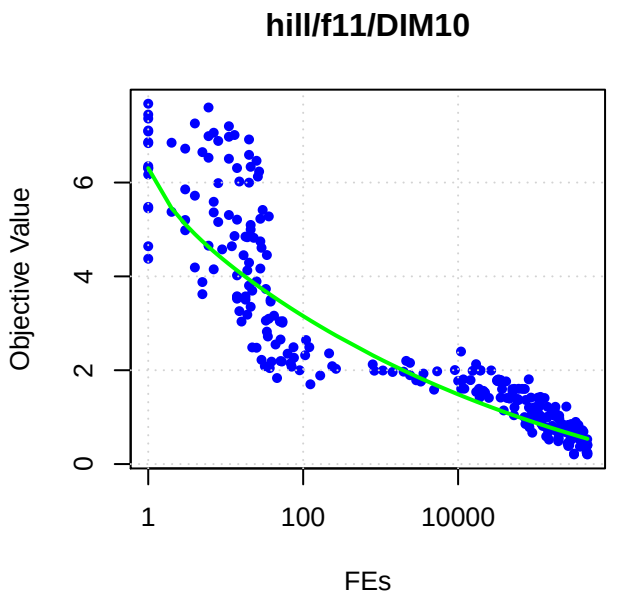
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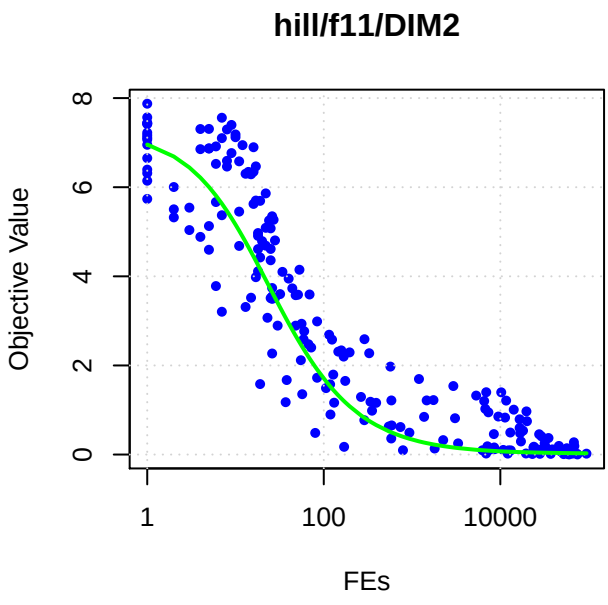
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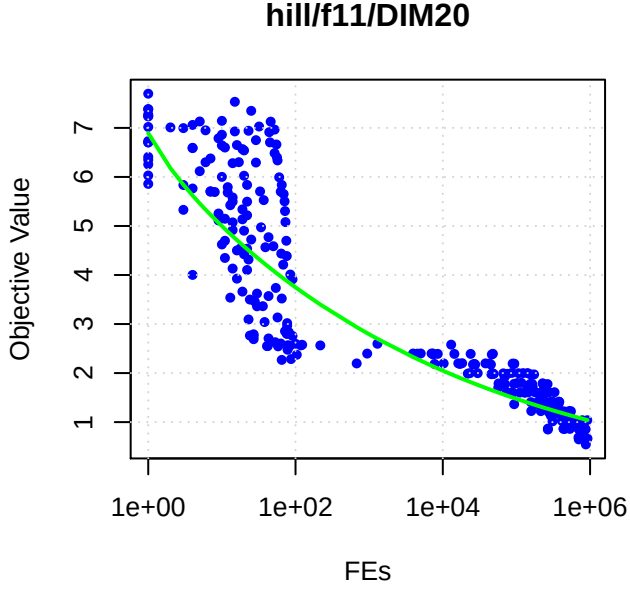
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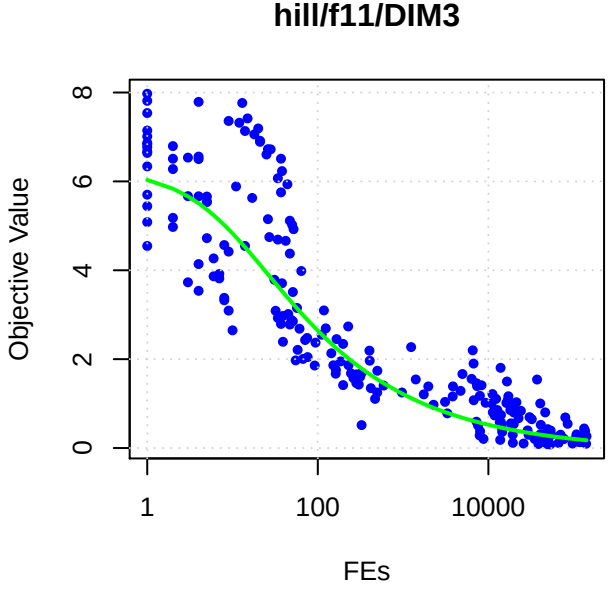
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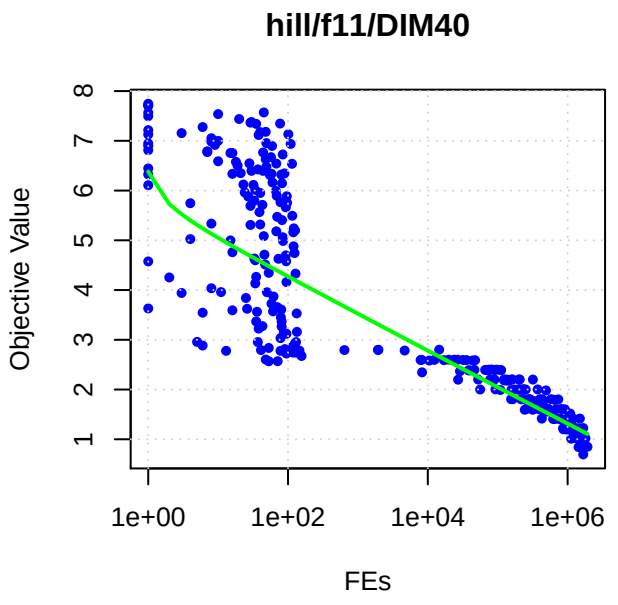
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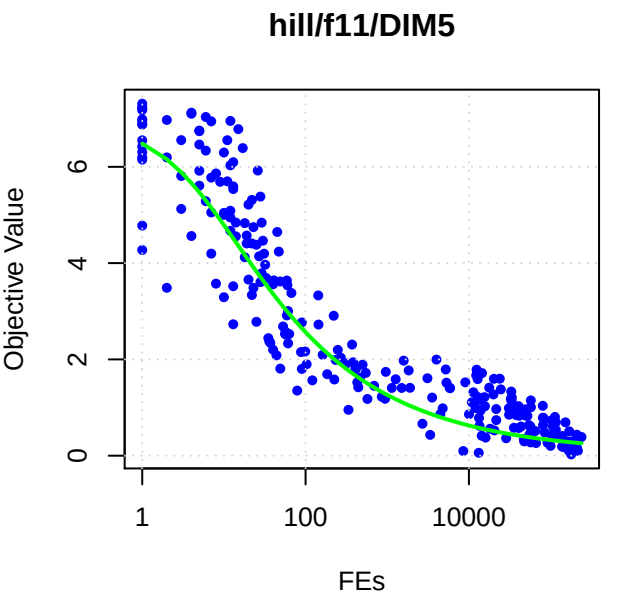
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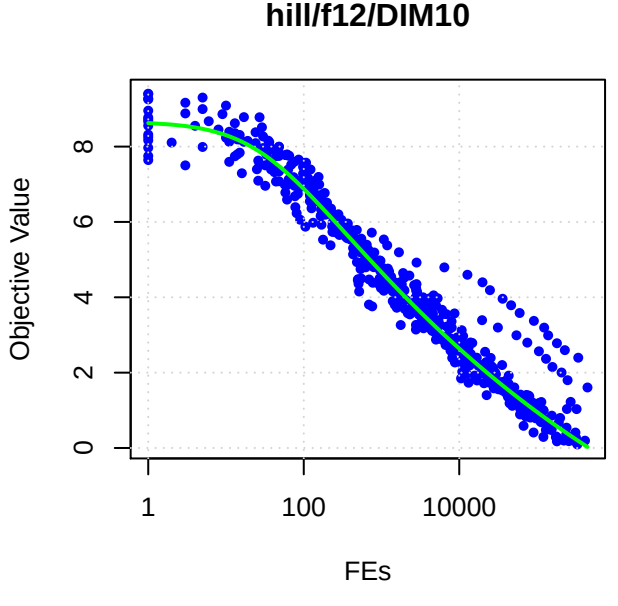
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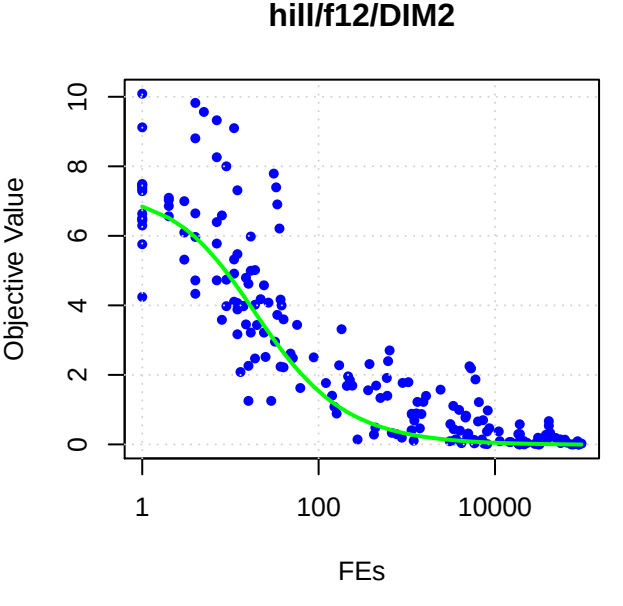
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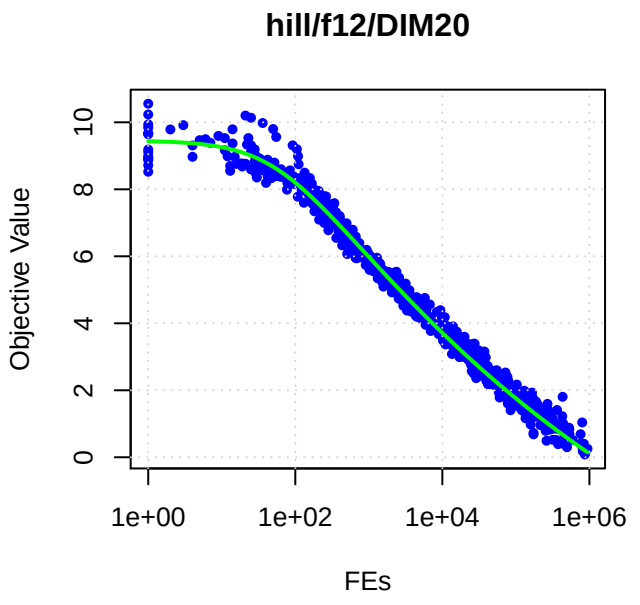
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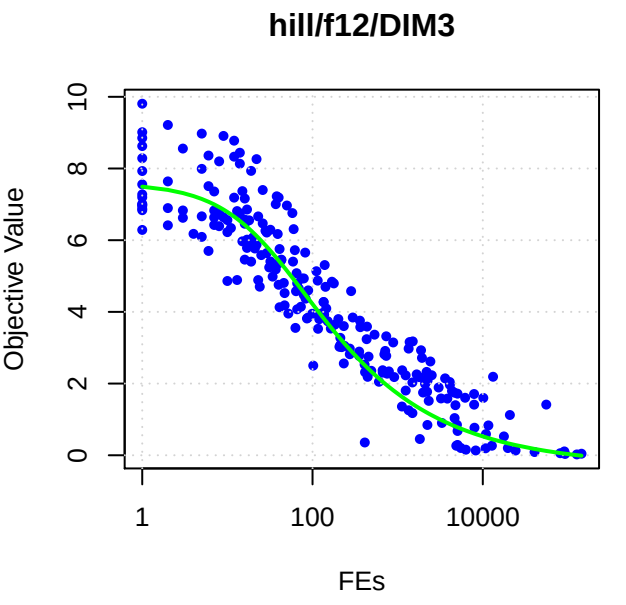
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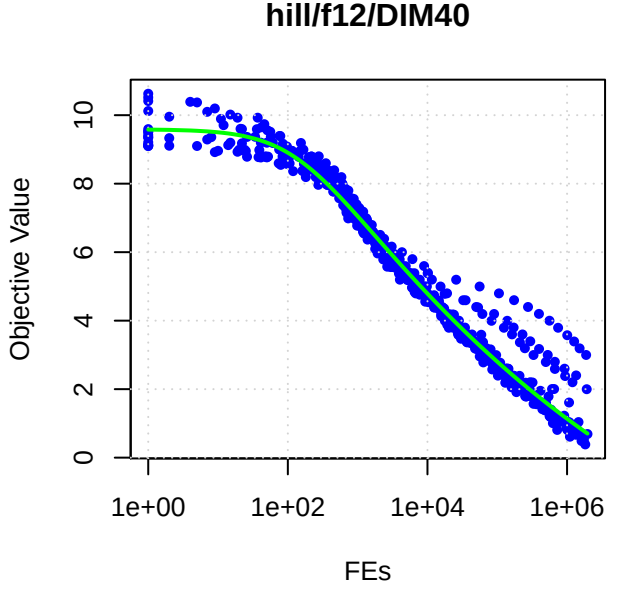
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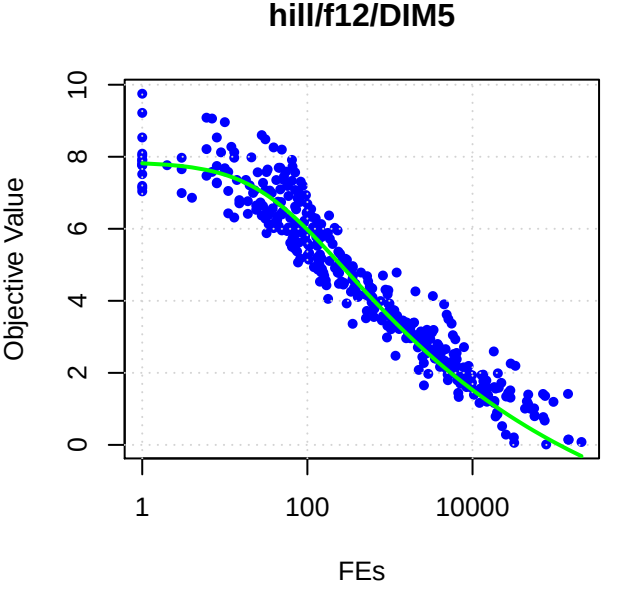
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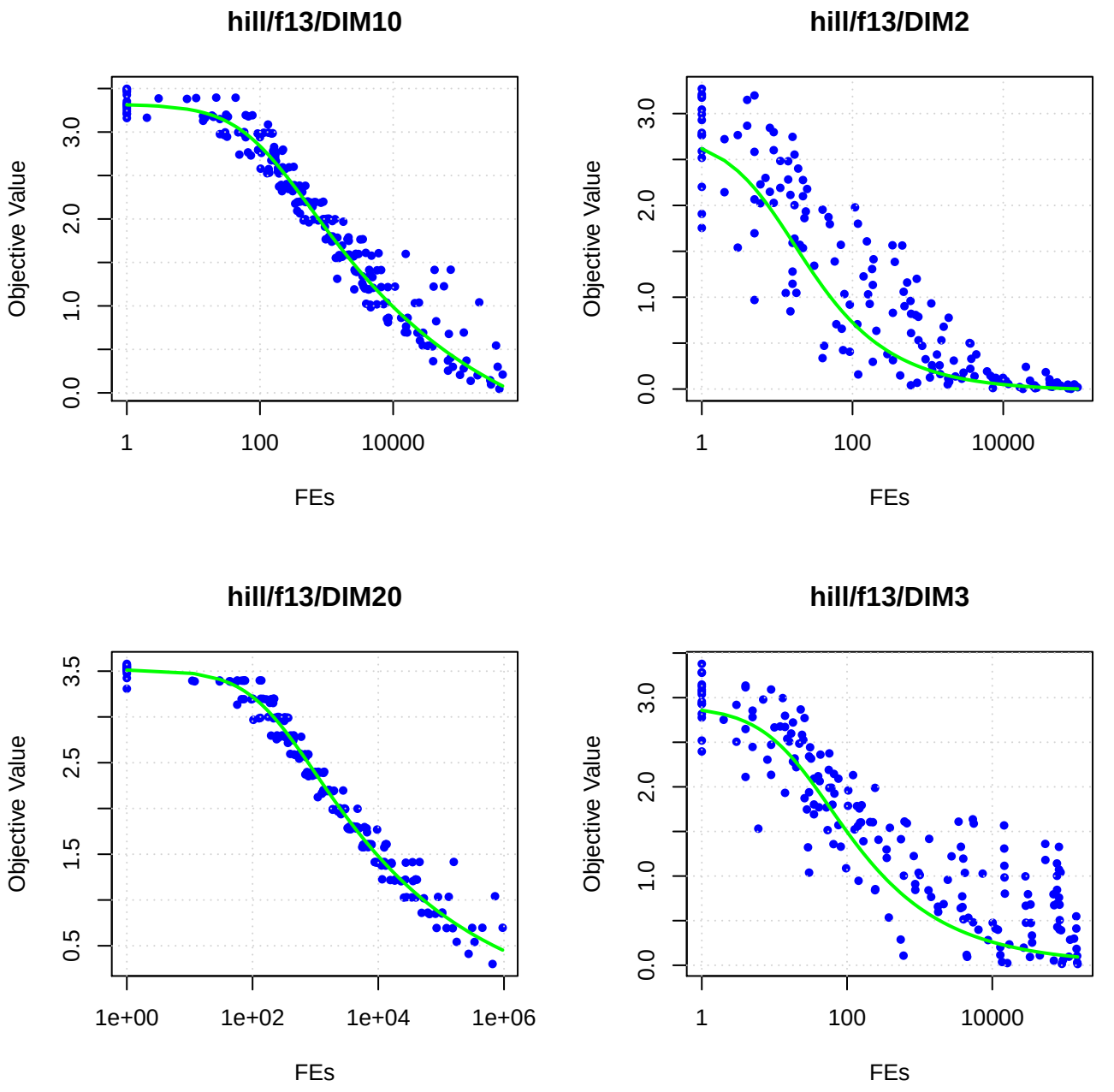
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FEs
hill/f13/DIM20
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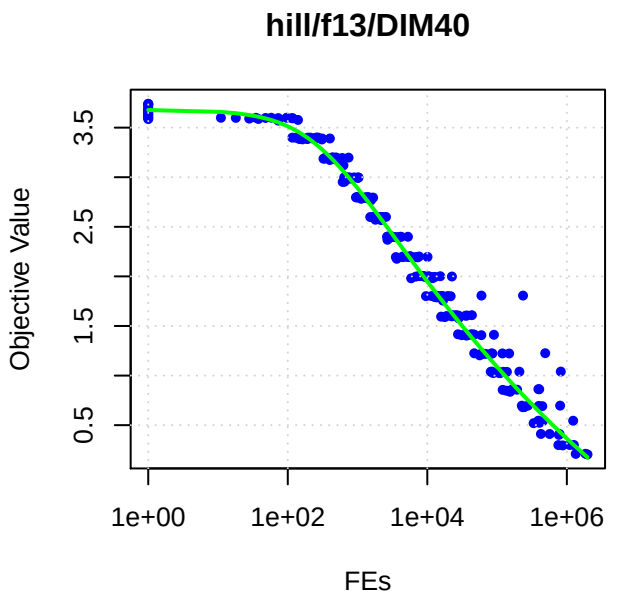
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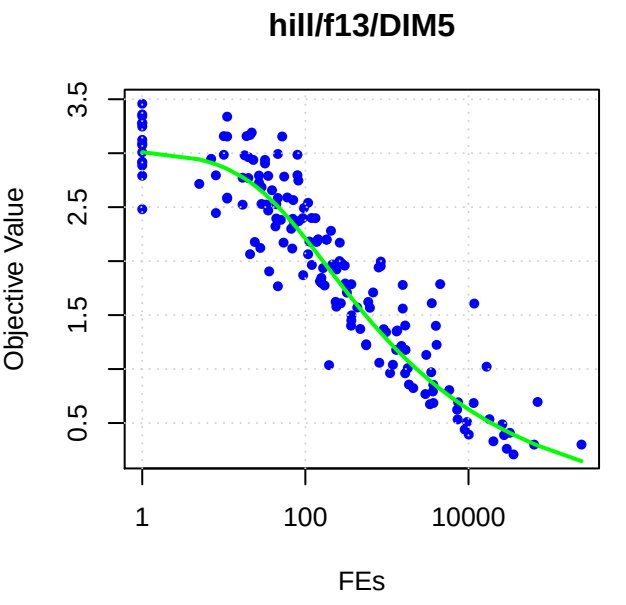
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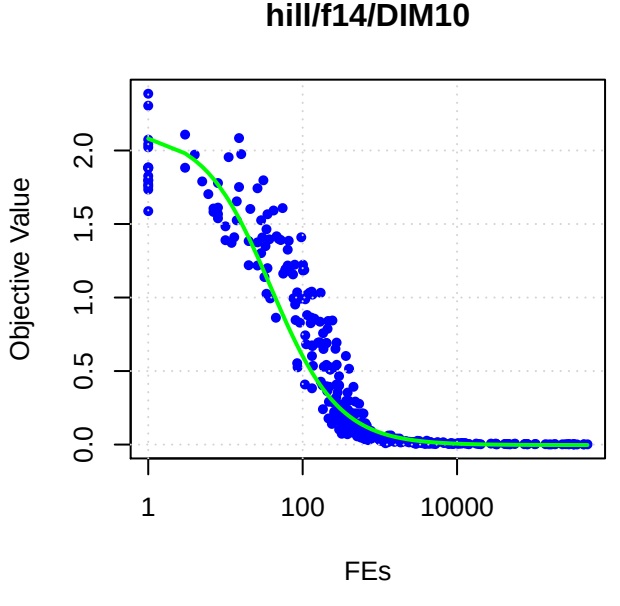
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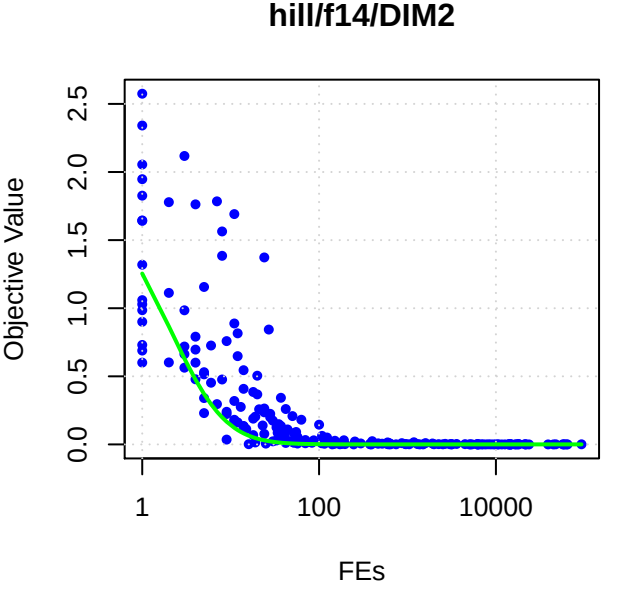
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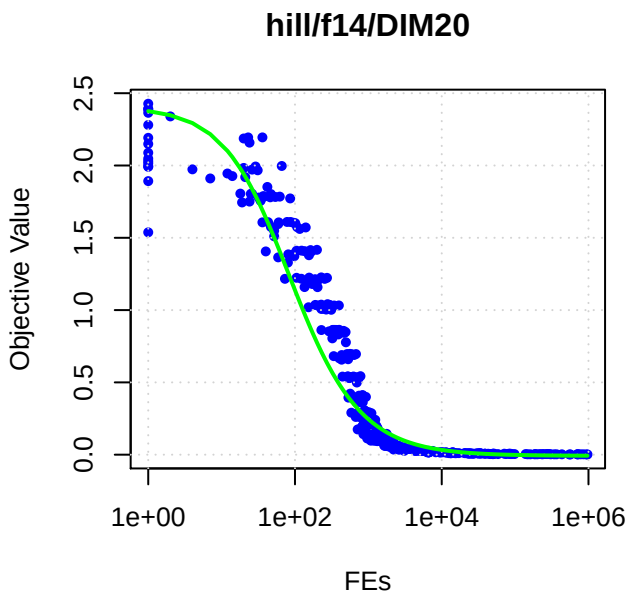
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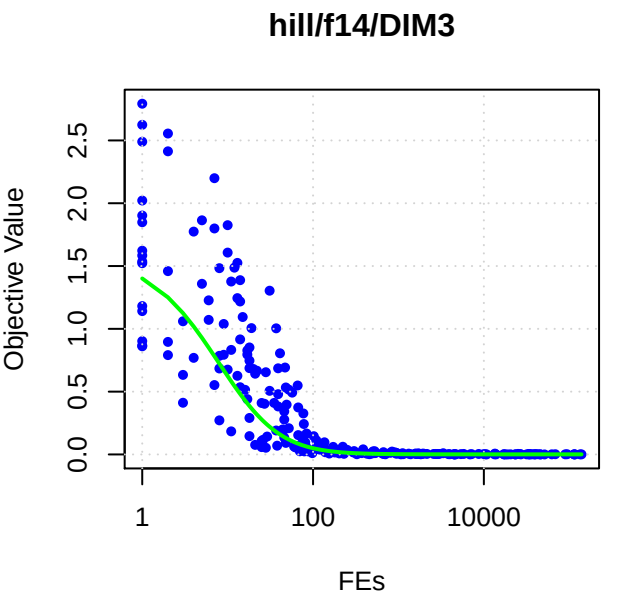
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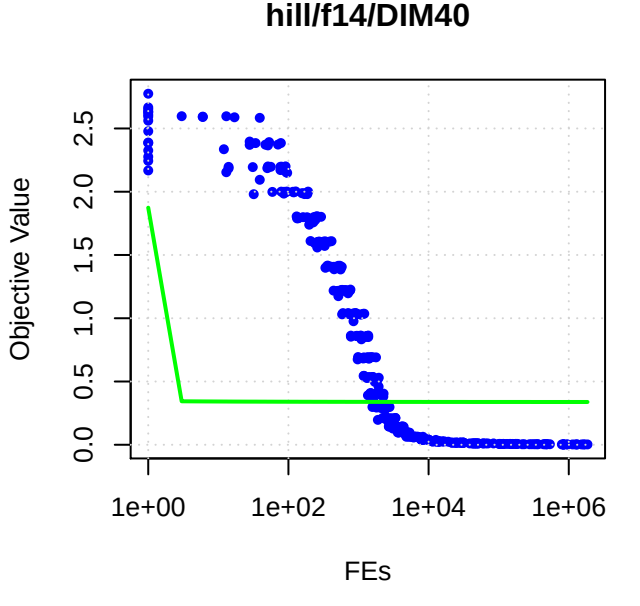
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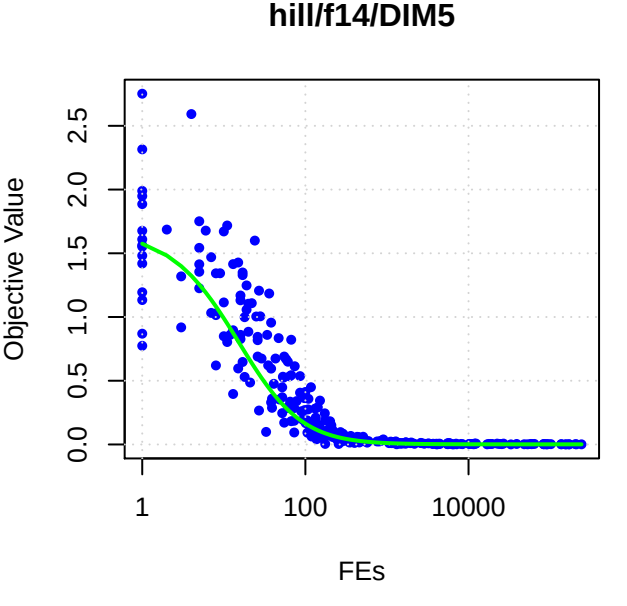
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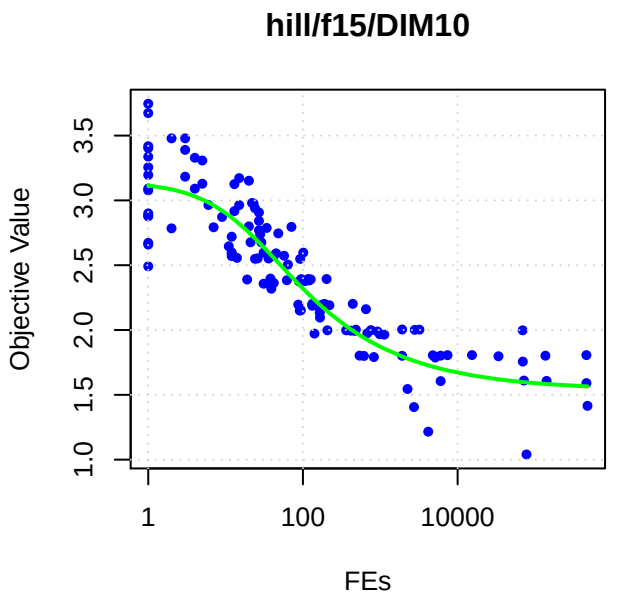
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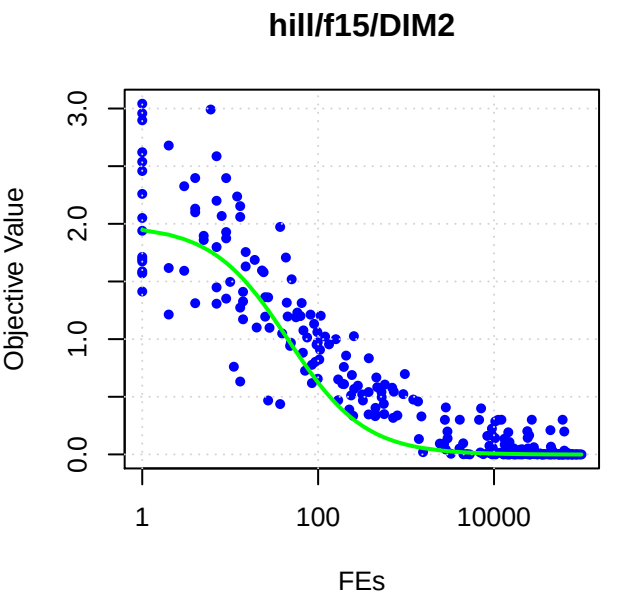
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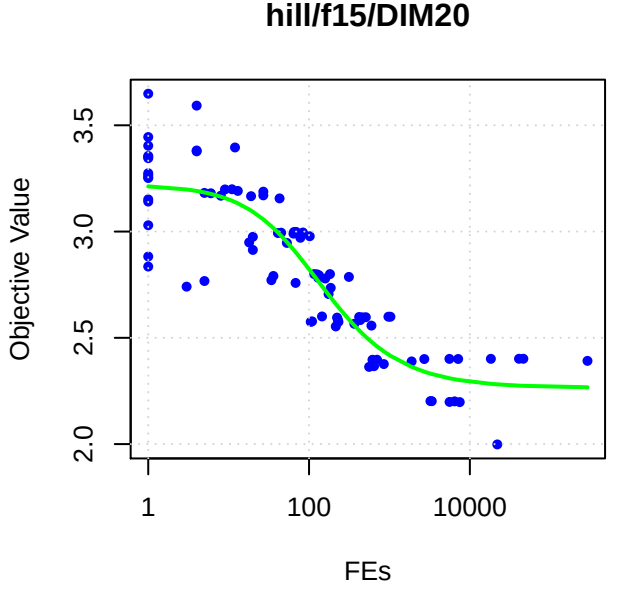
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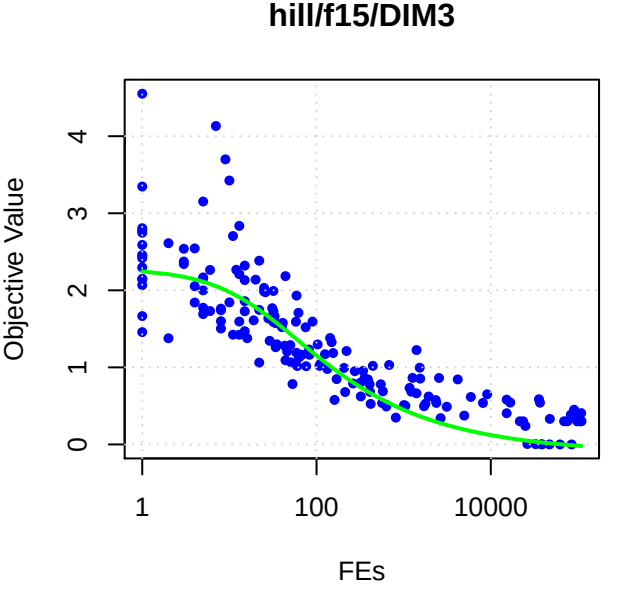
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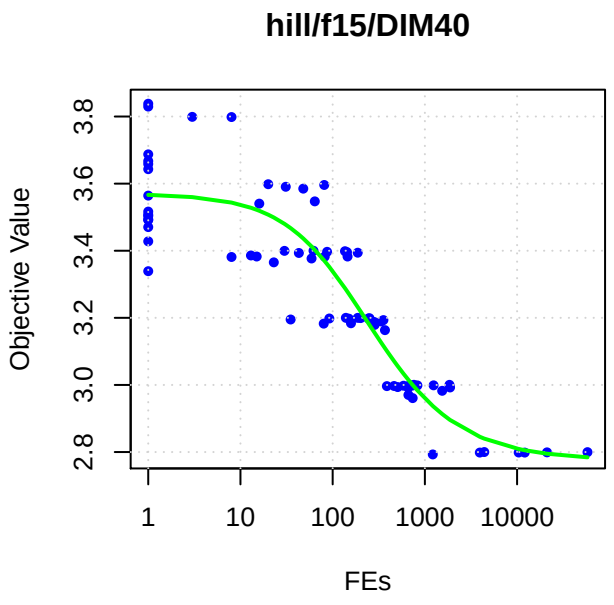
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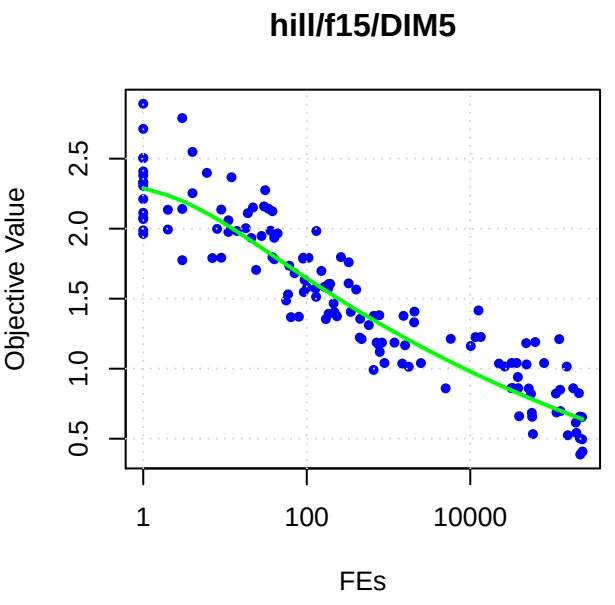
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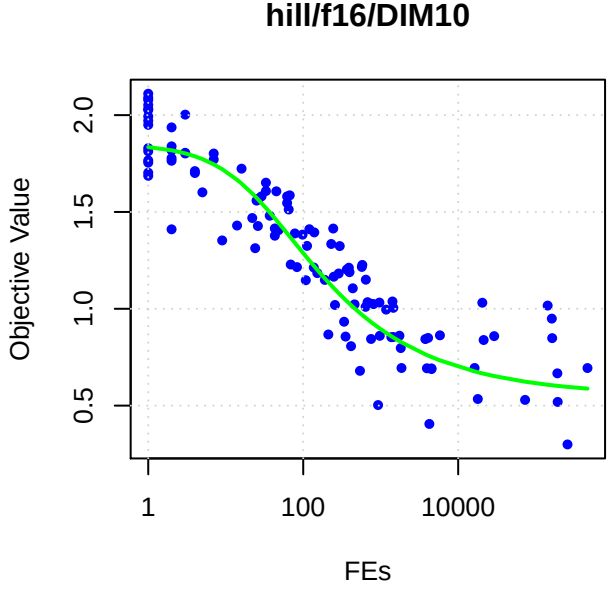
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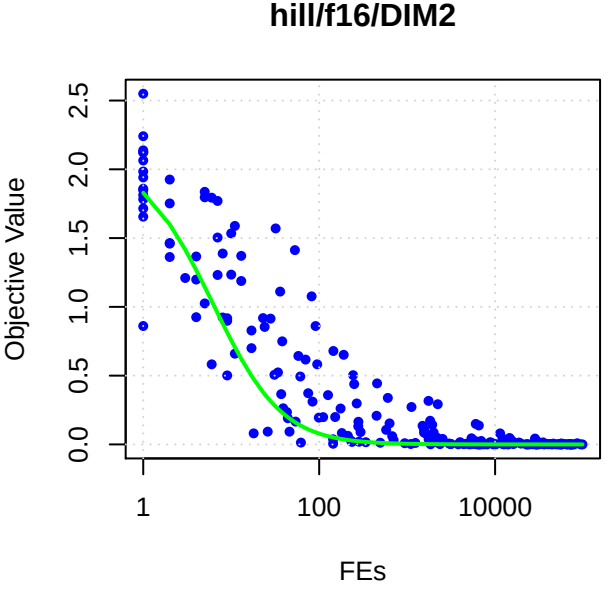
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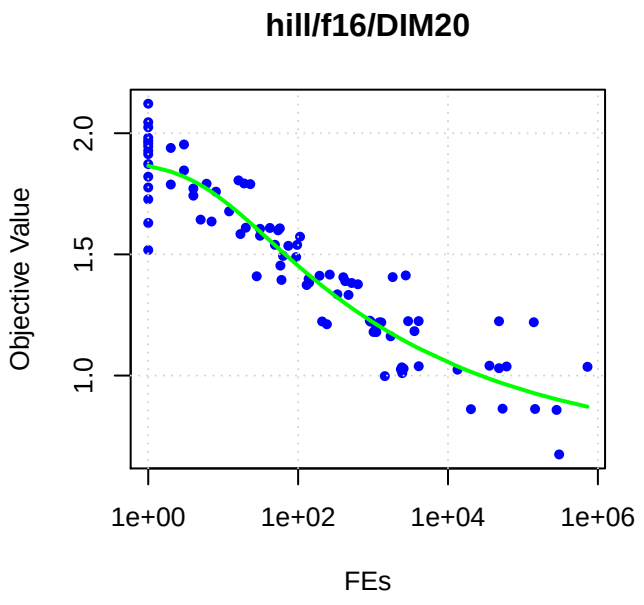
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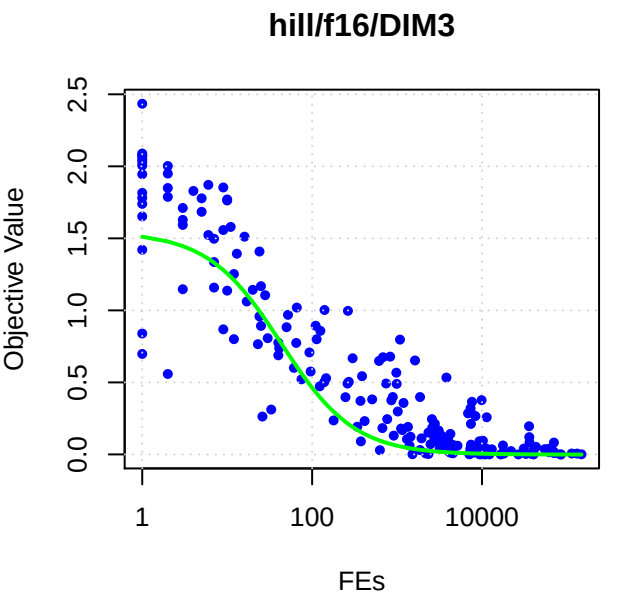
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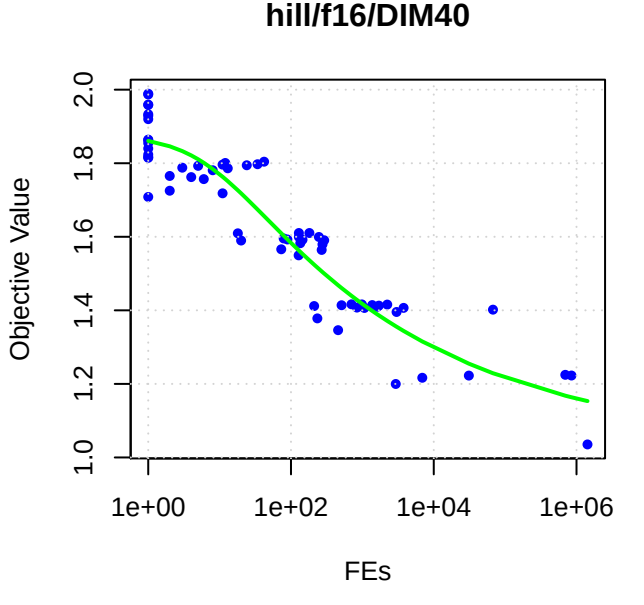
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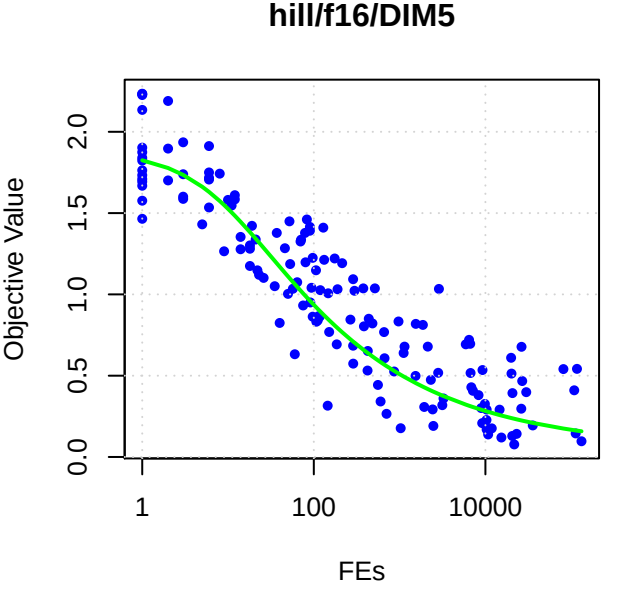
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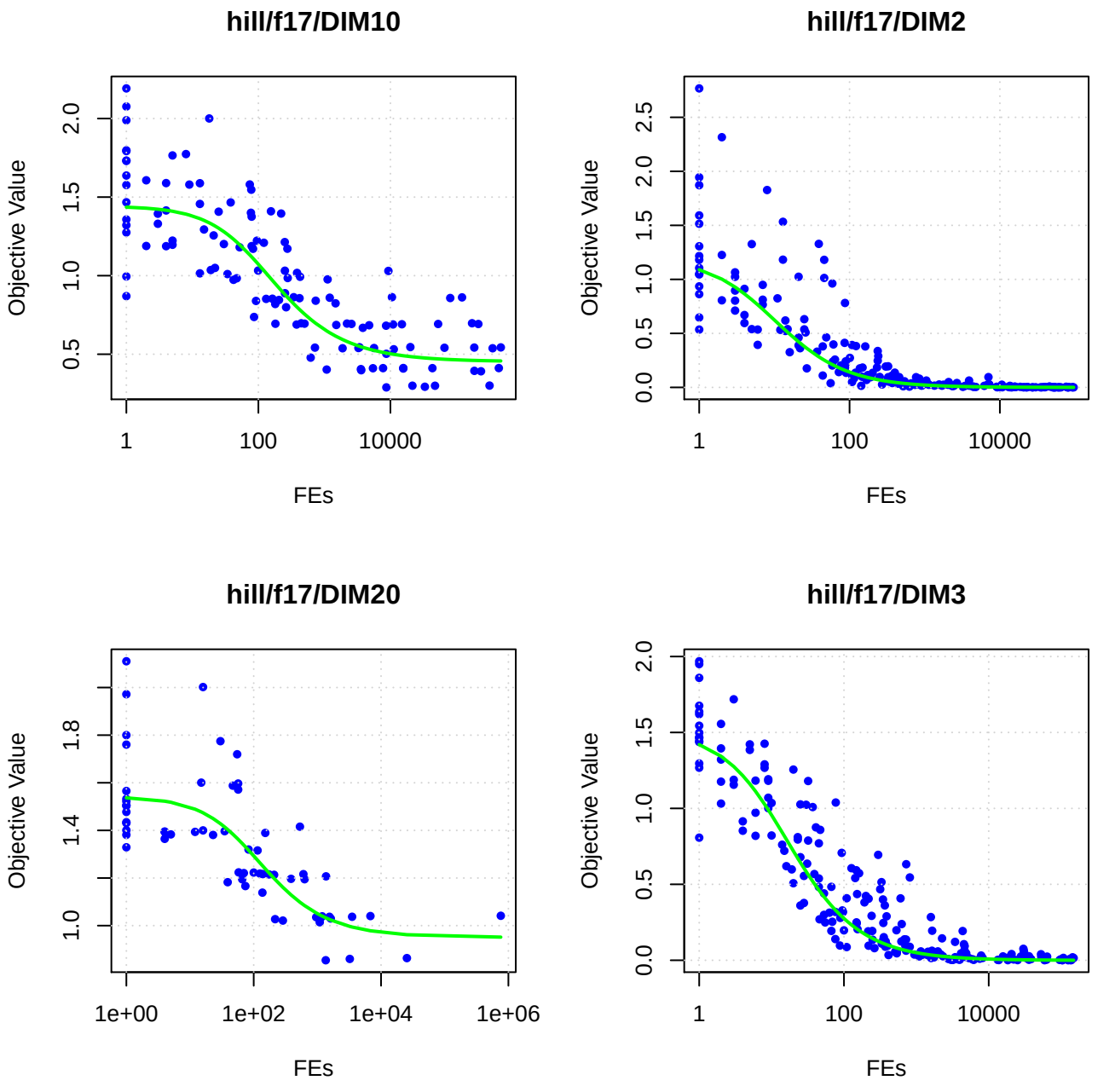
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FEs
hill/f17/DIM2
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FEs
hill/f17/DIM20
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1.4
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1e+02
1e+04
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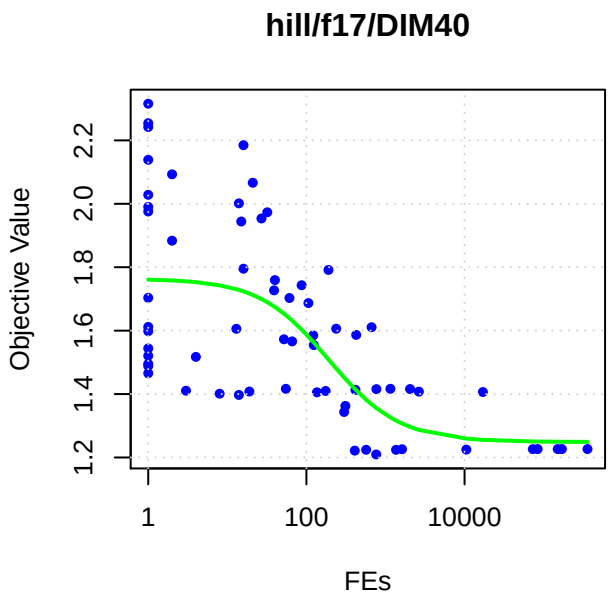
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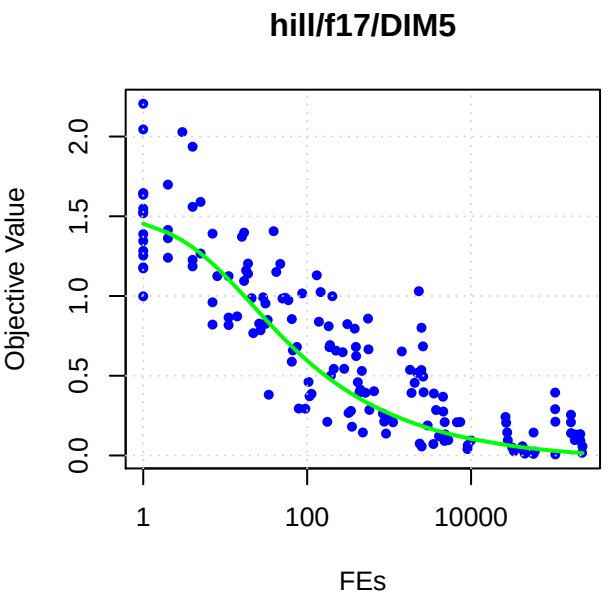
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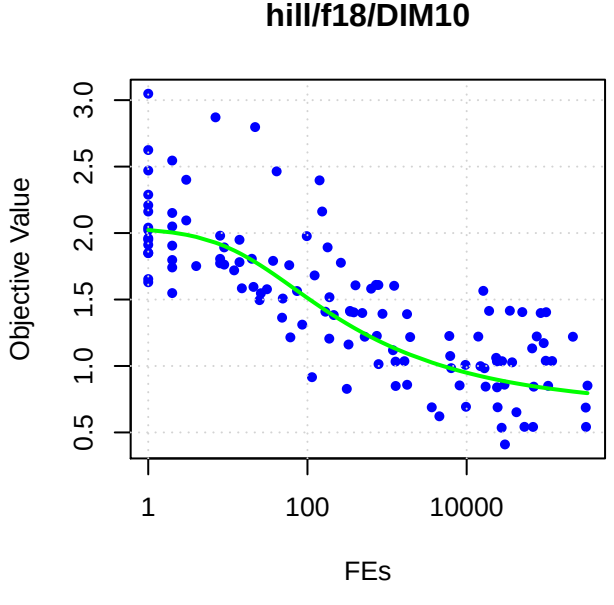
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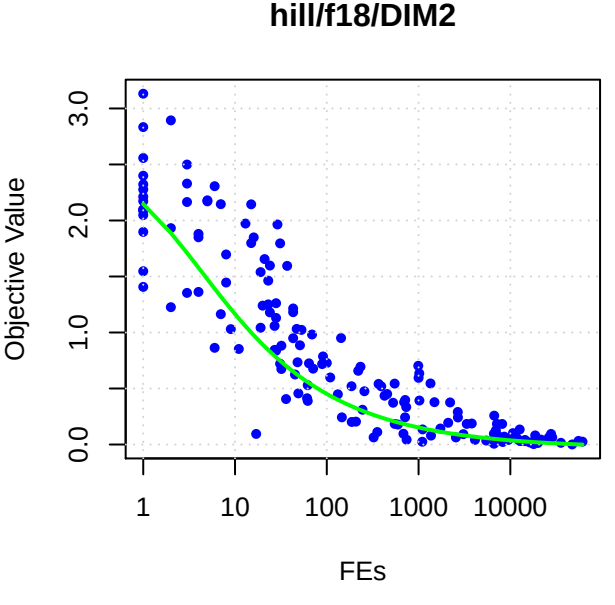
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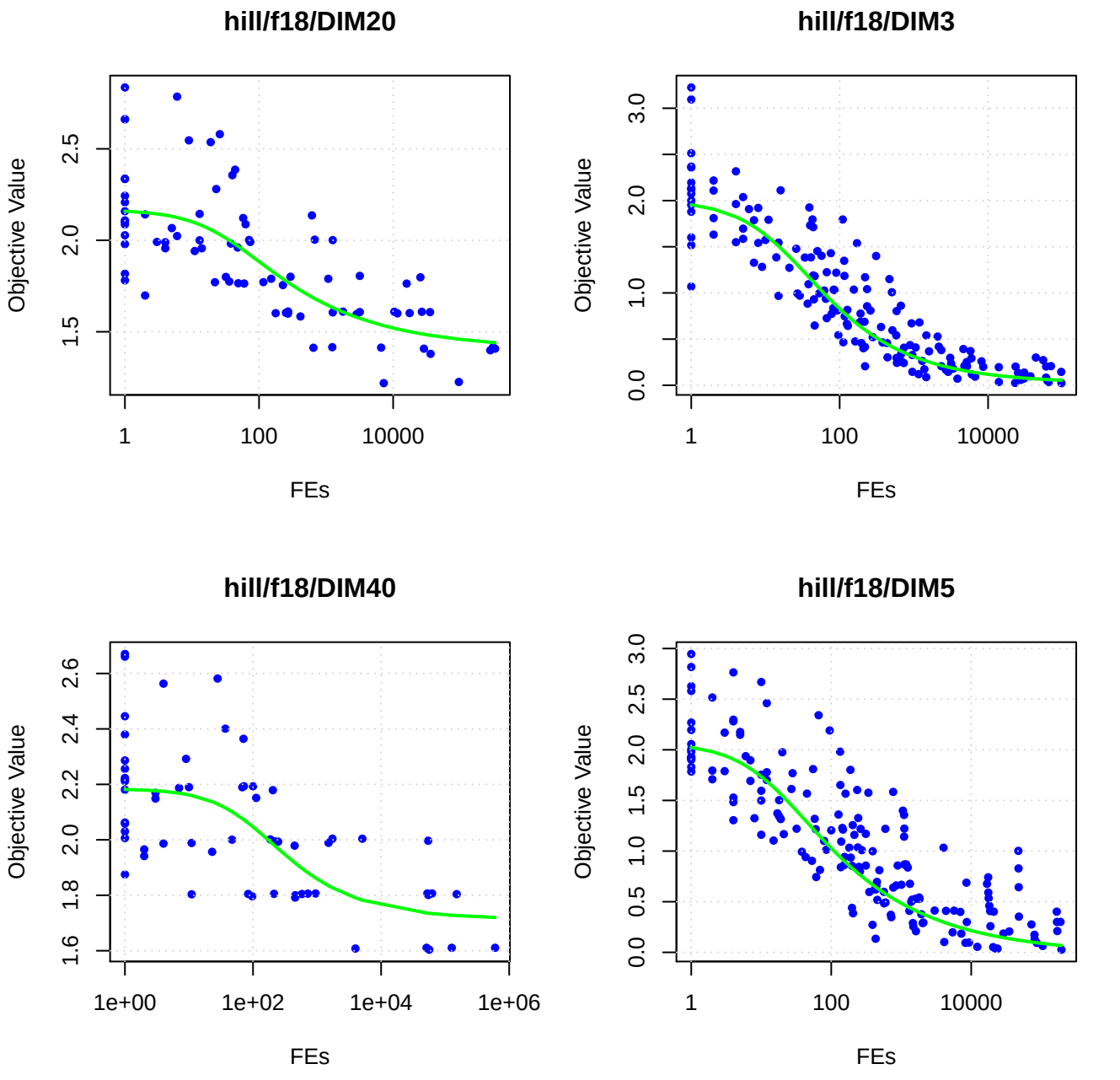
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Objective Value
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1.5
1
100
10000
FEs
hill/f18/DIM3
Objective Value
3.0
2.0
1.0
0.0
1
100
10000
FEs
hill/f18/DIM40
Objective Value
2.6
2.4
2.2
2.0
1.8
1.6
1e+00
1e+02
1e+04
1e+06
FEs
hill/f18/DIM5
Objective Value
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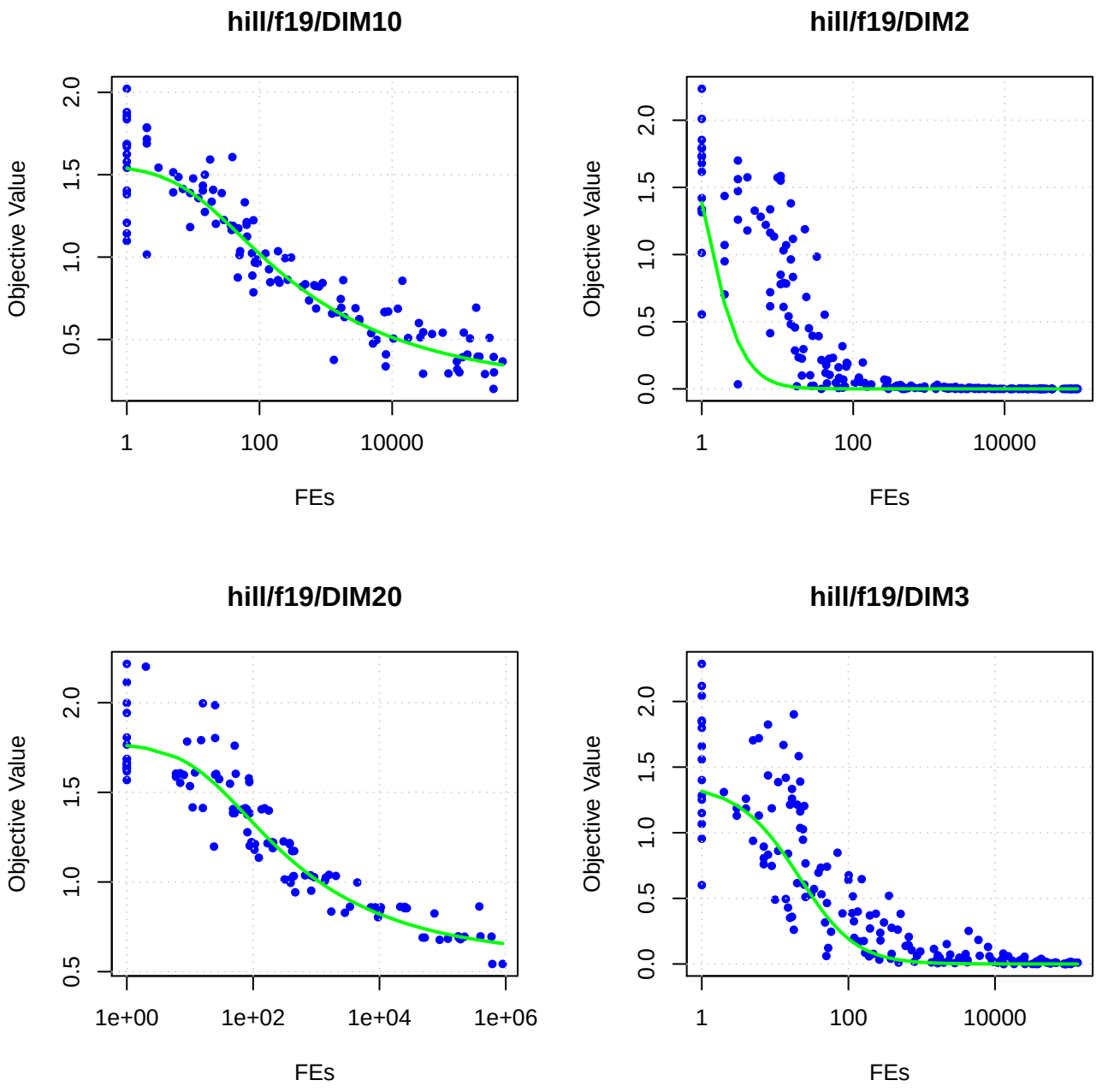
2.5
2.0
1.5
1.0
0.5
0.0
1
100
10000
FEs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Objective Value
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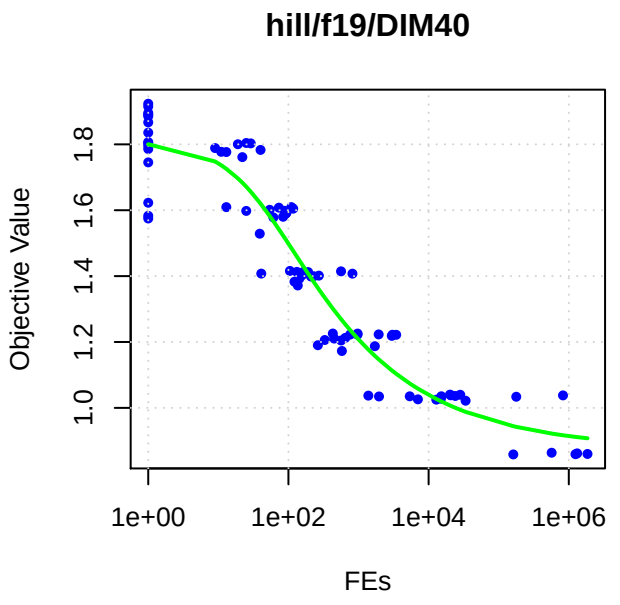
1.5
2.0
1
100
10000
FEs
hill/f19/DIM2
Objective Value
0.0
0.5
1.0
1.5
2.0
1
100
10000
FEs
hill/f19/DIM20
Objective Value
0.5
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs
hill/f19/DIM3
Objective Value
0.0
0.5
1.0
1.5
2.0
1
100
10000
FEs


hill/f19/DIM40
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1.8
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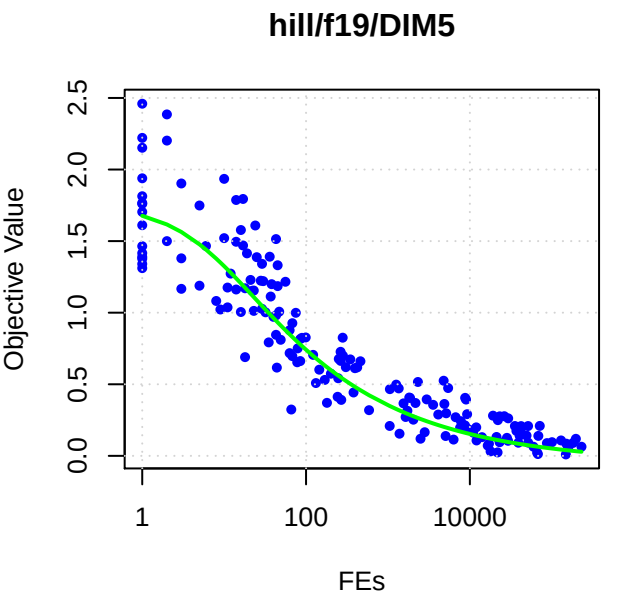
1e+06
FEs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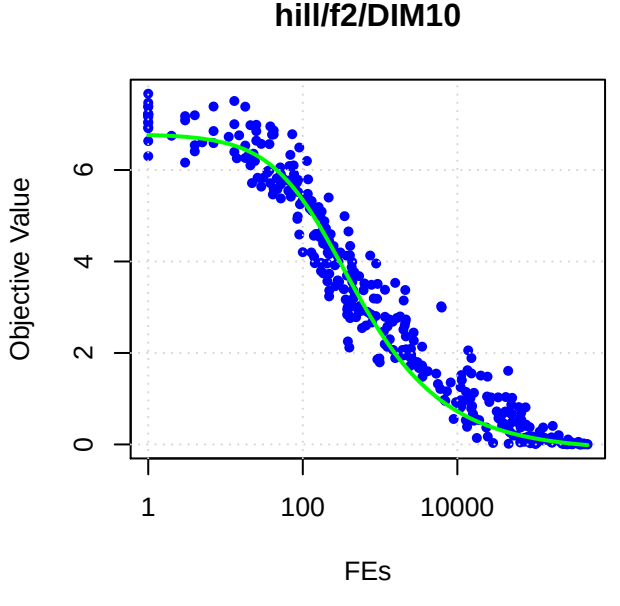
2.0
2.5
1
100
10000
FEs


hill/f2/DIM10
Objective Value
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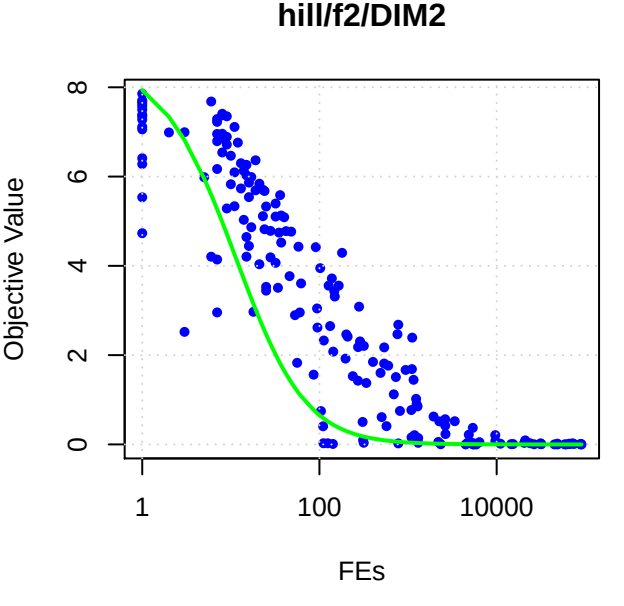
1
100
10000
FEs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Objective Value
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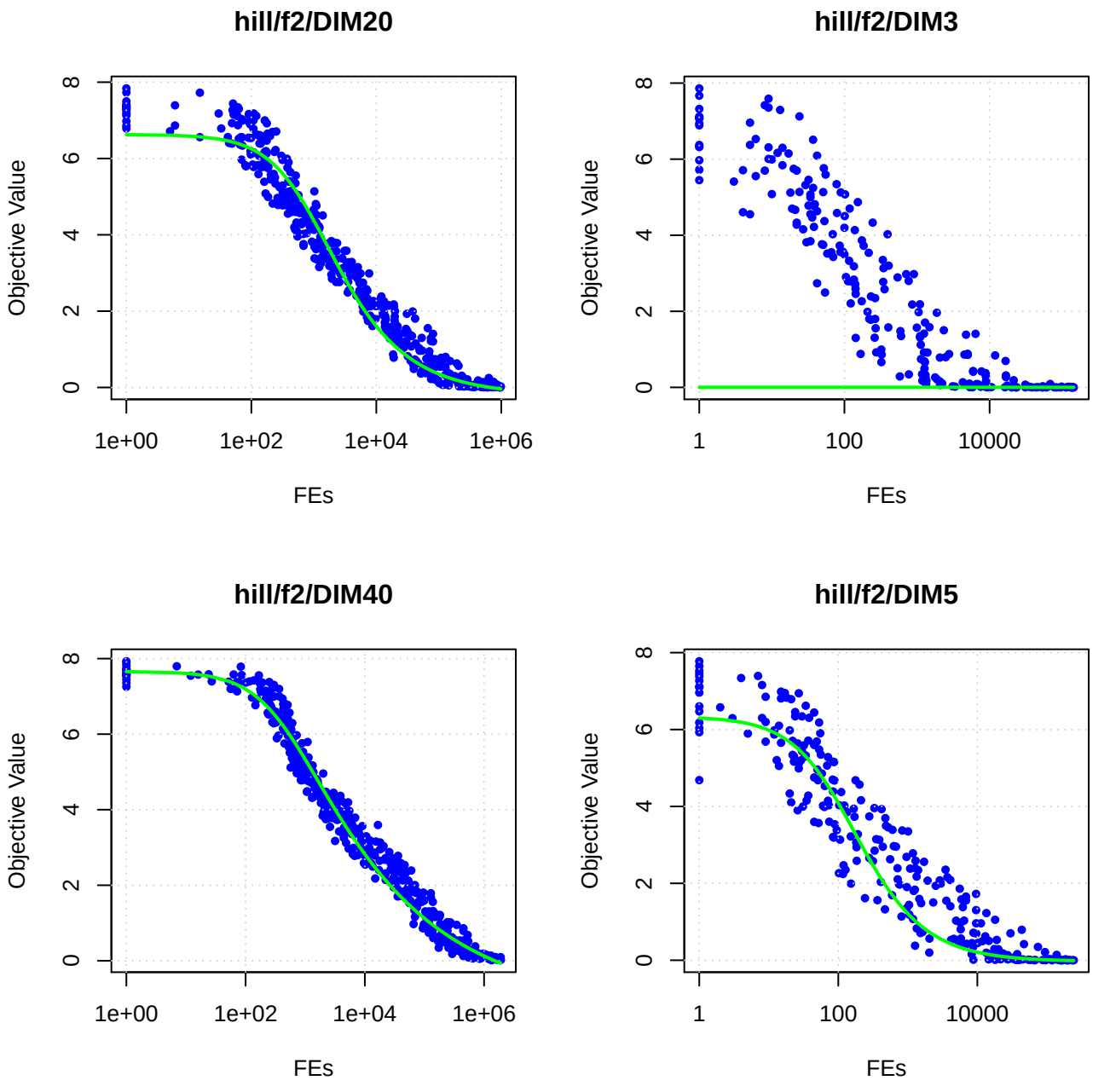
6
8
1
100
10000
FEs


hill/f2/DIM20
hill/f2/DIM3
hill/f2/DIM40
hill/f2/DIM5
Objective Value
FEs
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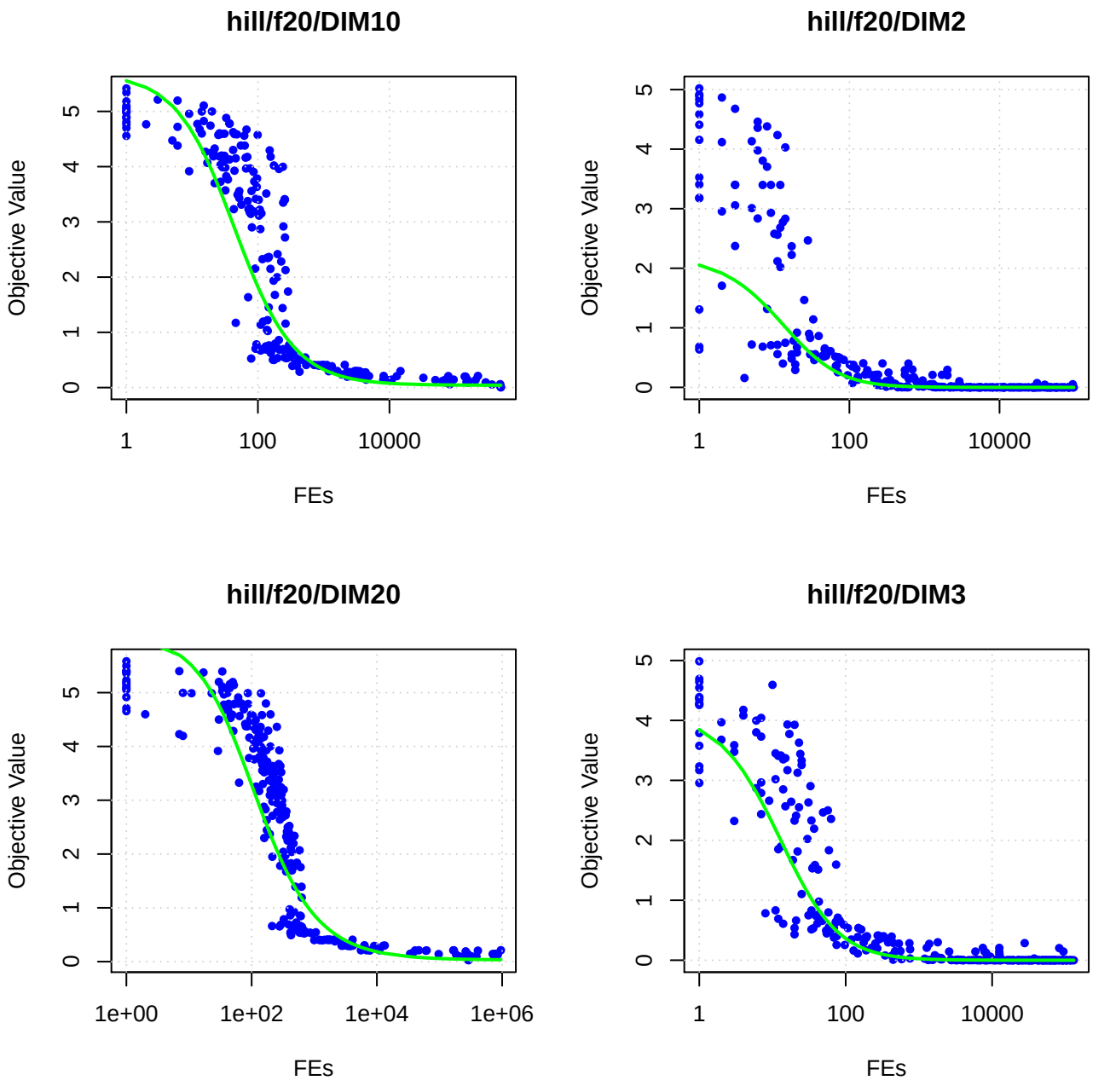
2
4
6
8
1e+00
1e+02
1e+04
1e+06
1
100
10000


hill/f20/DIM10
hill/f20/DIM2
hill/f20/DIM20
hill/f20/DIM3
Objective Value
FEs
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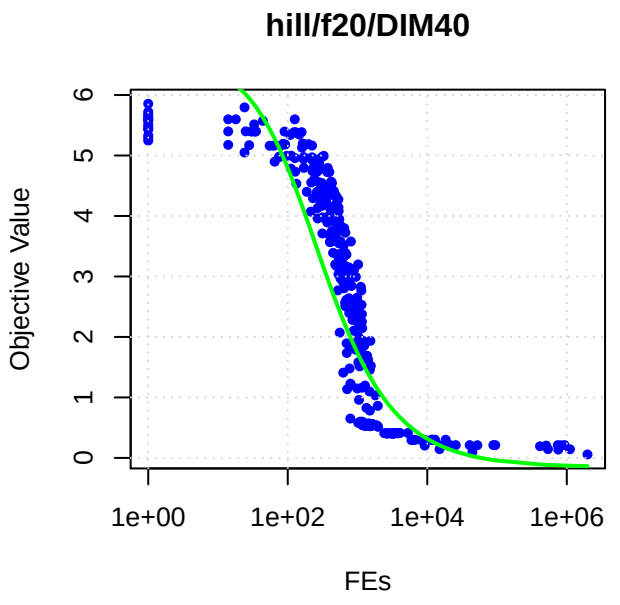
1e+04
1e+06


hill/f20/DIM40
Objective Value
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3
4
5
6
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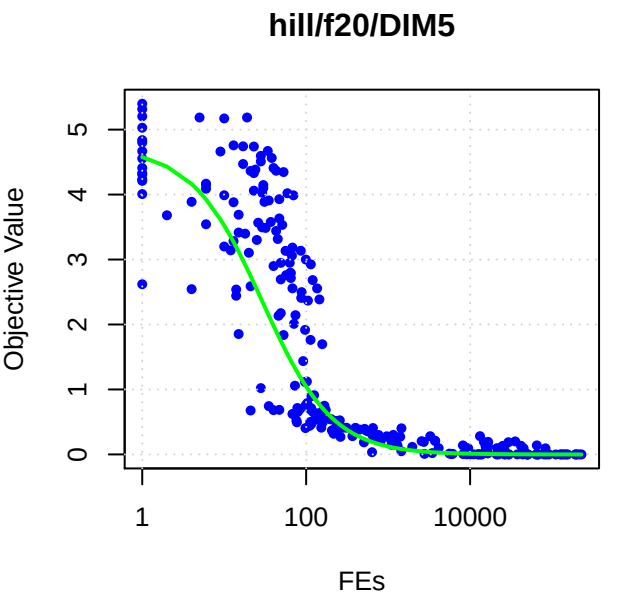
1e+02
1e+04
1e+06
FEs


hill/f20/DIM5
Objective Value
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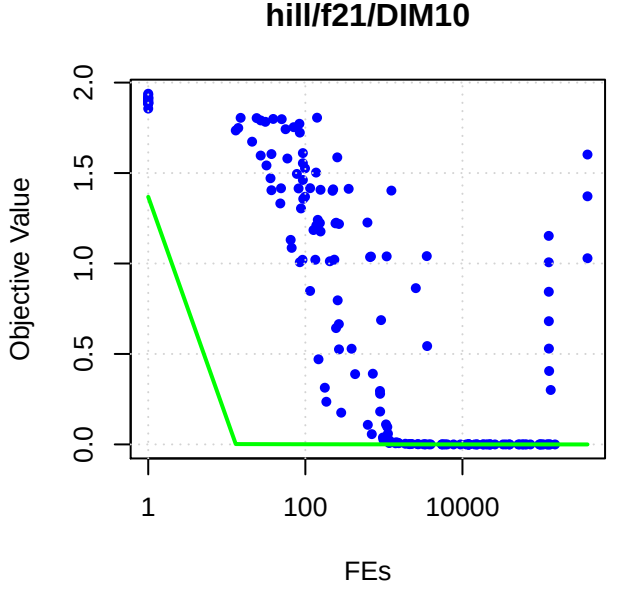
2
3
4
5
1
100
10000
FEs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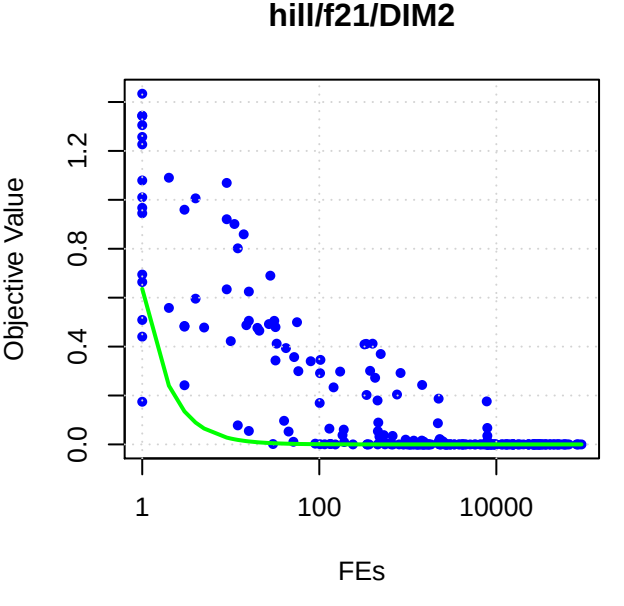
1.0
1.5
2.0
1
100
10000
FEs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Objective Value
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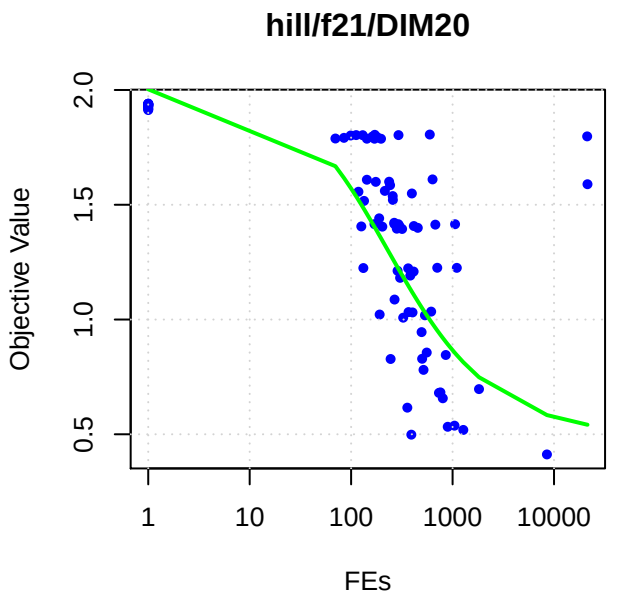
0.8
1.2
1
100
10000
FEs


hill/f21/DIM20
Objective Value
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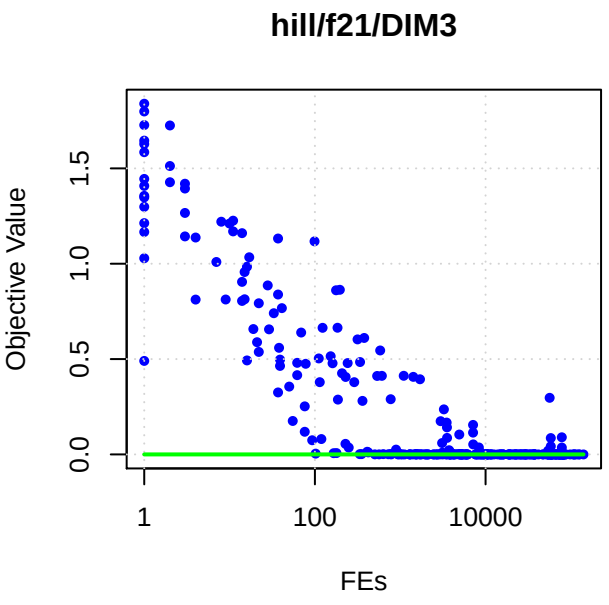
1.0
0.5
1
10
100
1000
10000
FEs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Objective Value
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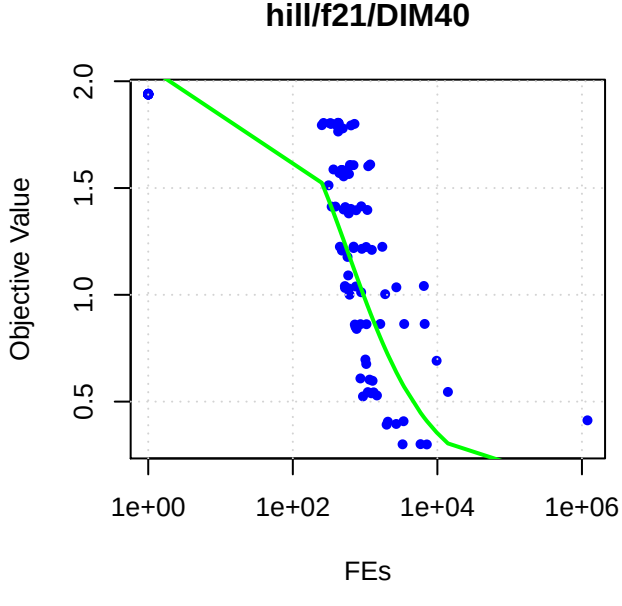
0.0
1
100
10000
FEs


hill/f21/DIM40
Objective Value
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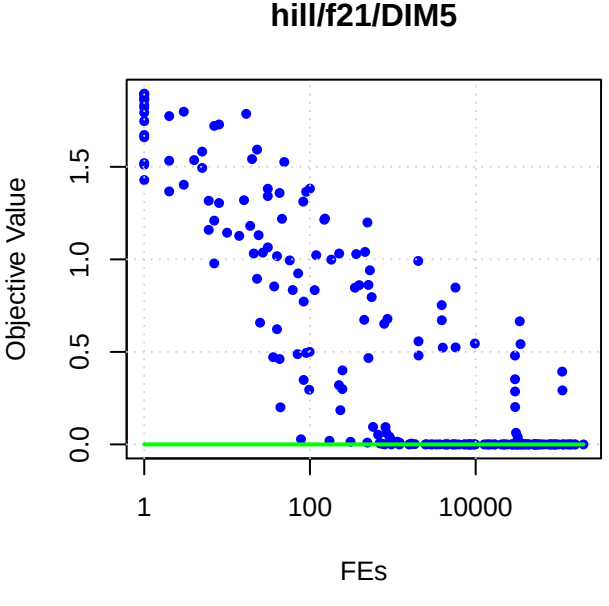
1.5
1.0
0.5
1e+00
1e+02
1e+04
1e+06
FEs


hill/f21/DIM5
Objective Value
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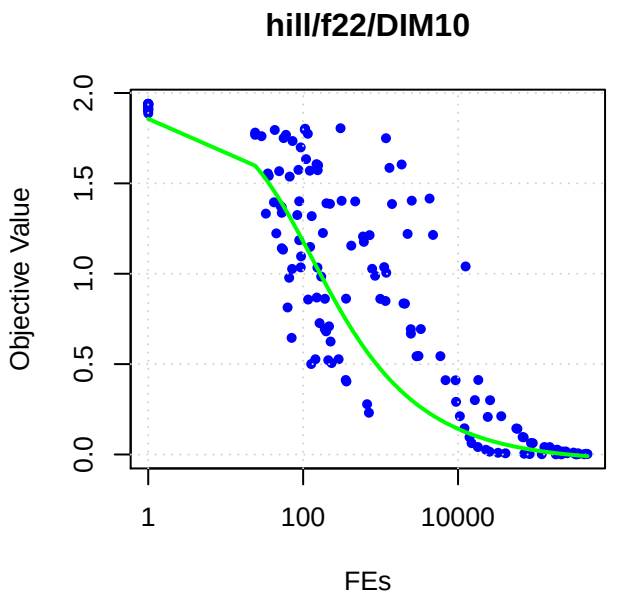
0.5
0.0
1
100
10000
FEs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Objective Value
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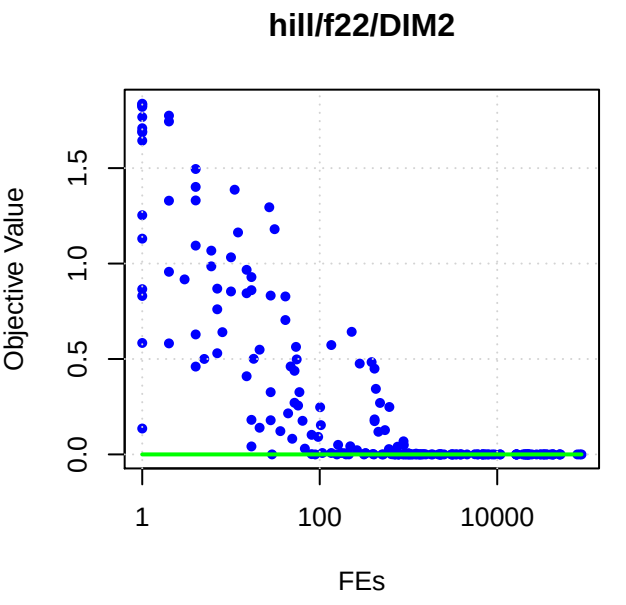
1.5
2.0
1
100
10000
FEs


hill/f22/DIM2
Objective Value
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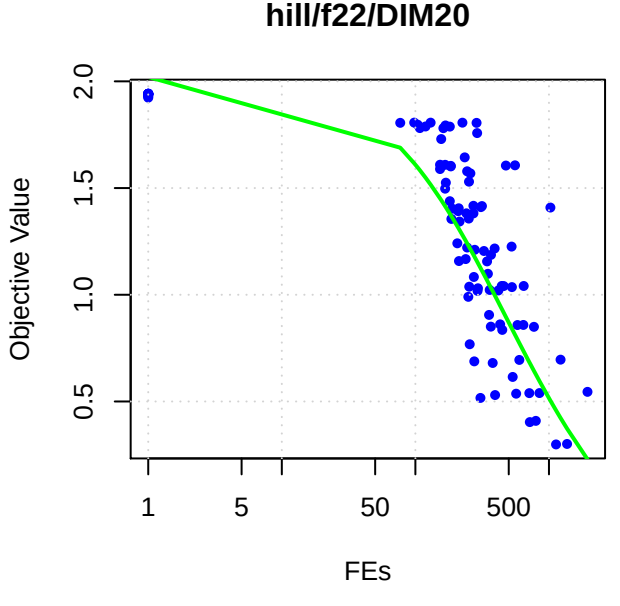
1.0
1.5
1
100
10000
FEs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Objective Value
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1.5
2.0
1
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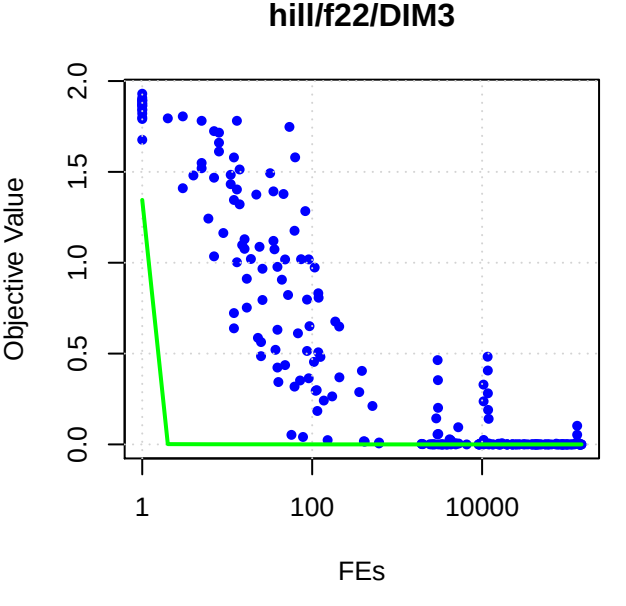
50
500
FEs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Objective Value
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1.5
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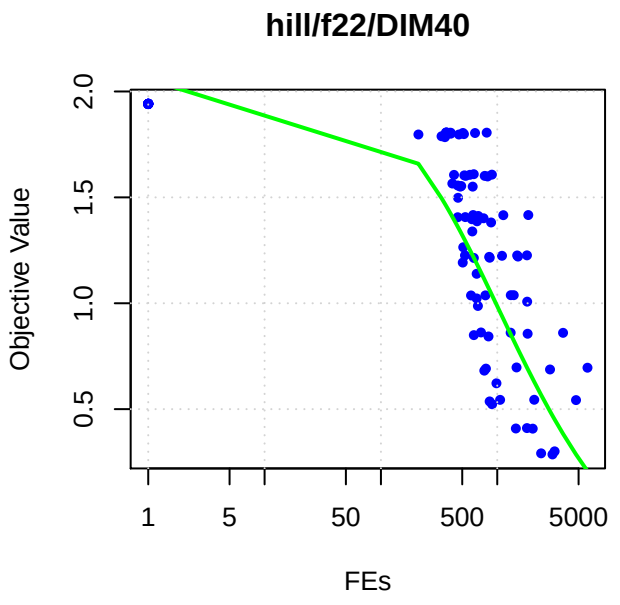
1
100
10000
FEs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1
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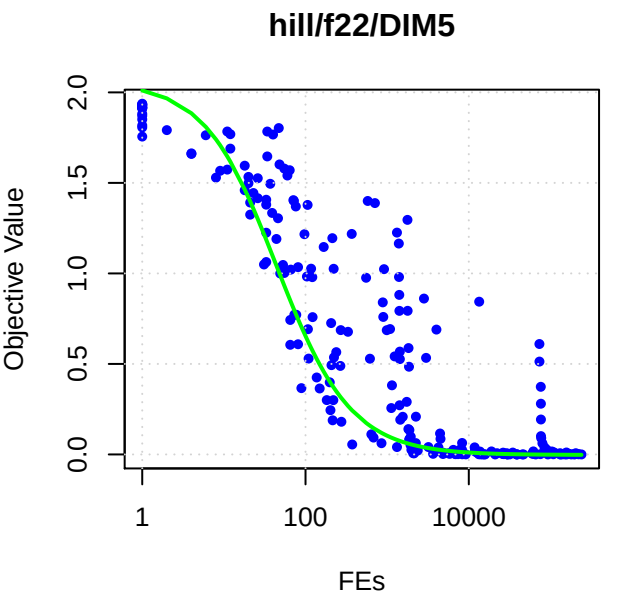
50
500
5000
FEs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Objective Value
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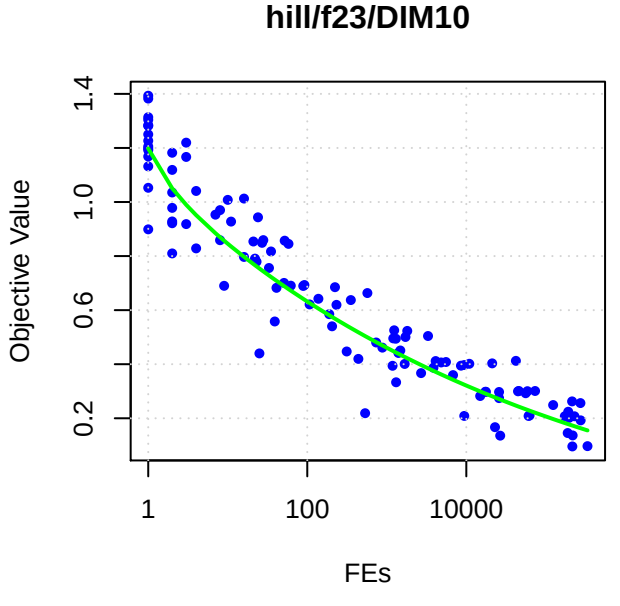
10000
FEs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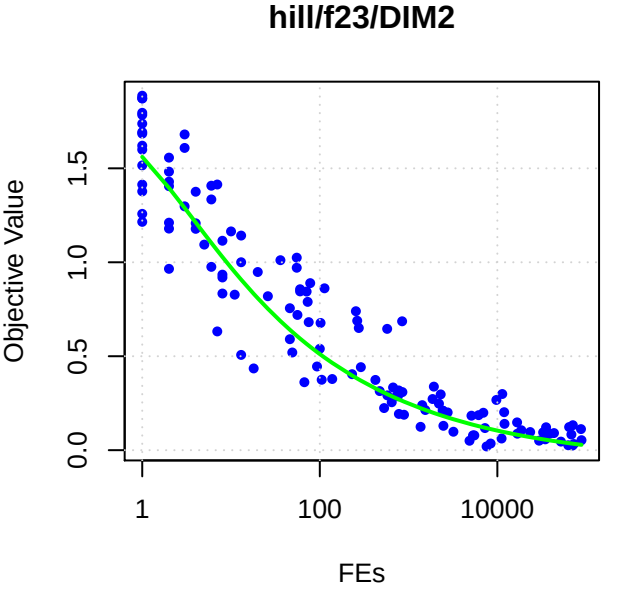
10000
FEs


hill/f23/DIM2
Objective Value
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1
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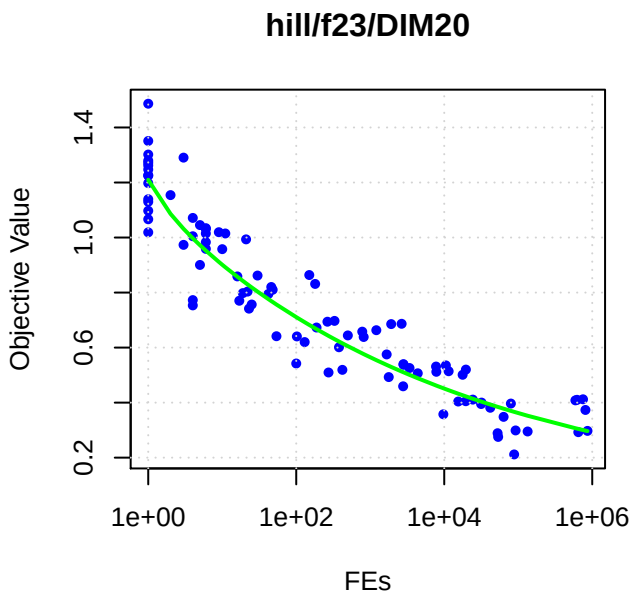
10000
FEs


hill/f23/DIM20
Objective Value
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0.6
1.0
1.4
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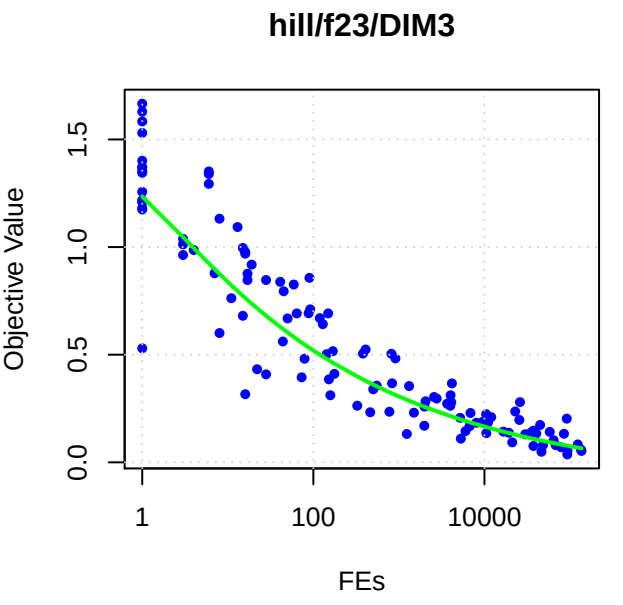
1e+02
1e+04
1e+06
FEs


hill/f23/DIM3
Objective Value
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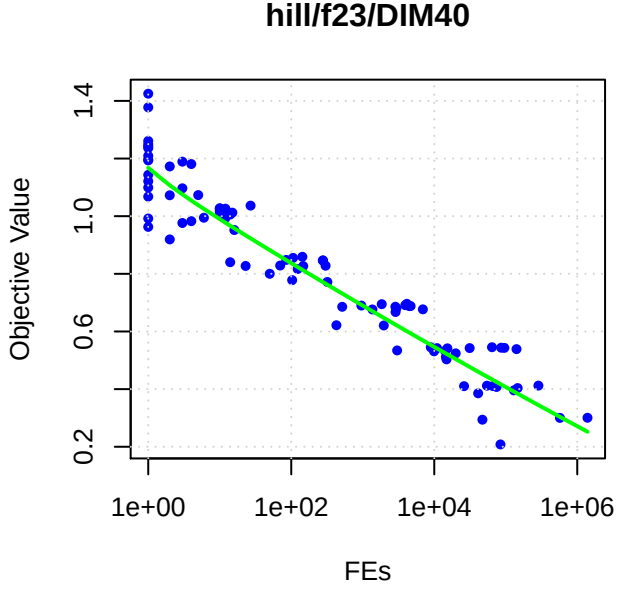
10000
FEs


hill/f23/DIM40
Objective Value
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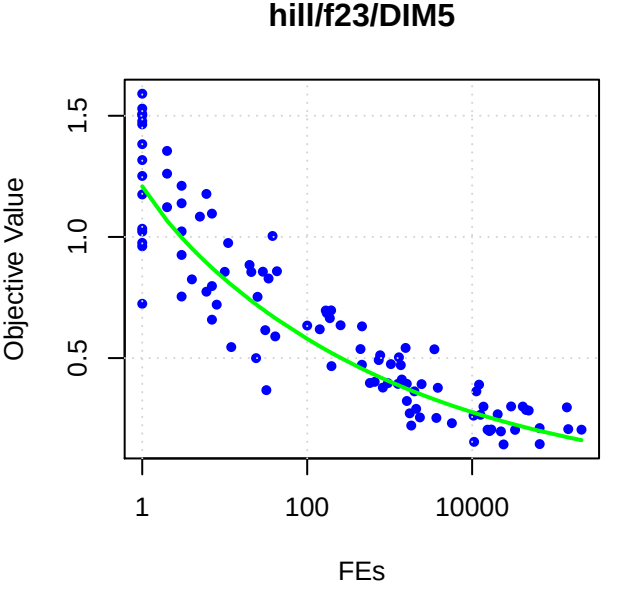
0.6
1.0
1.4
1e+00
1e+02
1e+04
1e+06
FEs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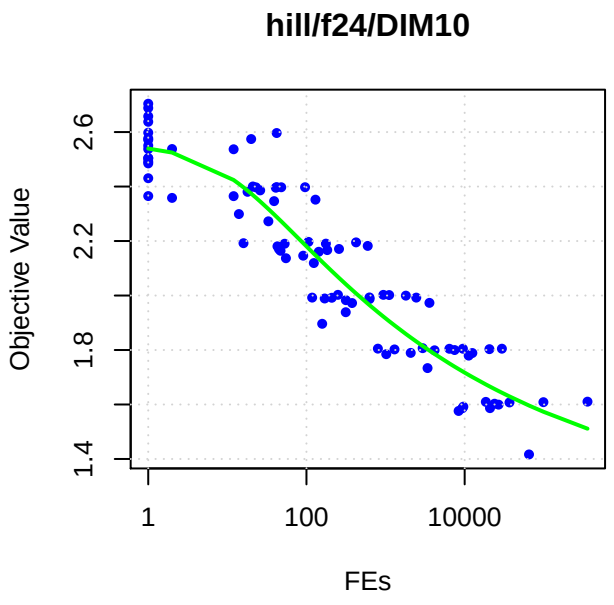
10000
FEs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Objective Value
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2.2
1.8
1.4
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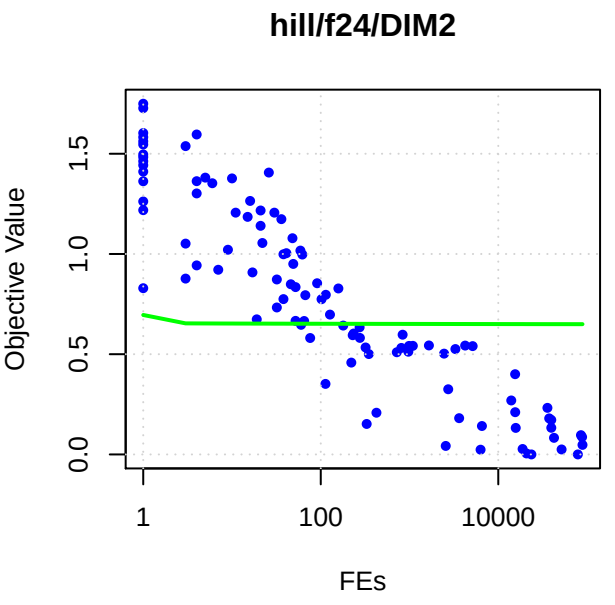
10000
FEs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Objective Value
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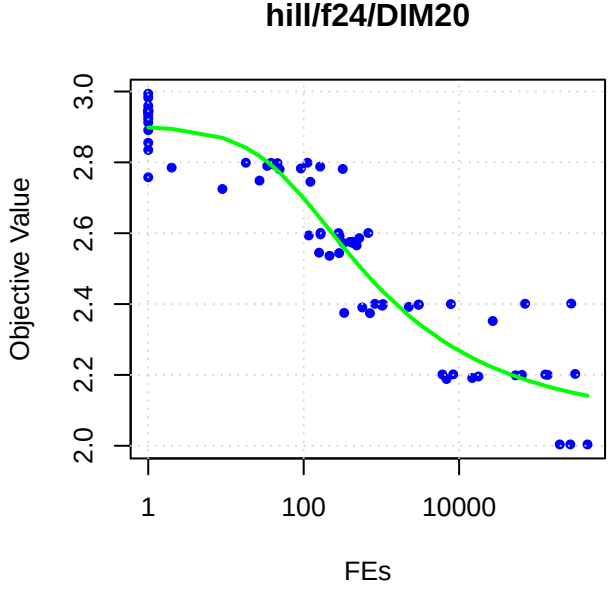
FEs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Objective Value
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2.6
2.4
2.2
2.0
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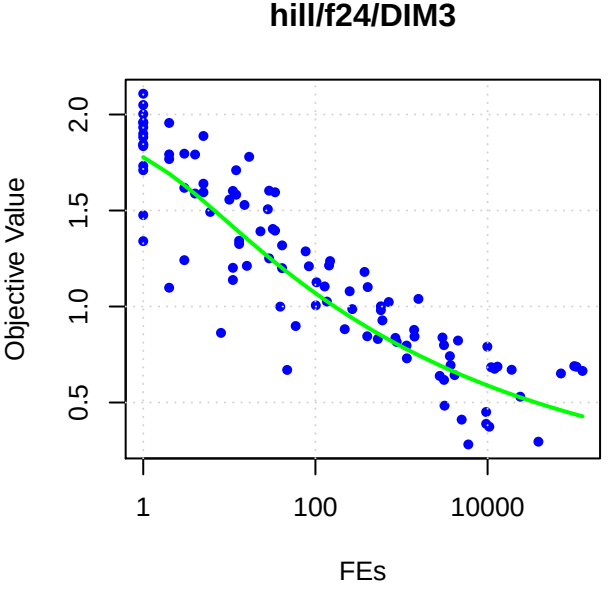
FEs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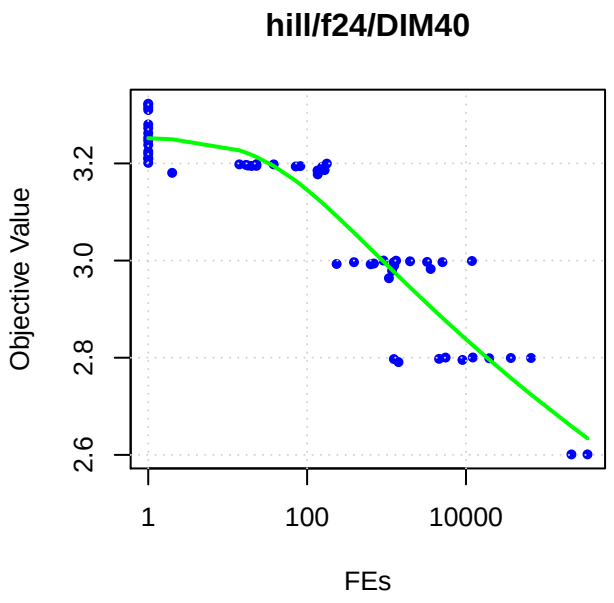
10000
FEs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Objective Value
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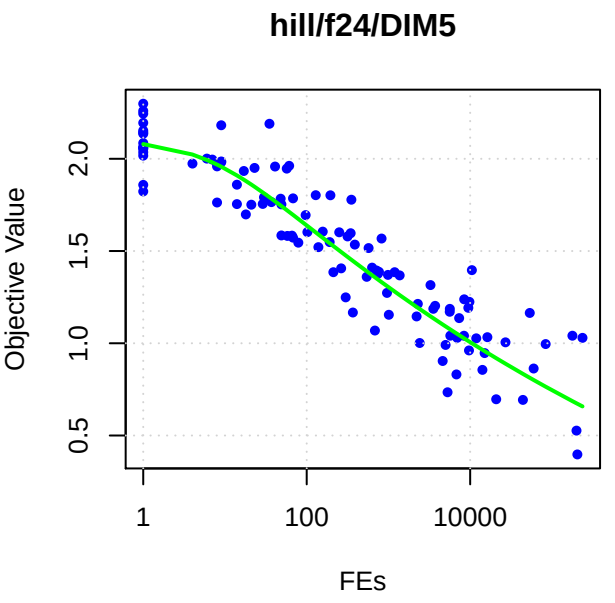
FEs


hill/f24/DIM5
Objective Value
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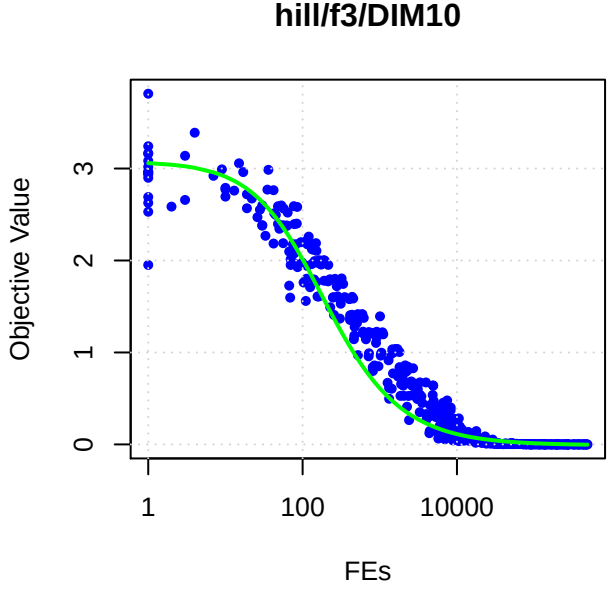
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Objective Value
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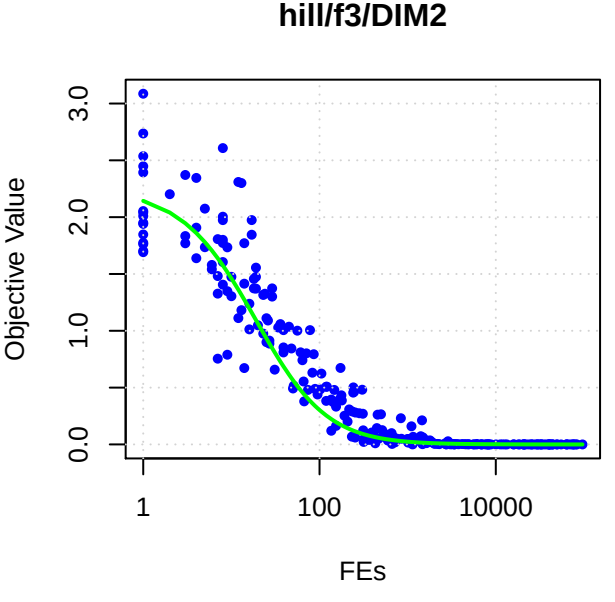
FEs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Objective Value
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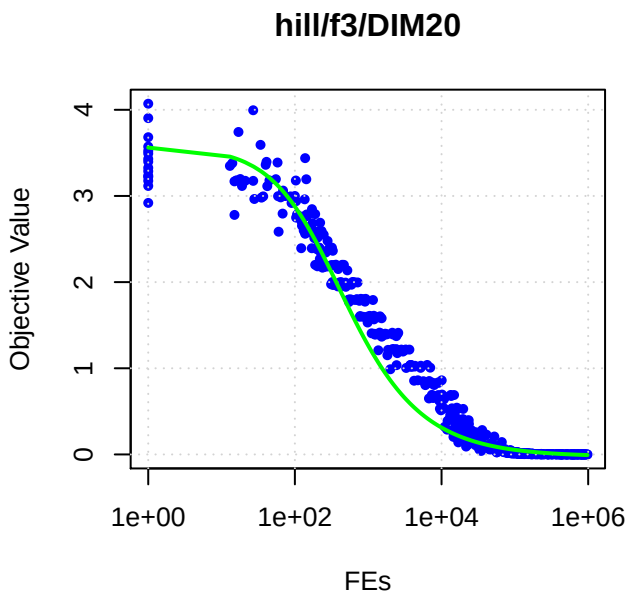
FEs


hill/f3/DIM20
Objective Value
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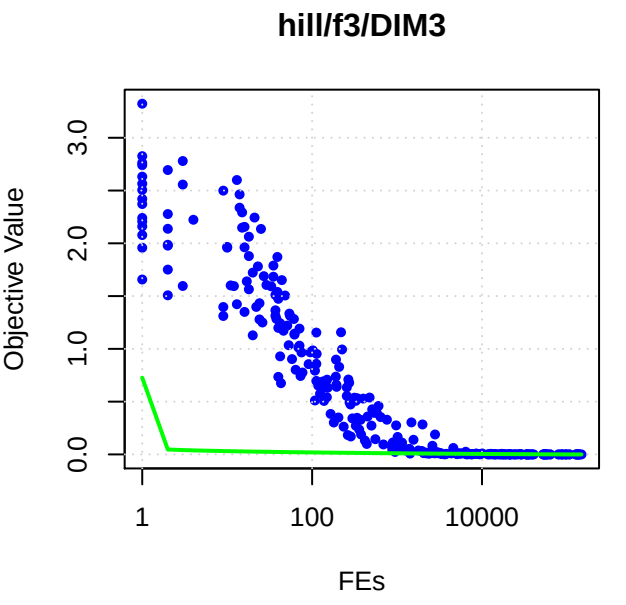
1e+04
1e+06
FEs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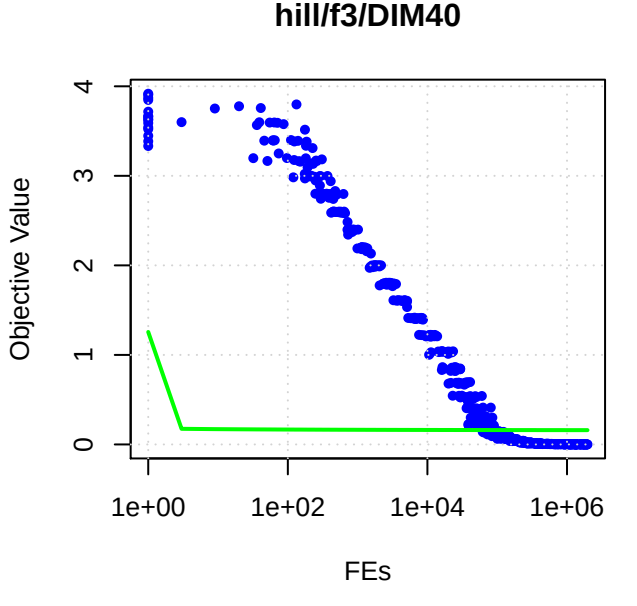
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Objective Value
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4
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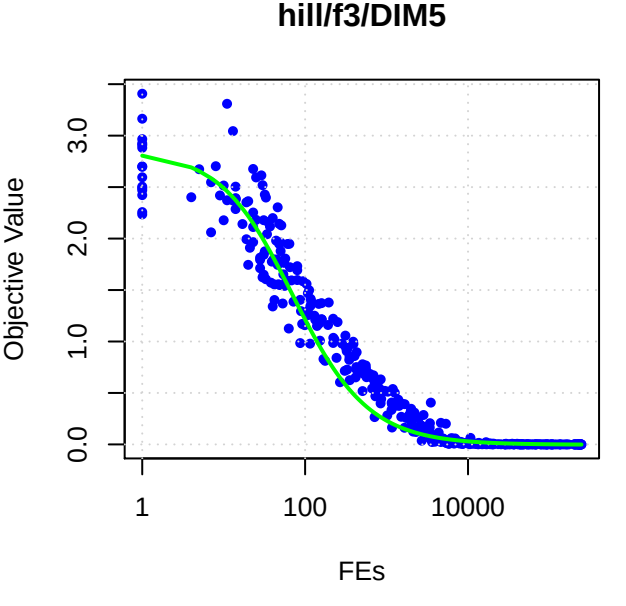
FEs


hill/f3/DIM5
Objective Value
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3.0
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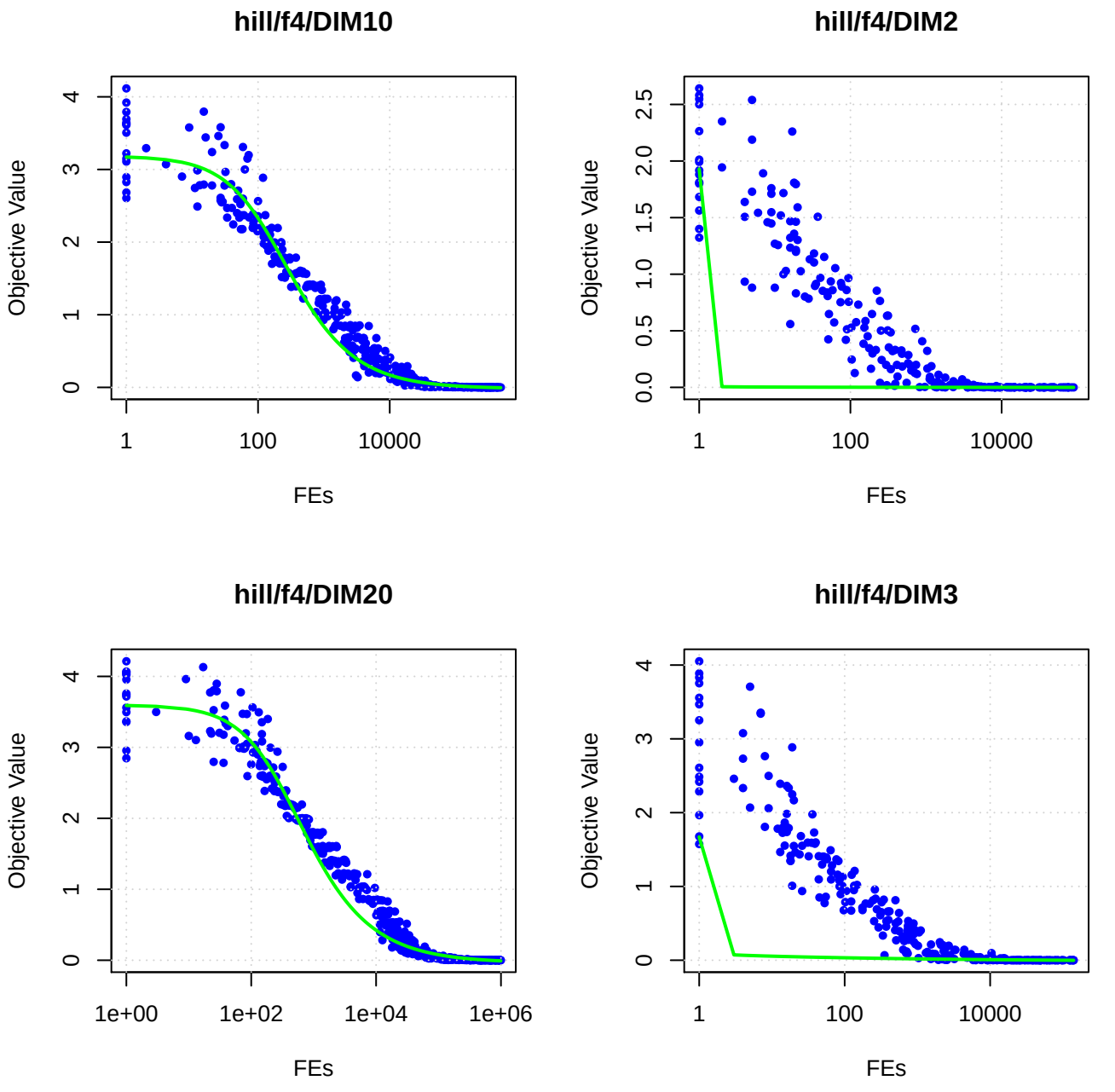
hill/f4/DIM10
Objective Value
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3
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1
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10000
FEs
hill/f4/DIM2
Objective Value
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0.5
1.0
1.5
2.0
2.5
1
100
10000
FEs
hill/f4/DIM20
Objective Value
0
1
2
3
4
1e+00
1e+02
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FEs
hill/f4/DIM3
Objective Value
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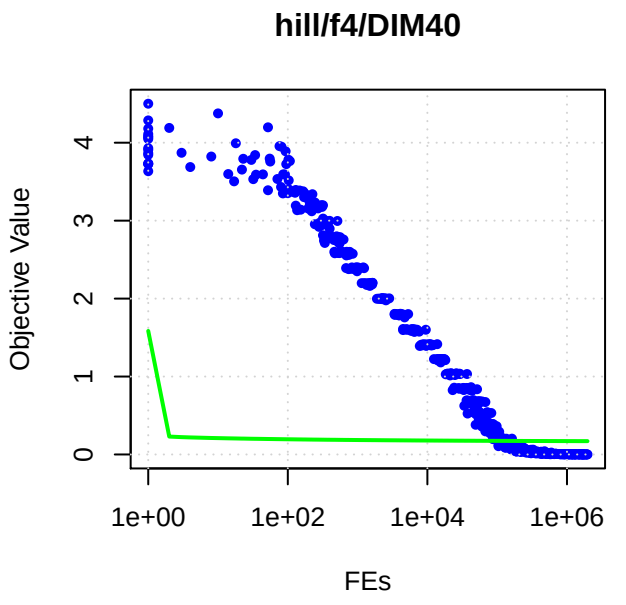
FEs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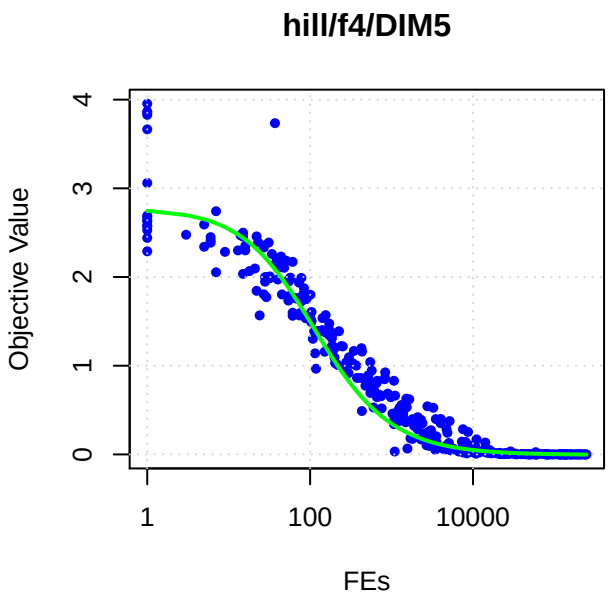
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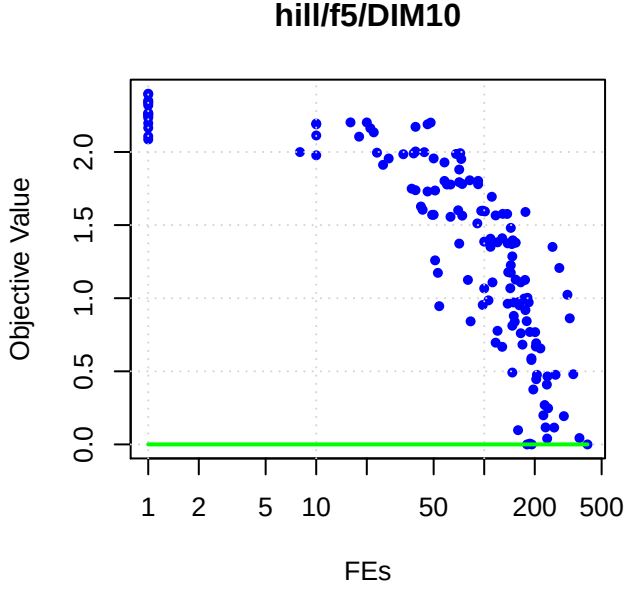
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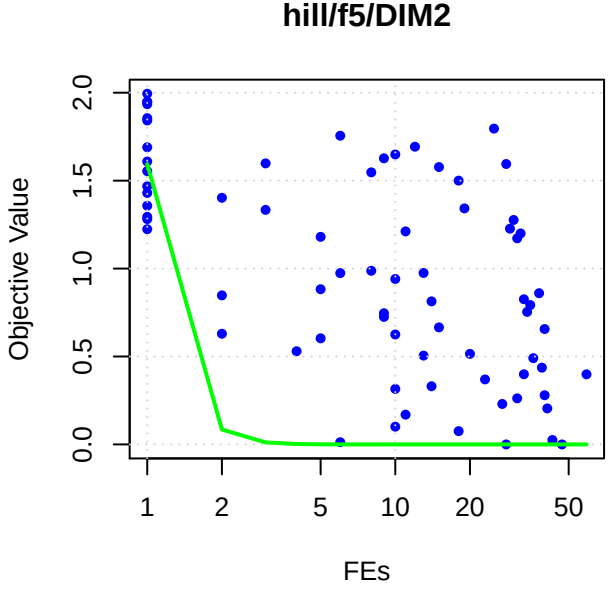
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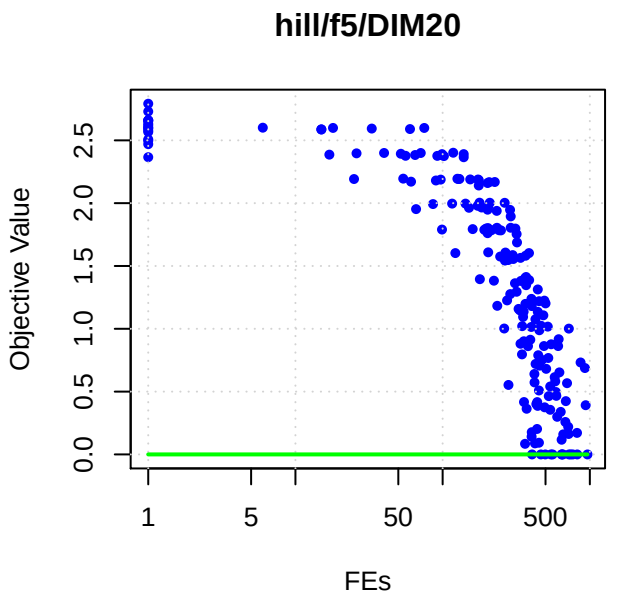
FEs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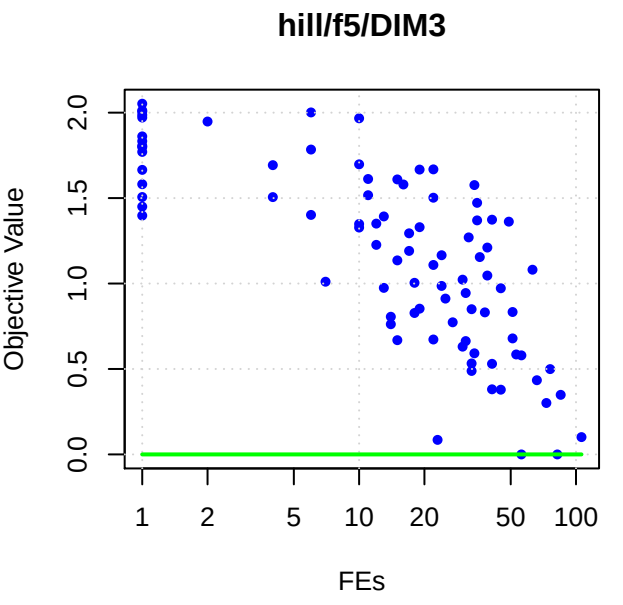
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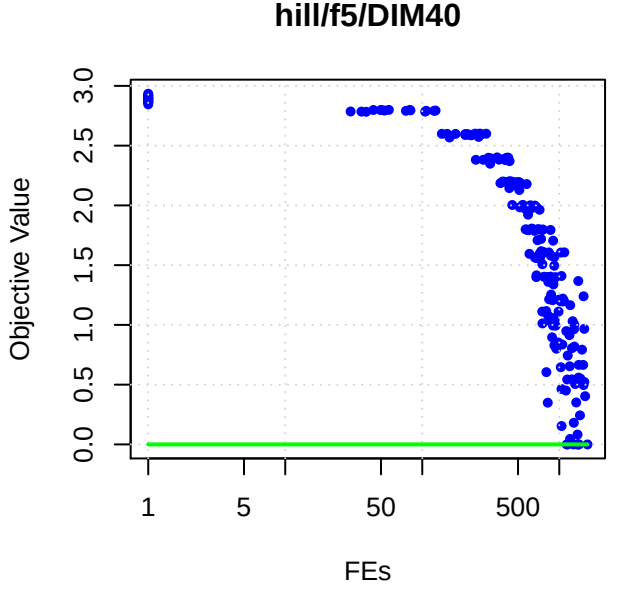
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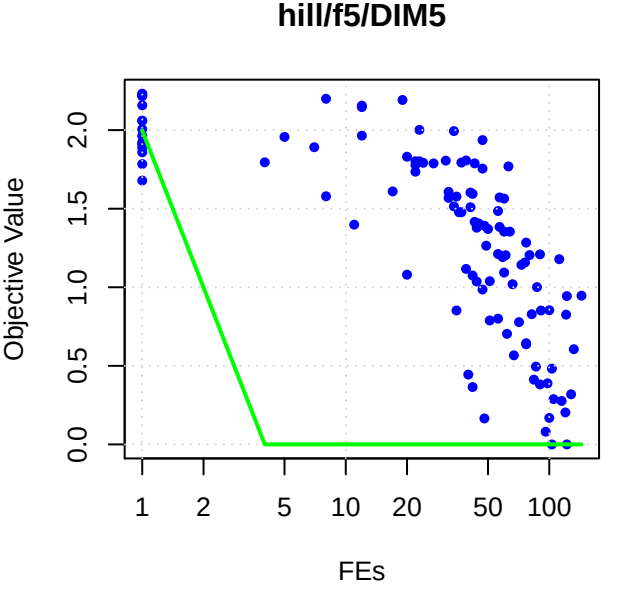
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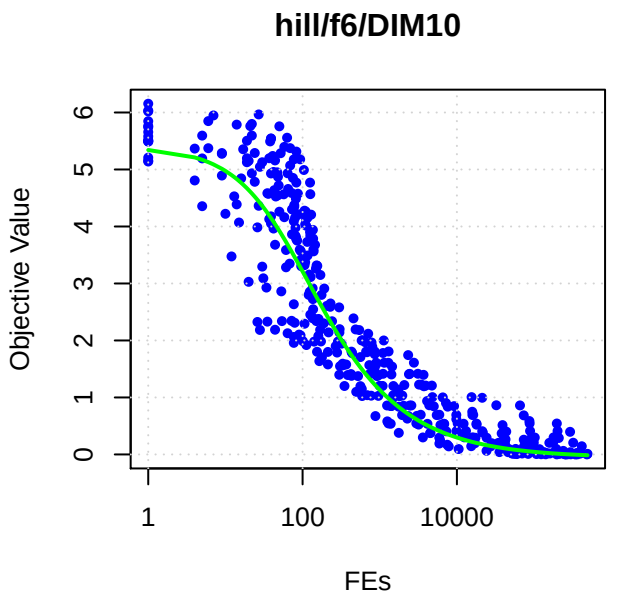
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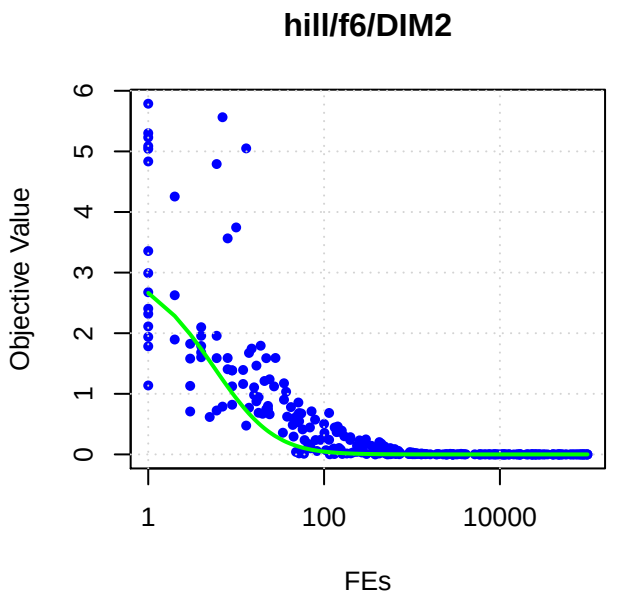
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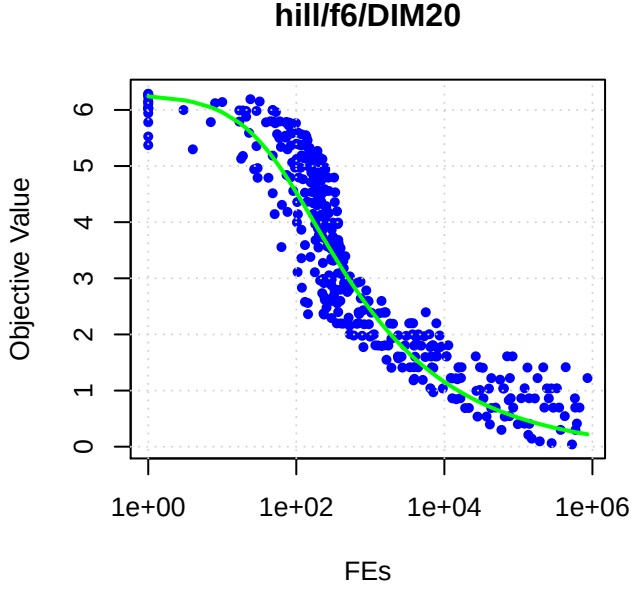
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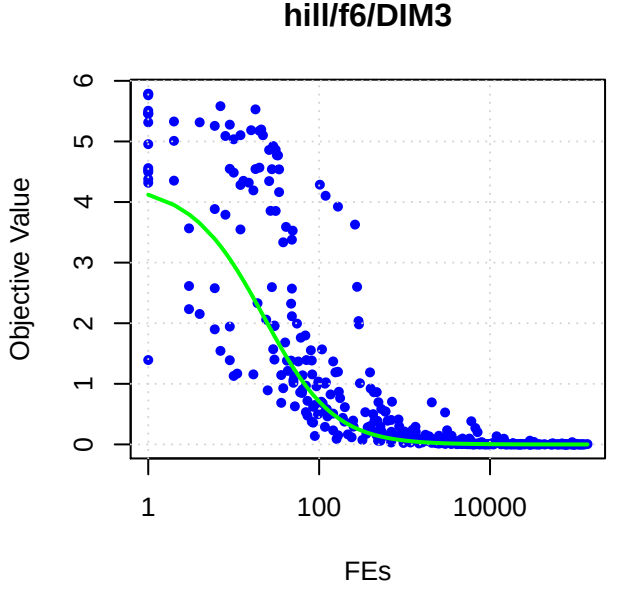
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Objective Value
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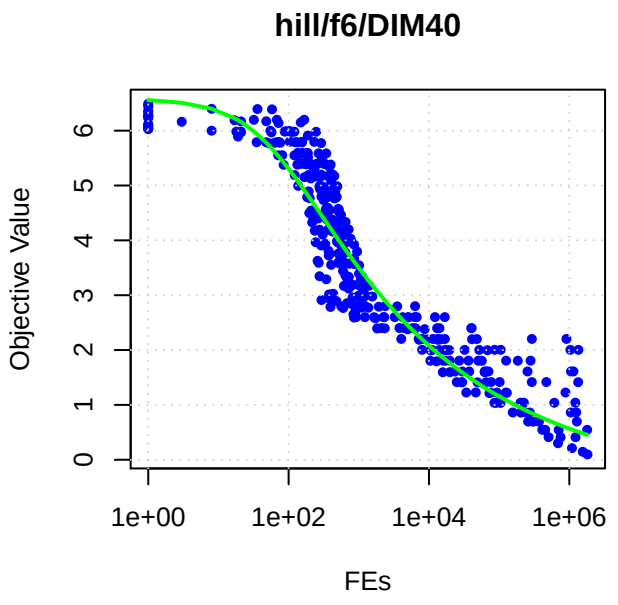
hill/f6/DIM40
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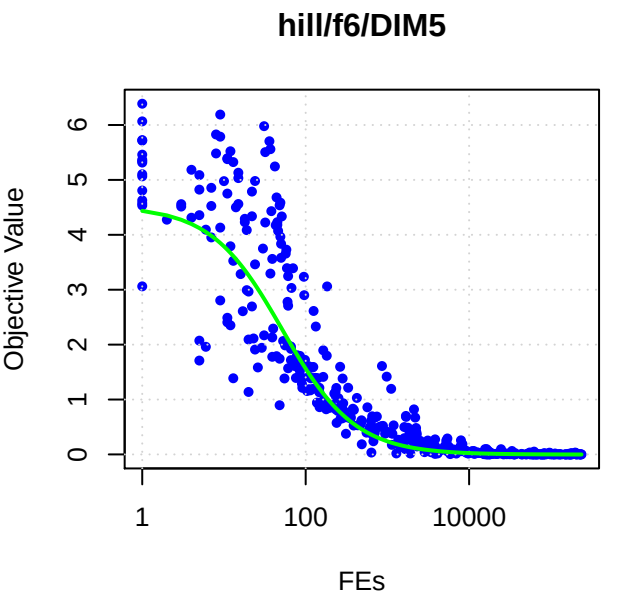
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Objective Value
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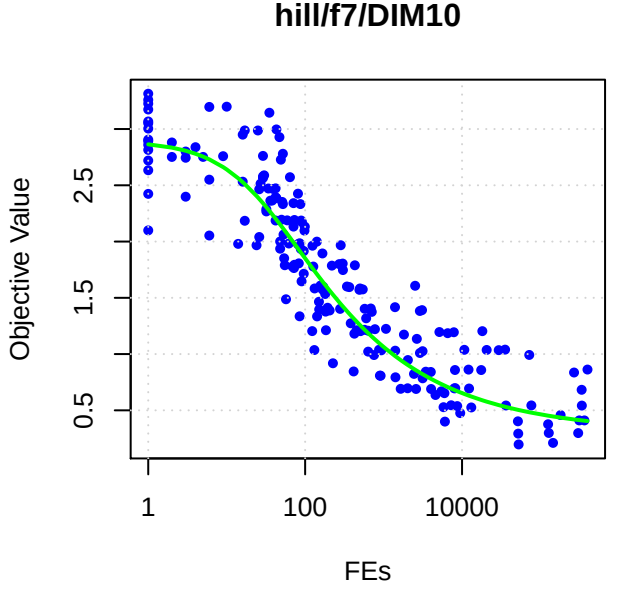
FEs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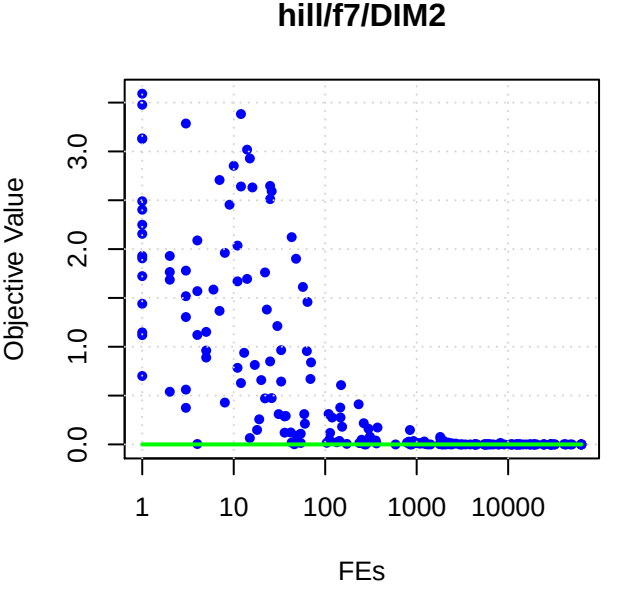
FEs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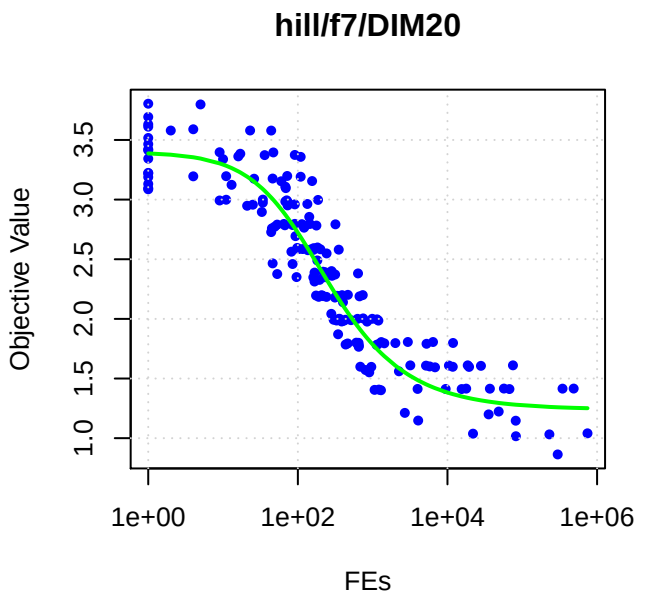
1000
10000
FEs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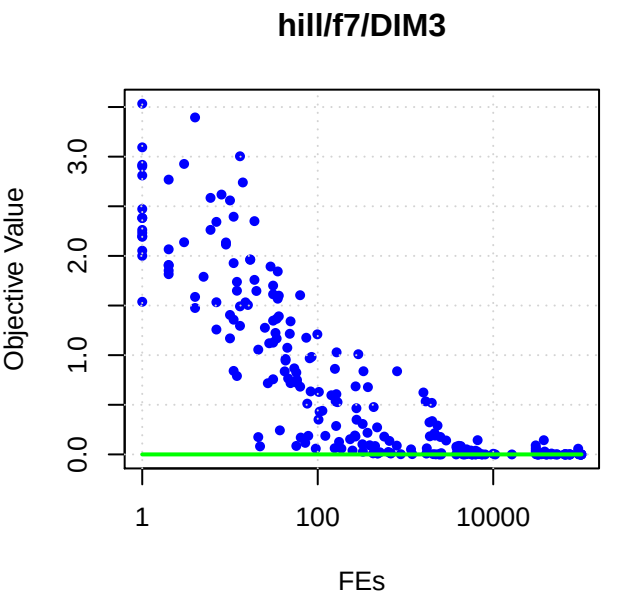
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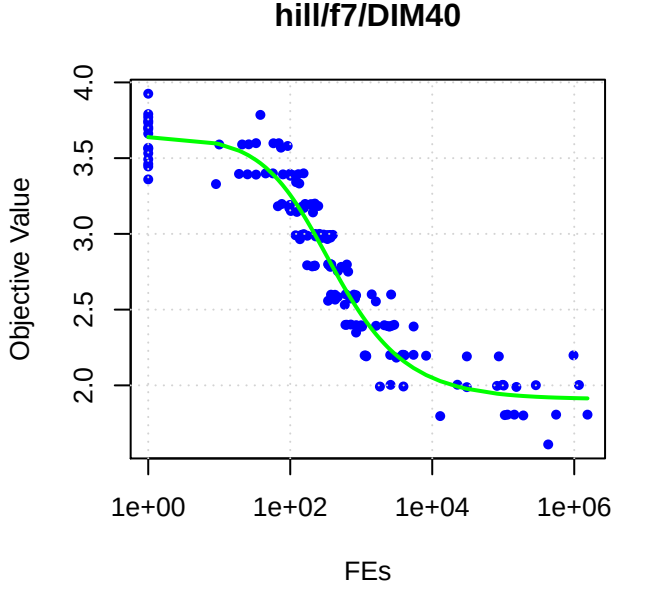
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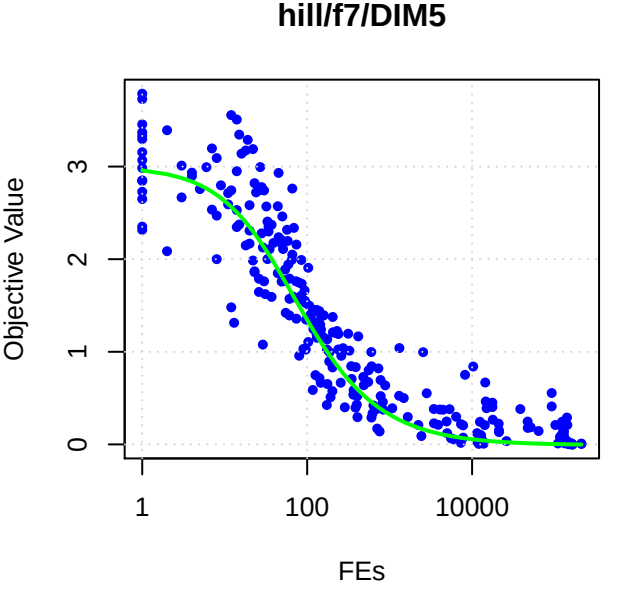
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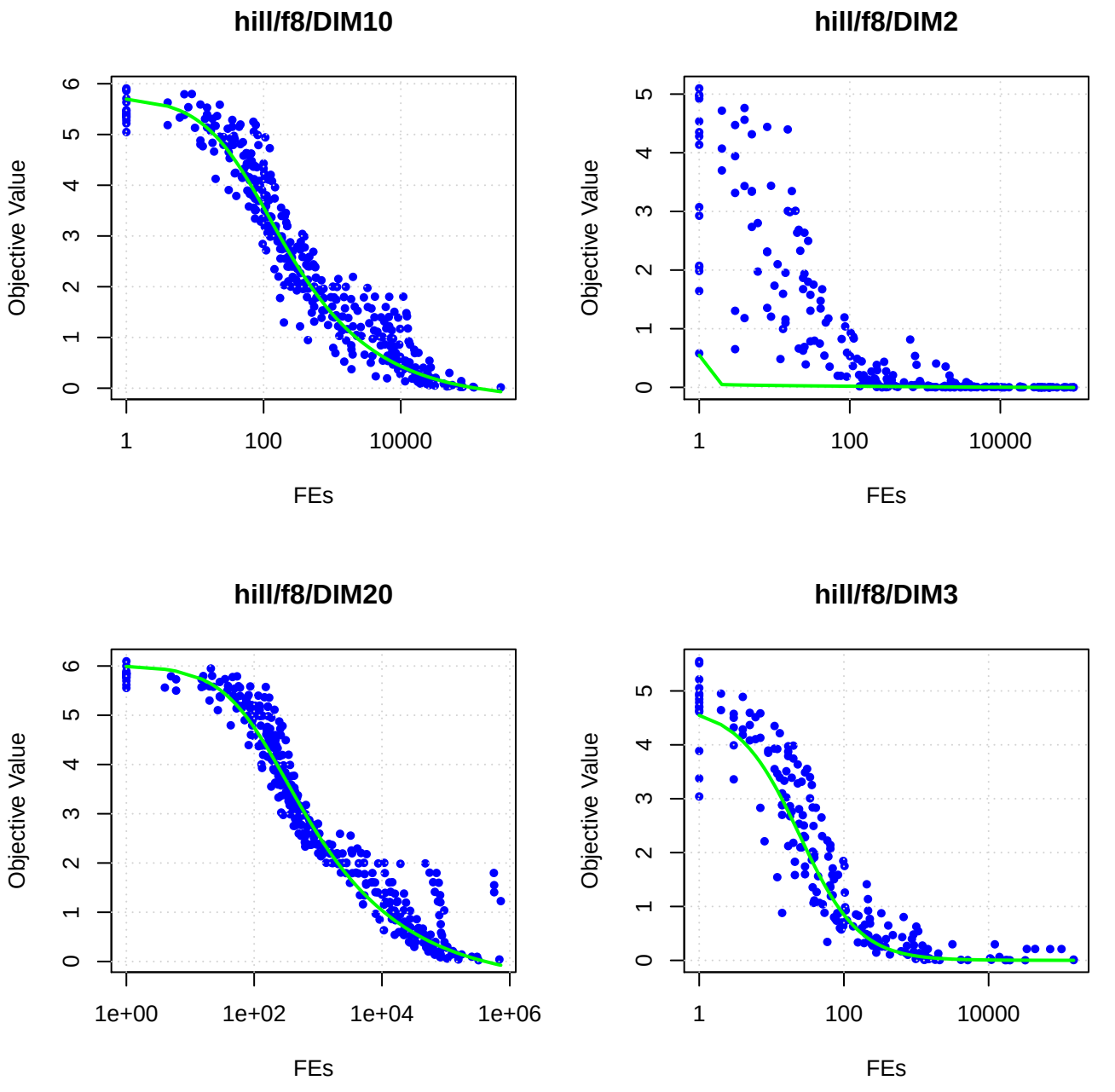
hill/f8/DIM10
hill/f8/DIM2
hill/f8/DIM20
hill/f8/DIM3
Objective Value
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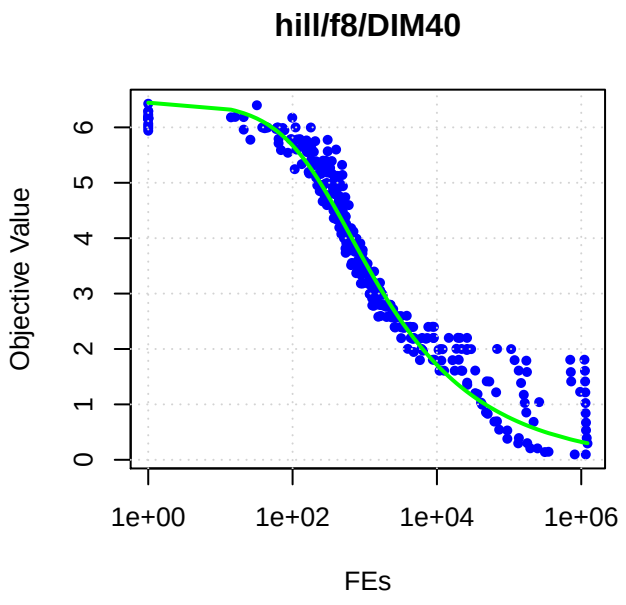
hill/f8/DIM40
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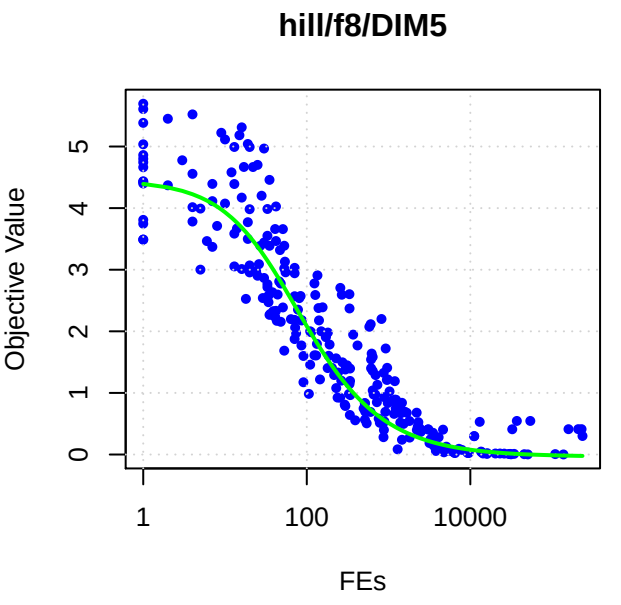
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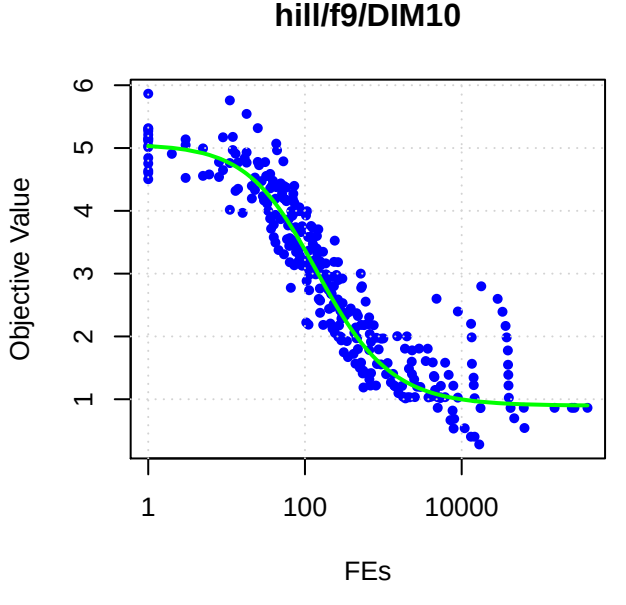
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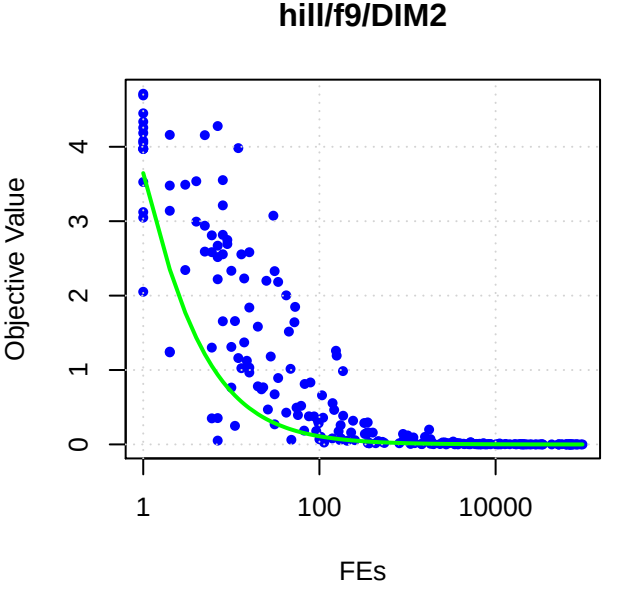
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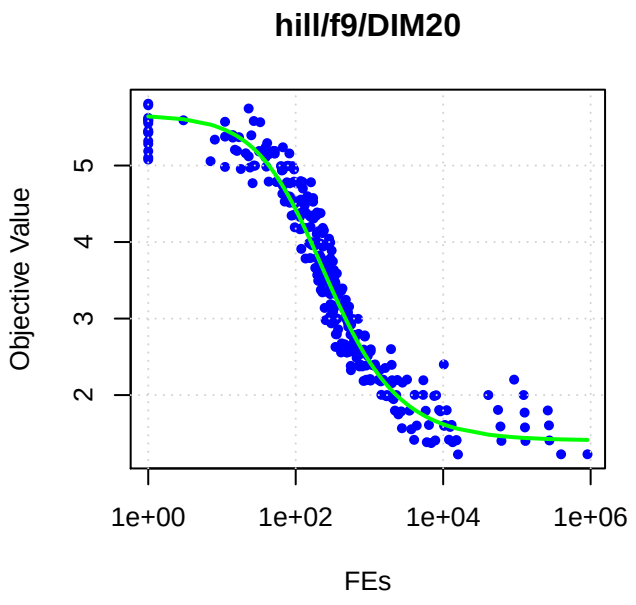
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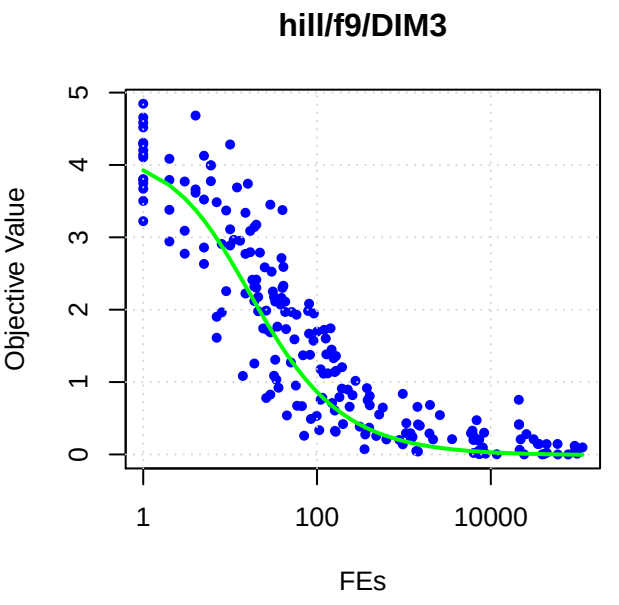
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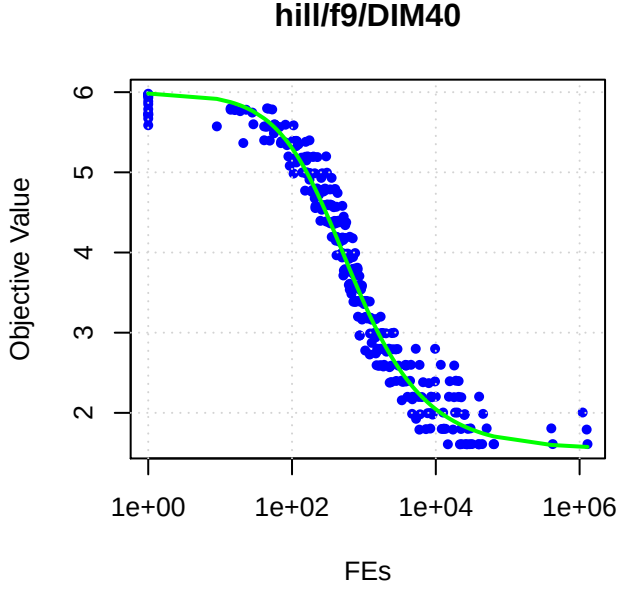
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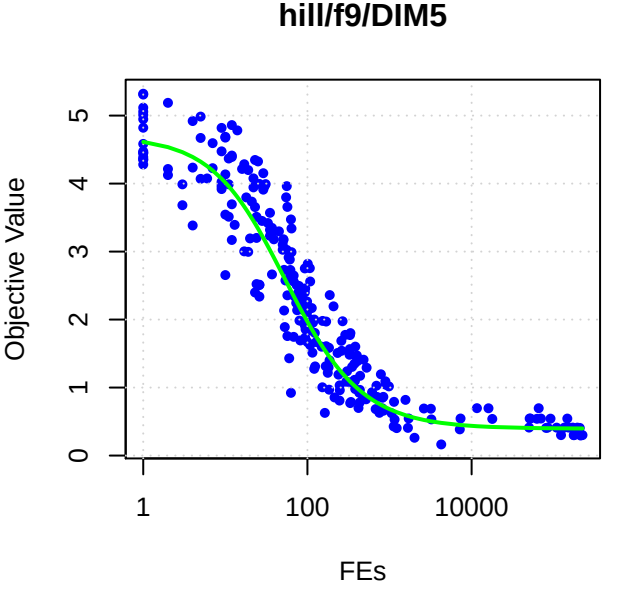
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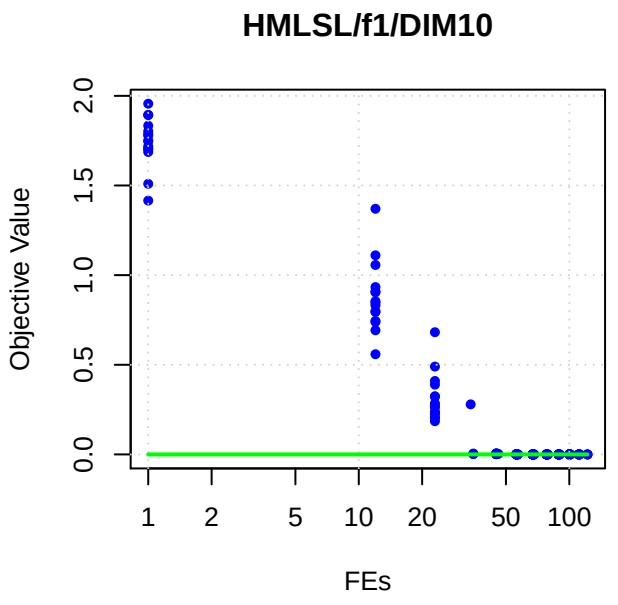
FEs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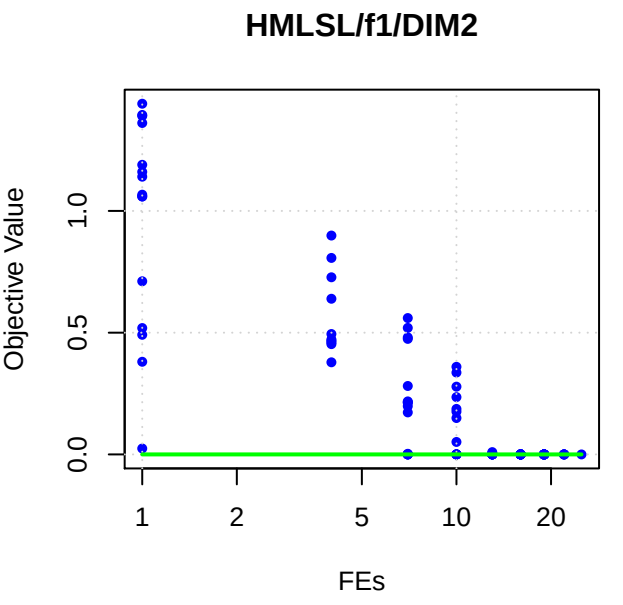
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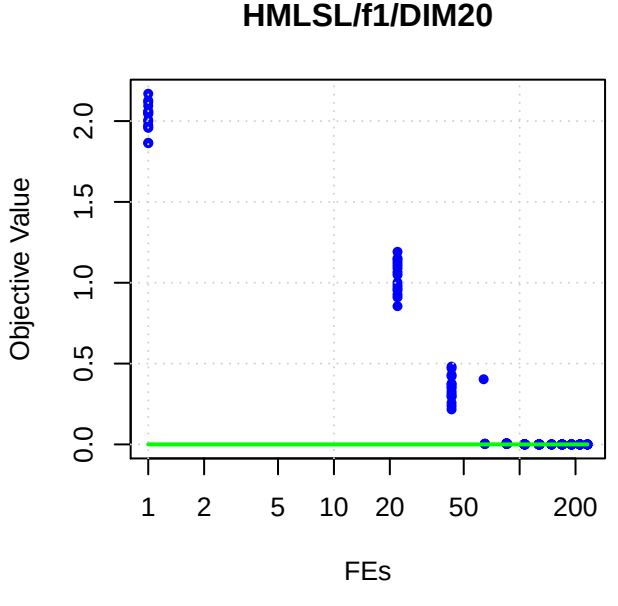
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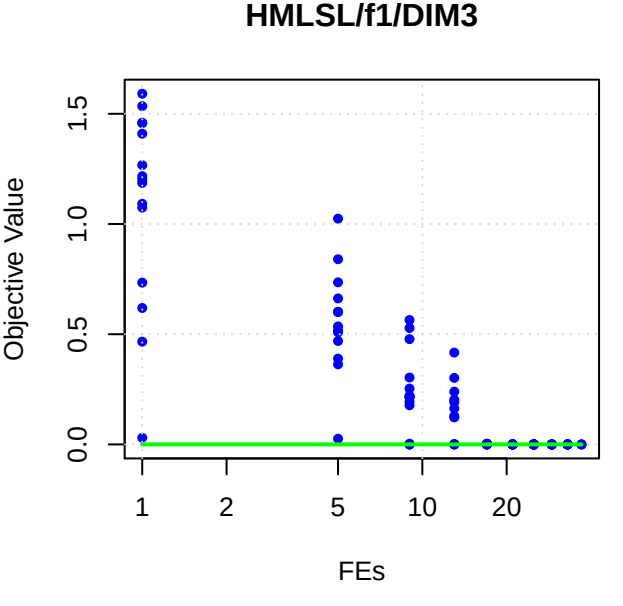
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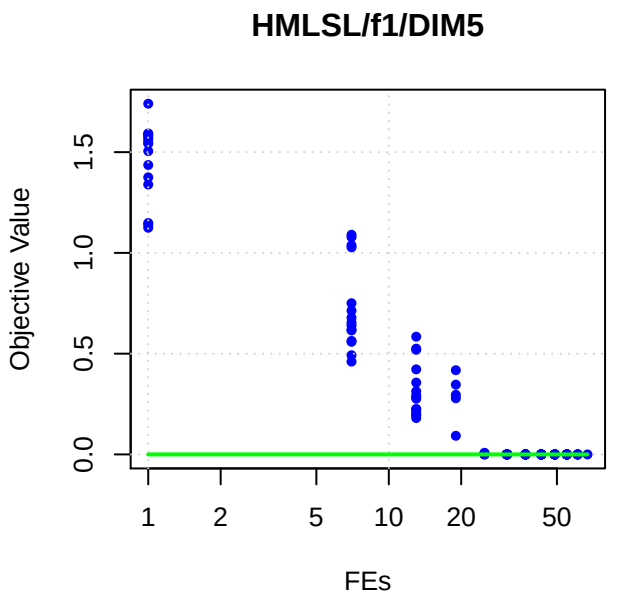
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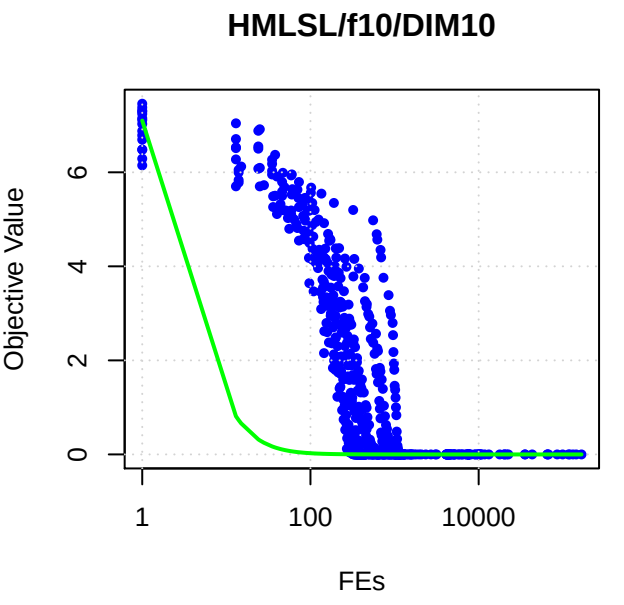
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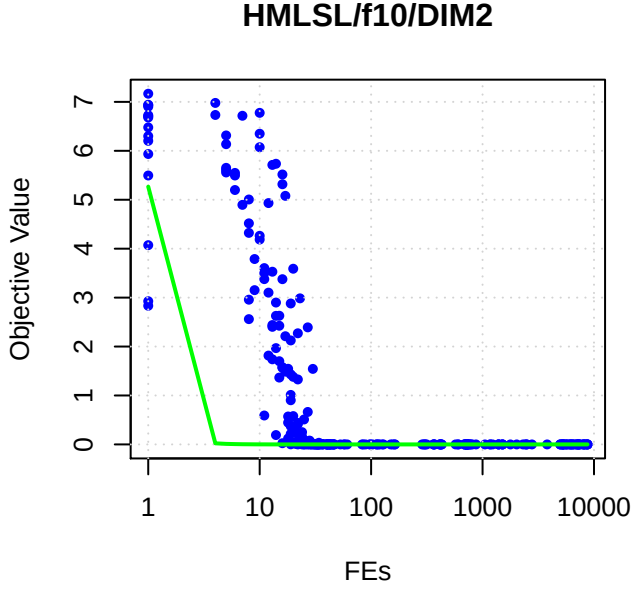
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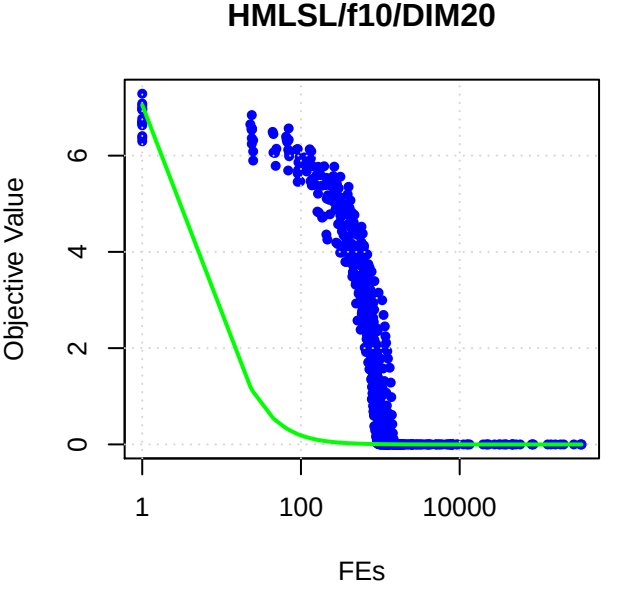
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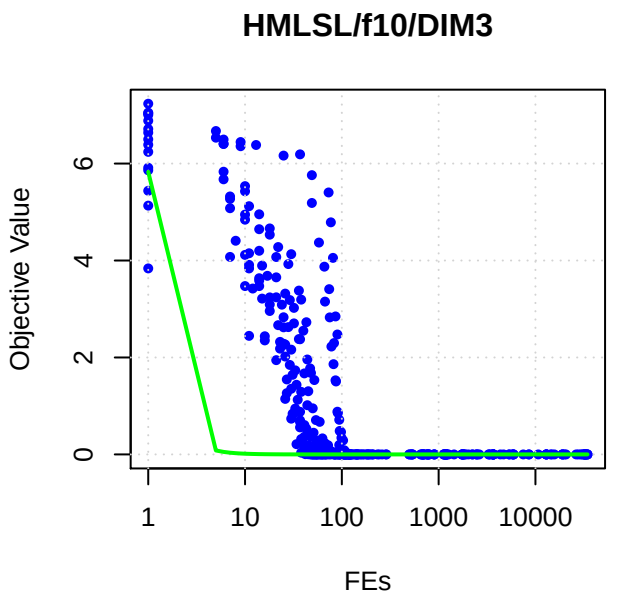
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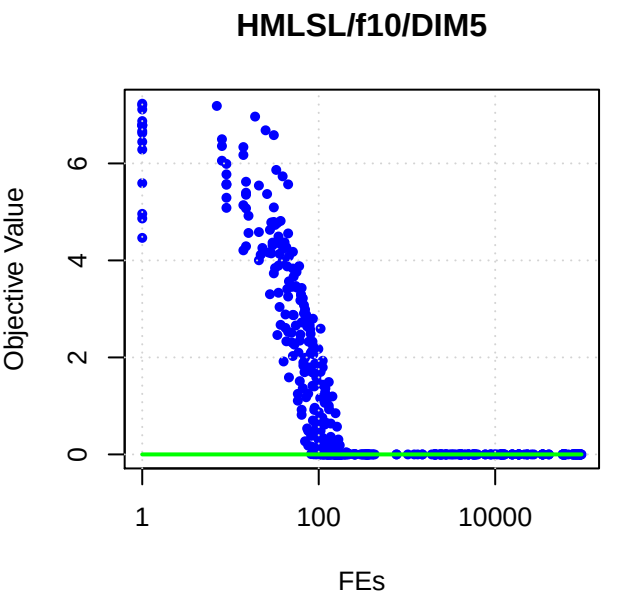
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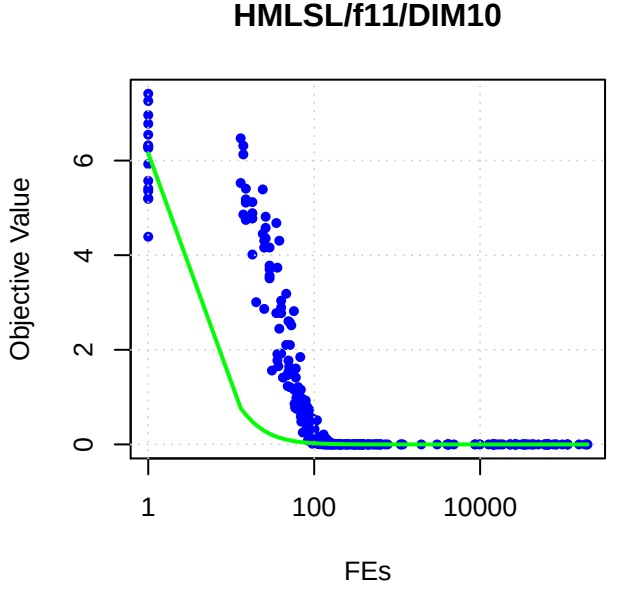
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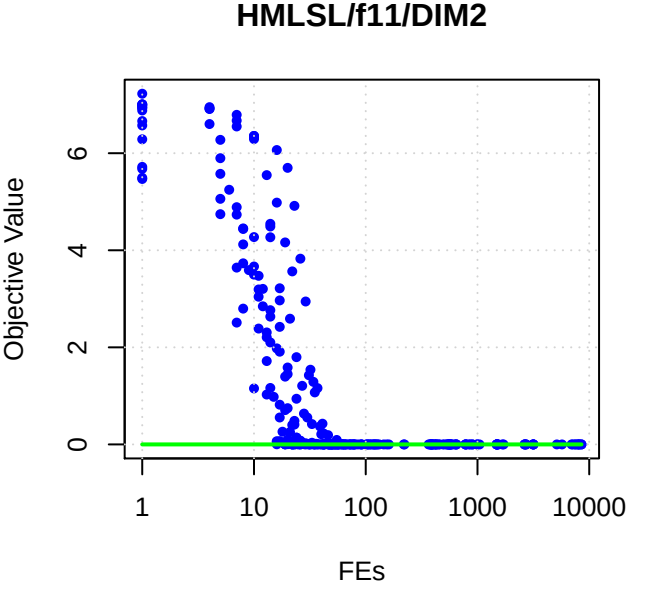
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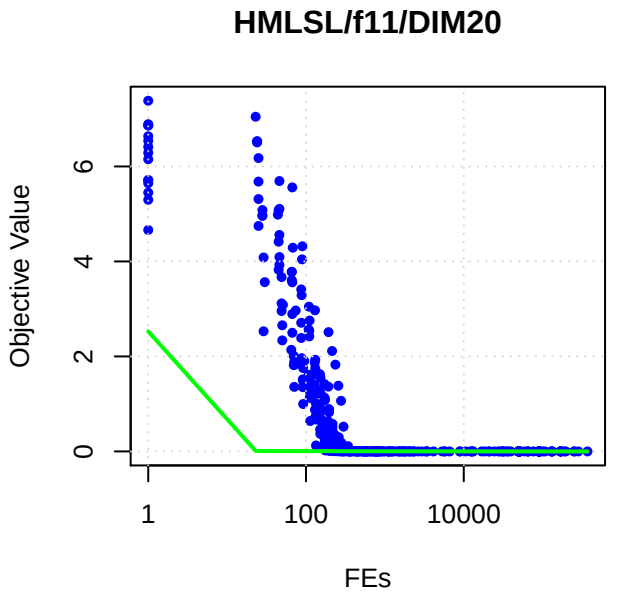
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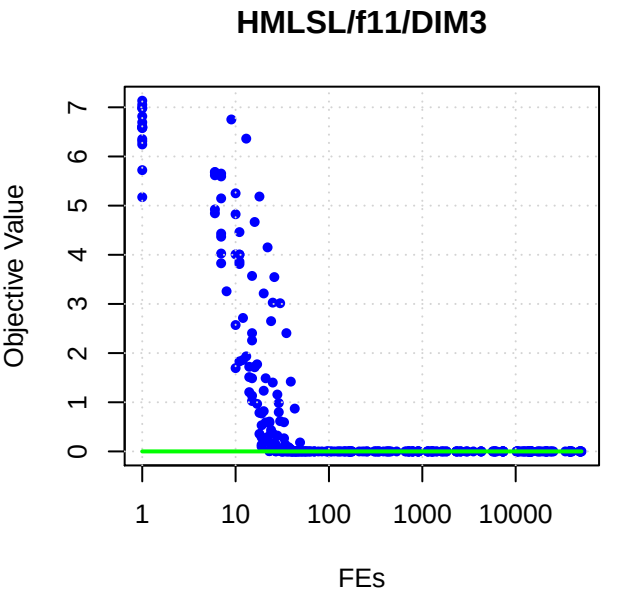
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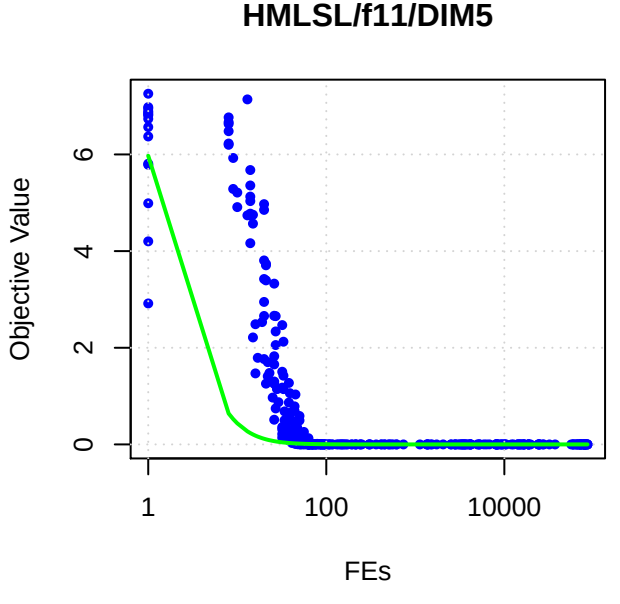
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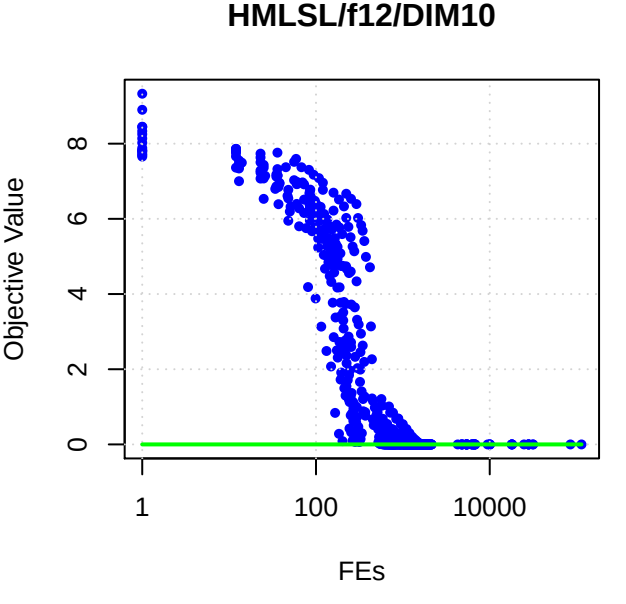
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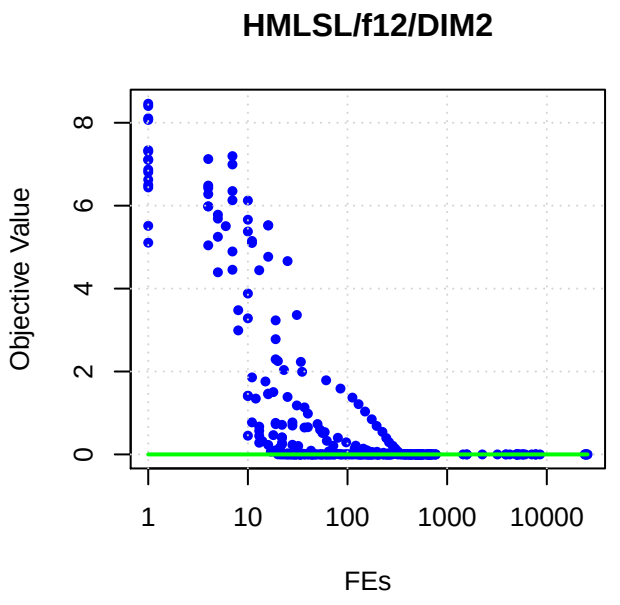
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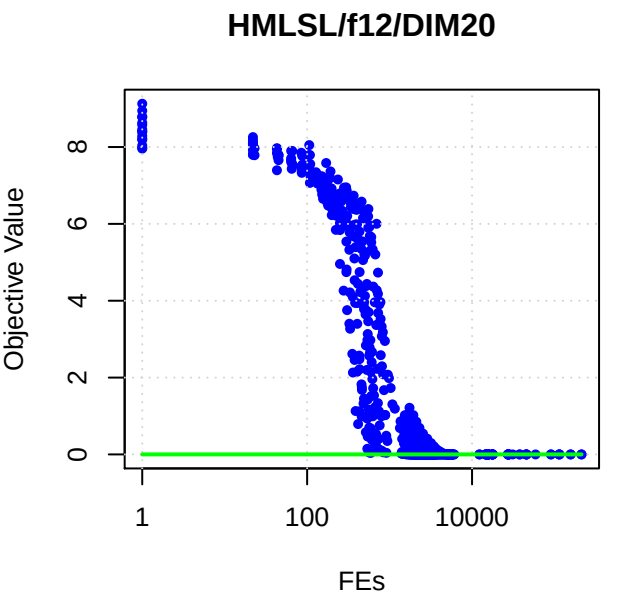
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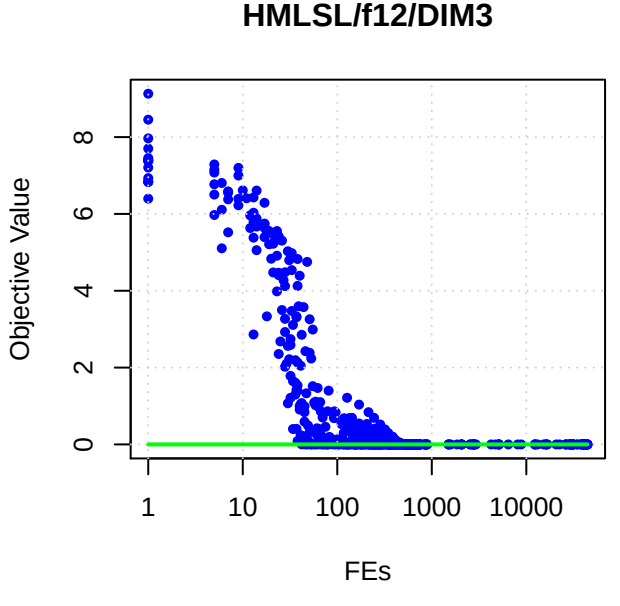
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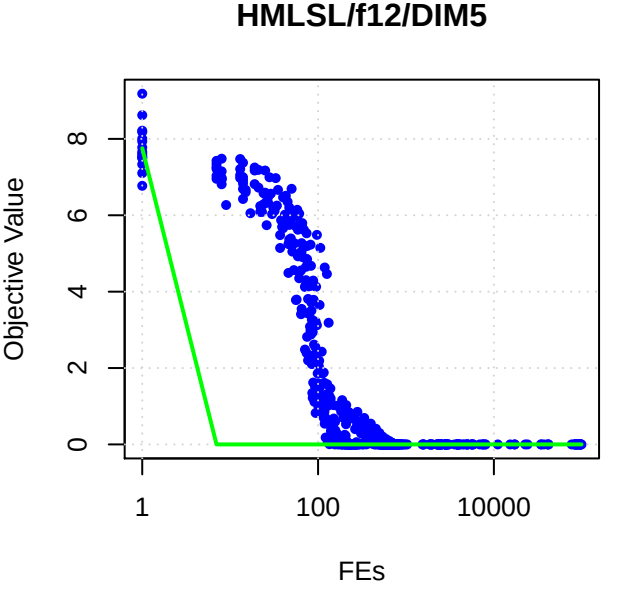
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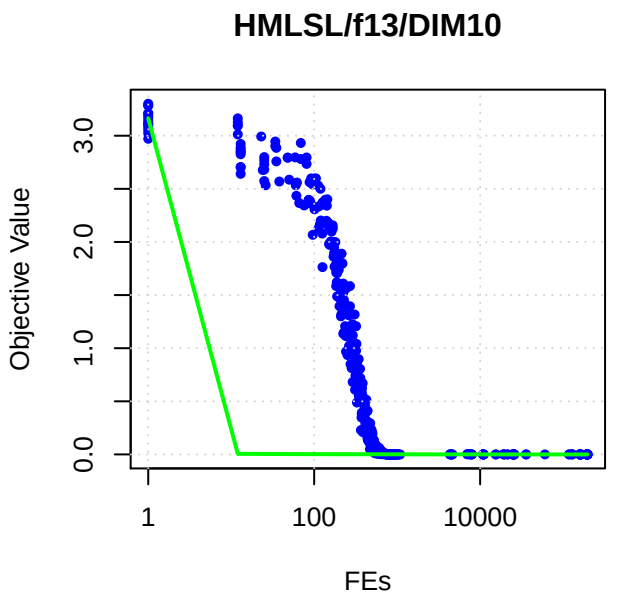
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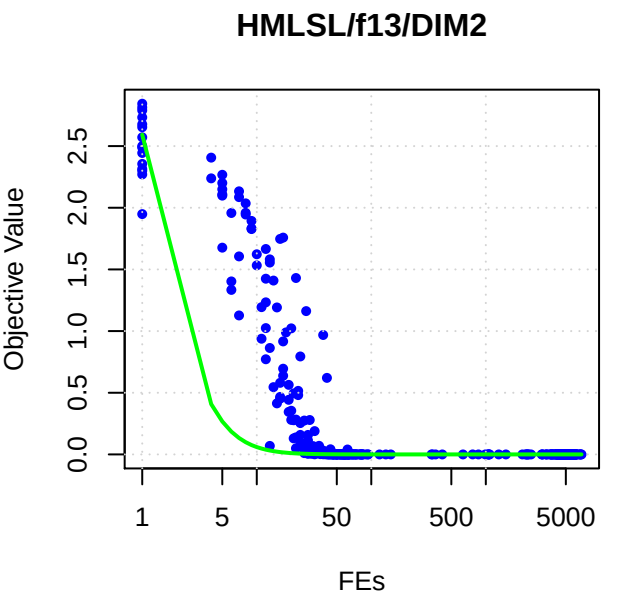
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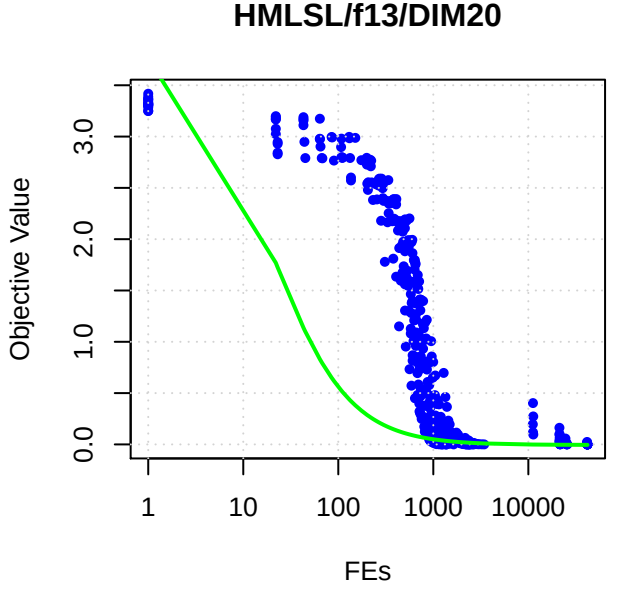
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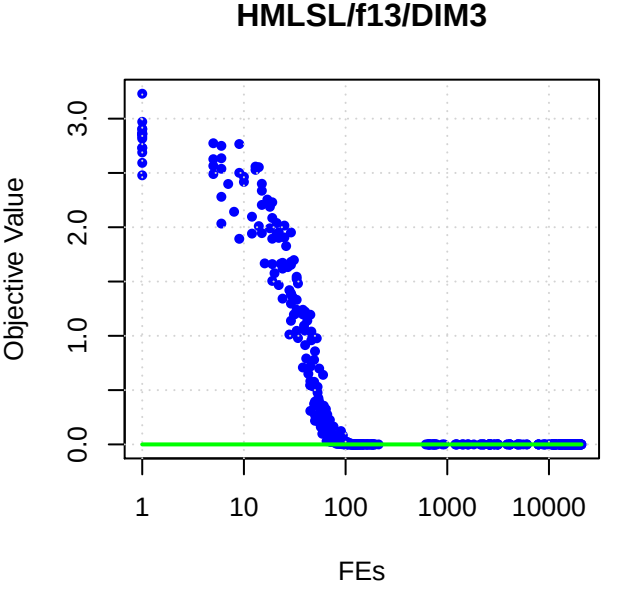
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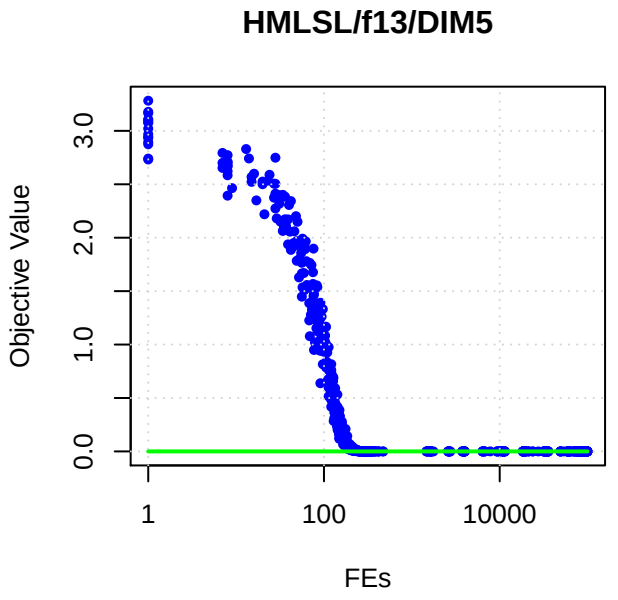
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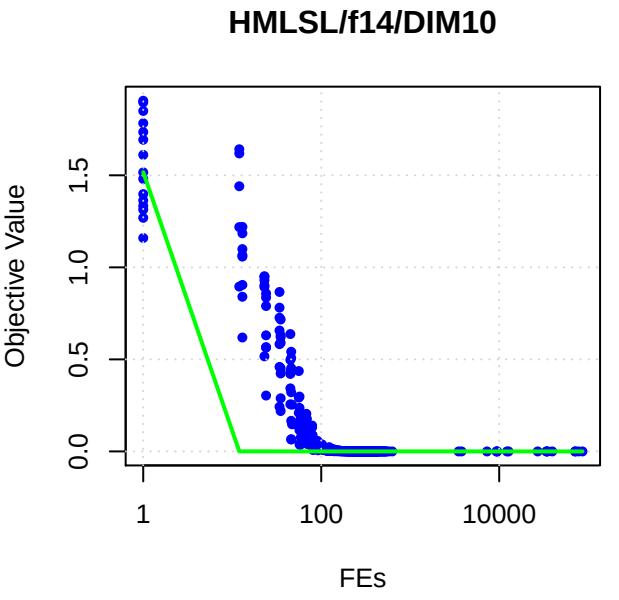
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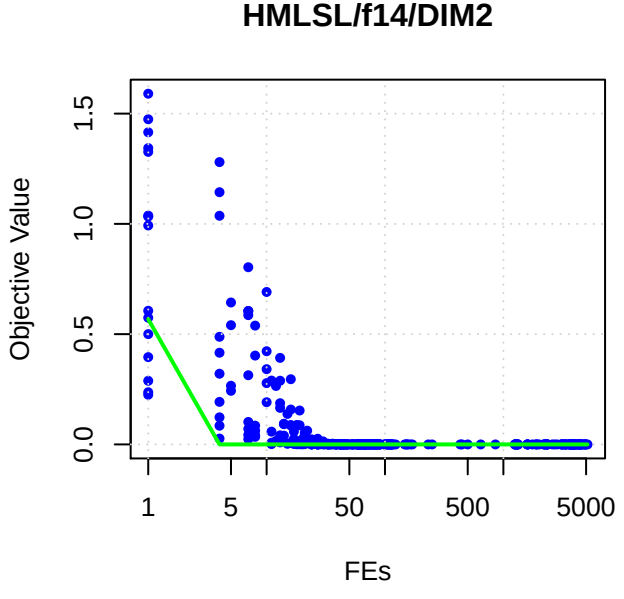
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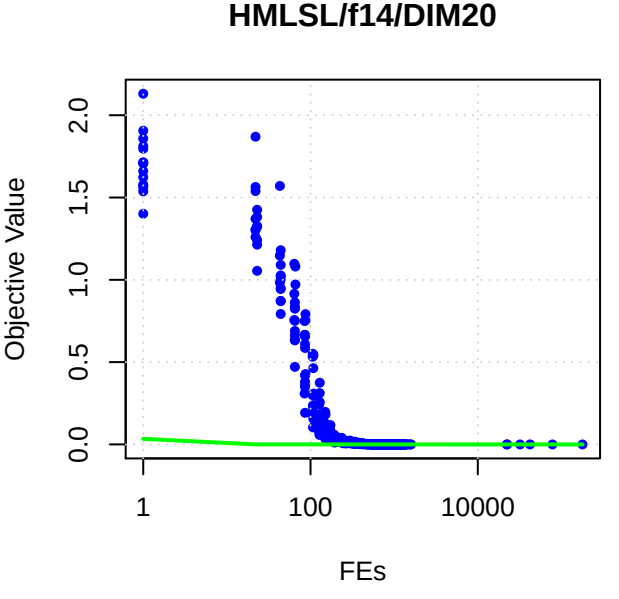
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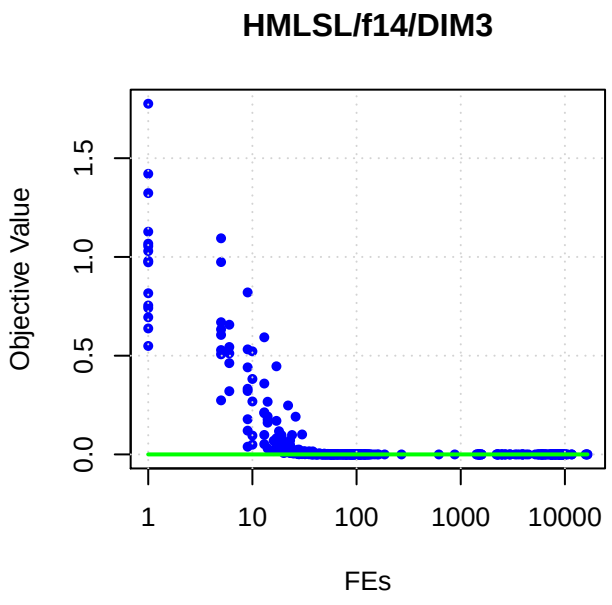
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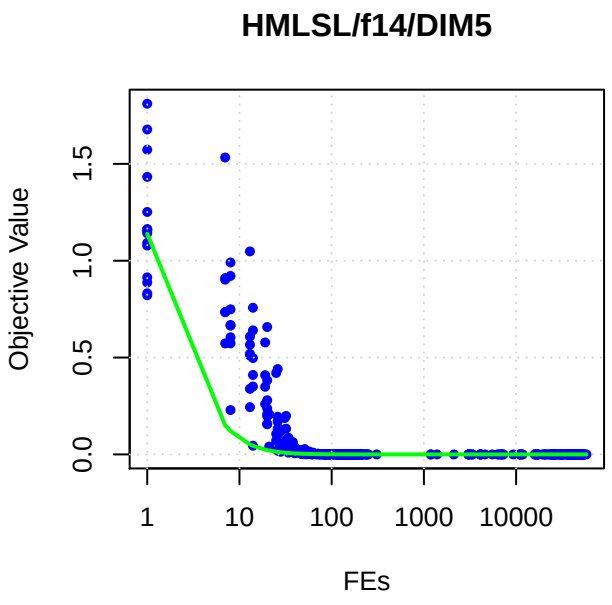
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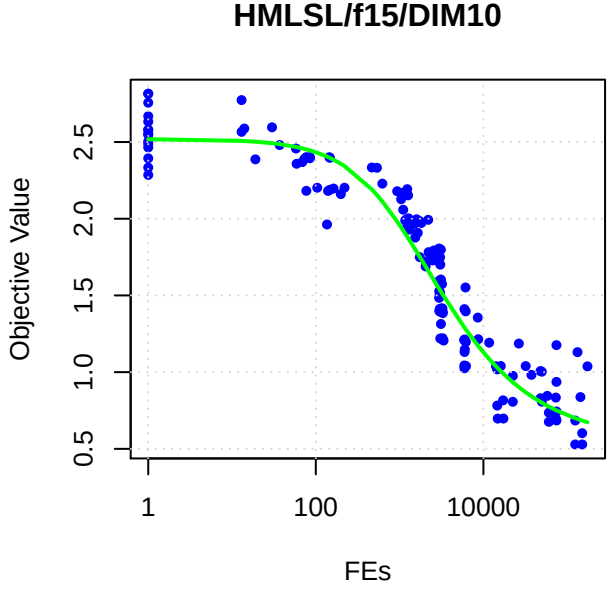
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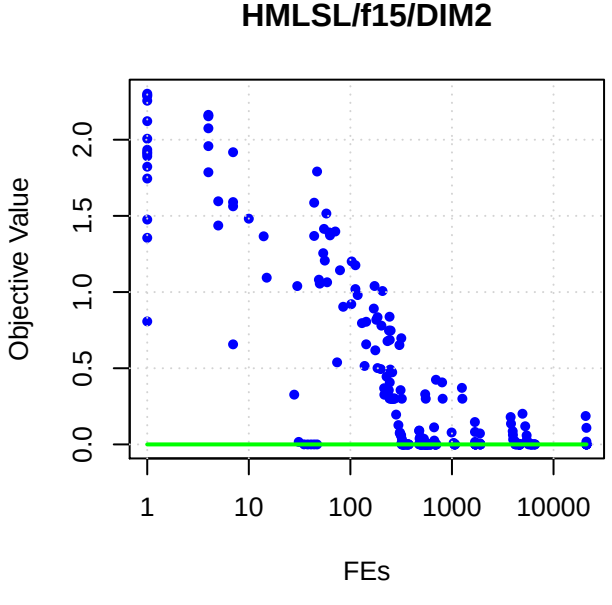
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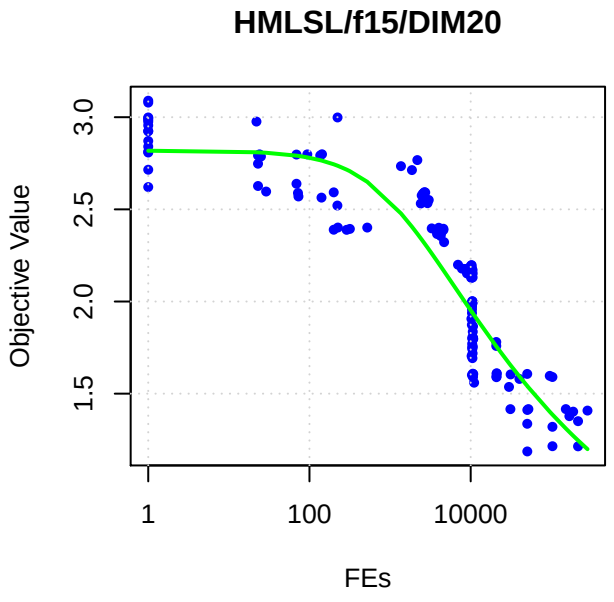
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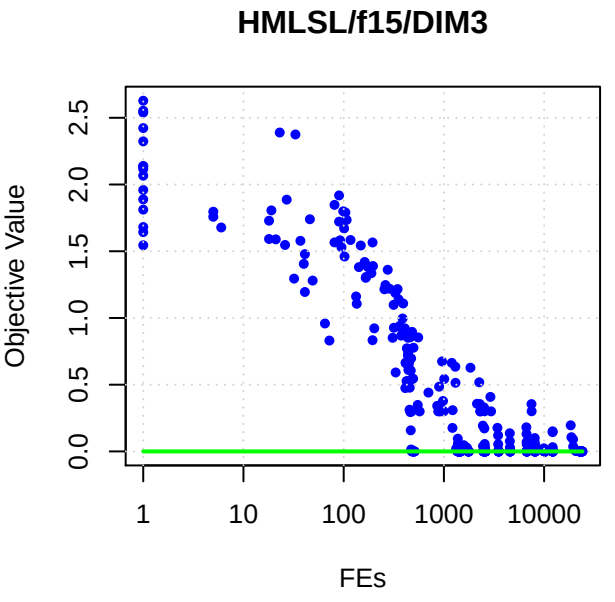
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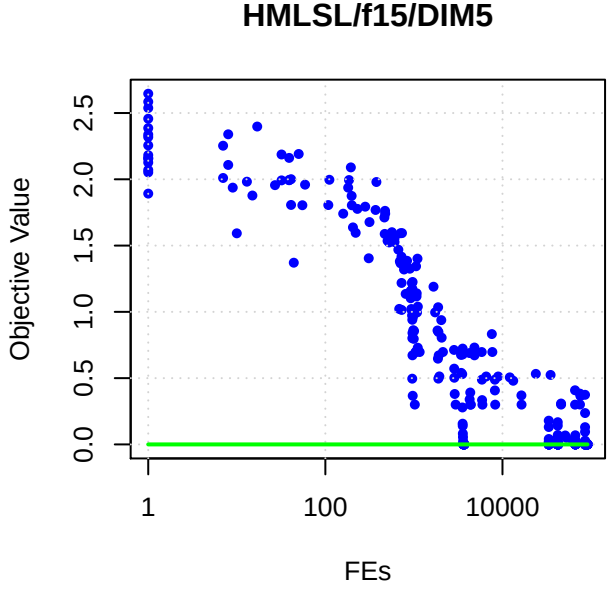
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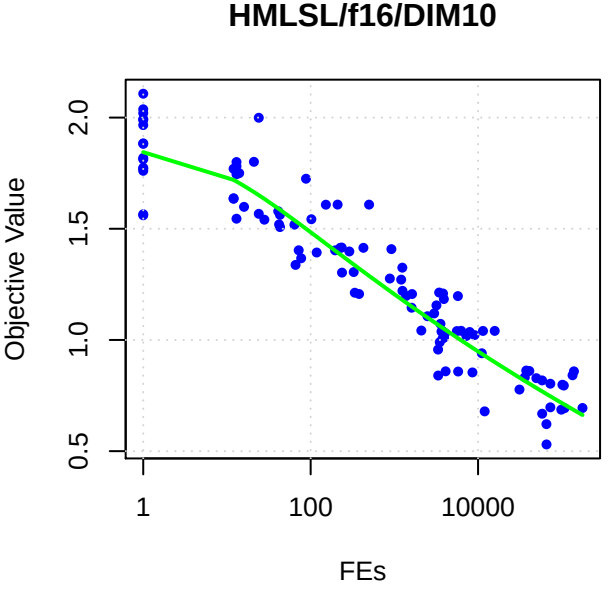
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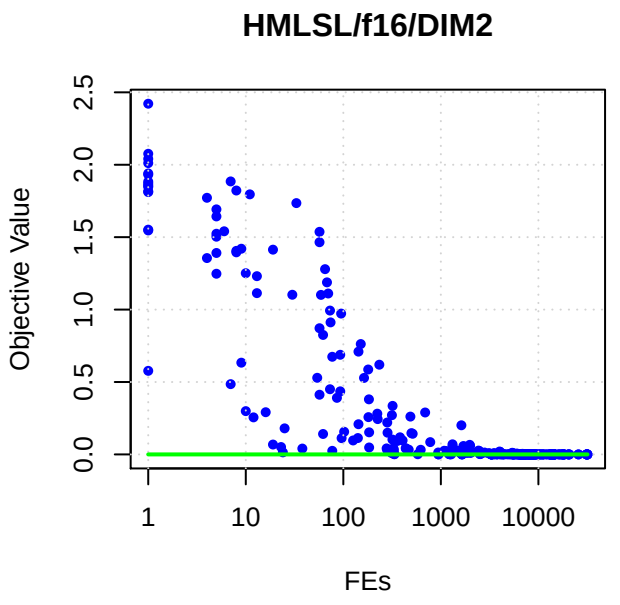
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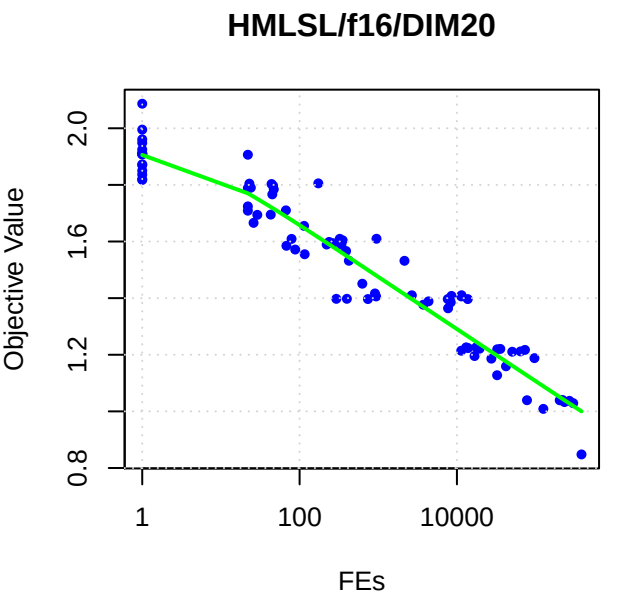
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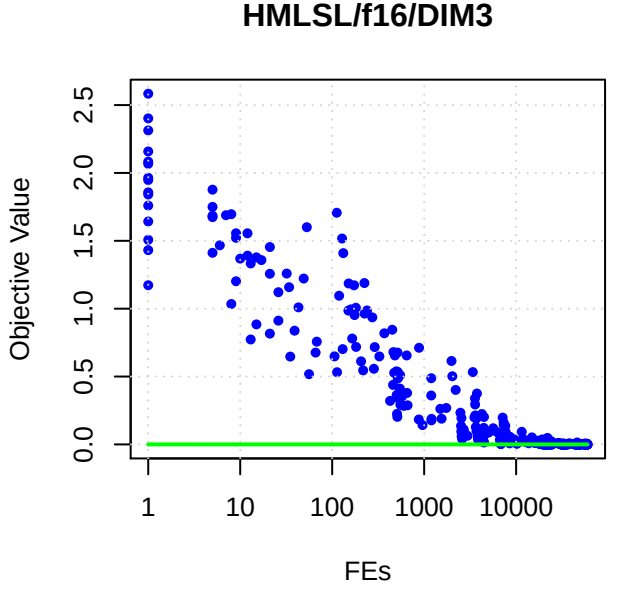
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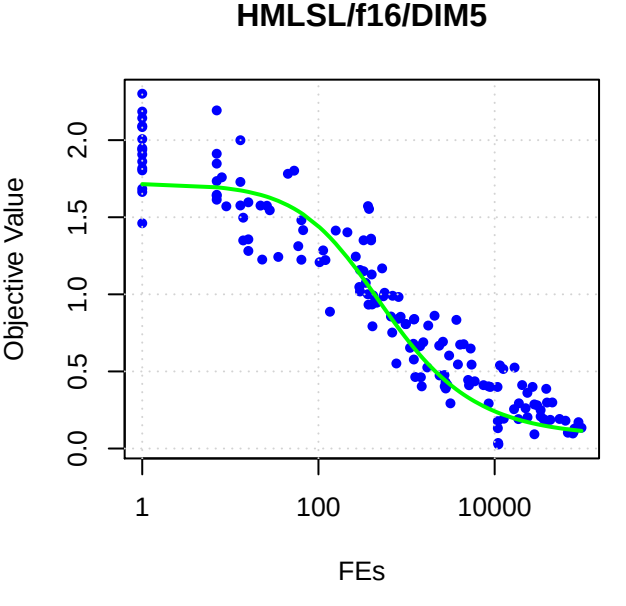
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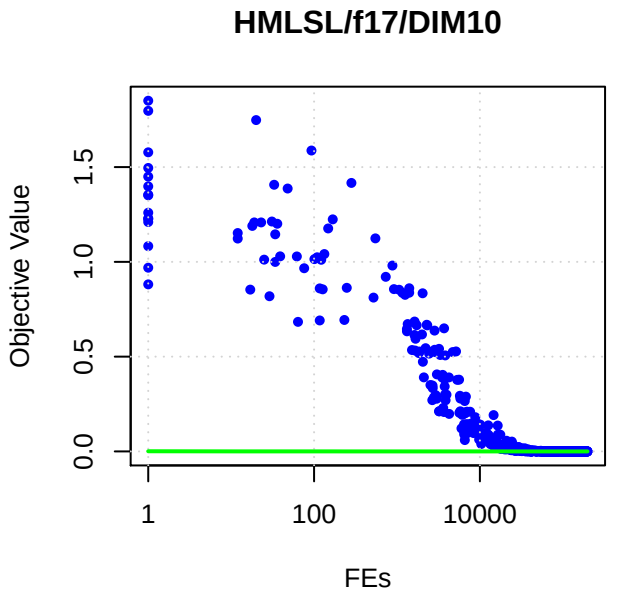
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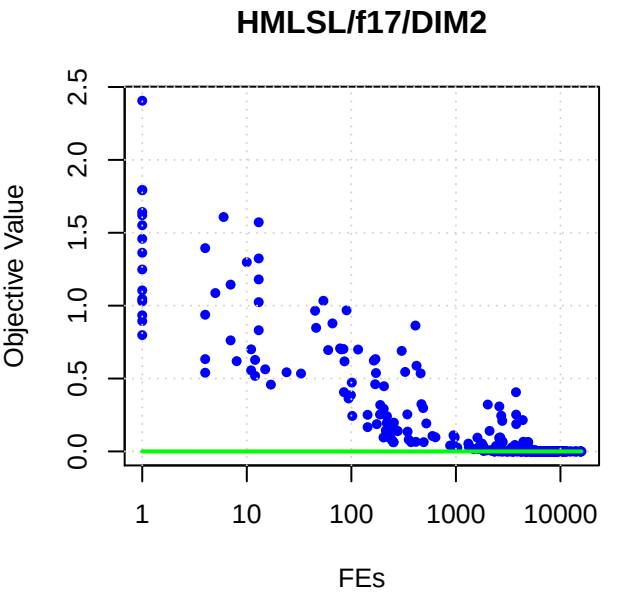
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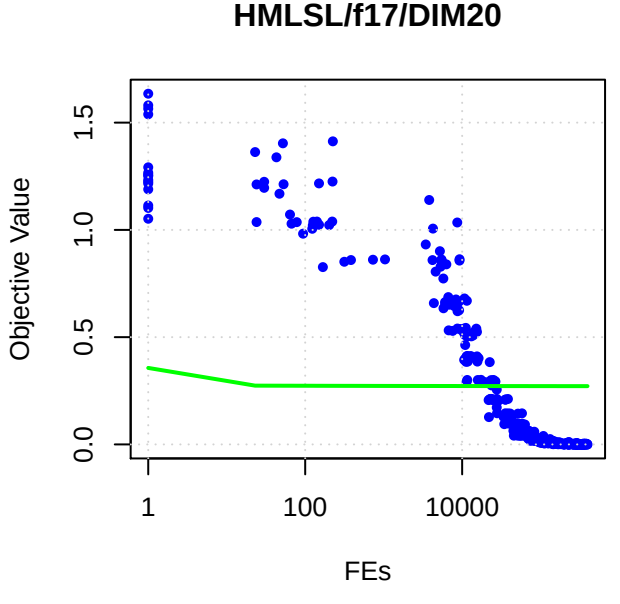
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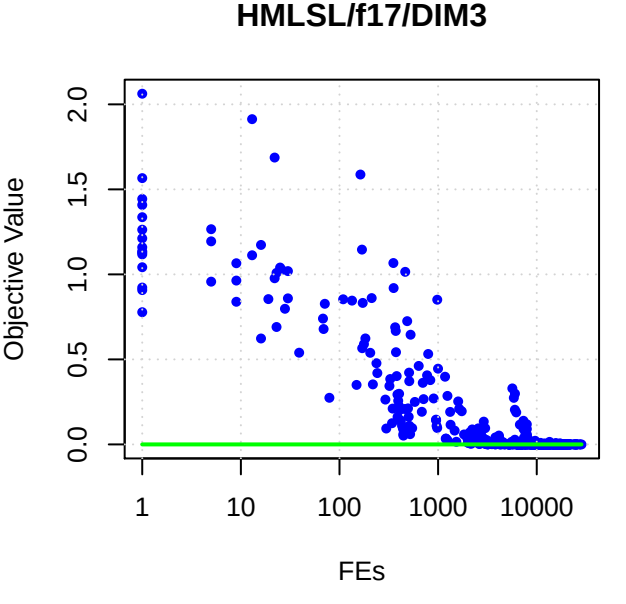
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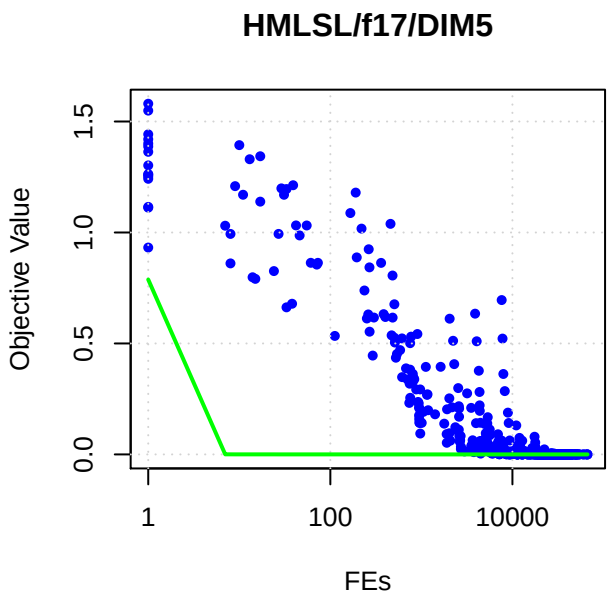
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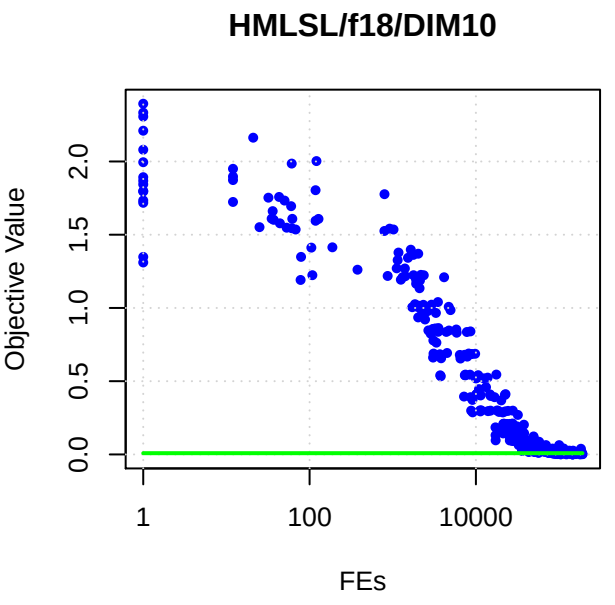
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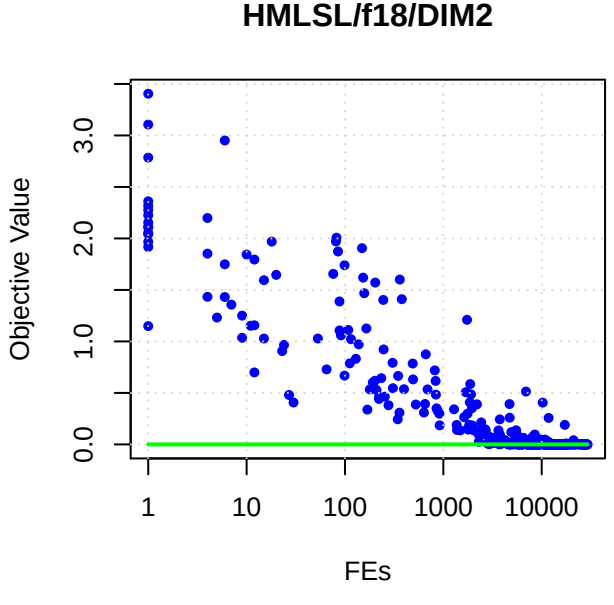
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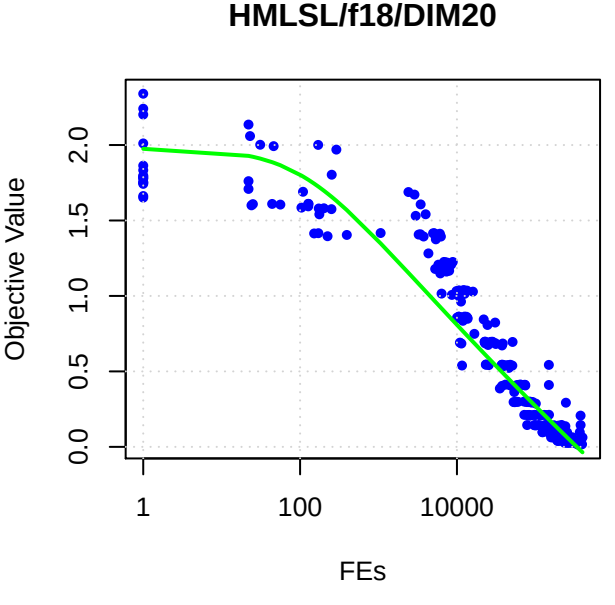
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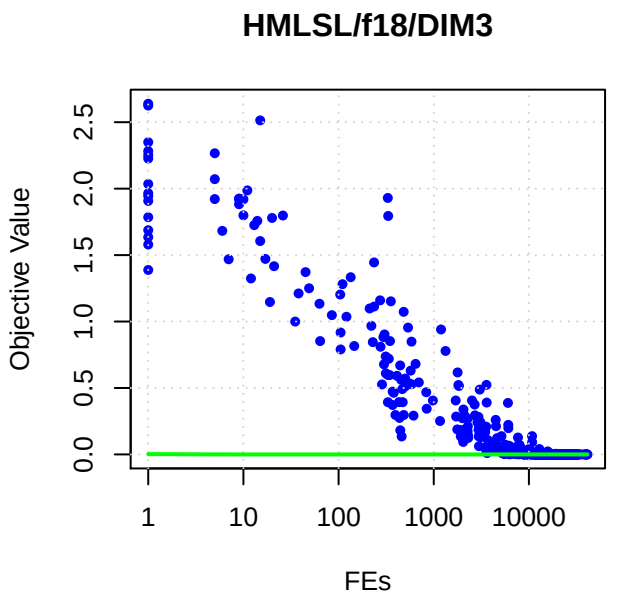
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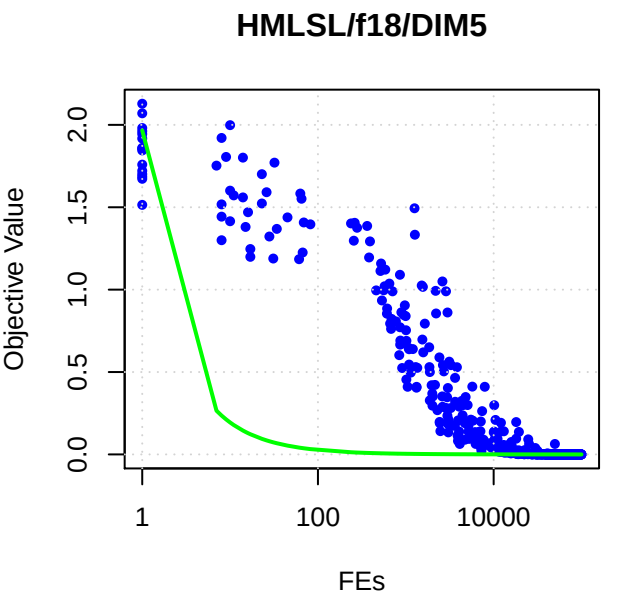
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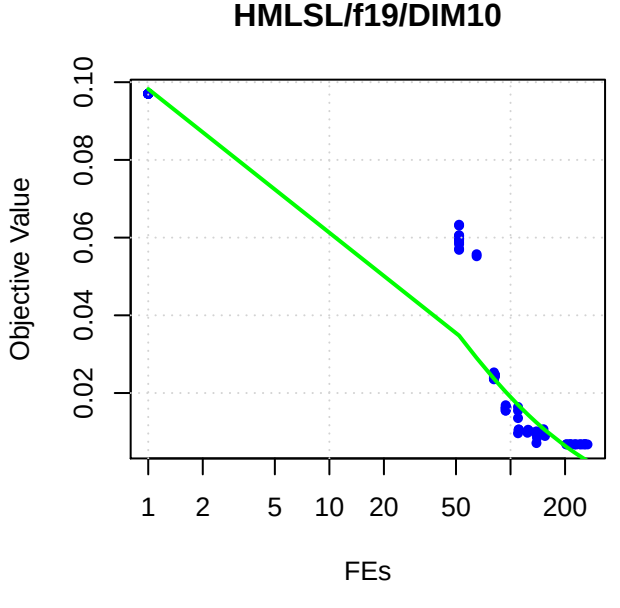
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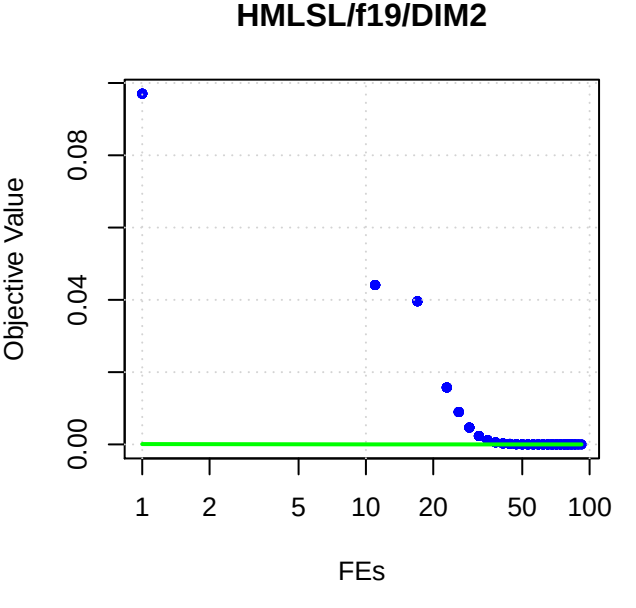
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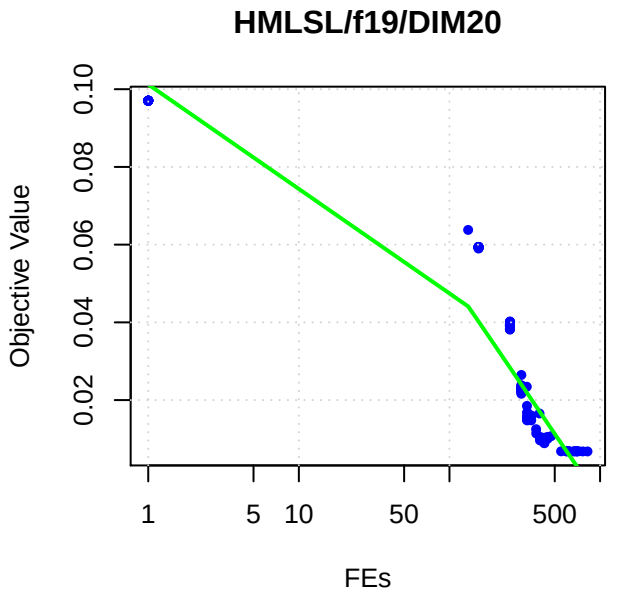
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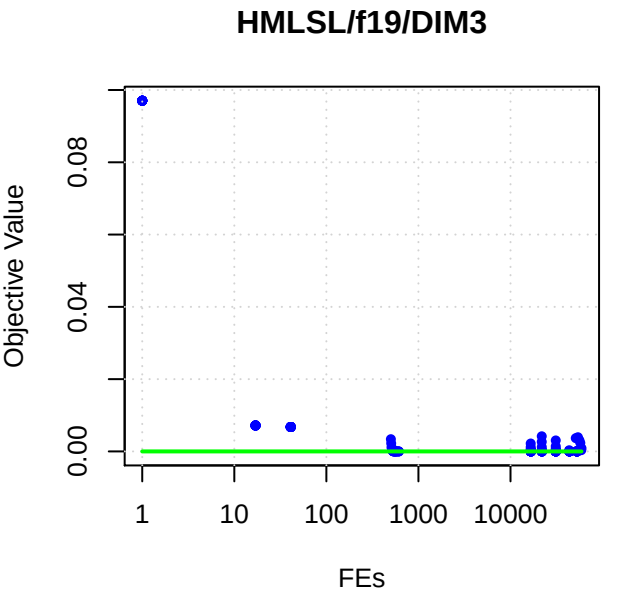
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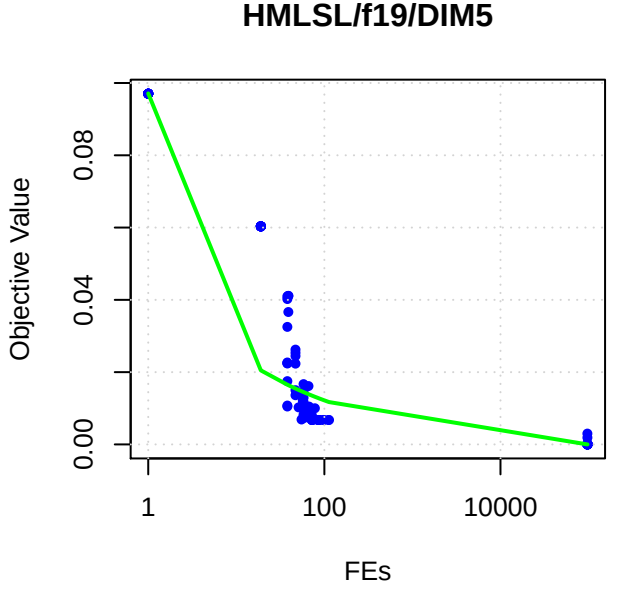
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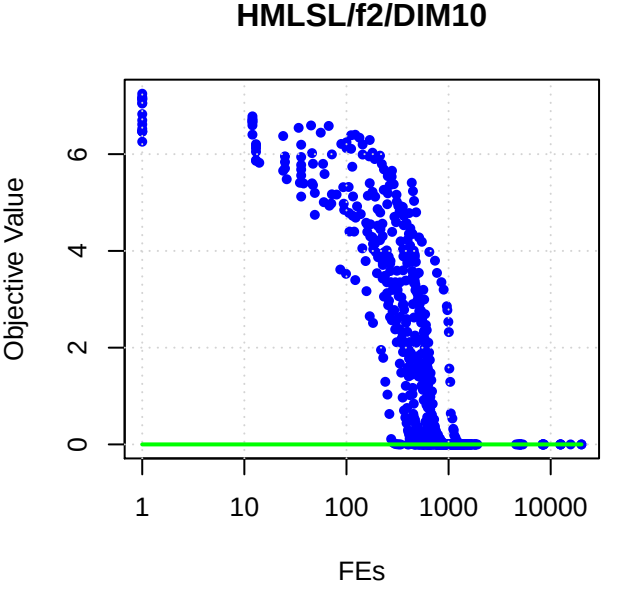
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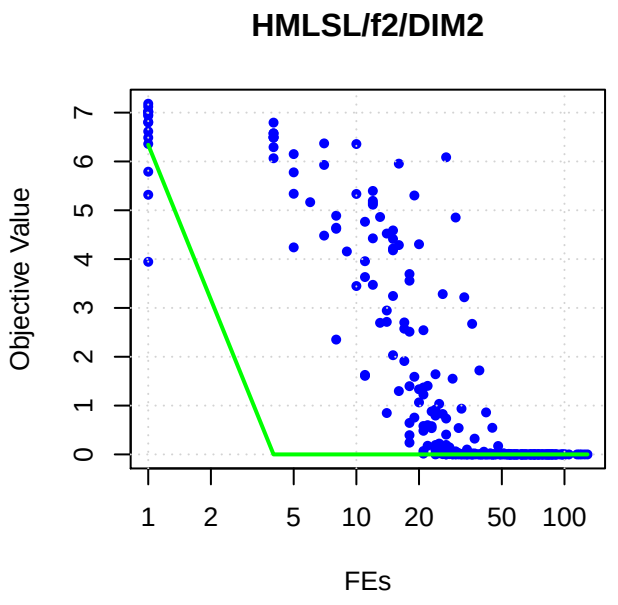
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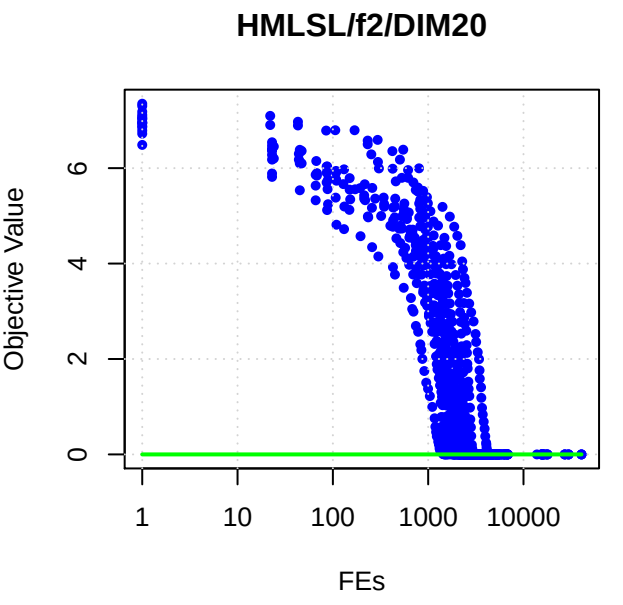
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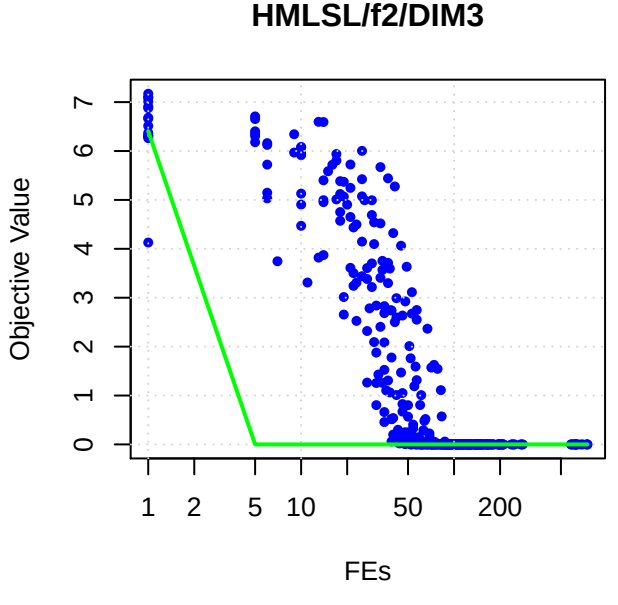
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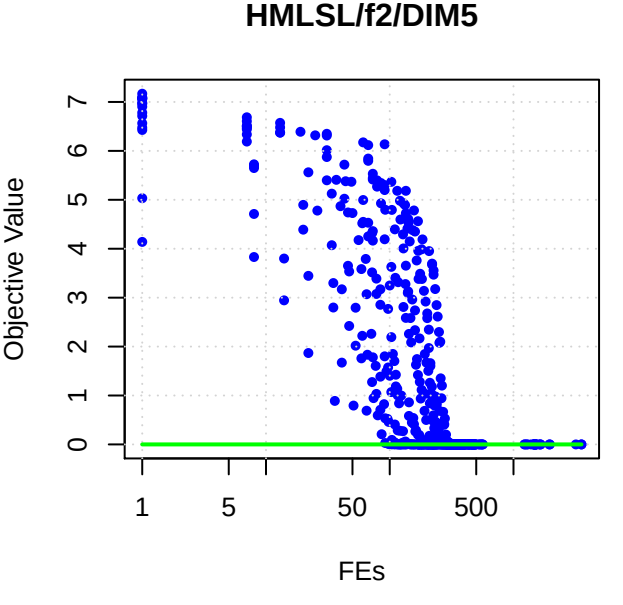
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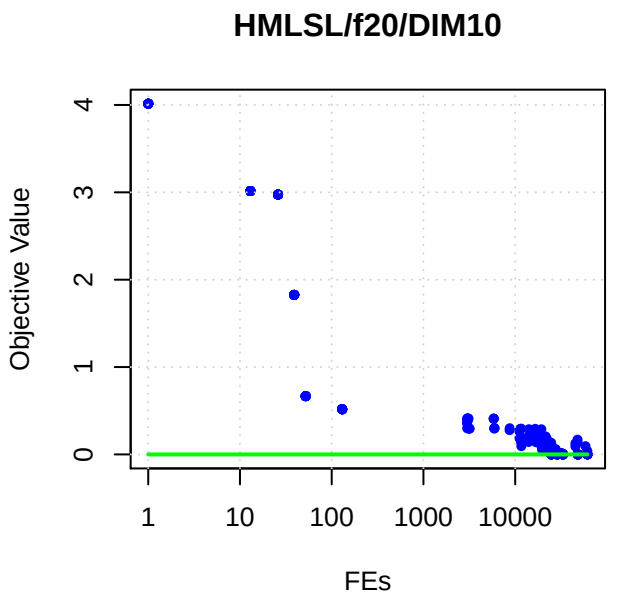
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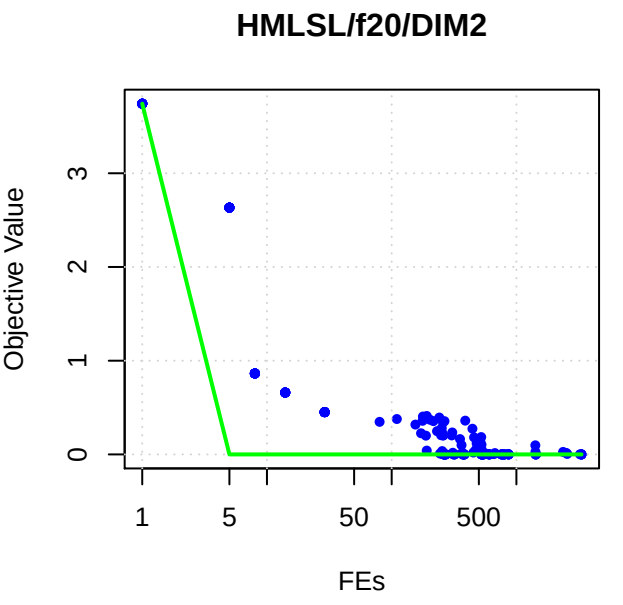
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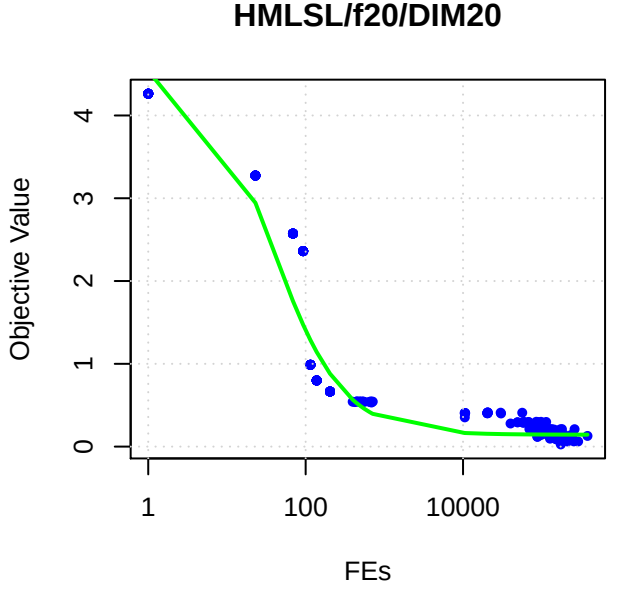
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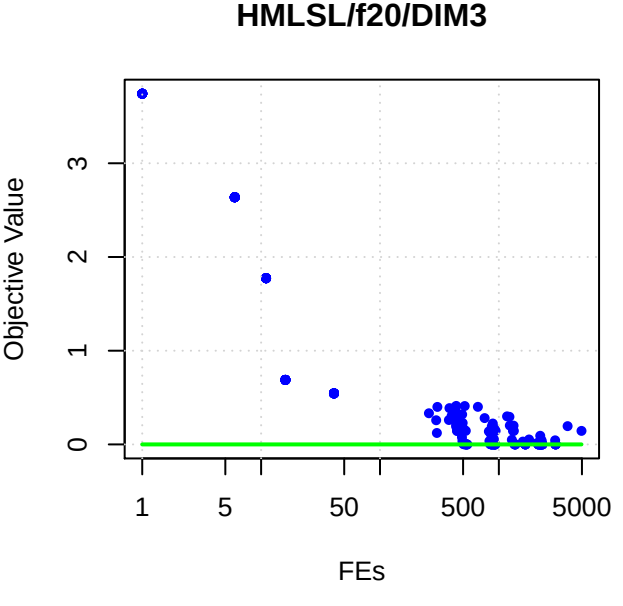
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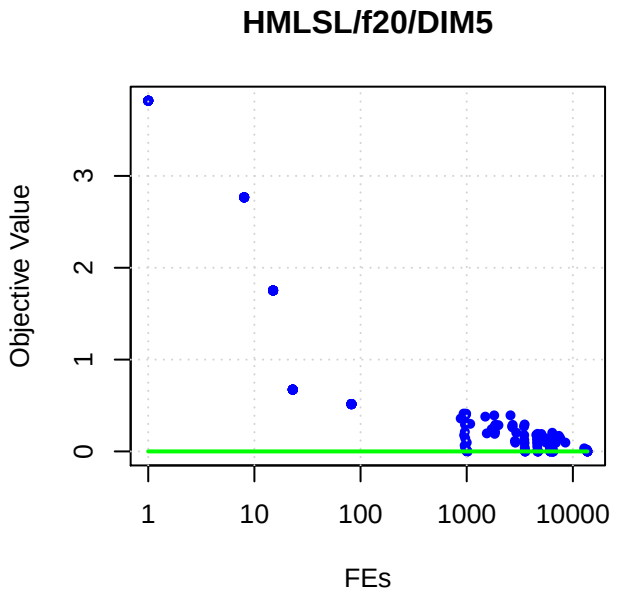
FEs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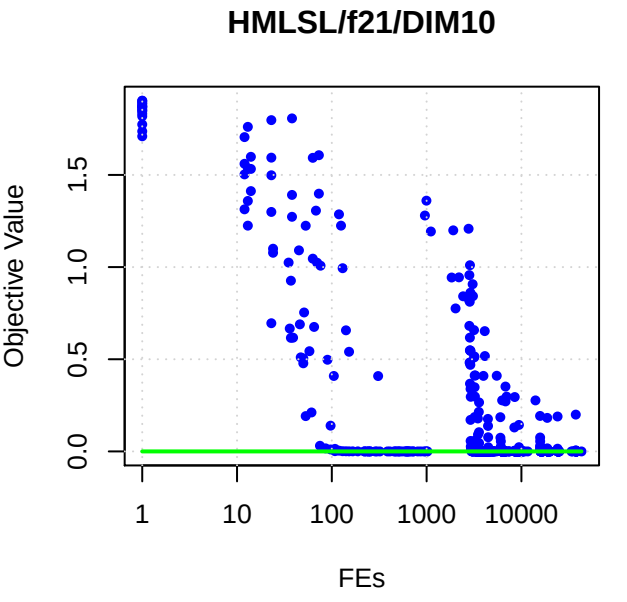
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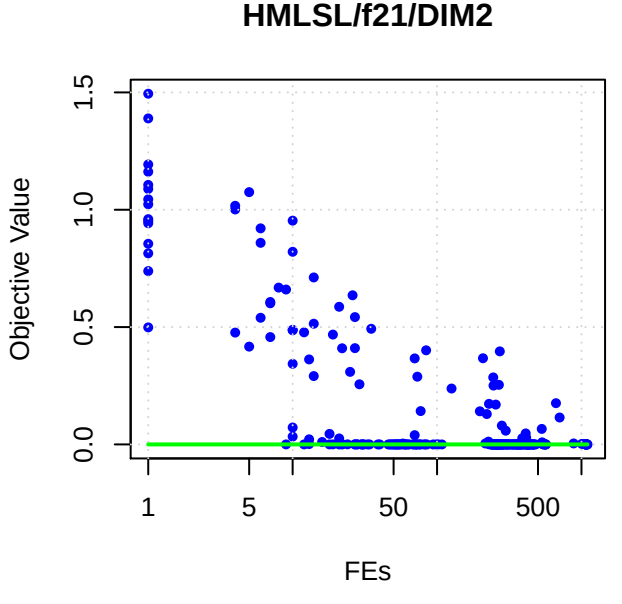
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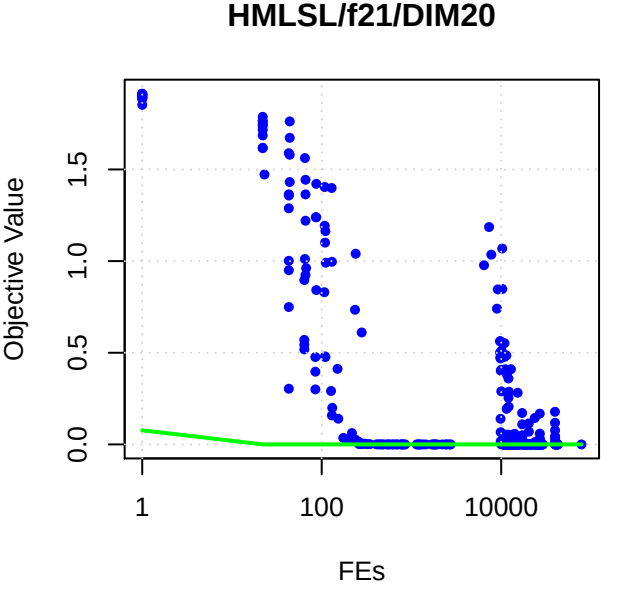
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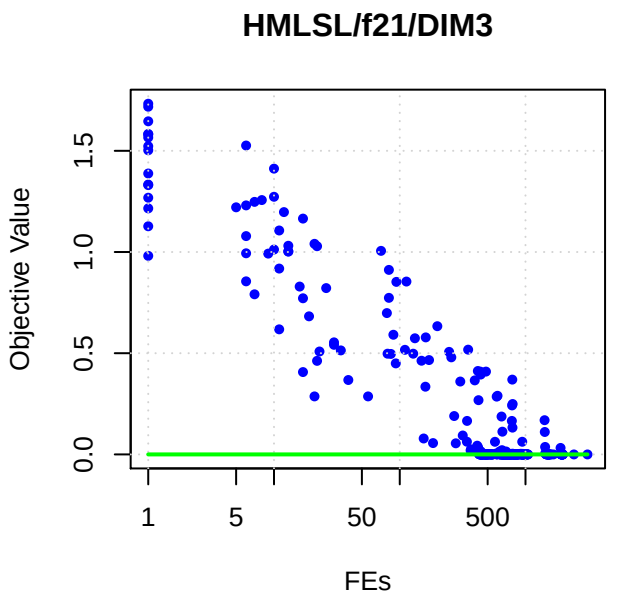
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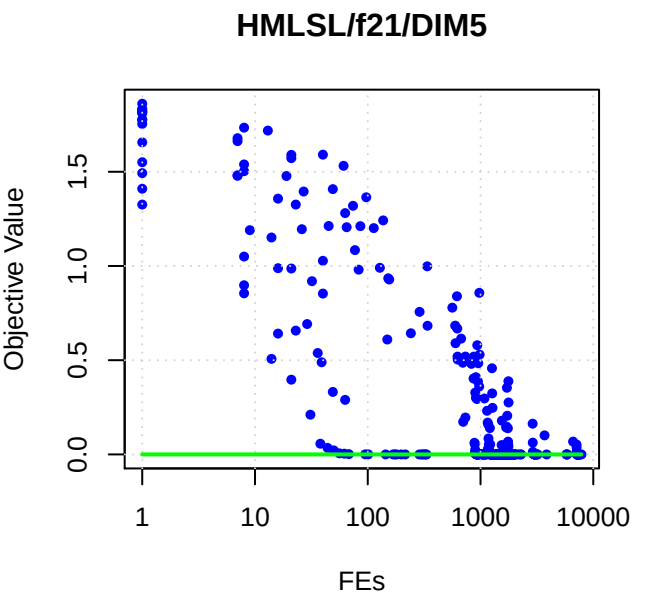
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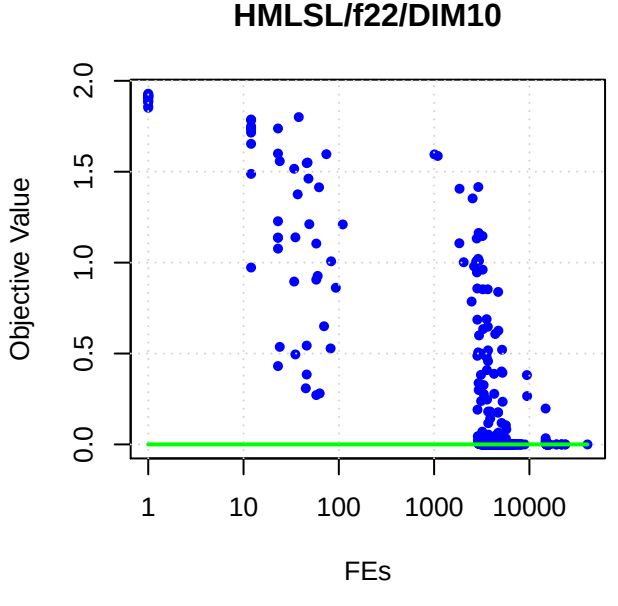
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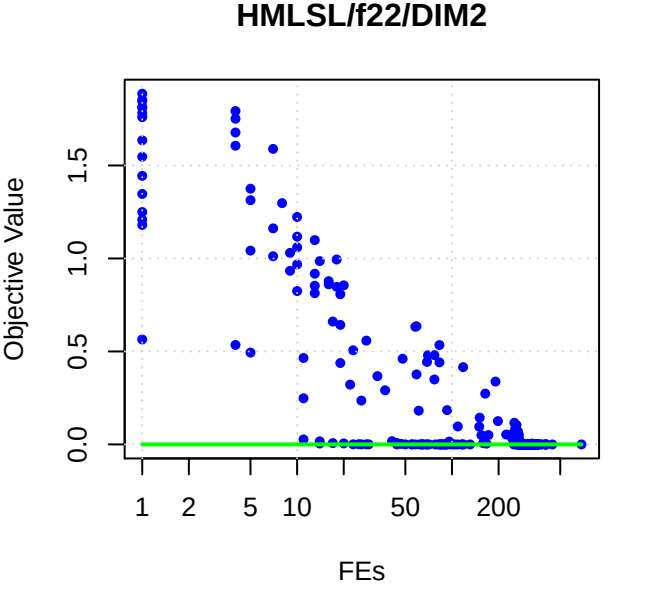
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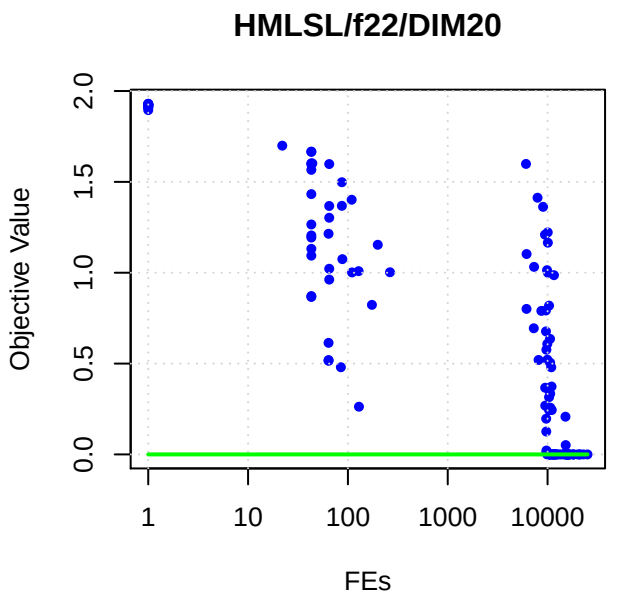
FEs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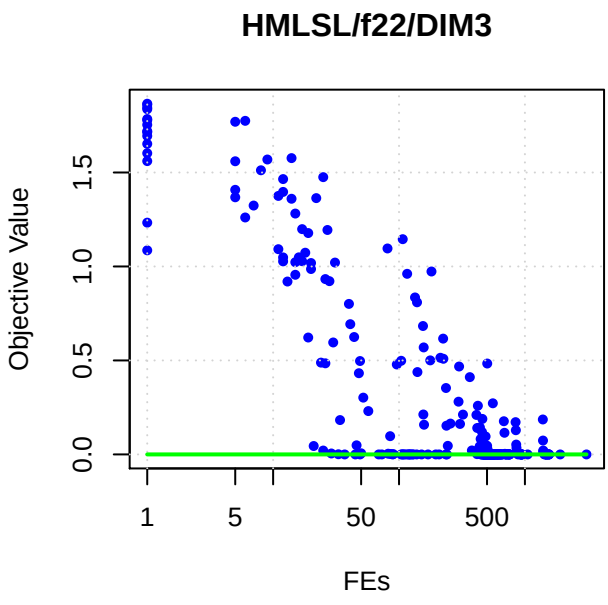
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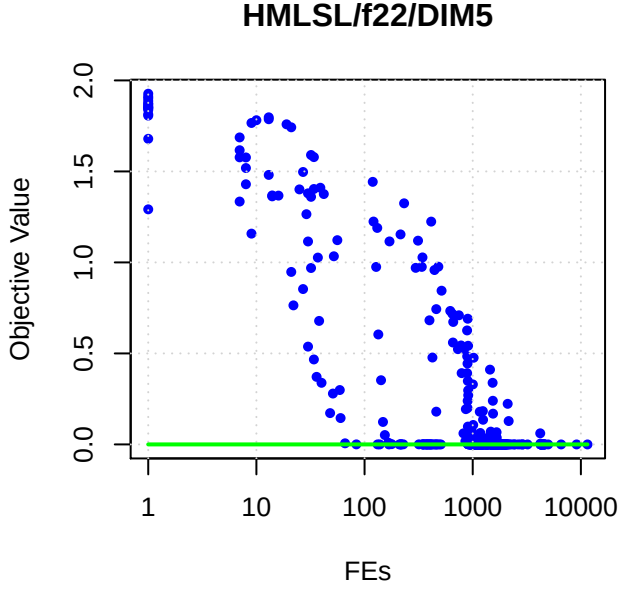
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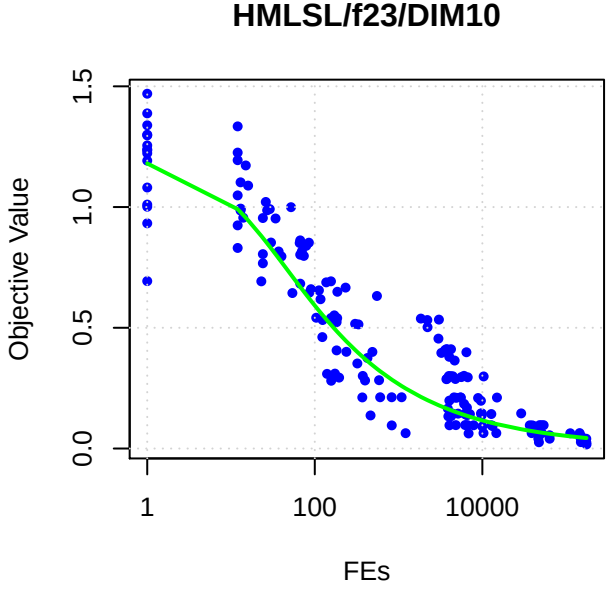
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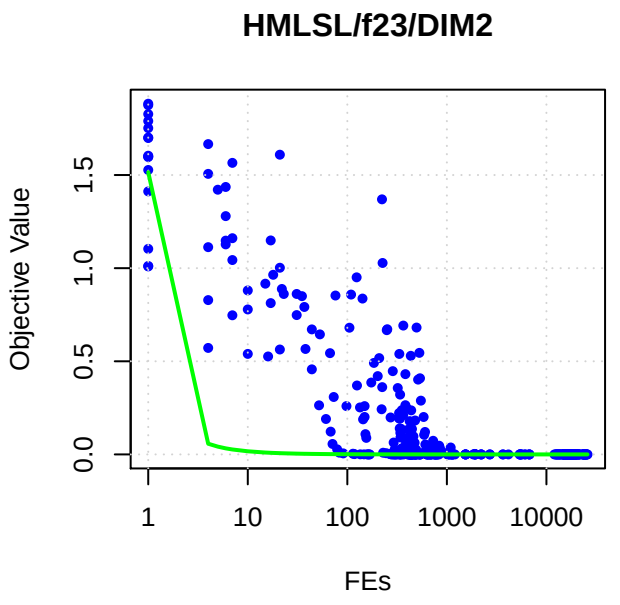
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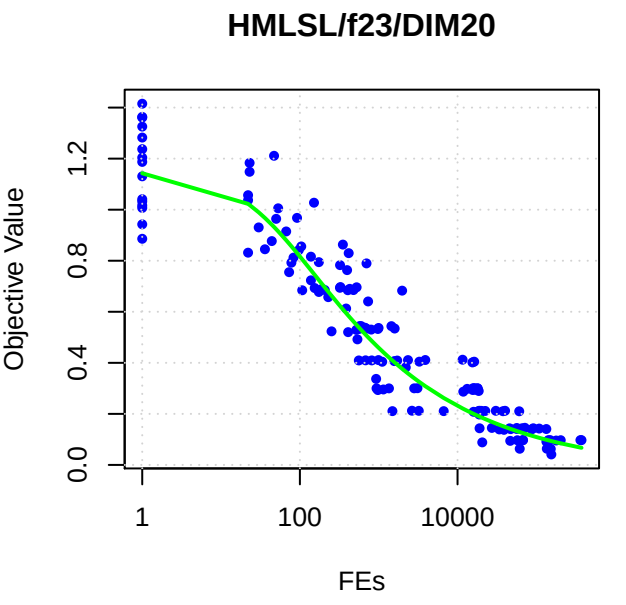
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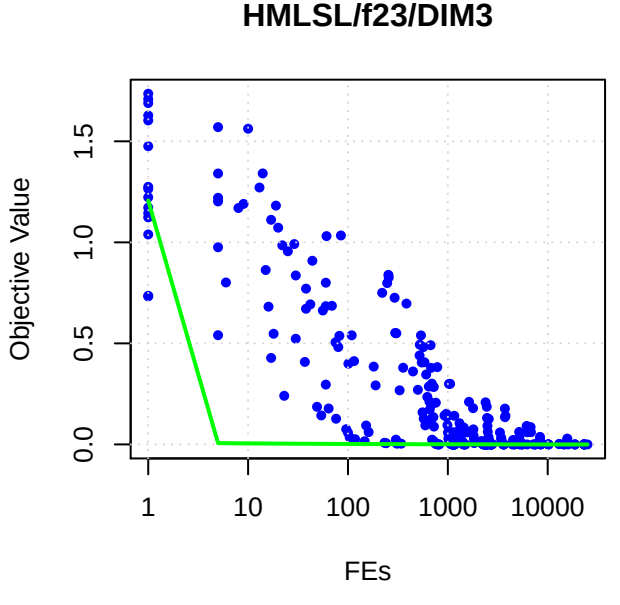
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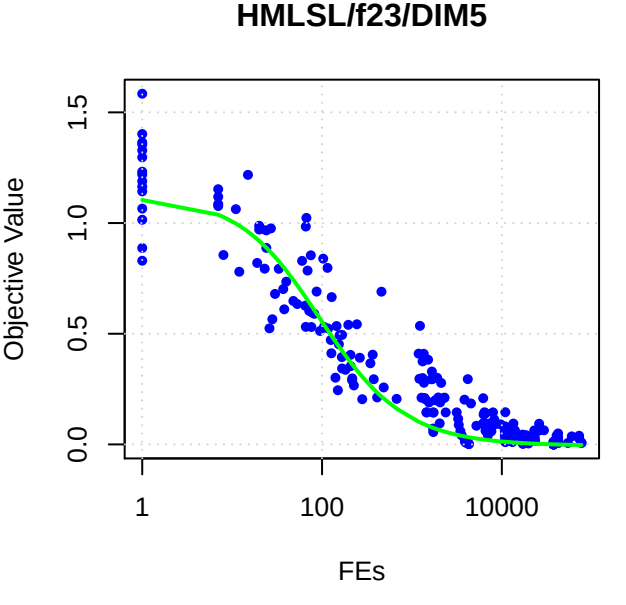
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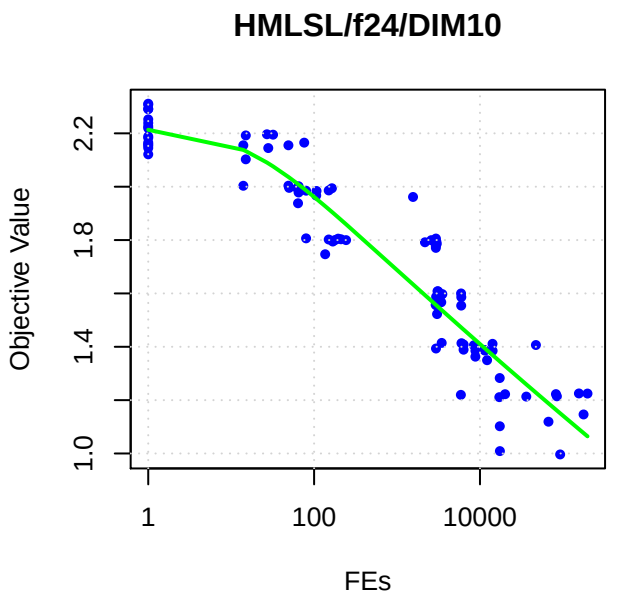
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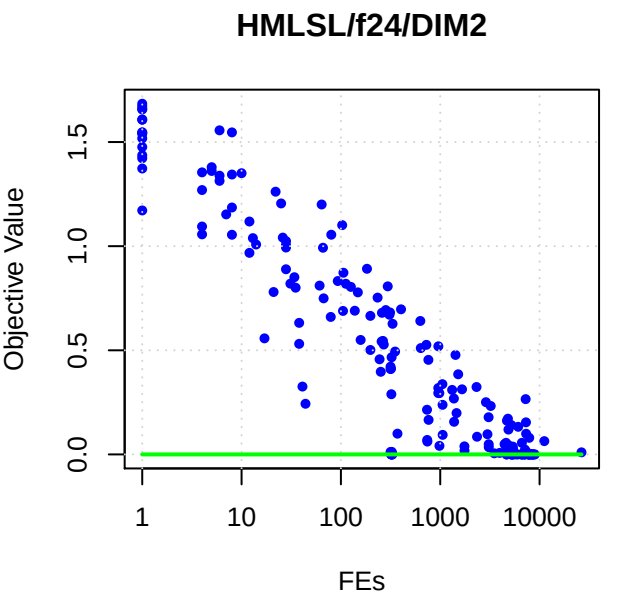
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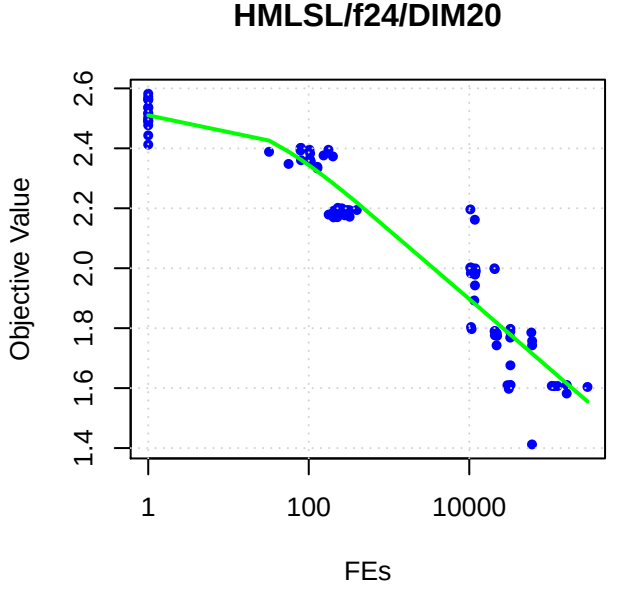
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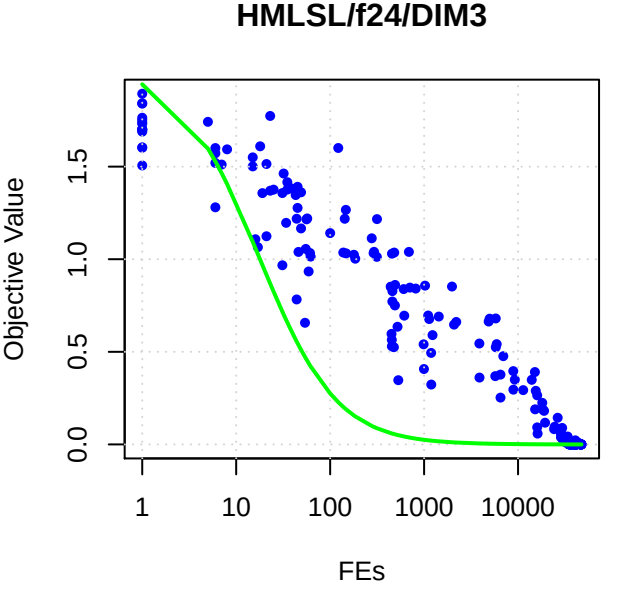
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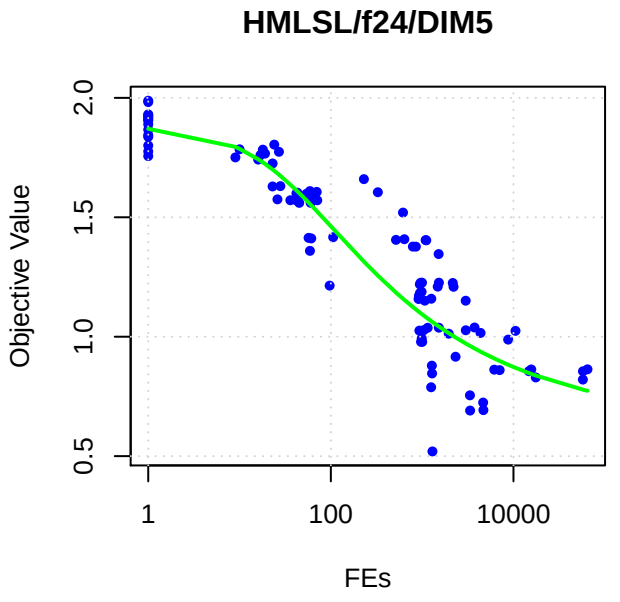
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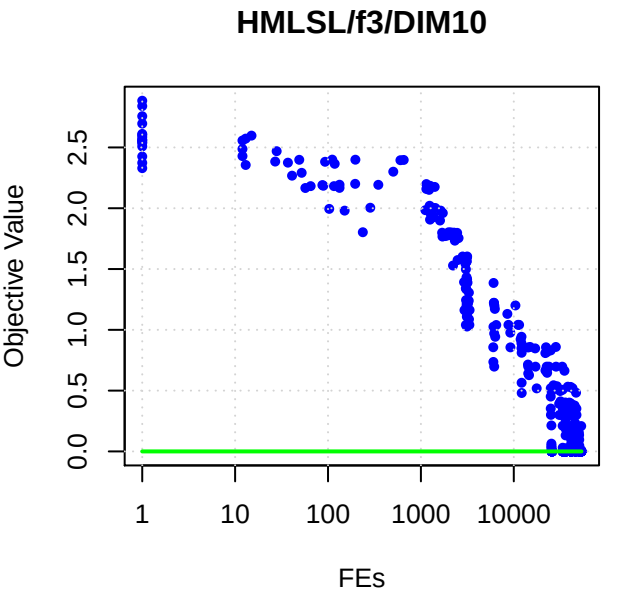
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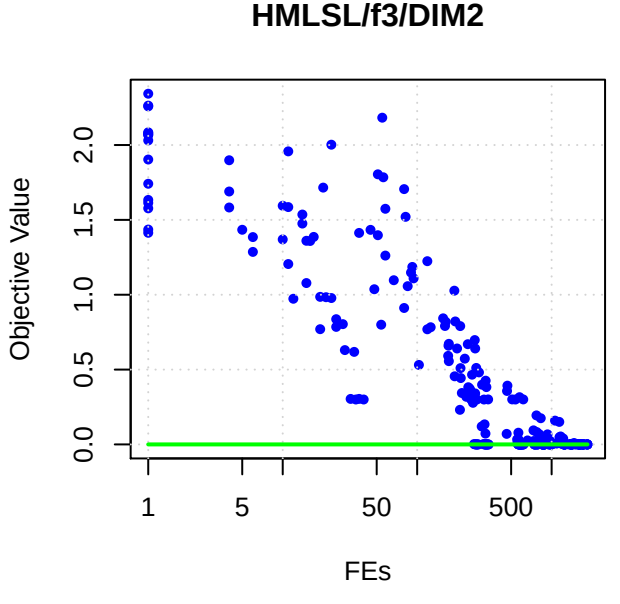
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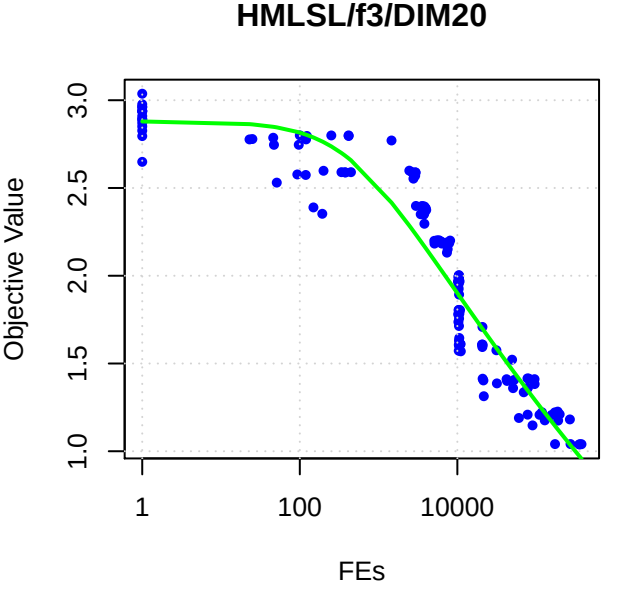
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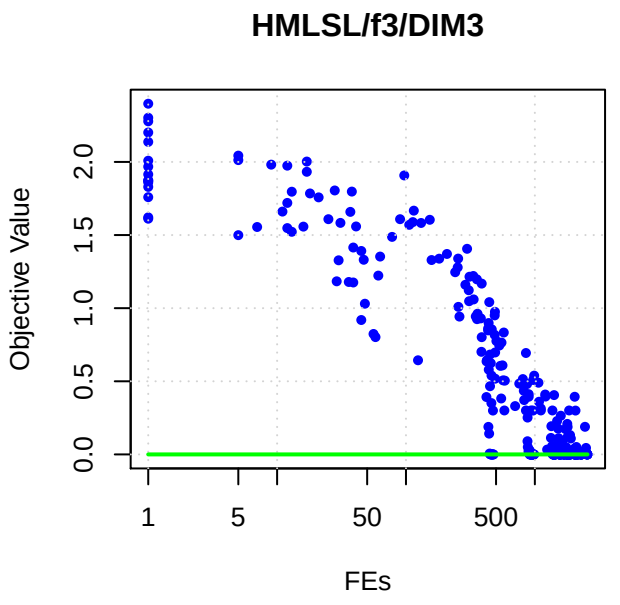
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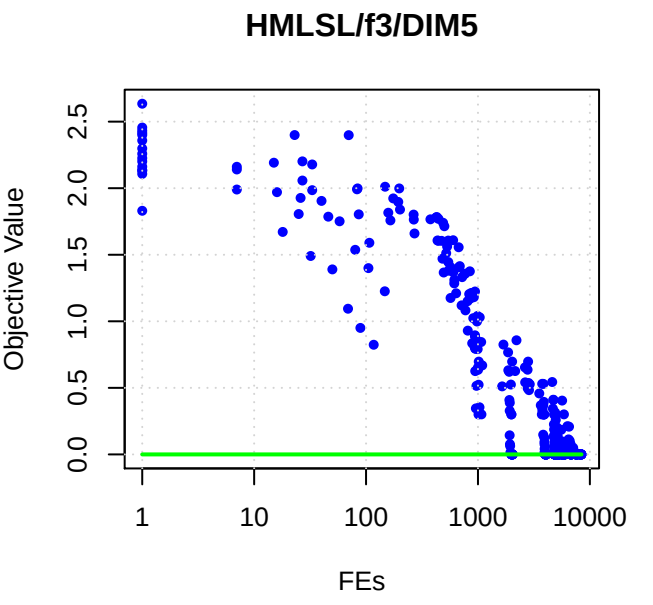
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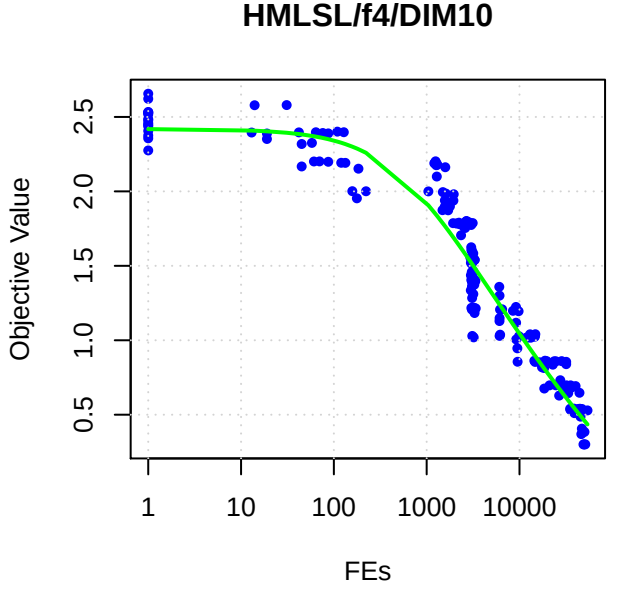
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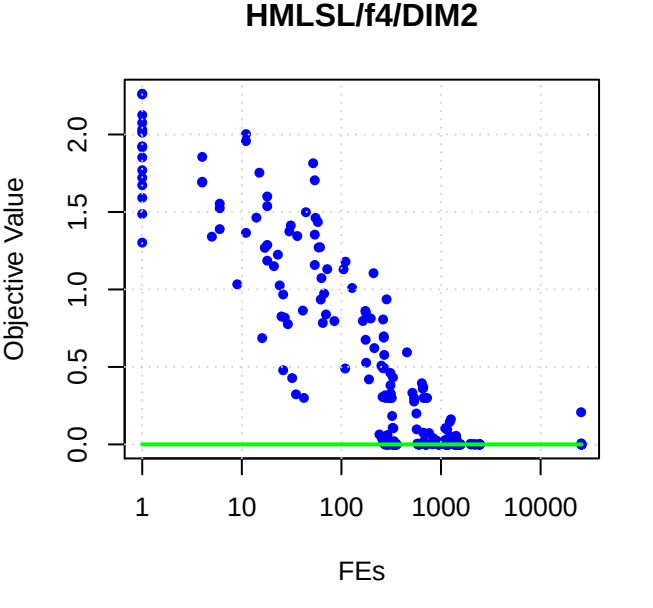
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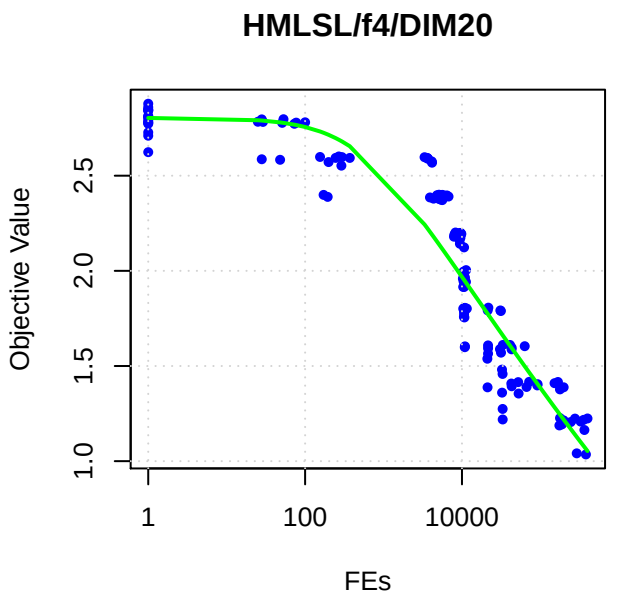
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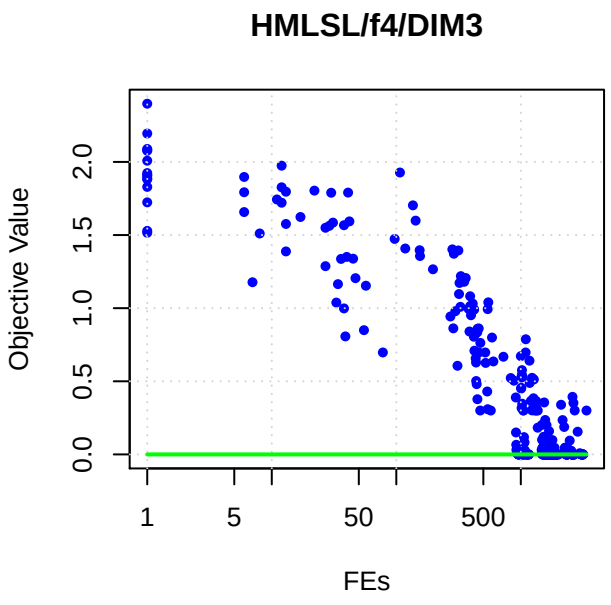
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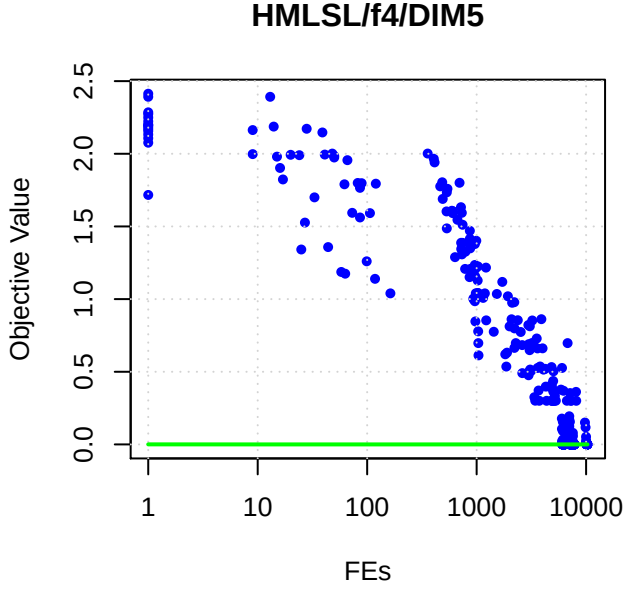
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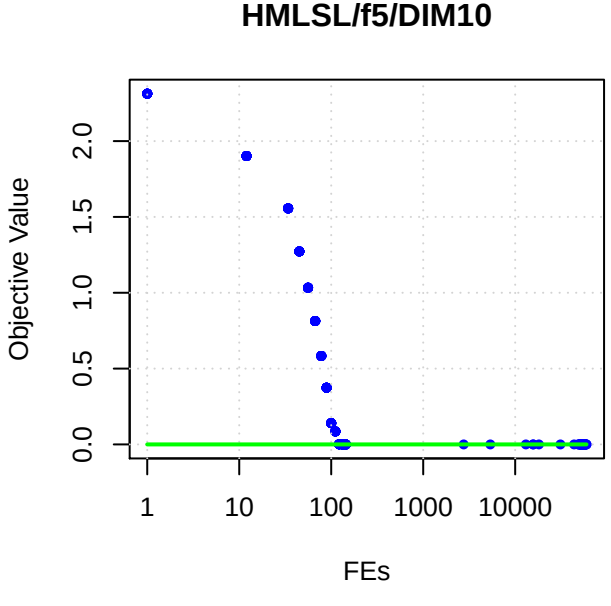
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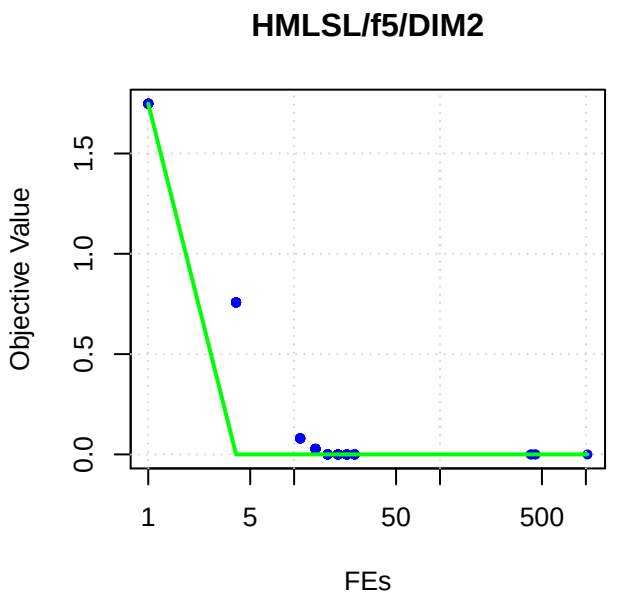
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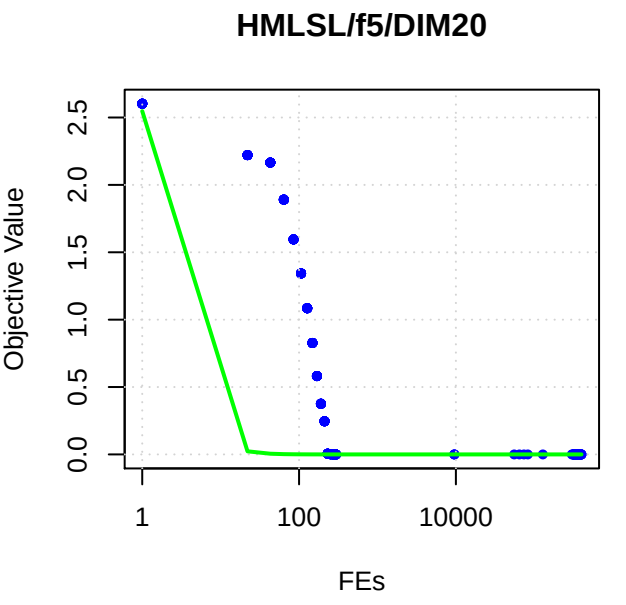
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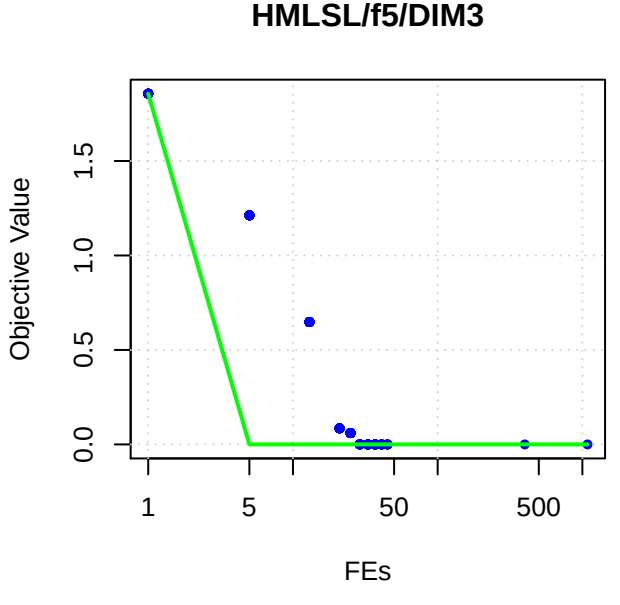
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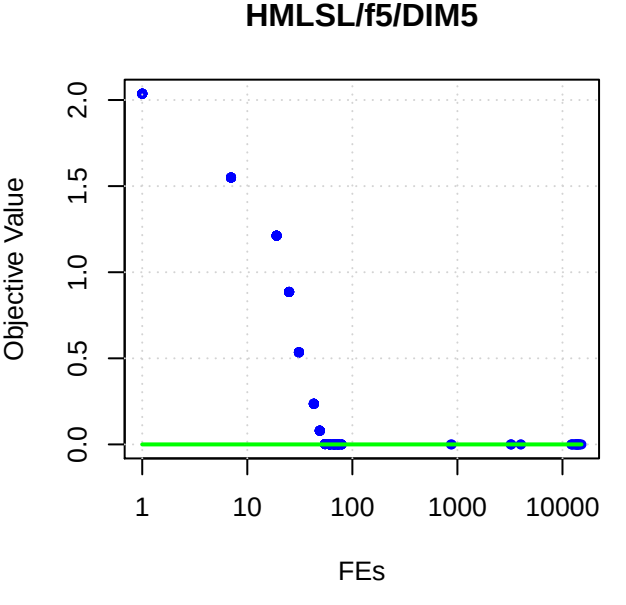
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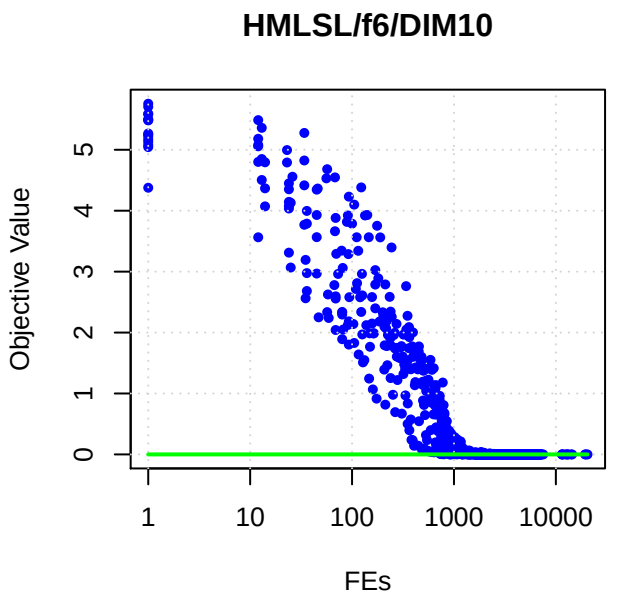
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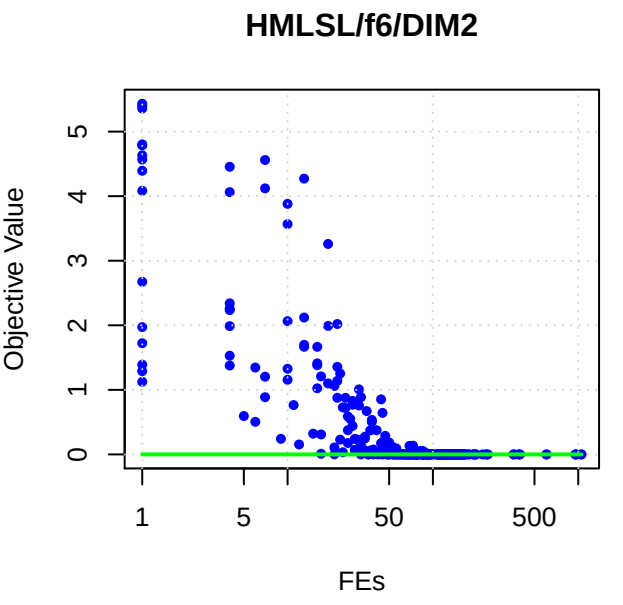
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Objective Value
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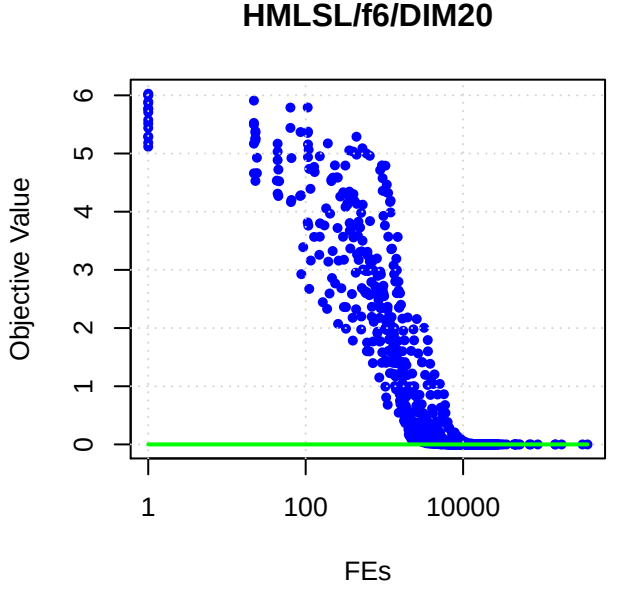
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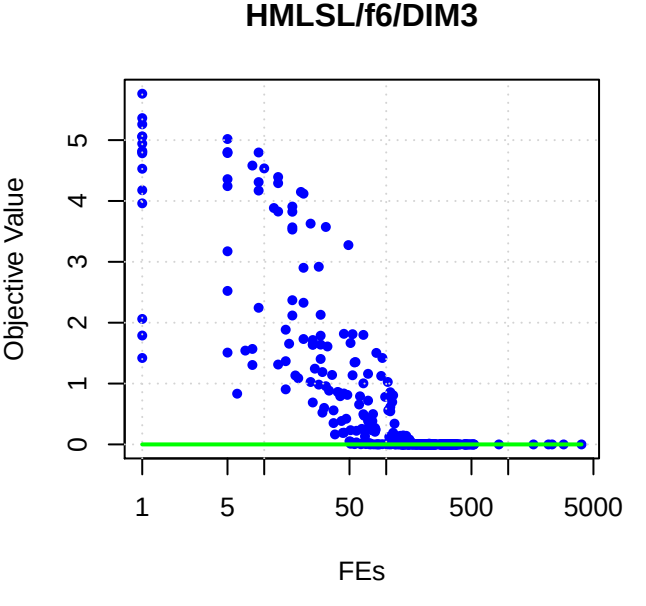
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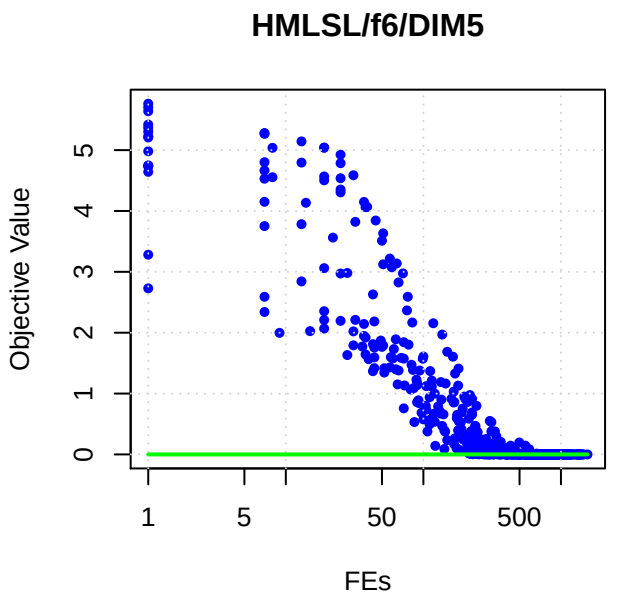
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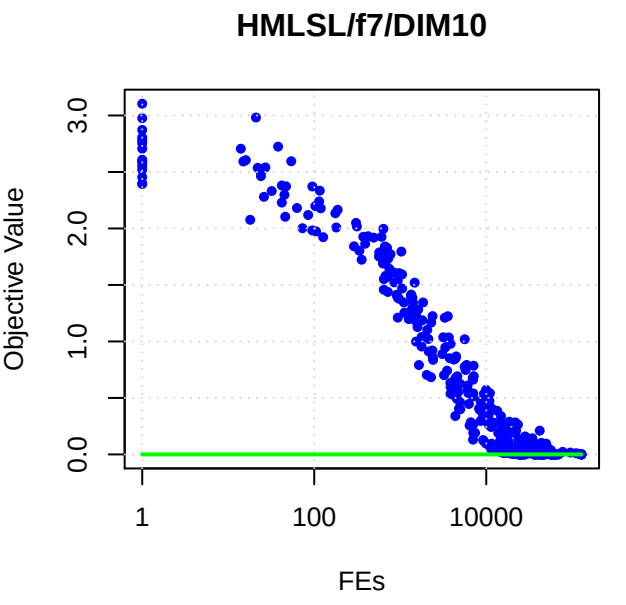
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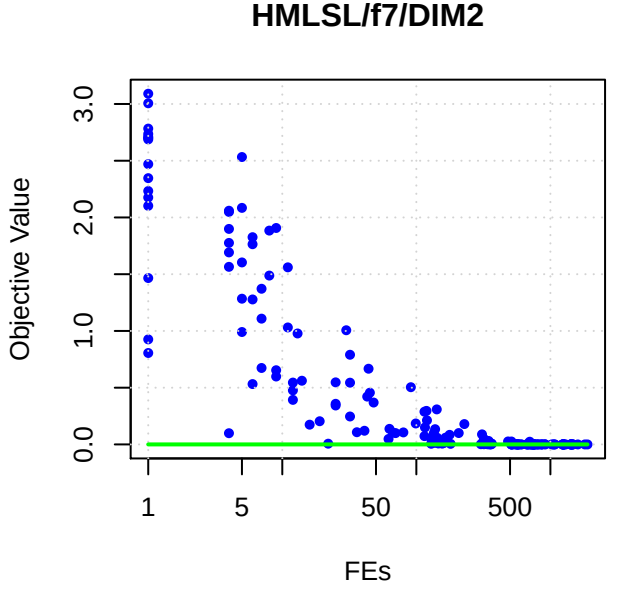
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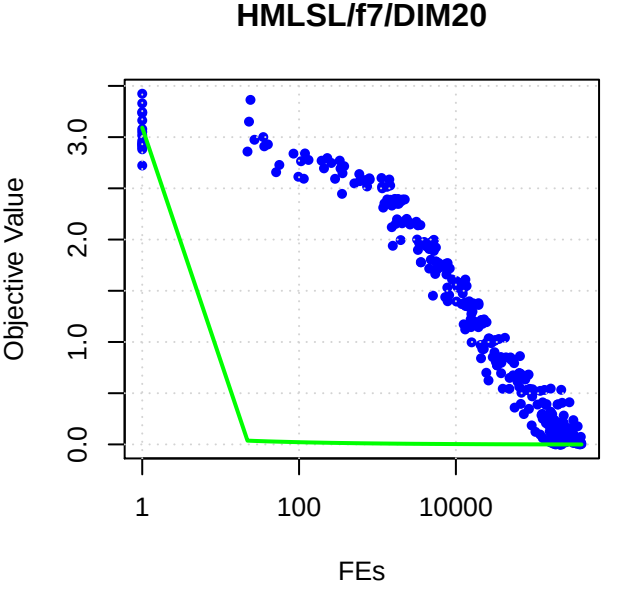
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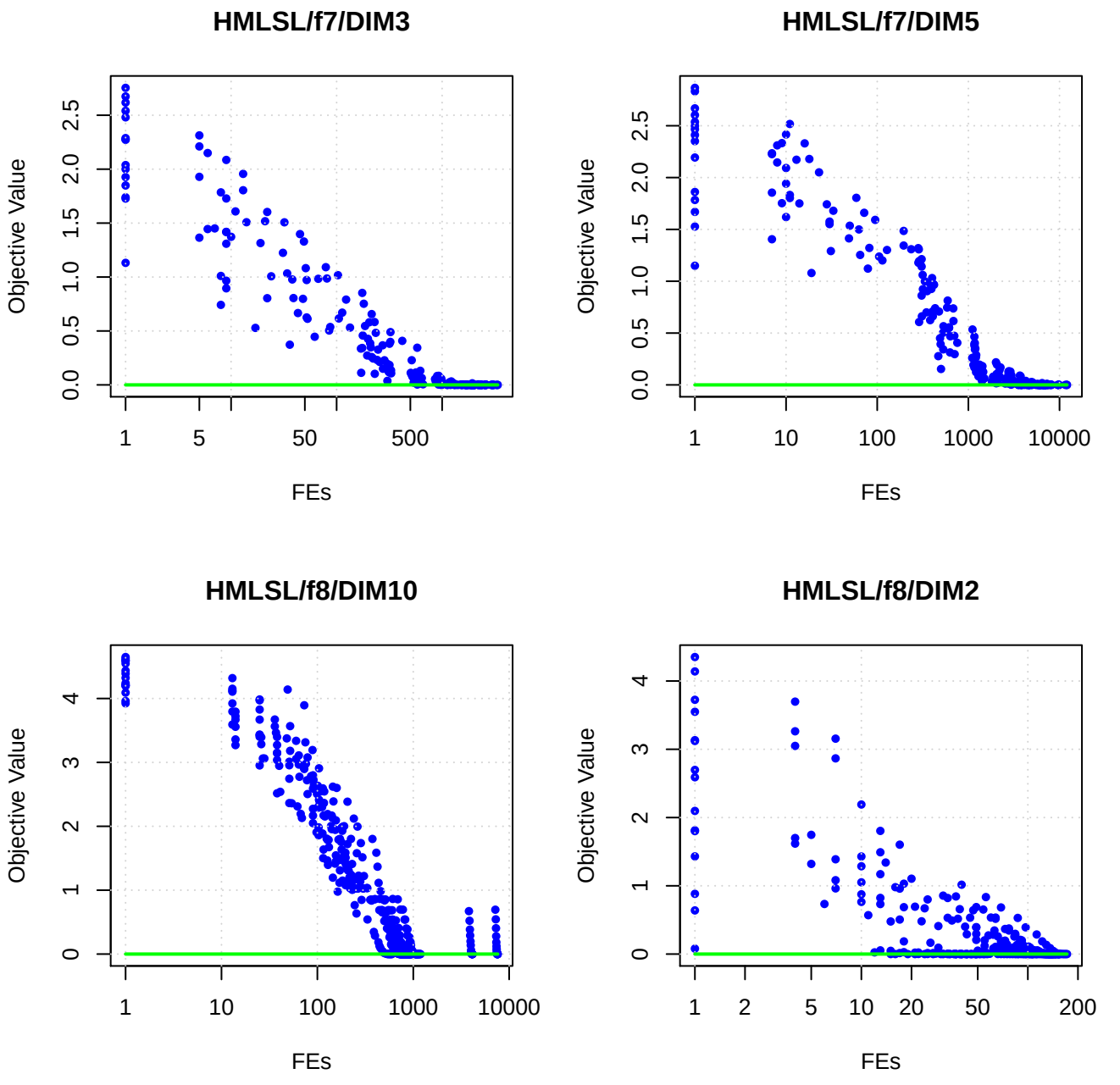
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FEs
HMLSL/f7/DIM5
Objective Value
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FEs
HMLSL/f8/DIM10
Objective Value
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Objective Value
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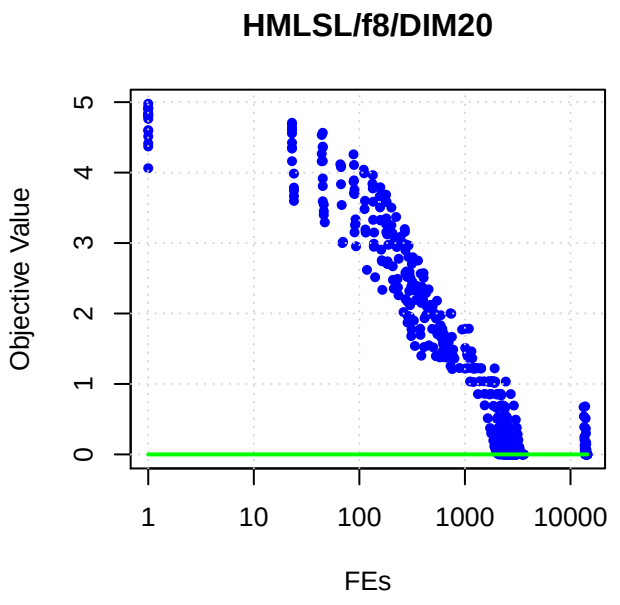
FEs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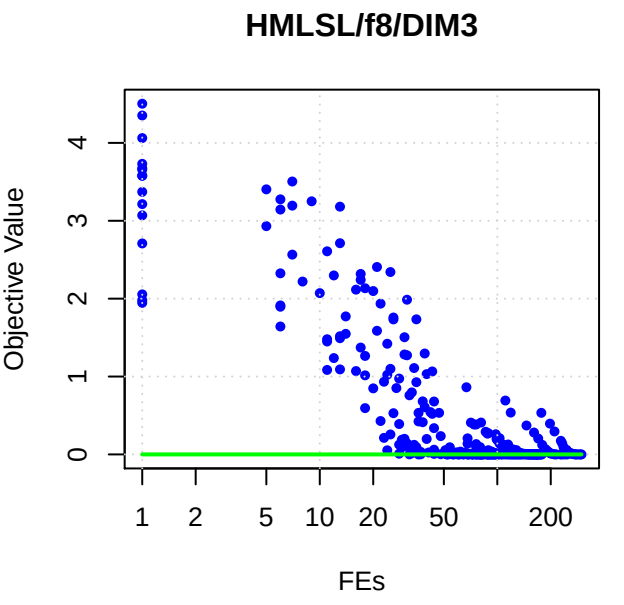
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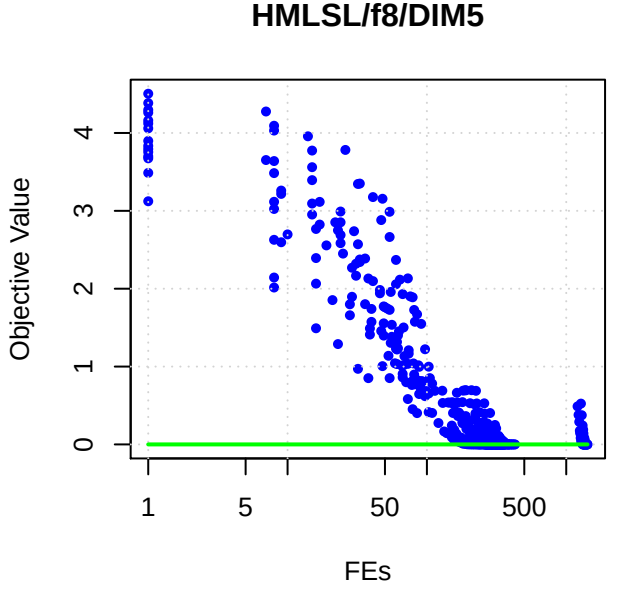
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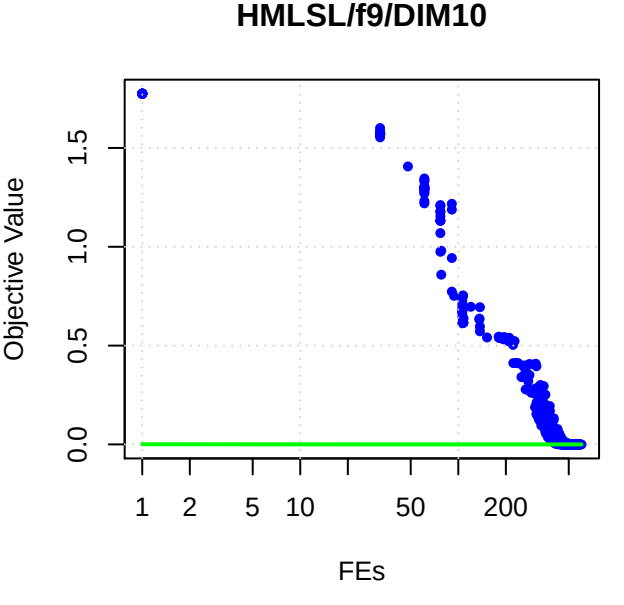
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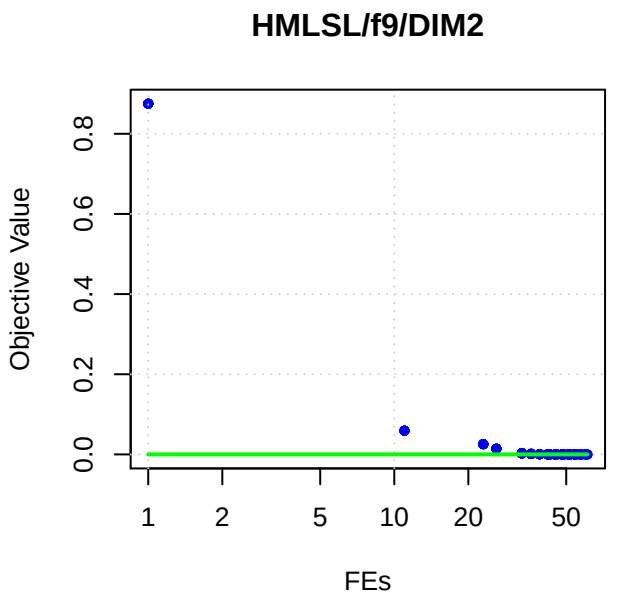
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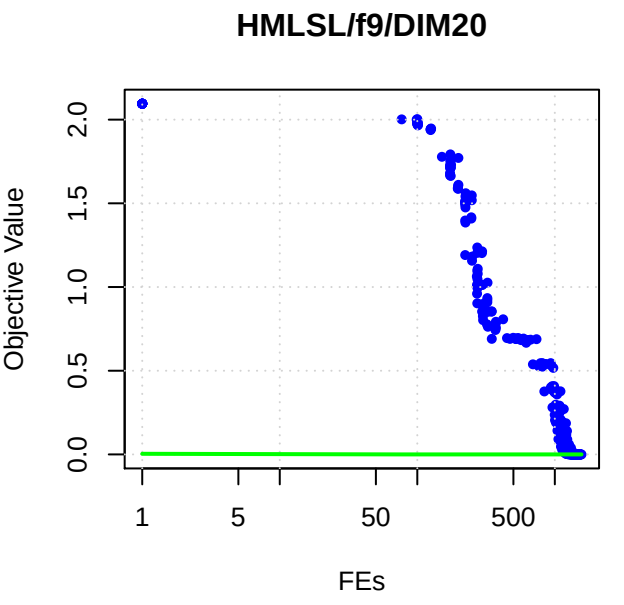
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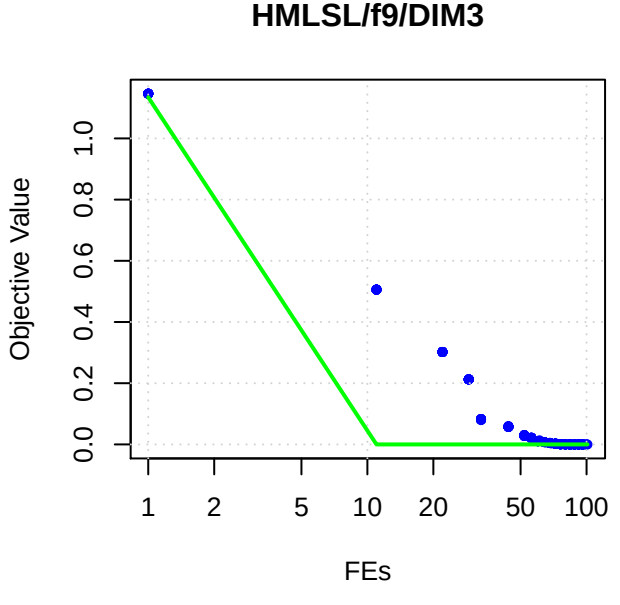
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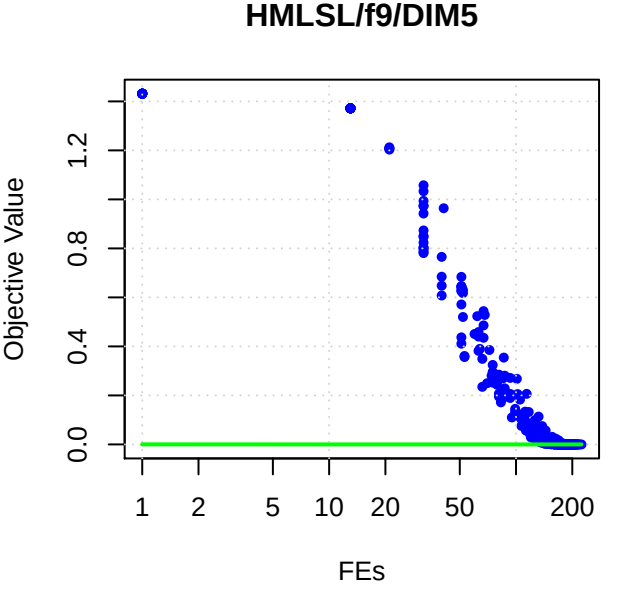
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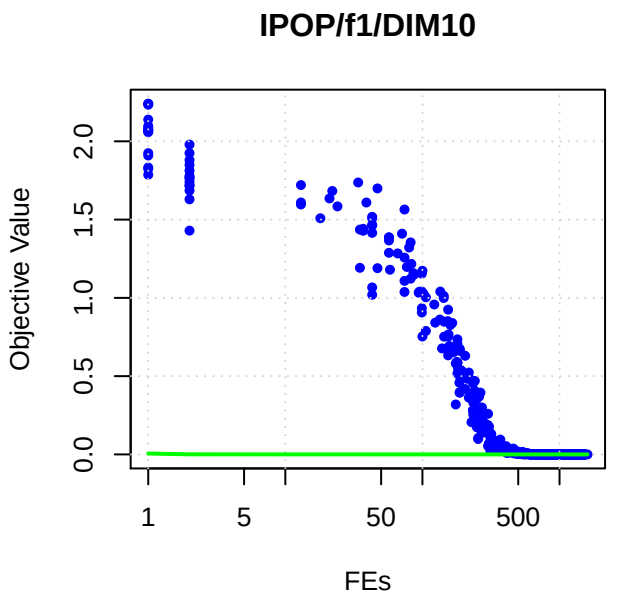
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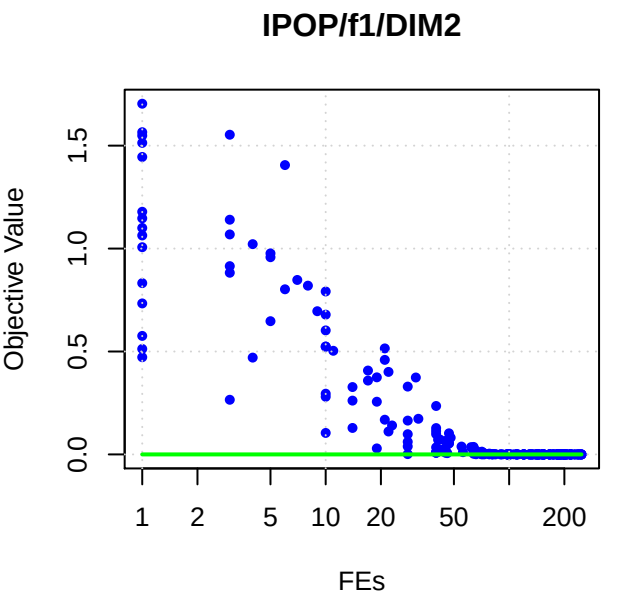
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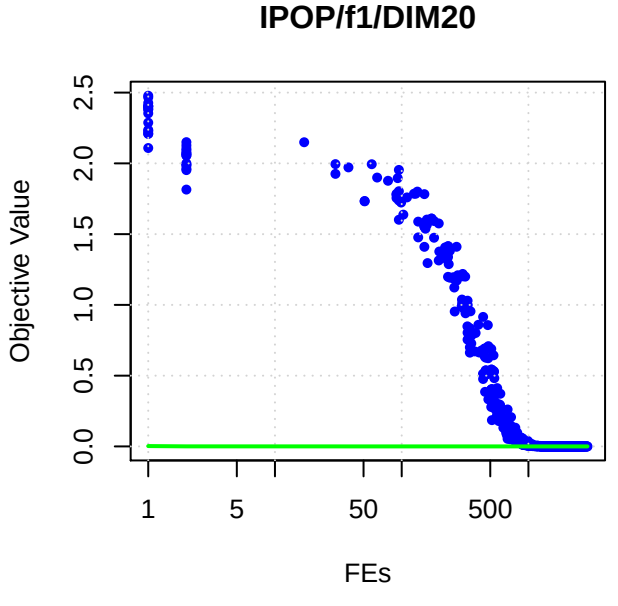
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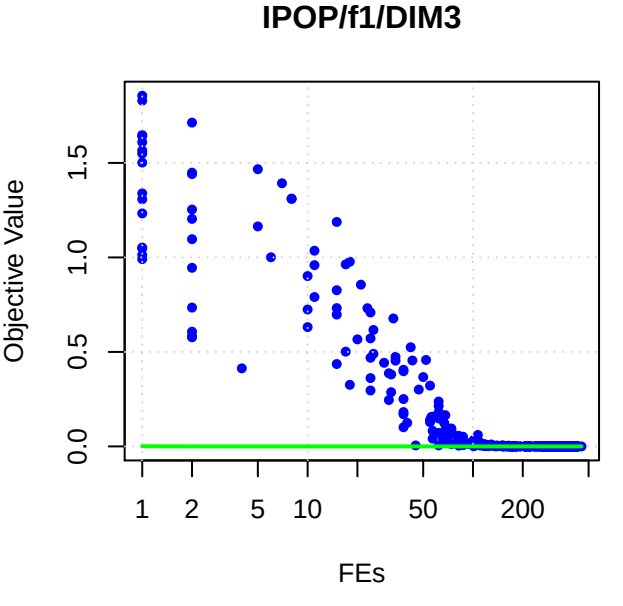
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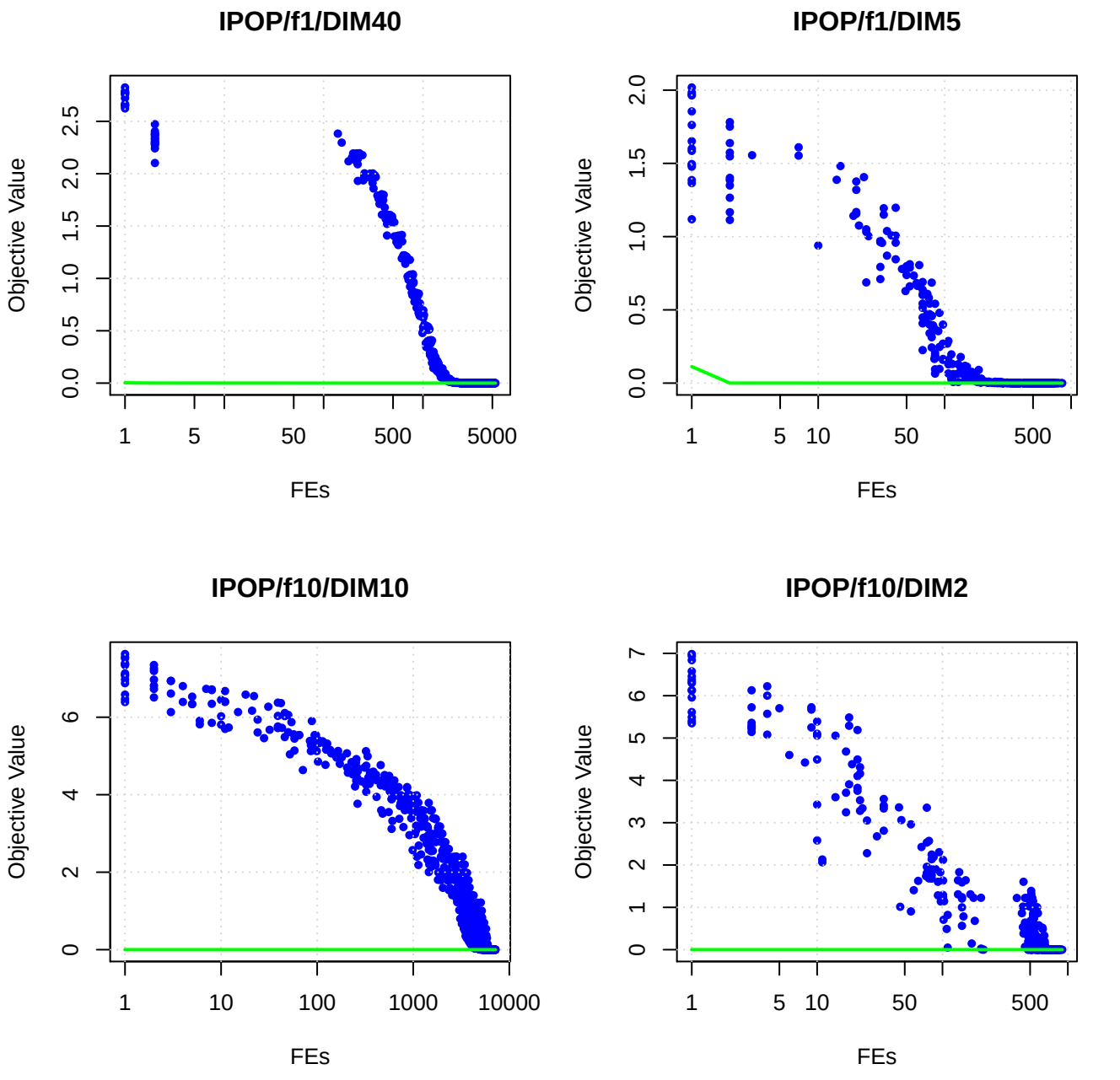
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FEs
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Objective Value
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FEs
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Objective Value
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10000
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Objective Value
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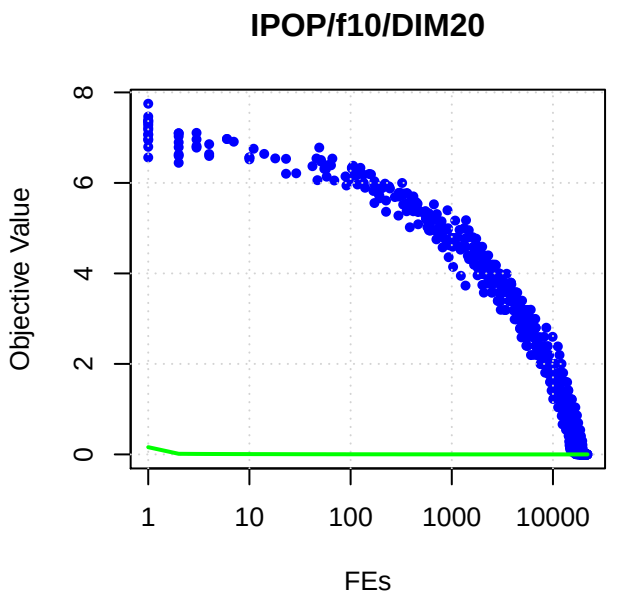
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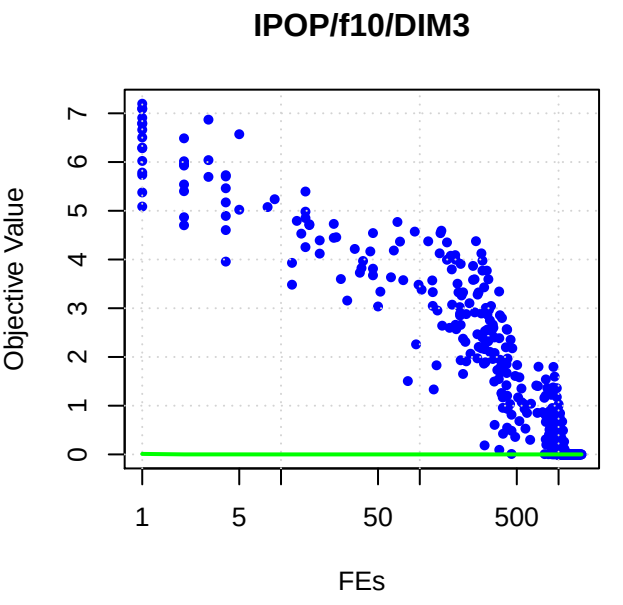
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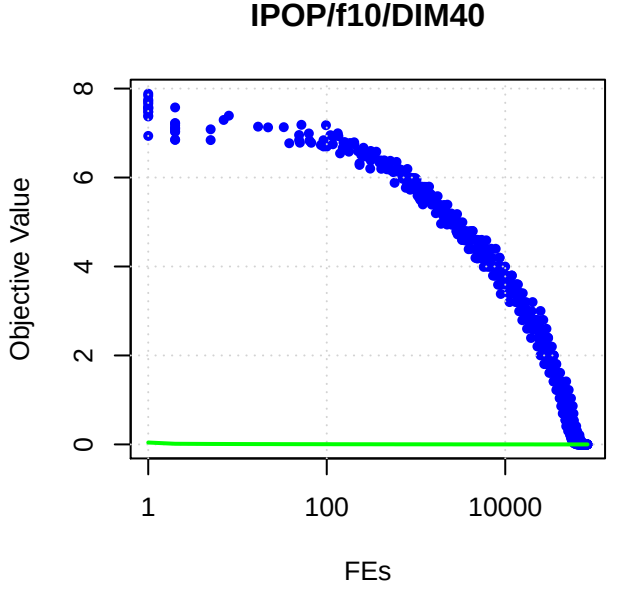
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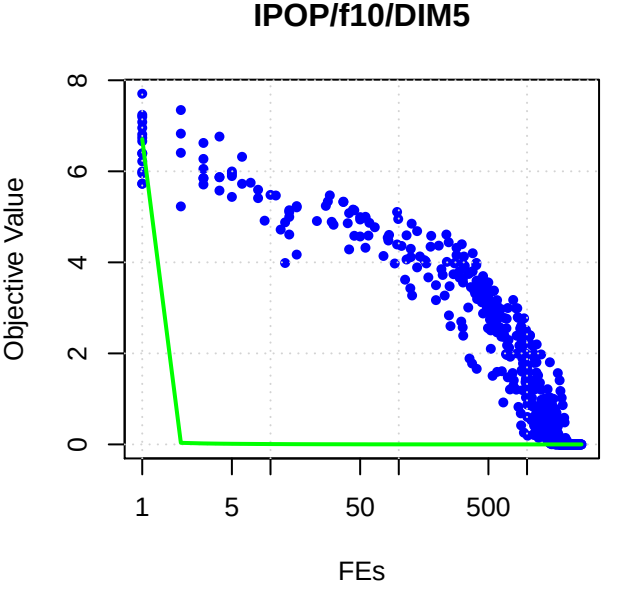
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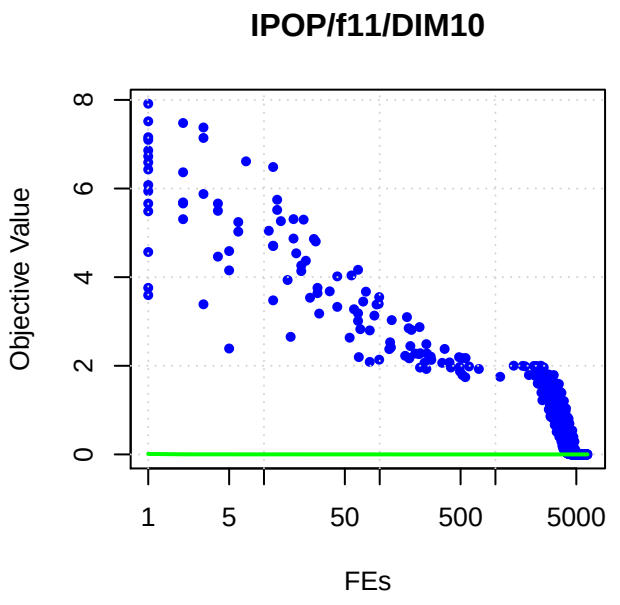
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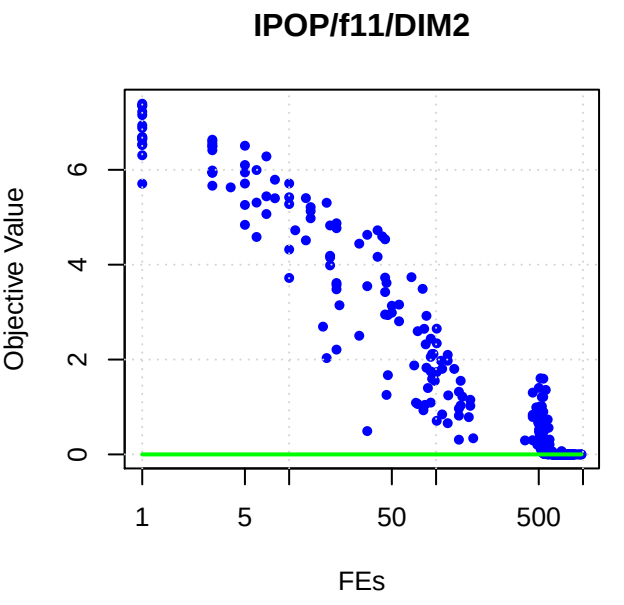
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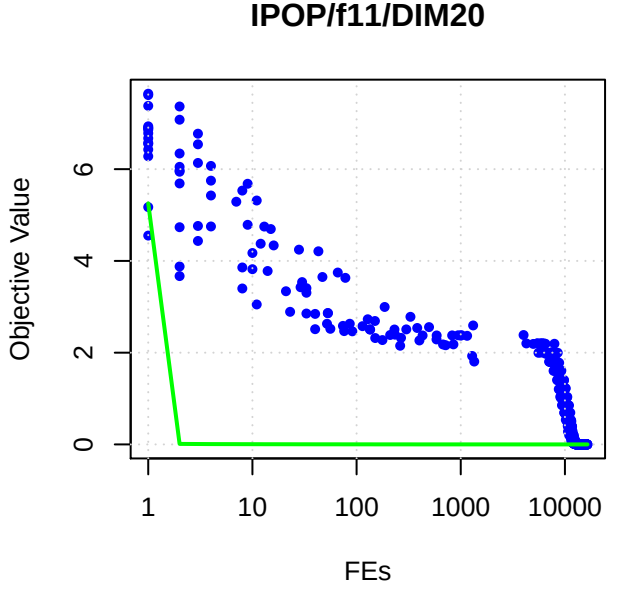
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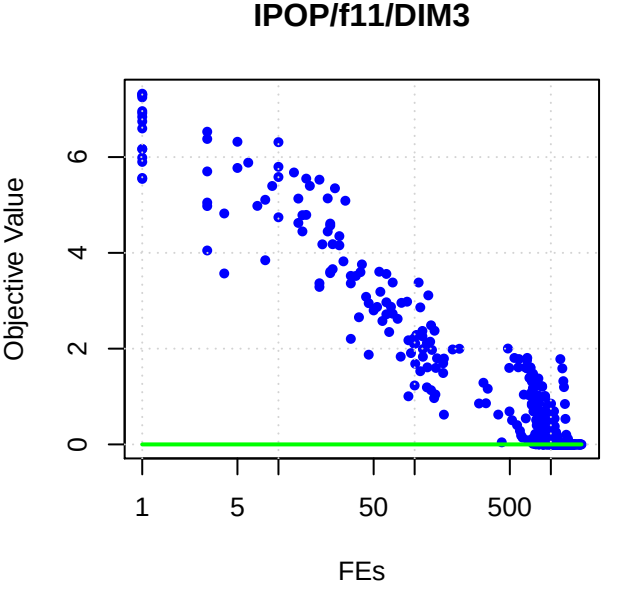
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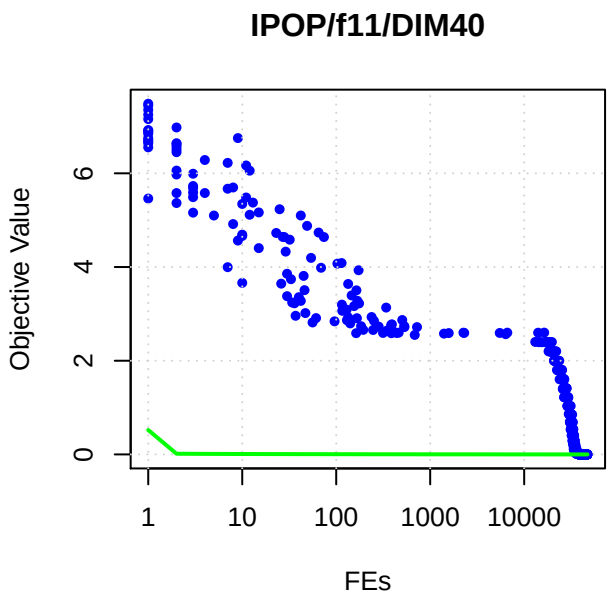
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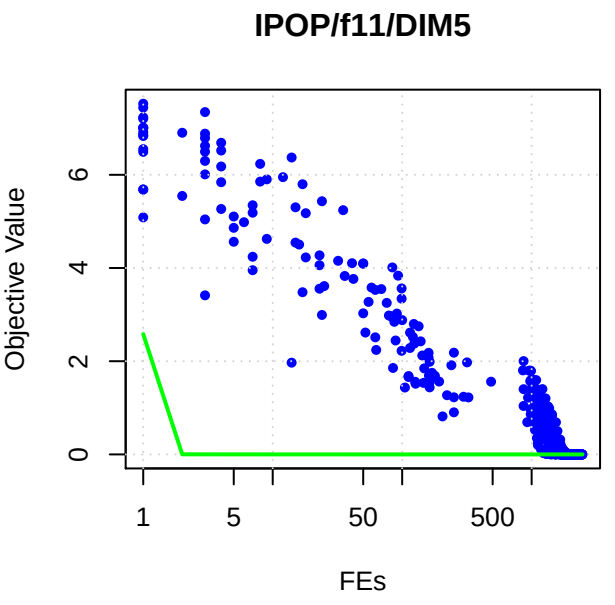
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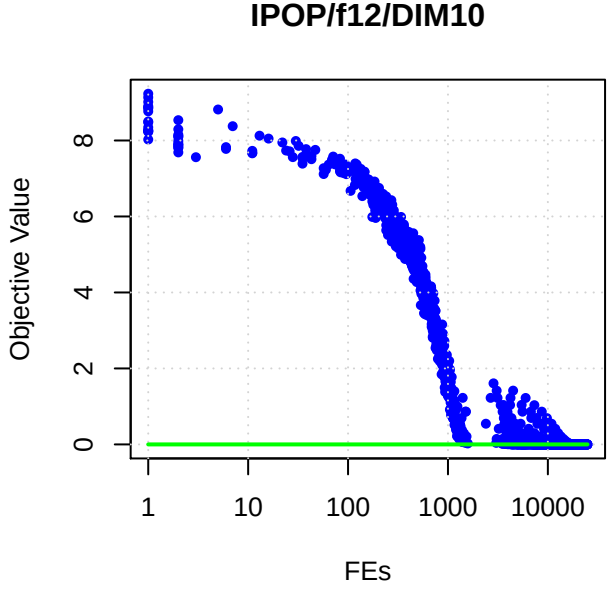
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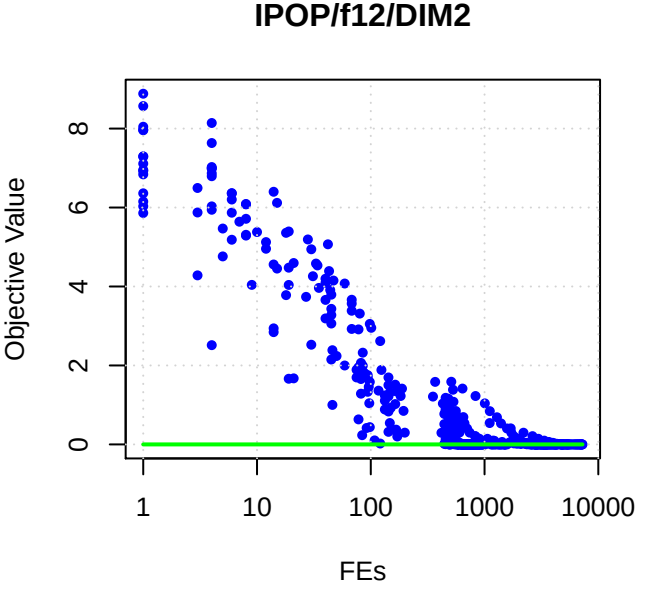
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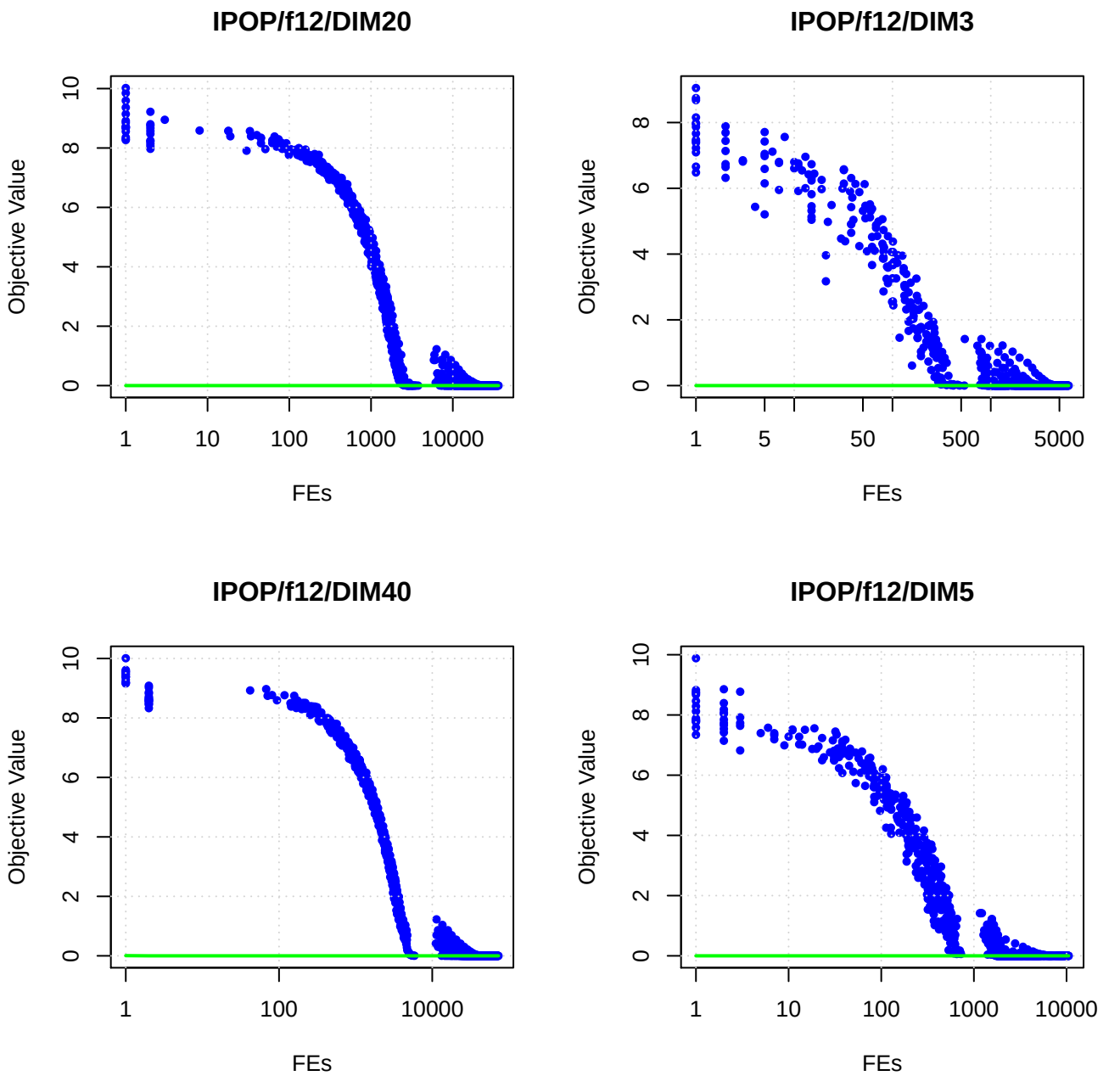
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Objective Value
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10000
FEs
IPOP/f12/DIM3
Objective Value
0
2
4
6
8
1
5
50
500
5000
FEs
IPOP/f12/DIM40
Objective Value
0
2
4
6
8
10
1
100
10000
FEs
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Objective Value
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8
10
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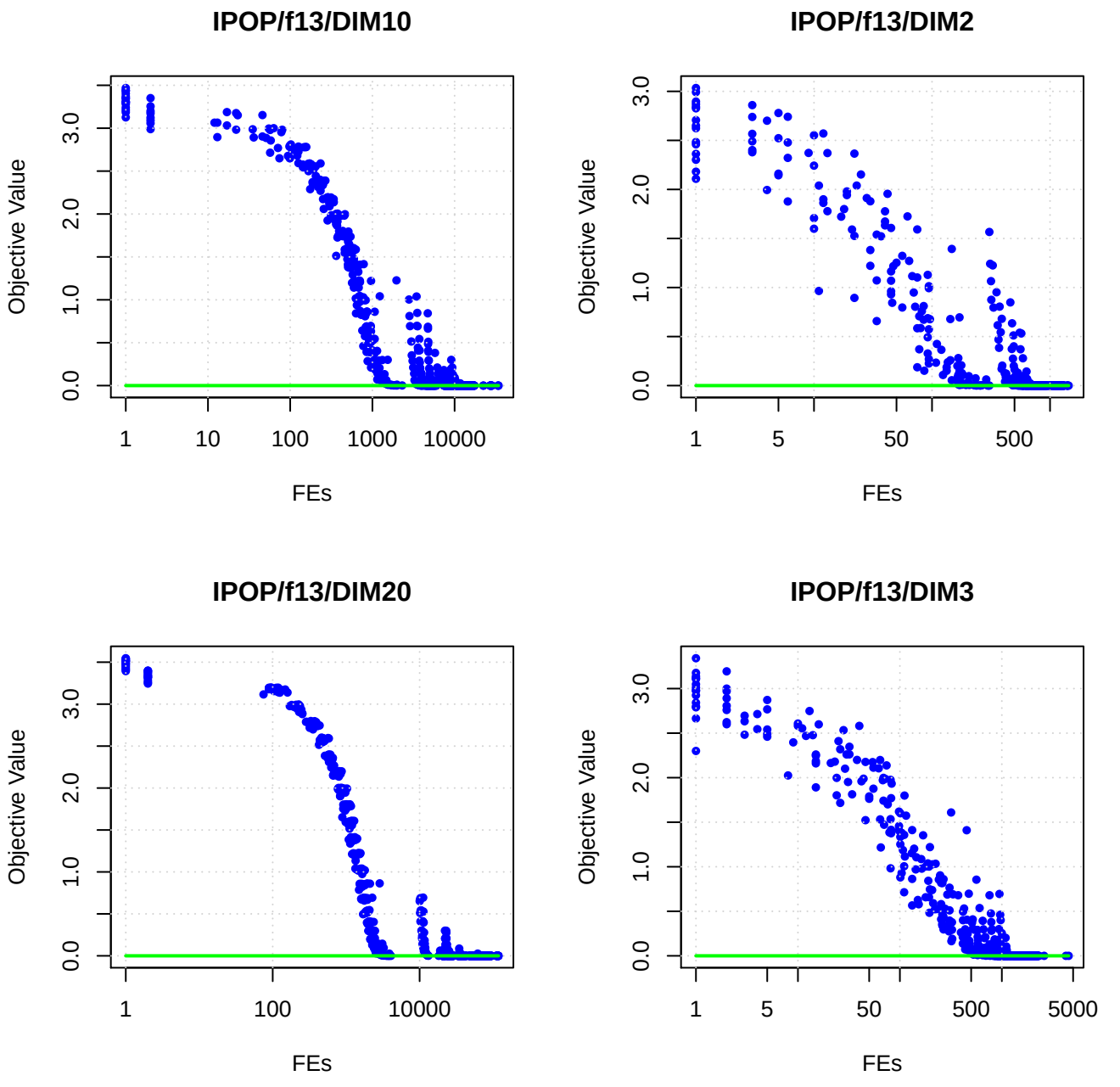
1000
10000
FEs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Objective Value
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3.0
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1000
10000
FEs
IPOP/f13/DIM2
Objective Value
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1.0
2.0
3.0
1
5
50
500
FEs
IPOP/f13/DIM20
Objective Value
0.0
1.0
2.0
3.0
1
100
10000
FEs
IPOP/f13/DIM3
Objective Value
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2.0
3.0
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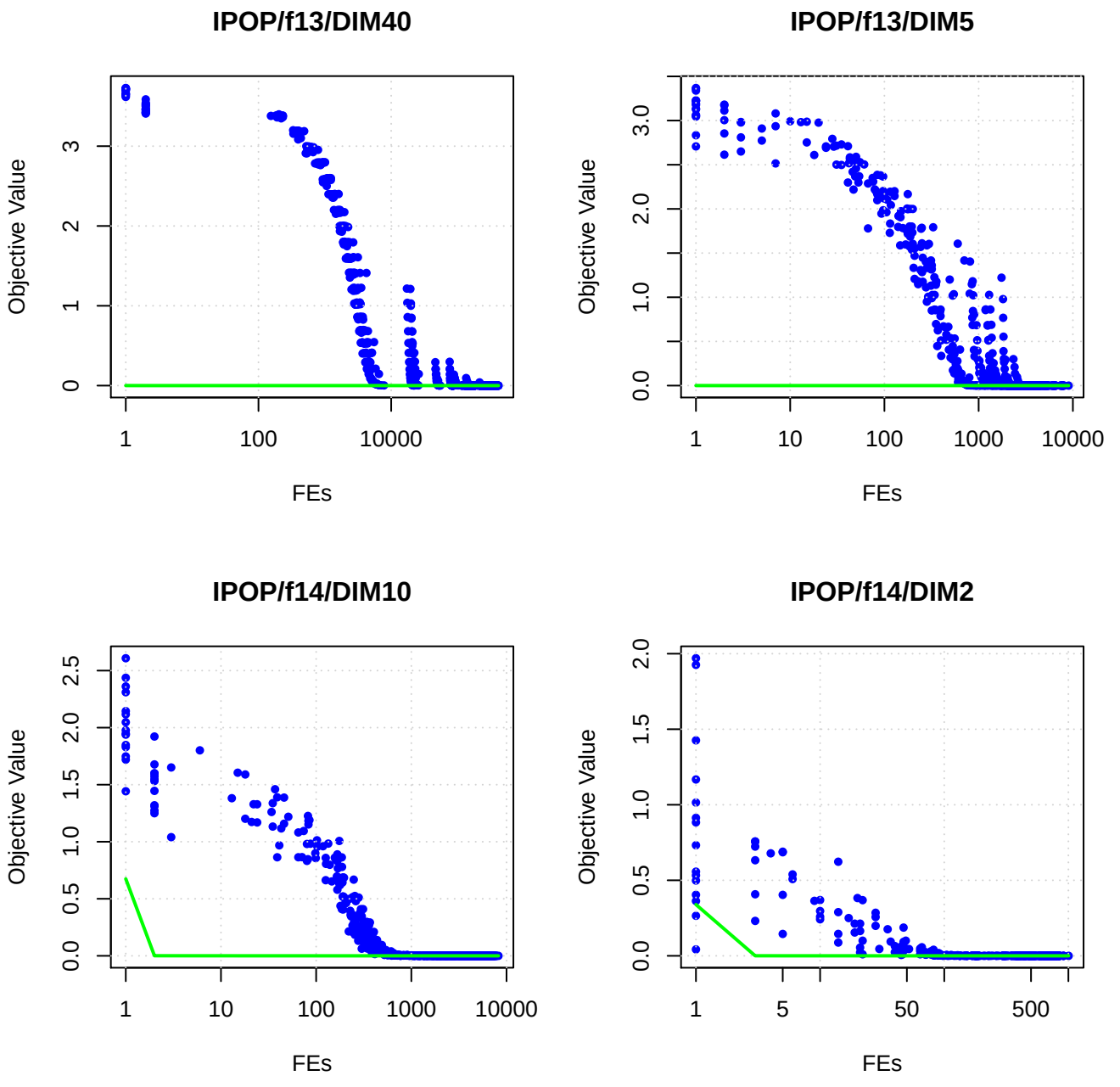
50
500
5000
FEs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Objective Value
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FEs
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Objective Value
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1.0
2.0
3.0
1
10
100
1000
10000
FEs
IPOP/f14/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs
IPOP/f14/DIM2
Objective Value
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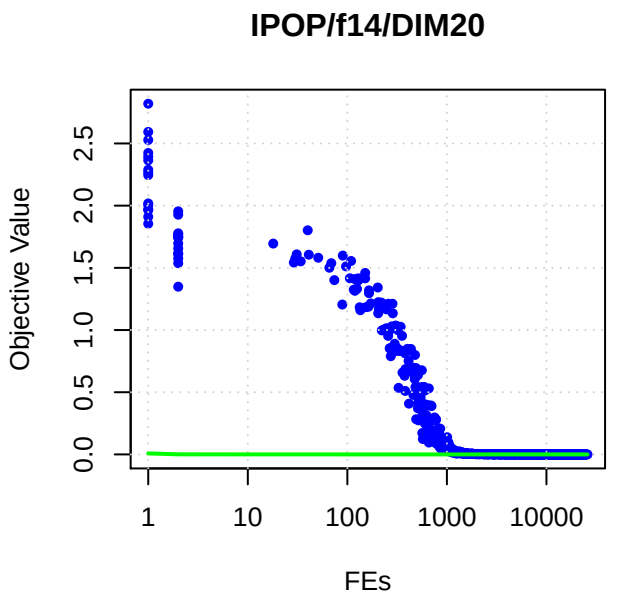
1.0
1.5
2.0
1
5
50
500
FEs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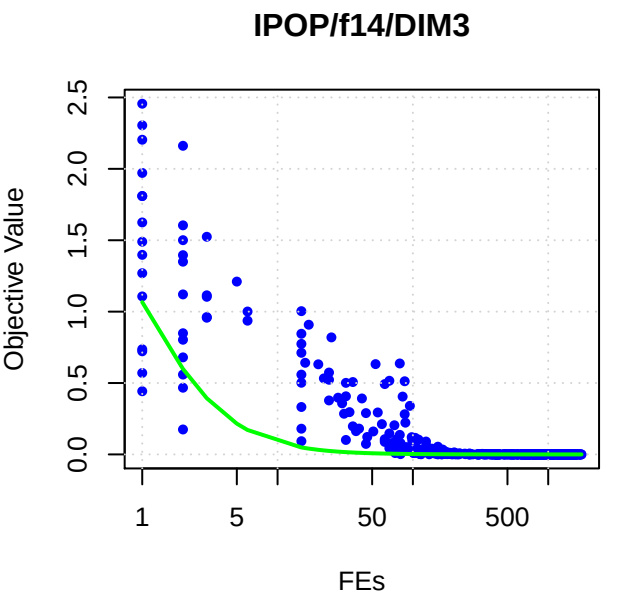
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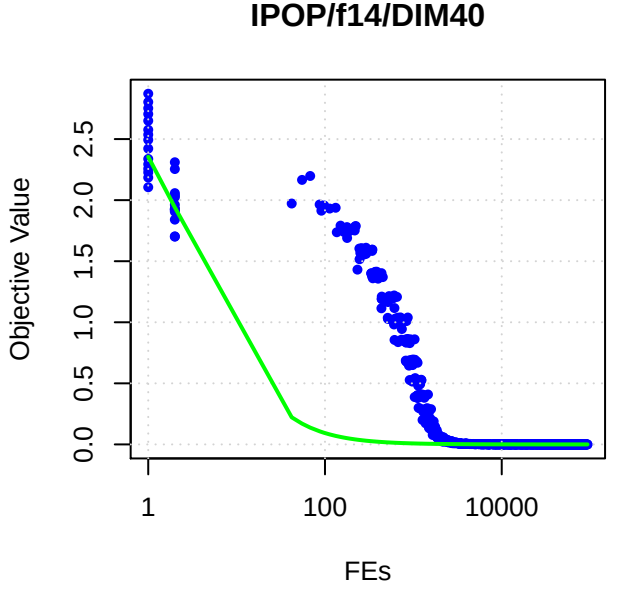
FEs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2.0
2.5
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100
10000
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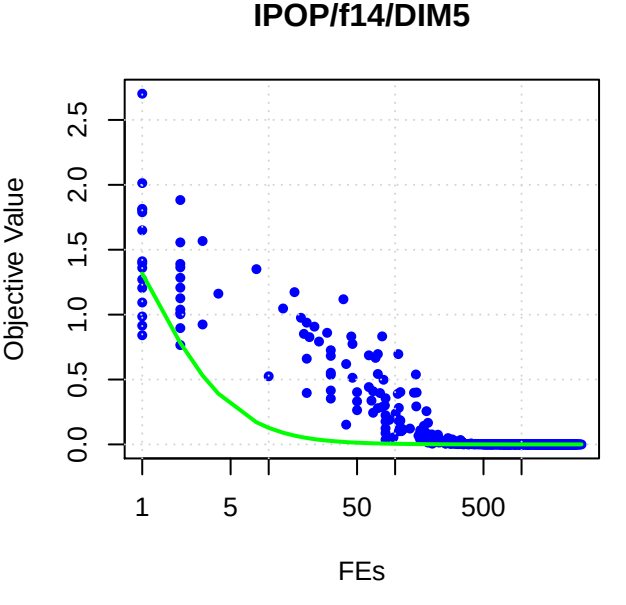
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5
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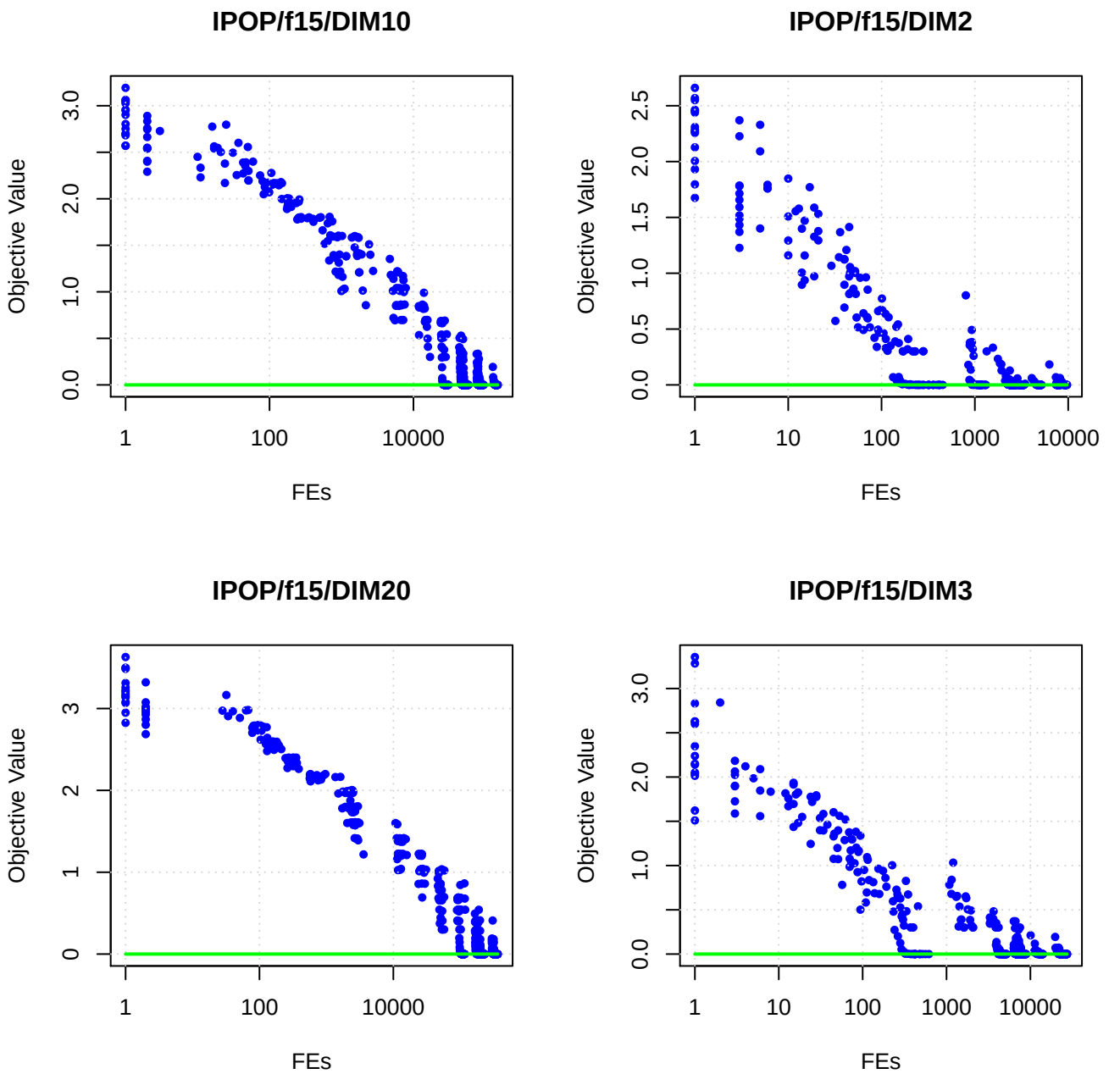
500
FEs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Objective Value
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FEs
IPOP/f15/DIM2
Objective Value
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0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs
IPOP/f15/DIM20
Objective Value
0
1
2
3
1
100
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Objective Value
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2.0
3.0
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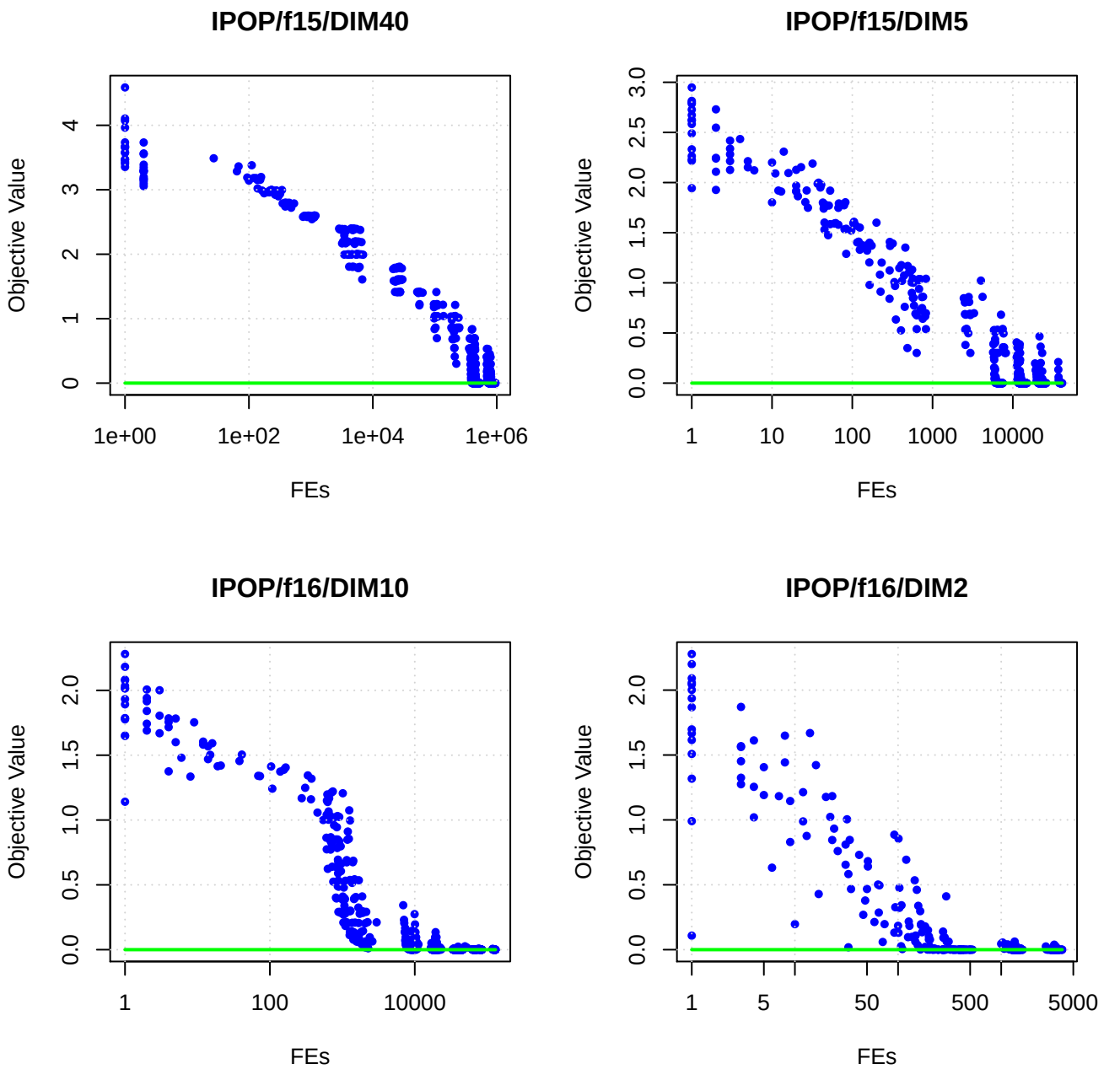
100
1000
10000
FEs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Objective Value
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4
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FEs
IPOP/f15/DIM5
Objective Value
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0.5
1.0
1.5
2.0
2.5
3.0
1
10
100
1000
10000
FEs
IPOP/f16/DIM10
Objective Value
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0.5
1.0
1.5
2.0
1
100
10000
FEs
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Objective Value
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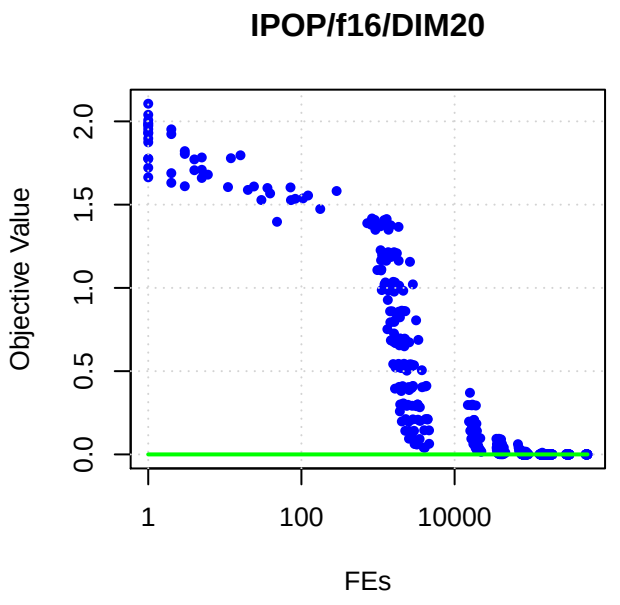
0.5
1.0
1.5
2.0
1
5
50
500
5000
FEs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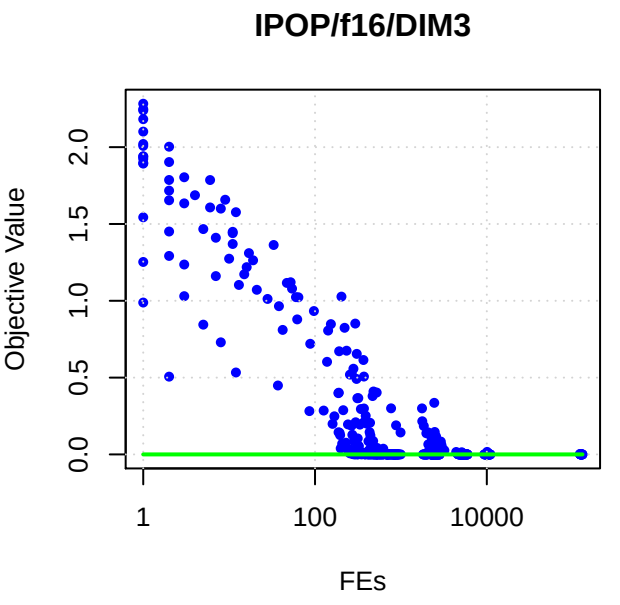
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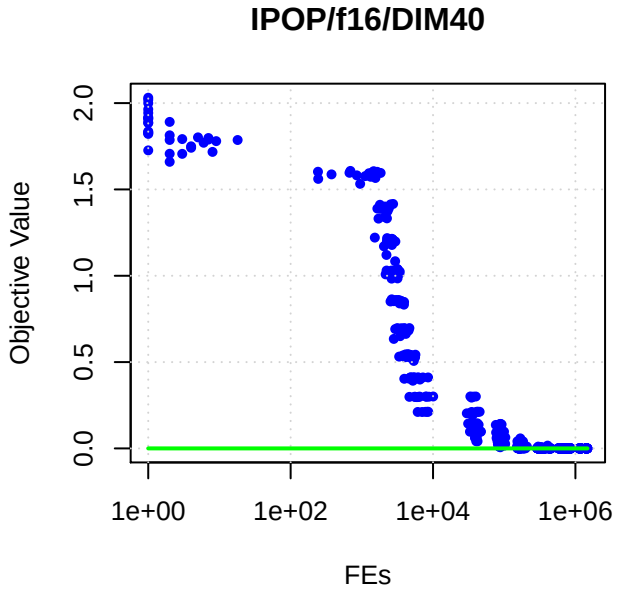
100
10000
FEs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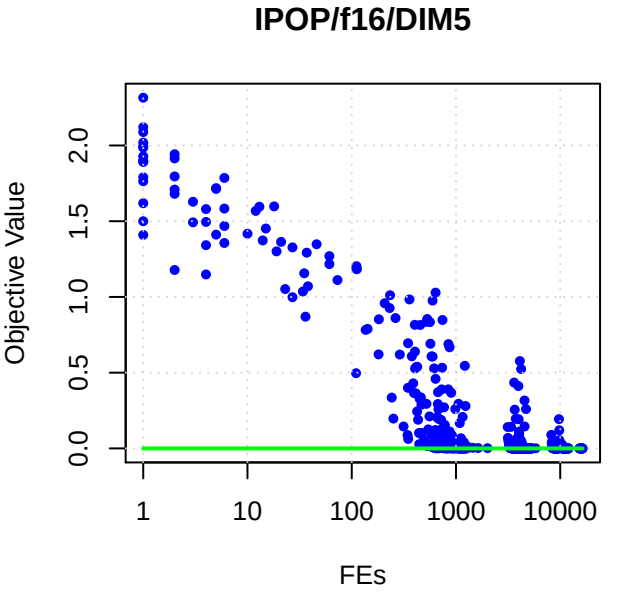
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1000
10000
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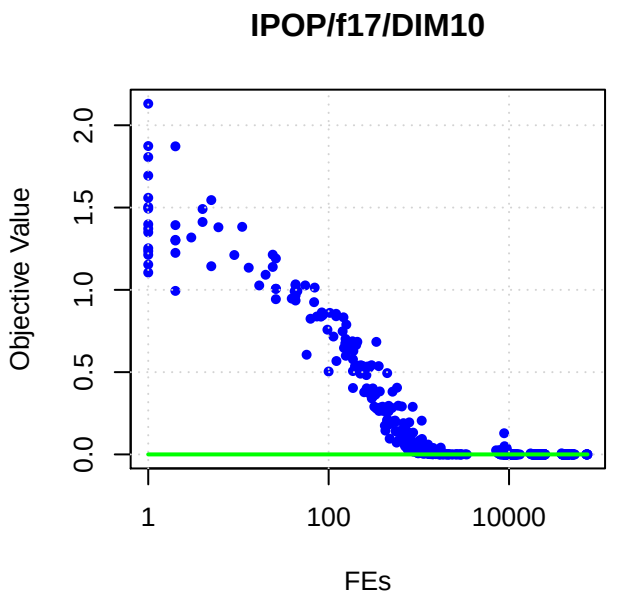
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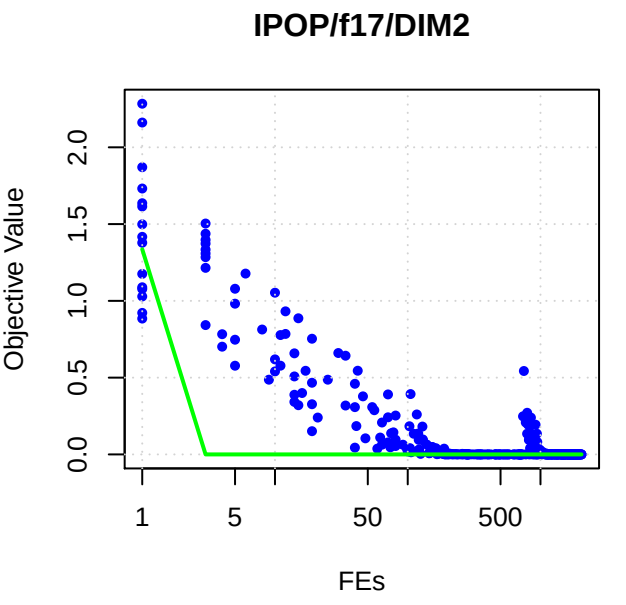
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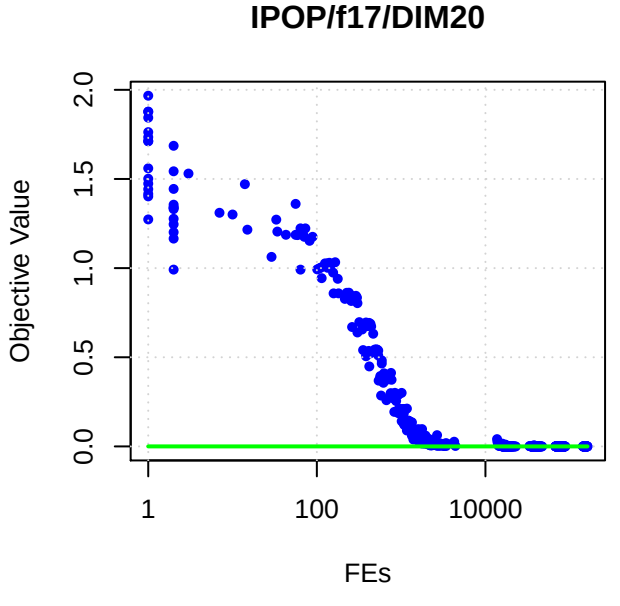
FEs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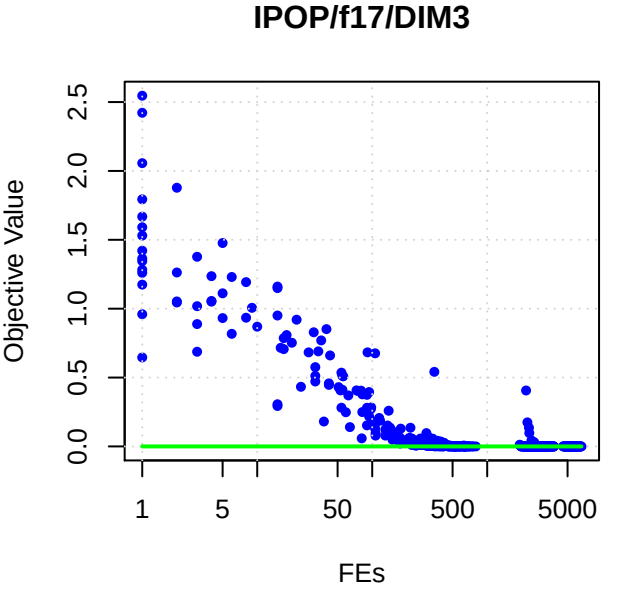
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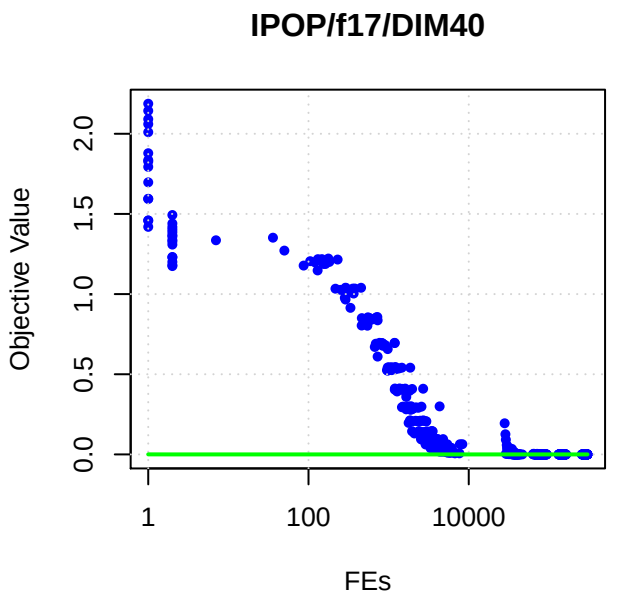
FEs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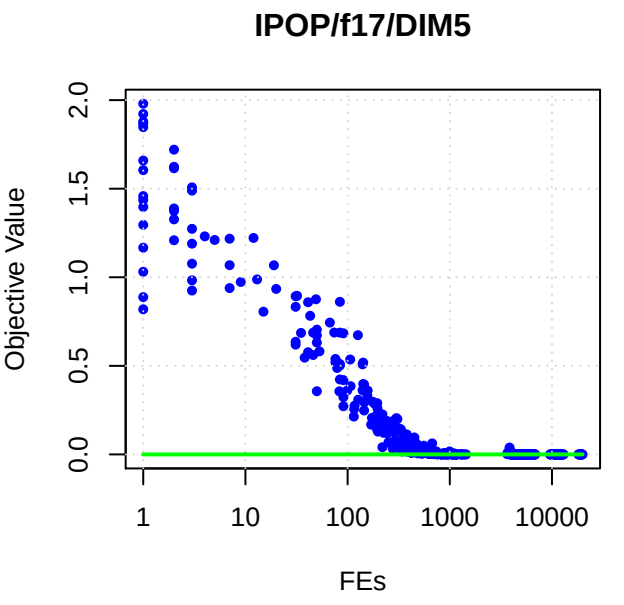
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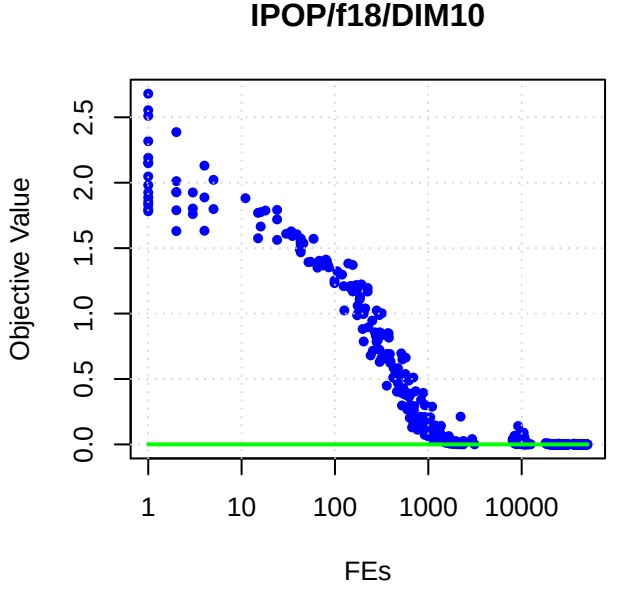
FEs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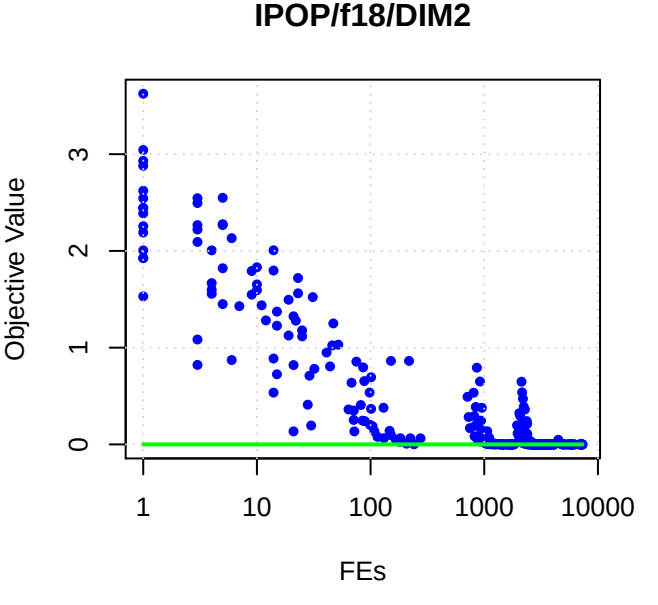
1000
10000
FEs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Objective Value
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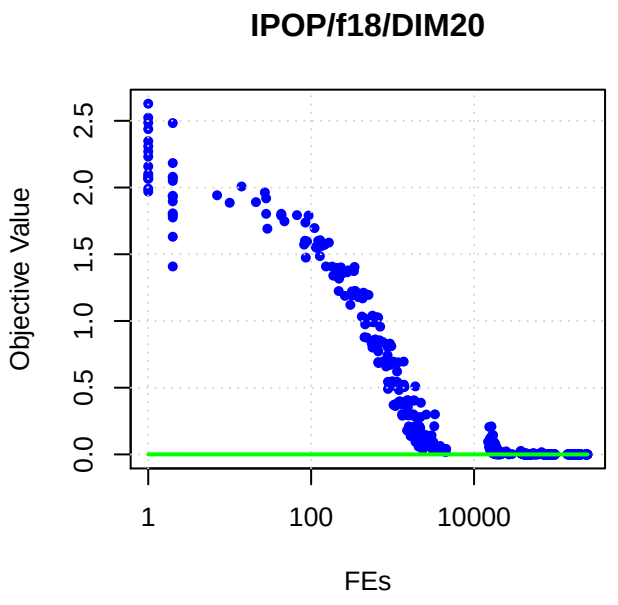
100
1000
10000
FEs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10000
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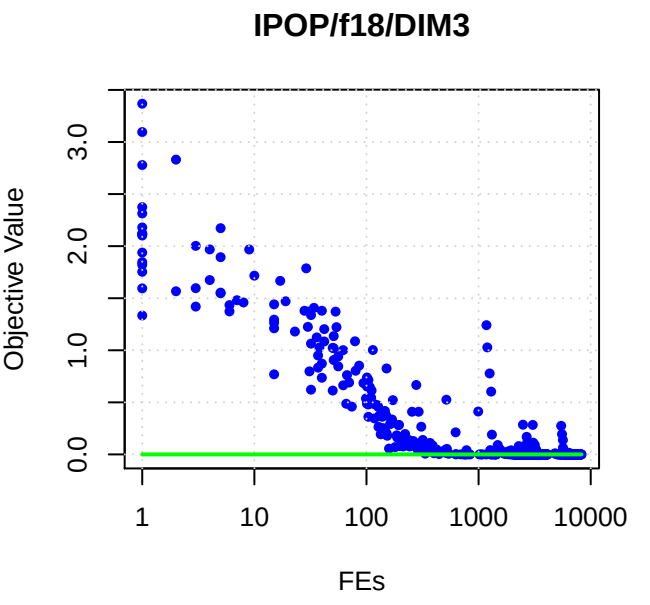
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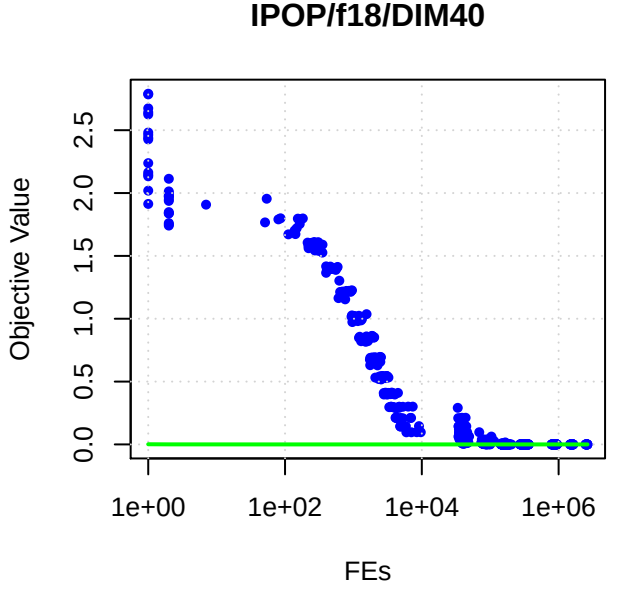
FEs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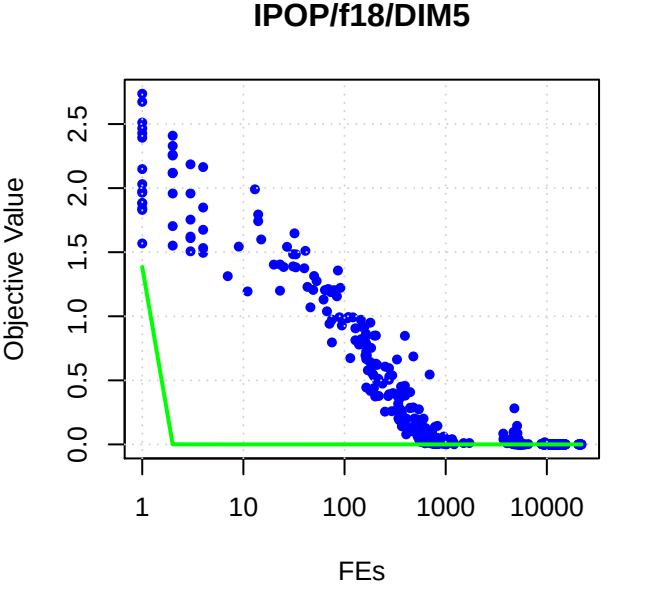
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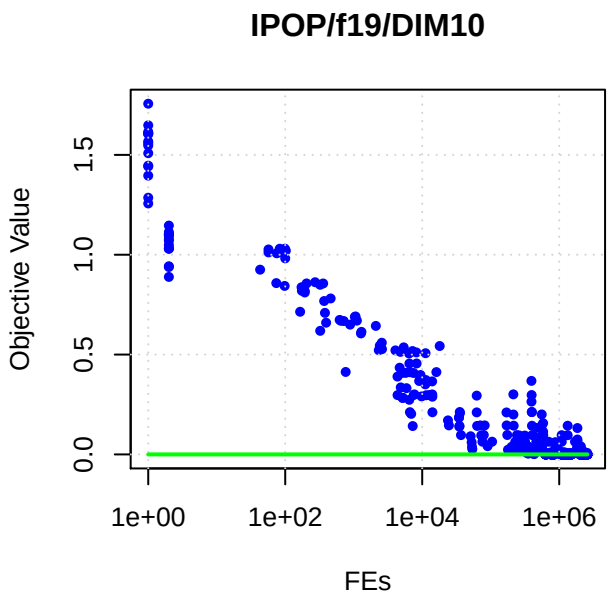
10000
FEs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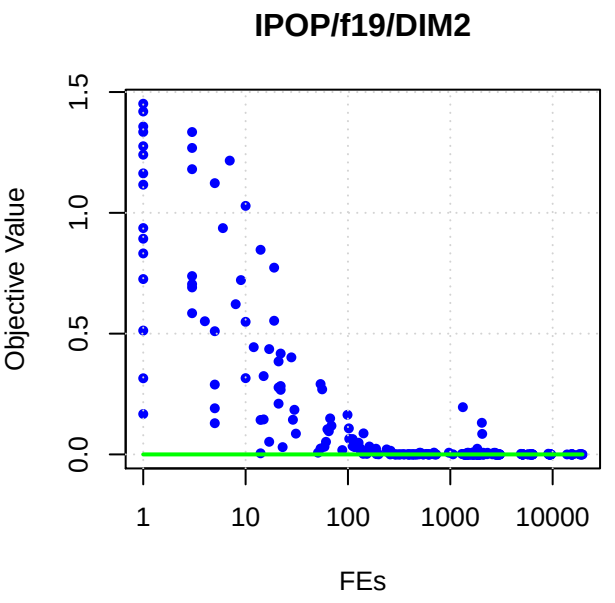
FEs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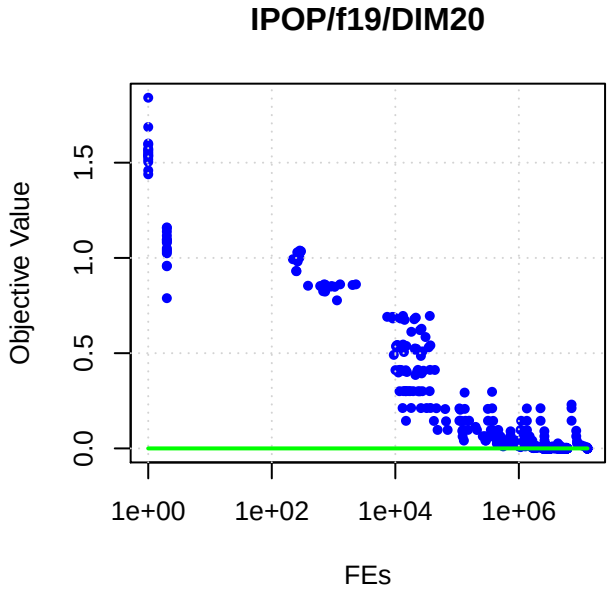
10000
FEs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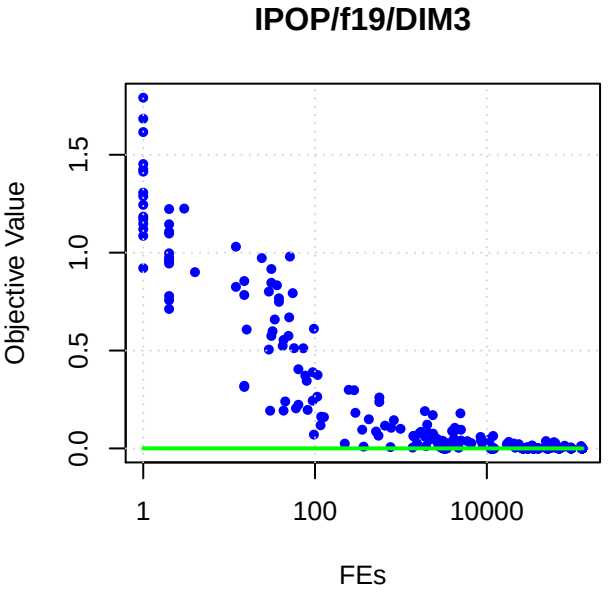
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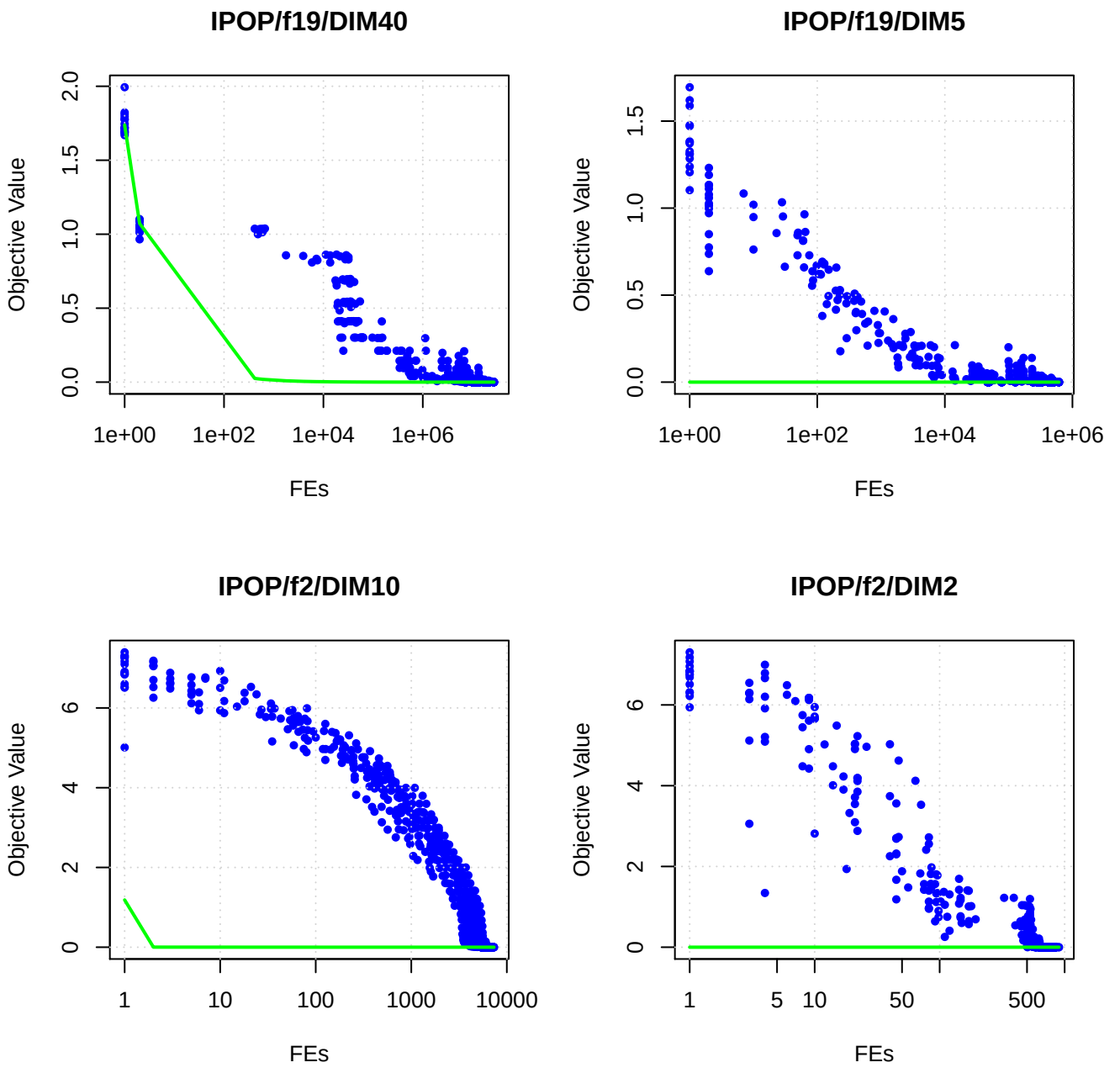
FEs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1e+06
FEs
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Objective Value
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1.5
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1e+02
1e+04
1e+06
FEs
IPOP/f2/DIM10
Objective Value
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4
6
1
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IPOP/f2/DIM2
Objective Value
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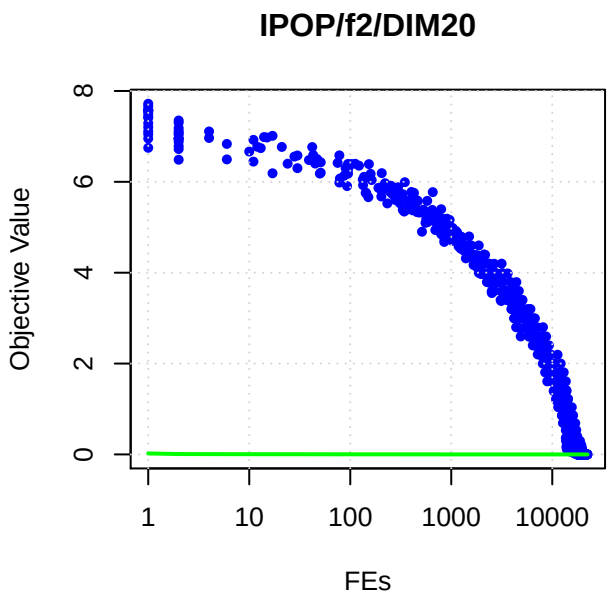
FEs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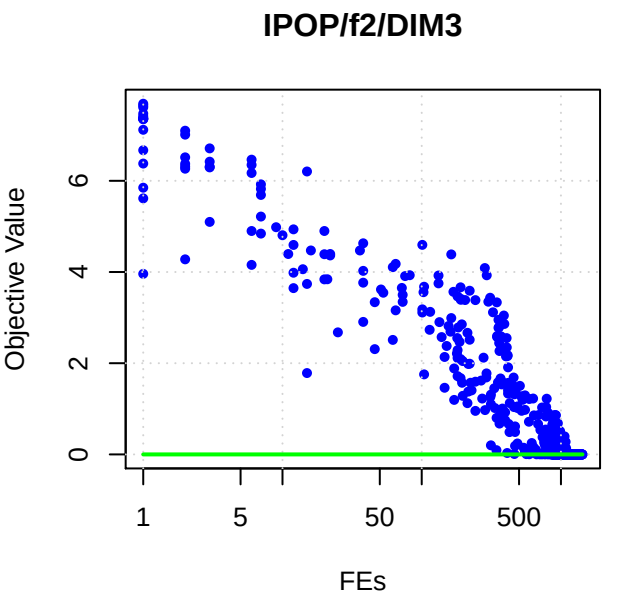
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Objective Value
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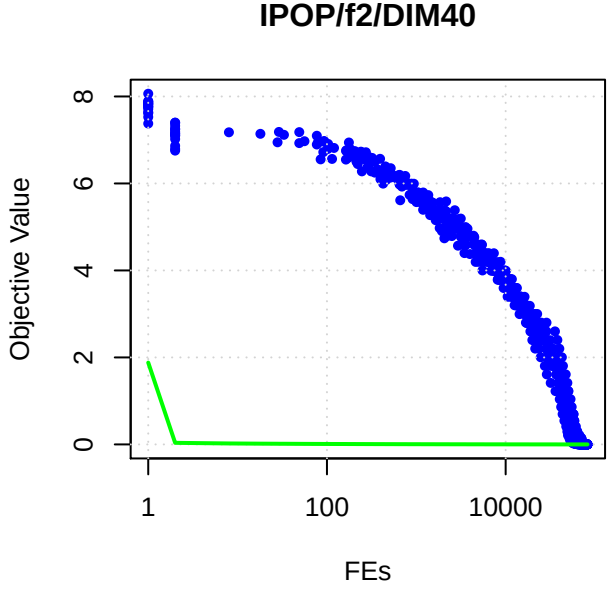
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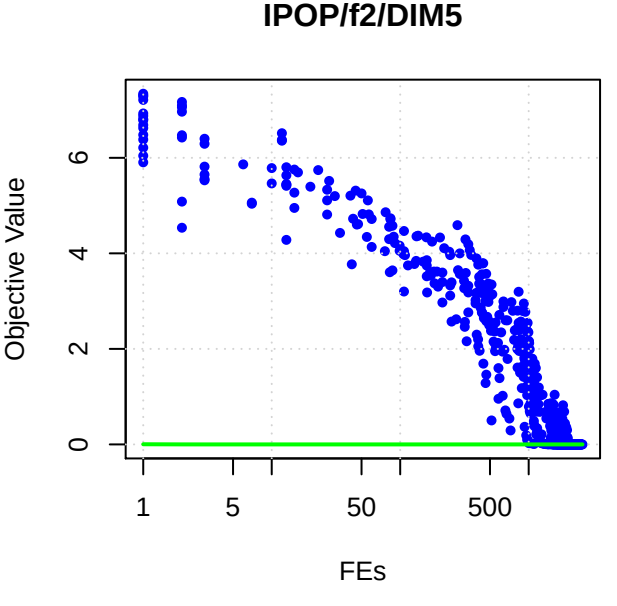
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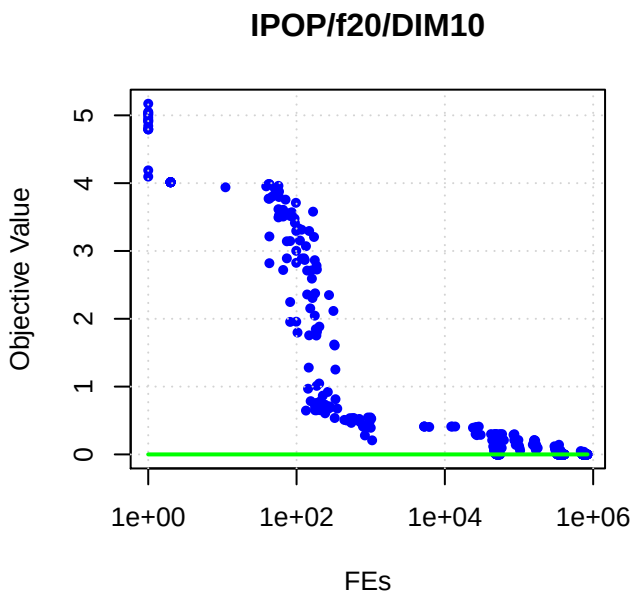
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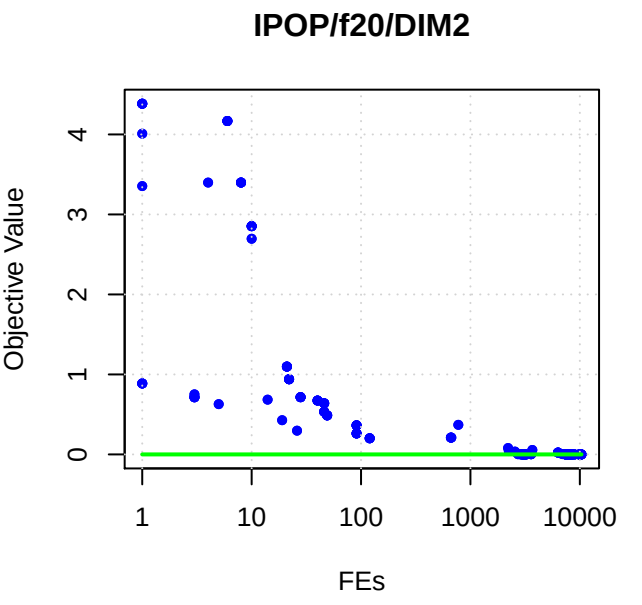
FEs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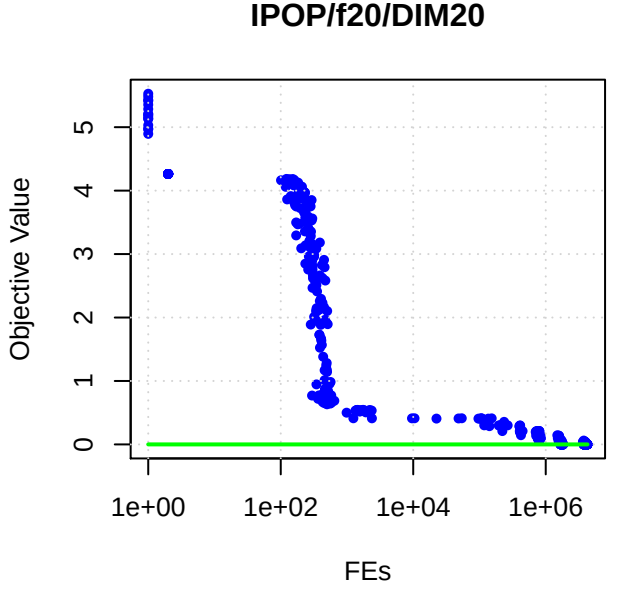
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1e+04
1e+06
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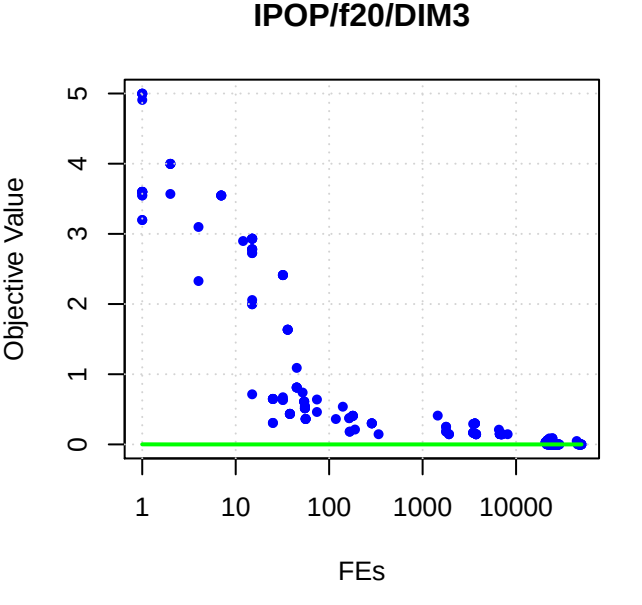
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Objective Value
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10000
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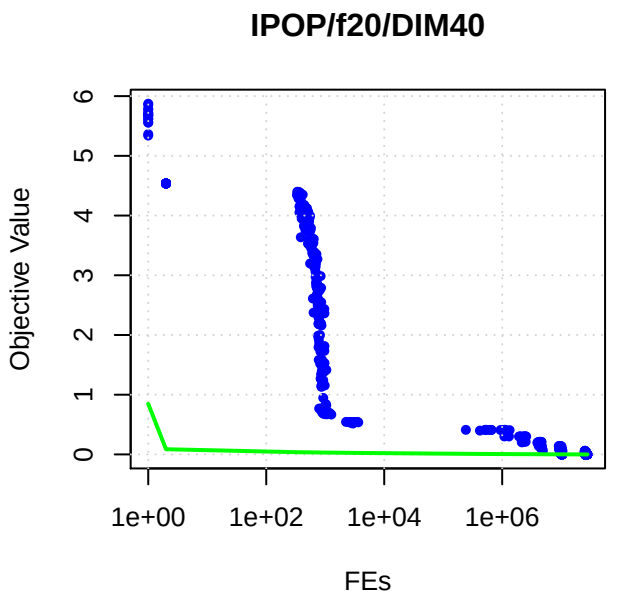
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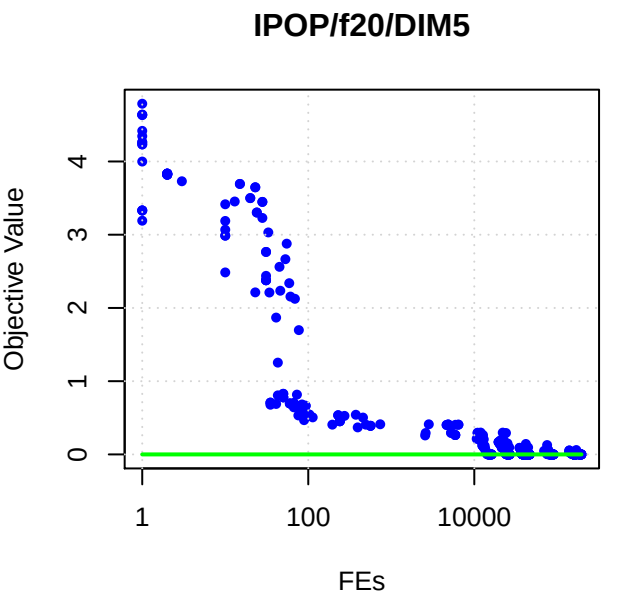
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100
10000
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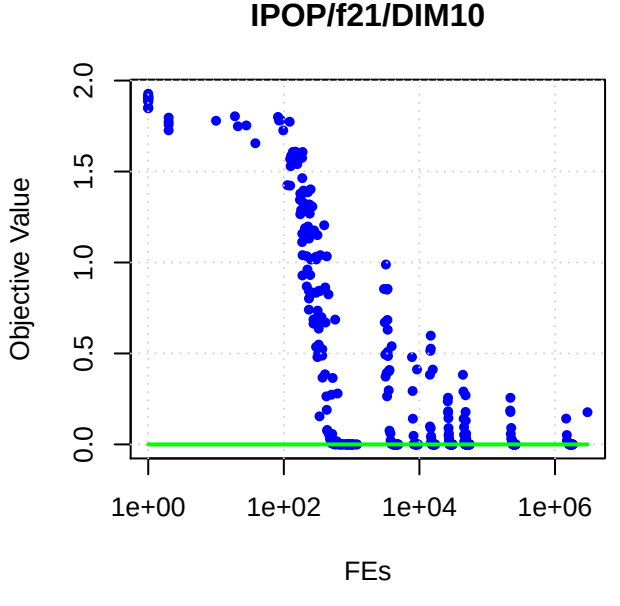
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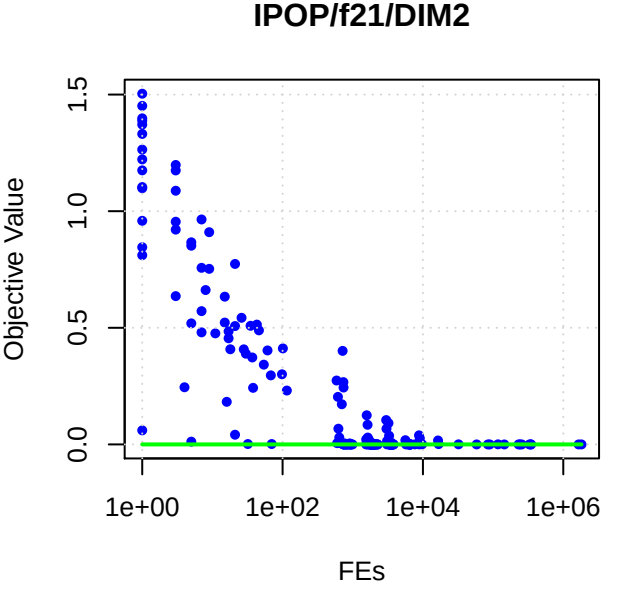
1e+06
FEs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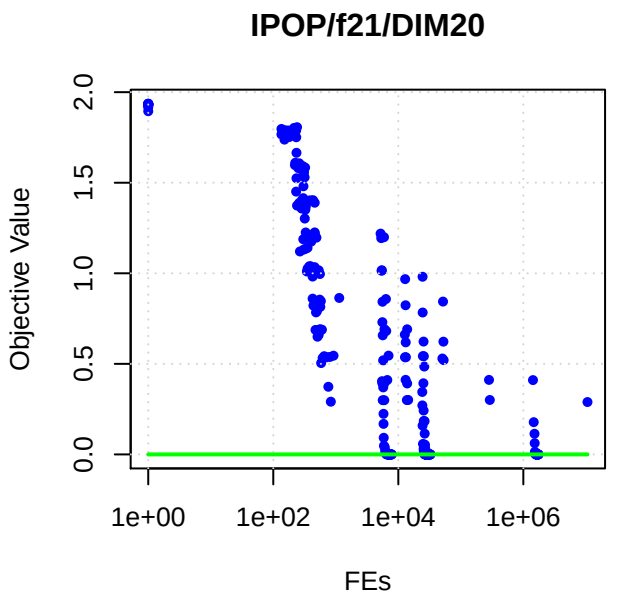
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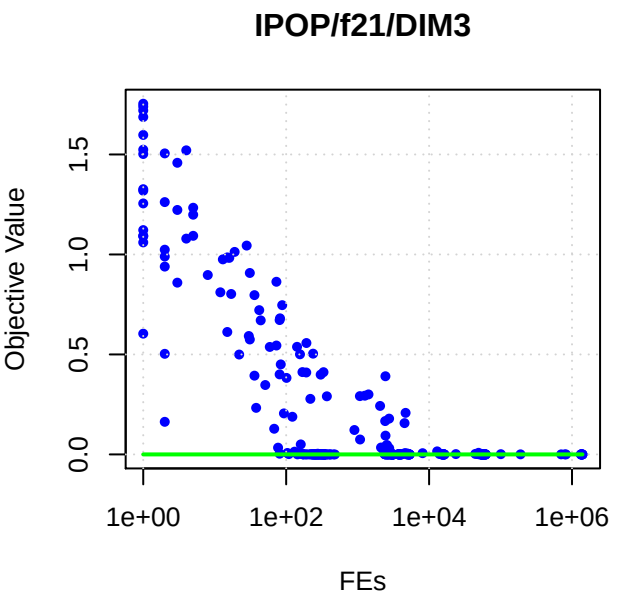
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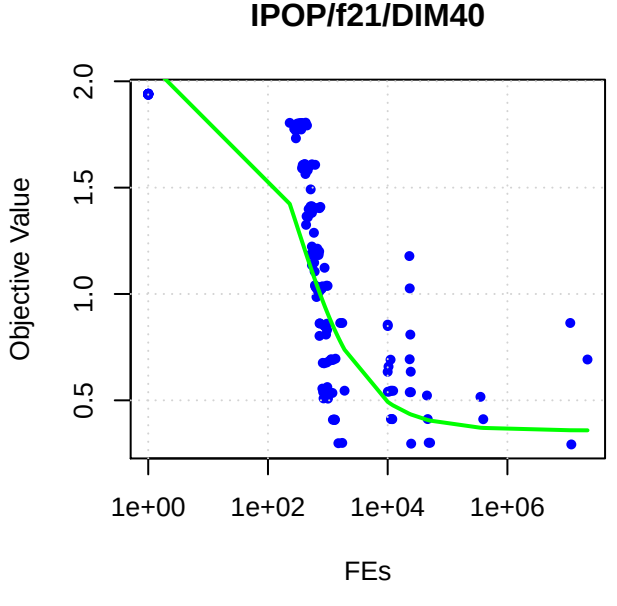
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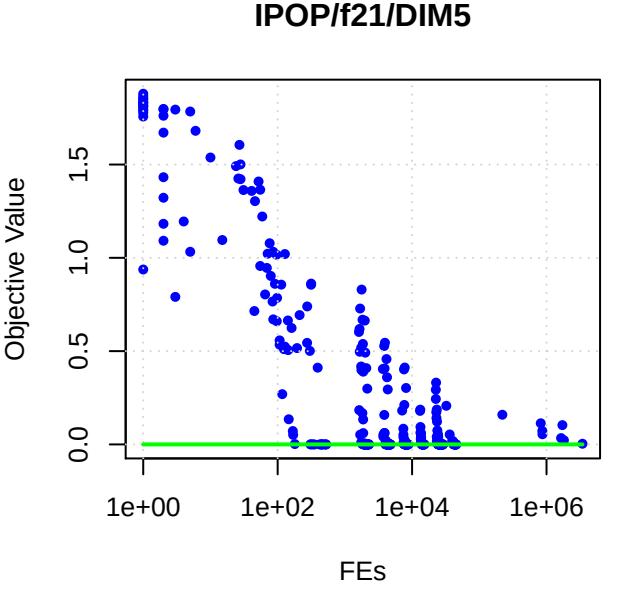
1e+06
FEs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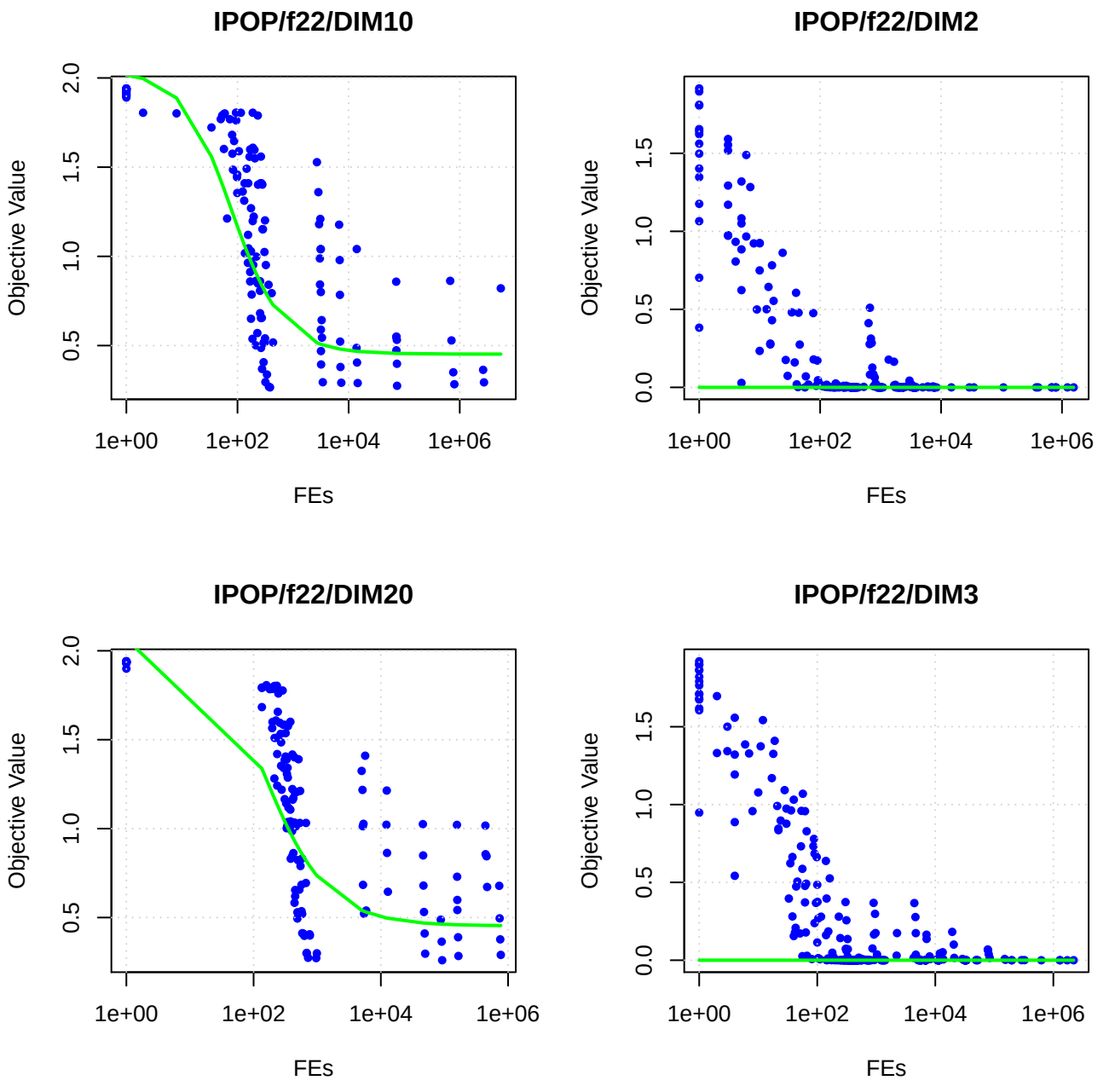
1e+06
FEs


IPOP/f22/DIM10
IPOP/f22/DIM2
IPOP/f22/DIM20
IPOP/f22/DIM3
Objective Value
FEs
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1e+02
1e+04
1e+06
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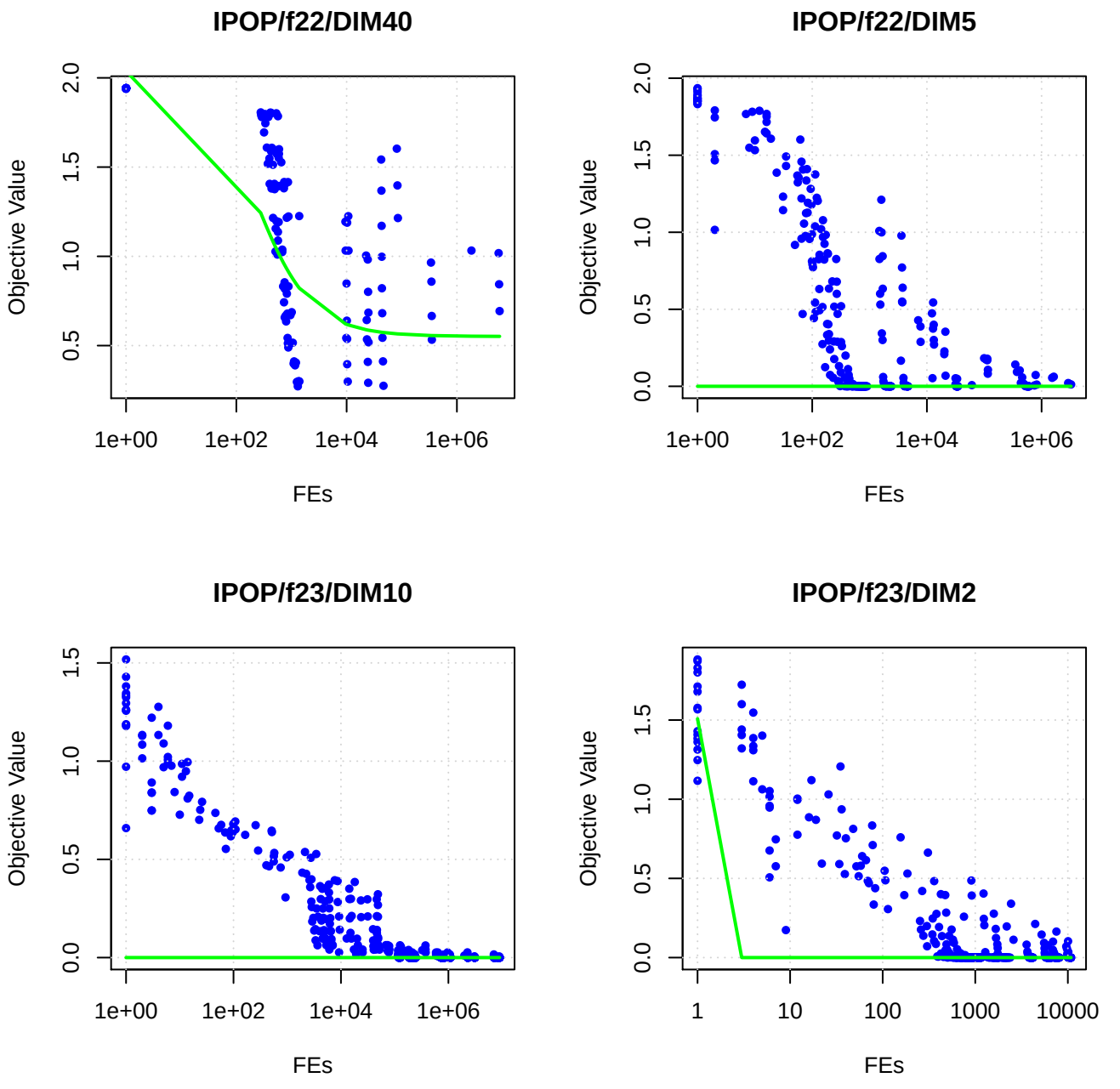
1.0
1.5
2.0


IPOP/f22/DIM40
IPOP/f22/DIM5
IPOP/f23/DIM10
IPOP/f23/DIM2
Objective Value
FEs
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1e+02
1e+04
1e+06
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10
100
1000
10000
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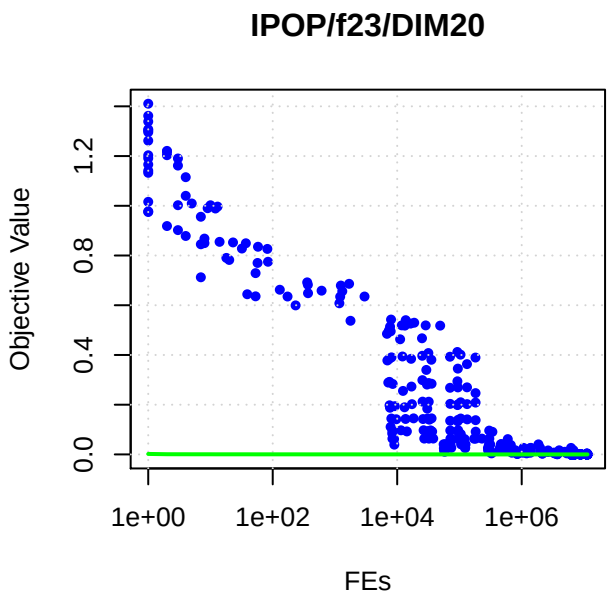
0.5
1.0
1.5
2.0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Objective Value
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0.8
1.2
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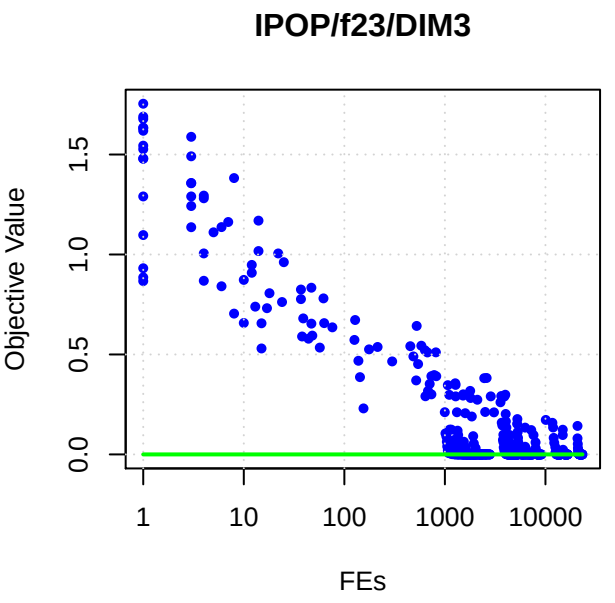
1e+02
1e+04
1e+06
FEs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Objective Value
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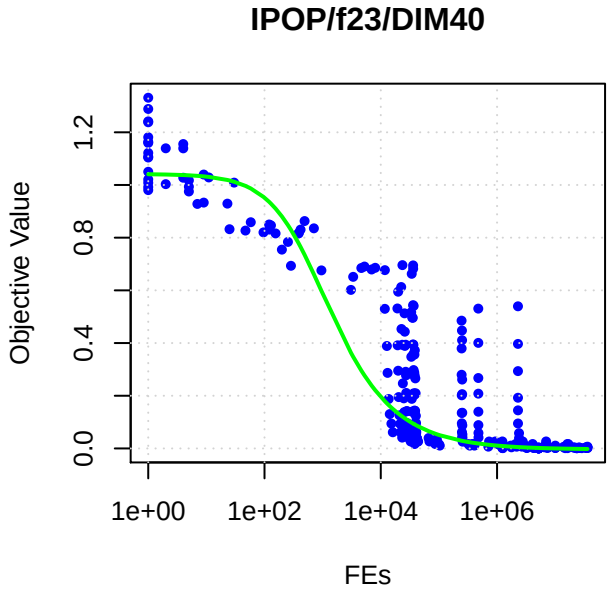
1.0
1.5
1
10
100
1000
10000
FEs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0.8
1.2
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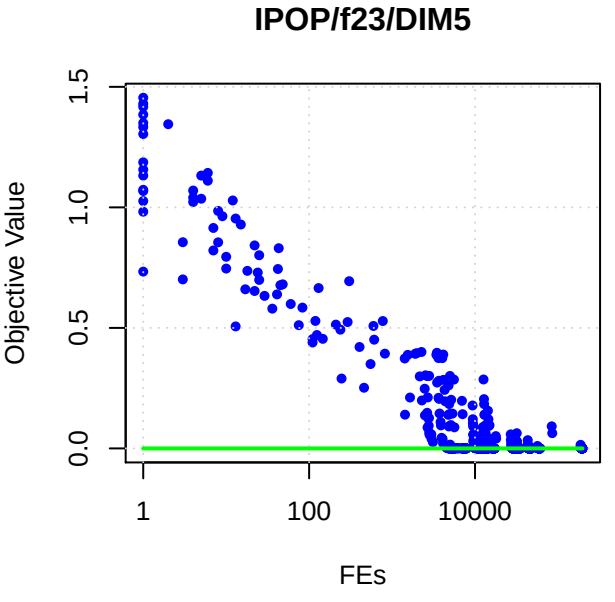
1e+04
1e+06
FEs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1.5
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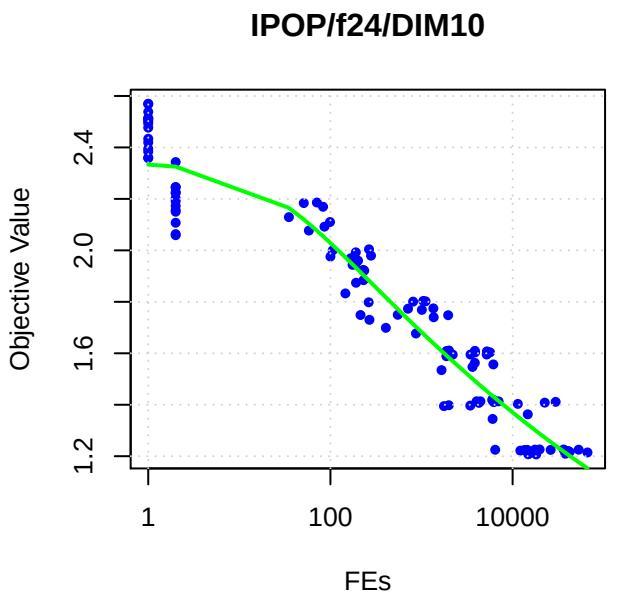
100
10000
FEs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Objective Value
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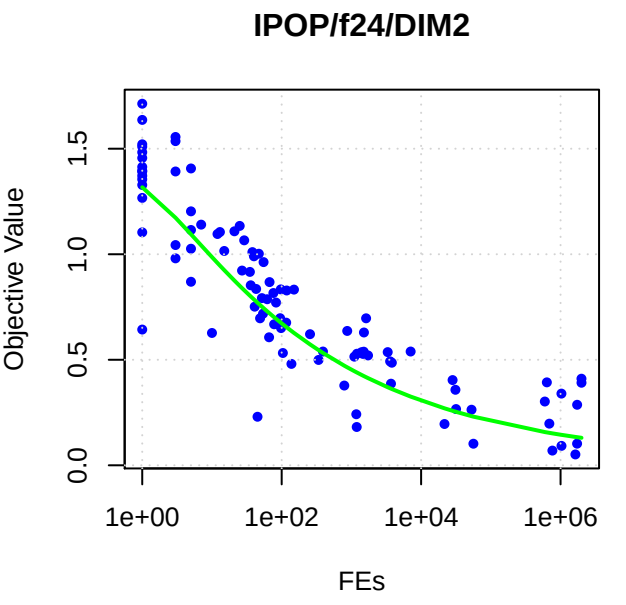
1.2
1
100
10000
FEs


IPOP/f24/DIM2
Objective Value
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0.0
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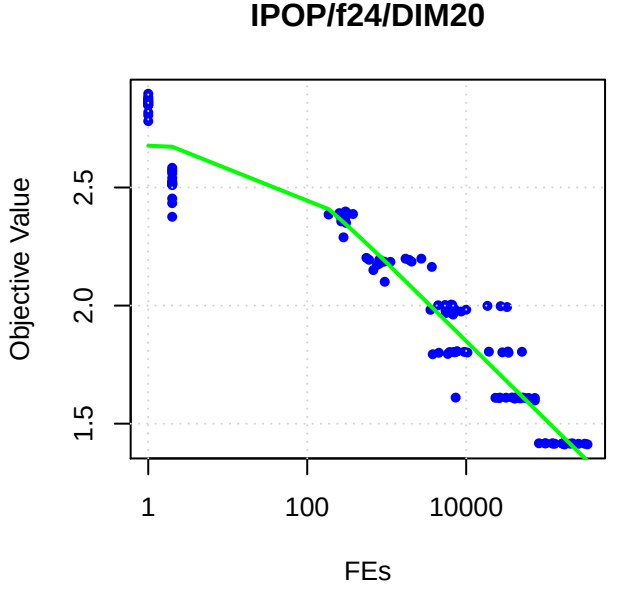
1e+04
1e+06
FEs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Objective Value
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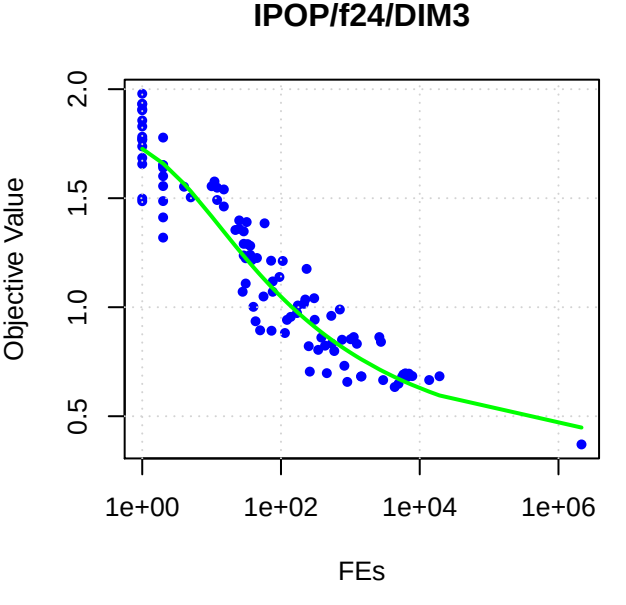
10000
FEs


IPOP/f24/DIM3
Objective Value
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1.5
1.0
0.5
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1e+02
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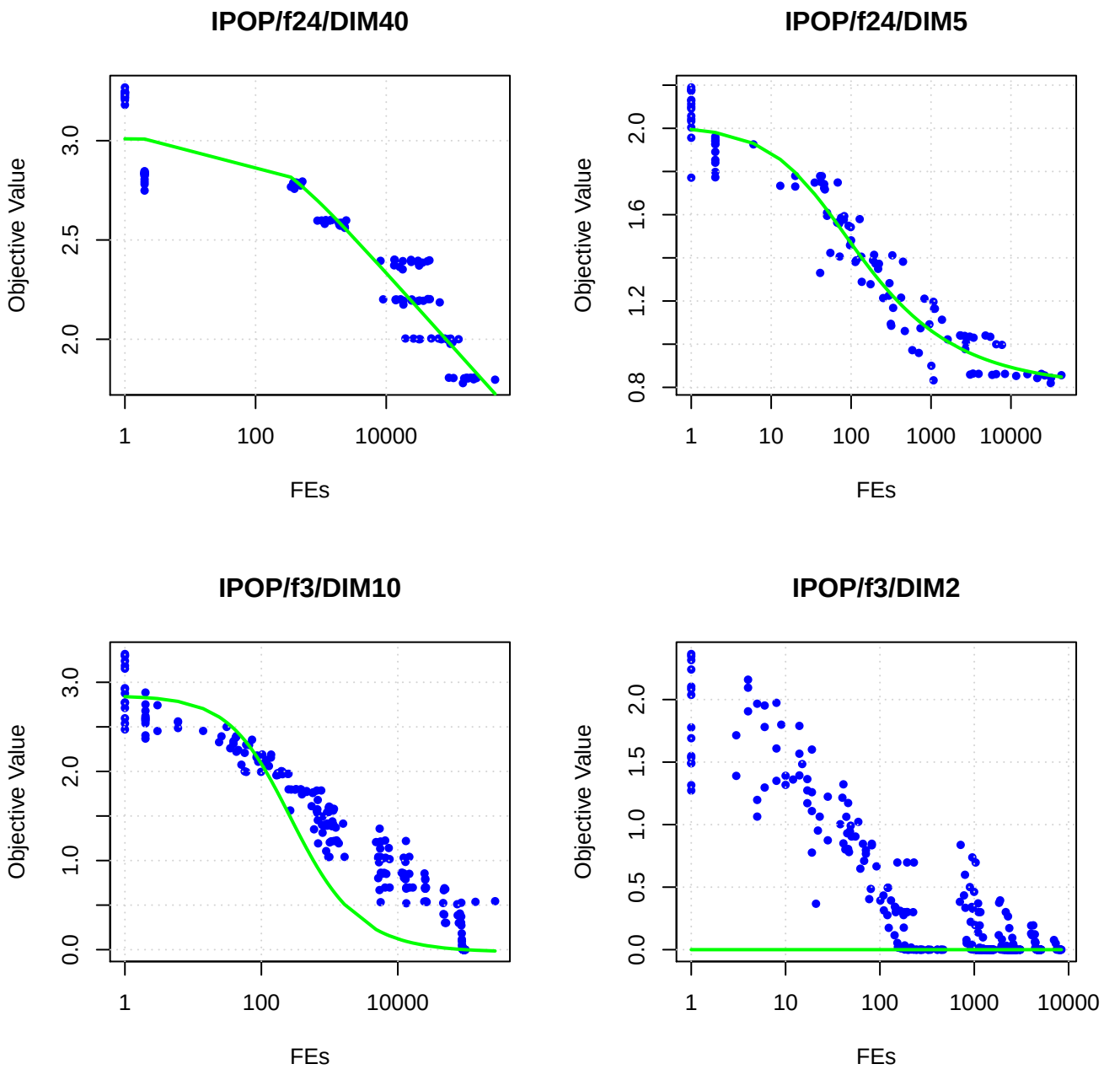
1e+06
FEs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2.0
1
100
10000
FEs
IPOP/f24/DIM5
Objective Value
2.0
1.6
1.2
0.8
1
10
100
1000
10000
FEs
IPOP/f3/DIM10
Objective Value
3.0
2.0
1.0
0.0
1
100
10000
FEs
IPOP/f3/DIM2
Objective Value
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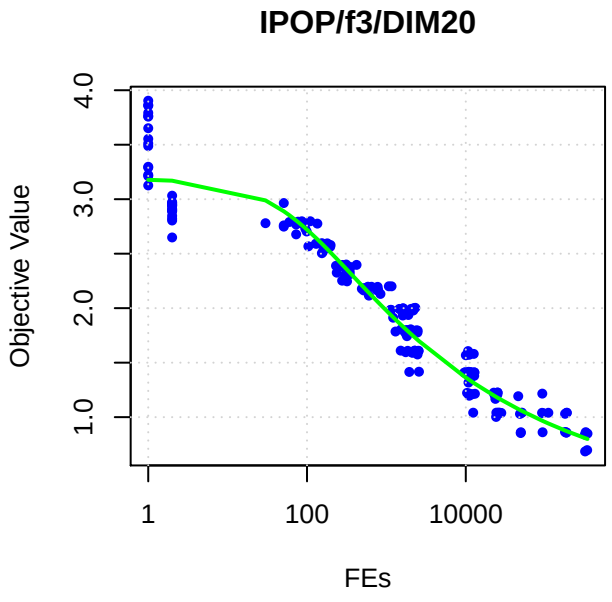
1.0
0.5
0.0
1
10
100
1000
10000
FEs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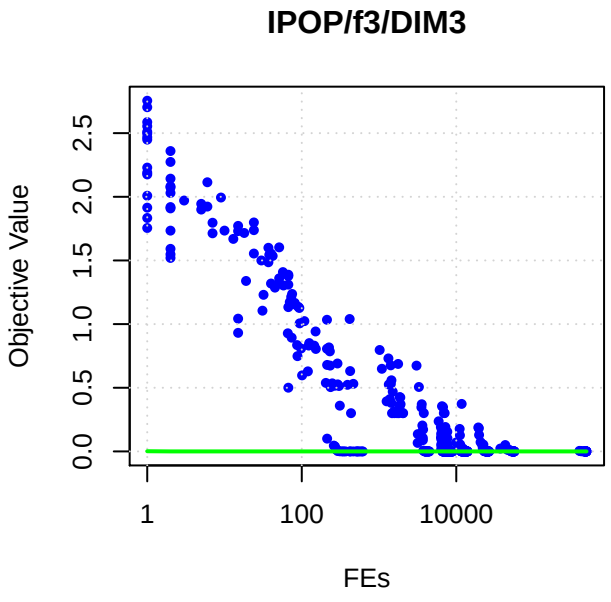
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1.0
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1
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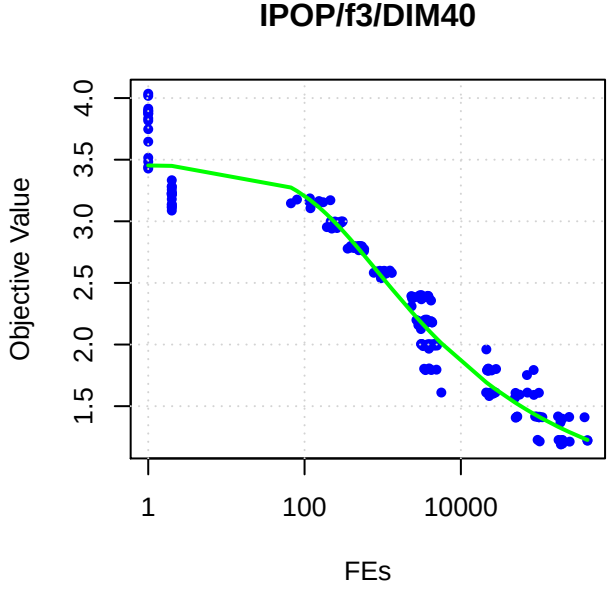
10000
FEs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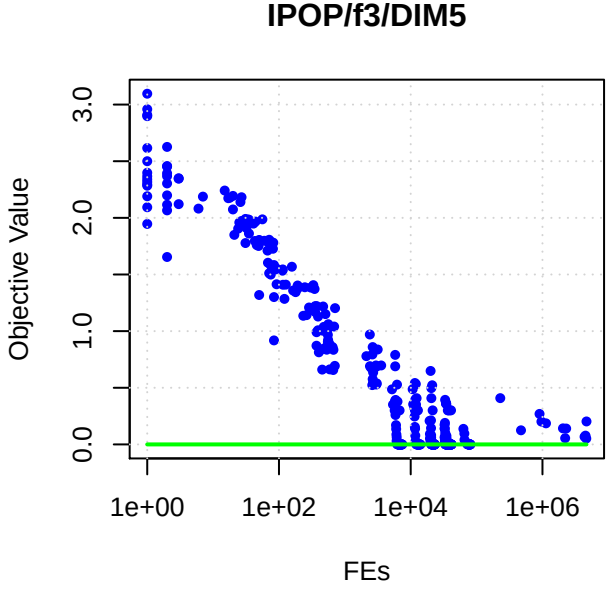
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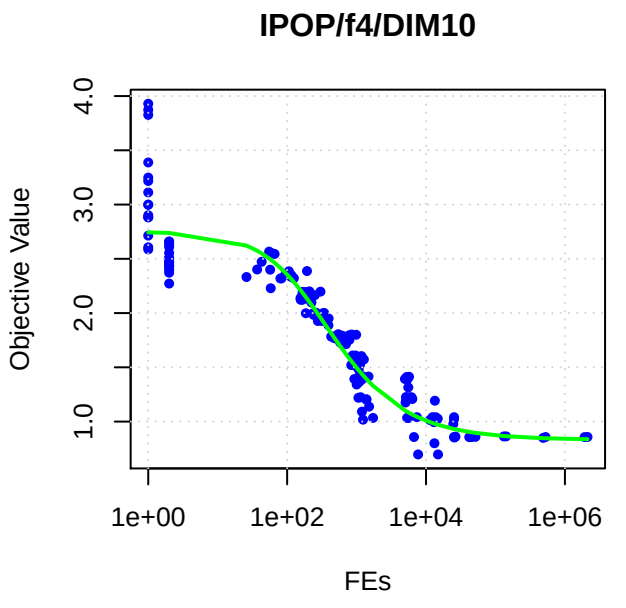
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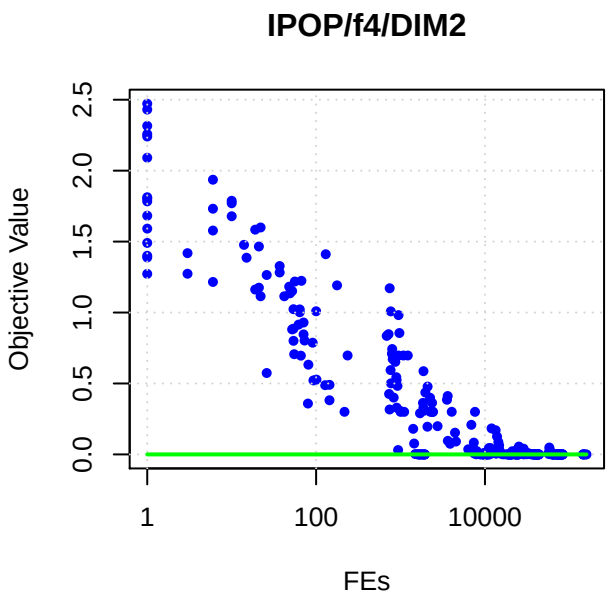
1e+04
1e+06
FEs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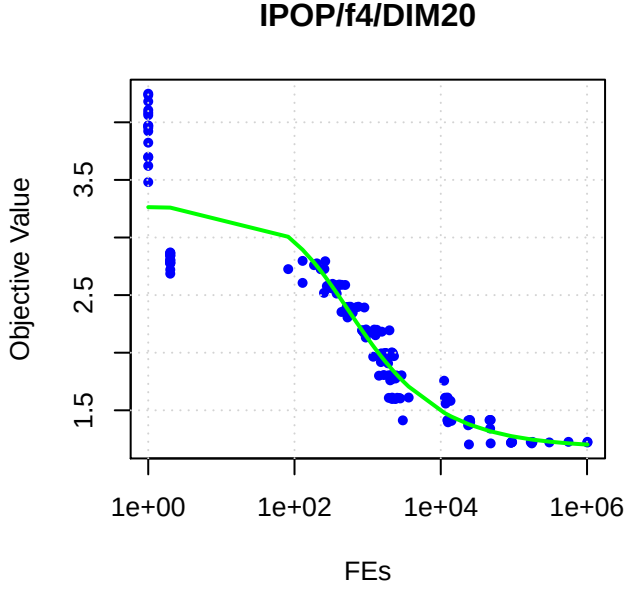
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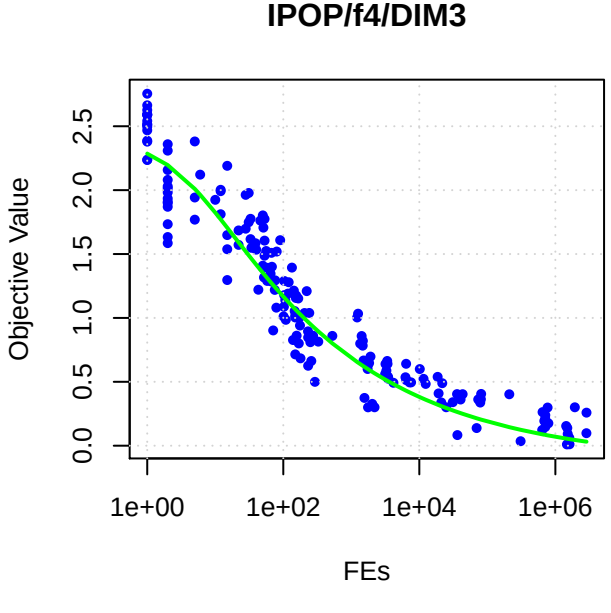
1e+06
FEs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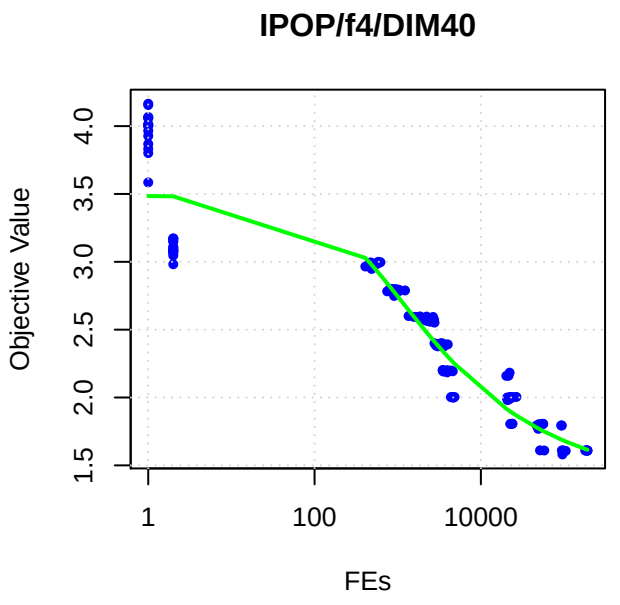
FEs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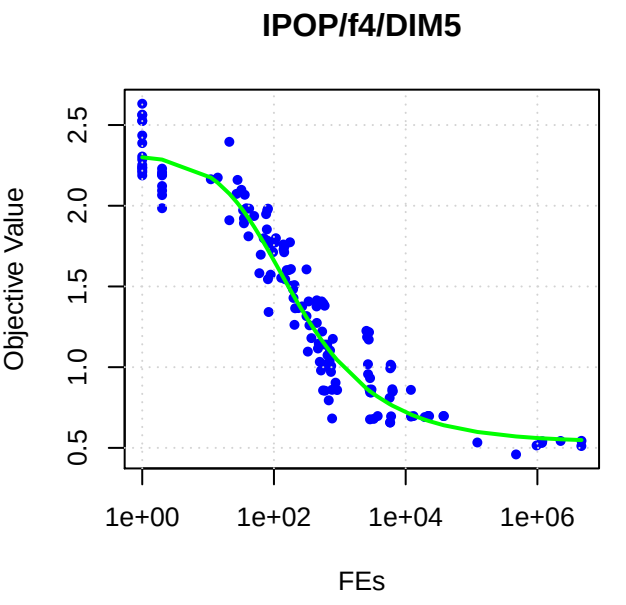
FEs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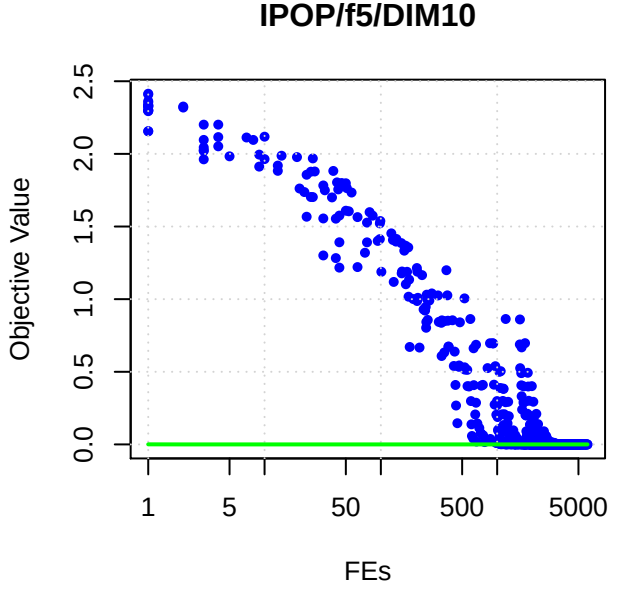
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5000
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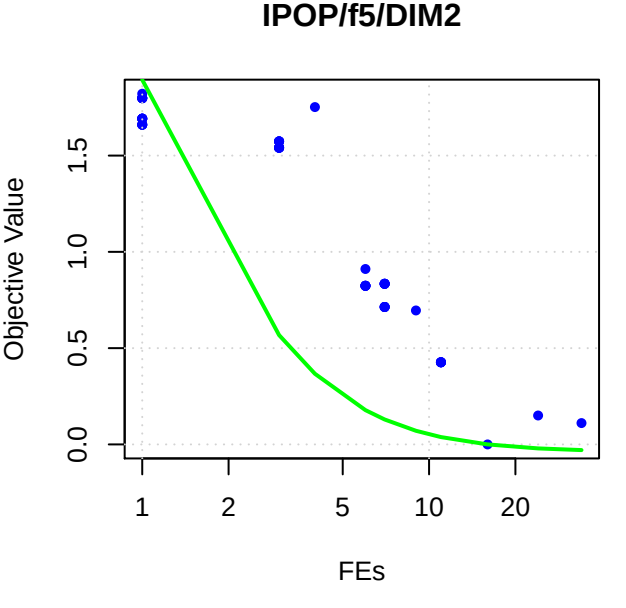
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20
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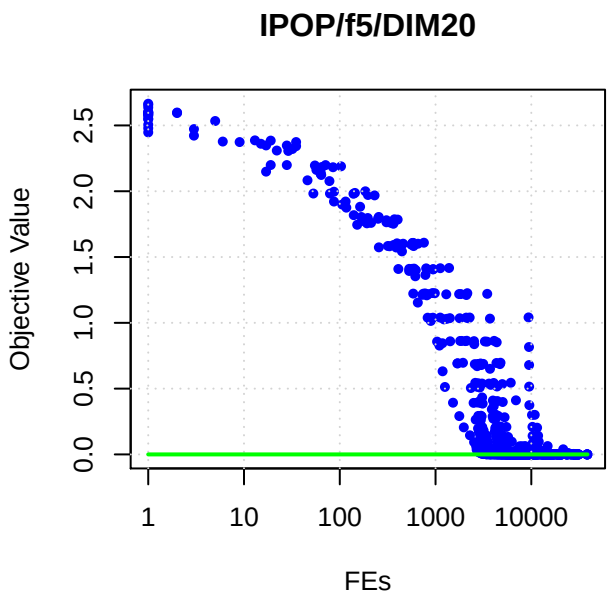
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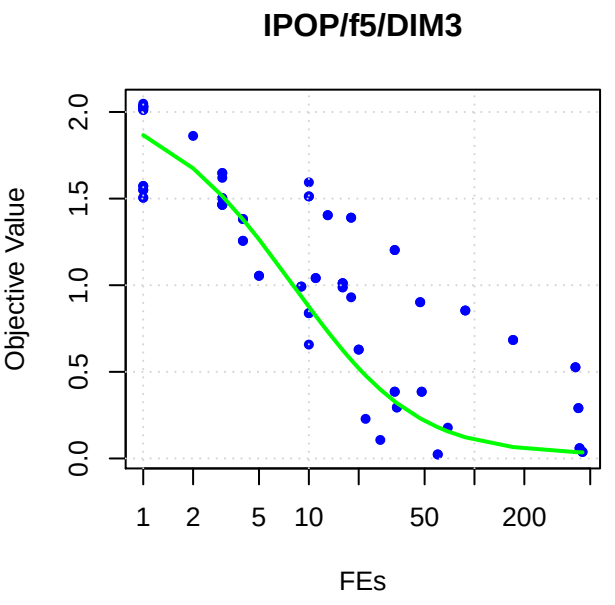
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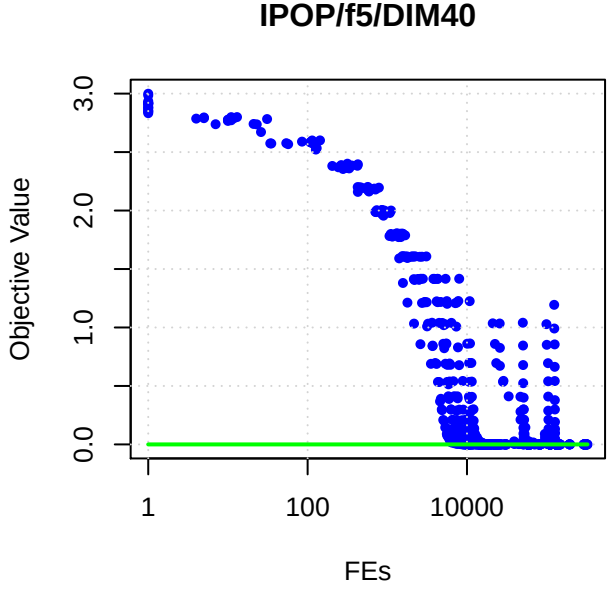
FEs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Objective Value
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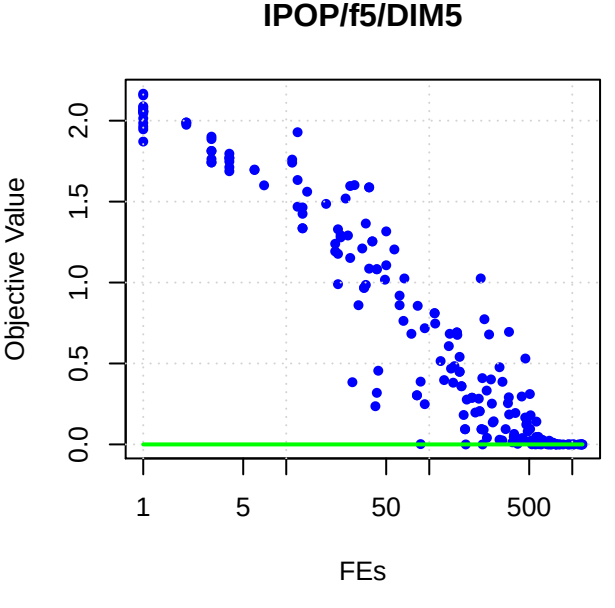
FEs


IPOP/f5/DIM5
Objective Value
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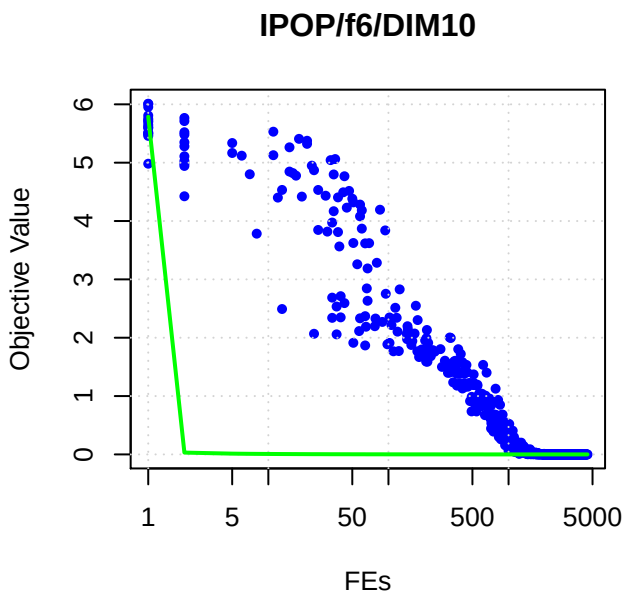
1.5
2.0
1
5
50
500
FEs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Objective Value
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5
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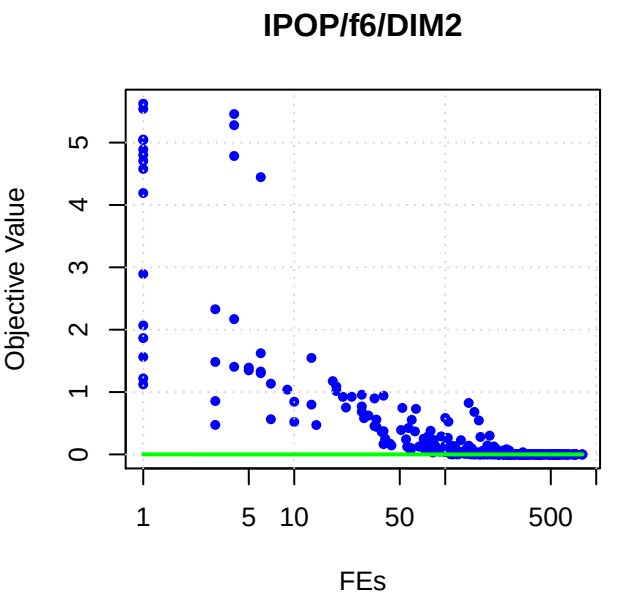
500
5000
FEs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Objective Value
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10
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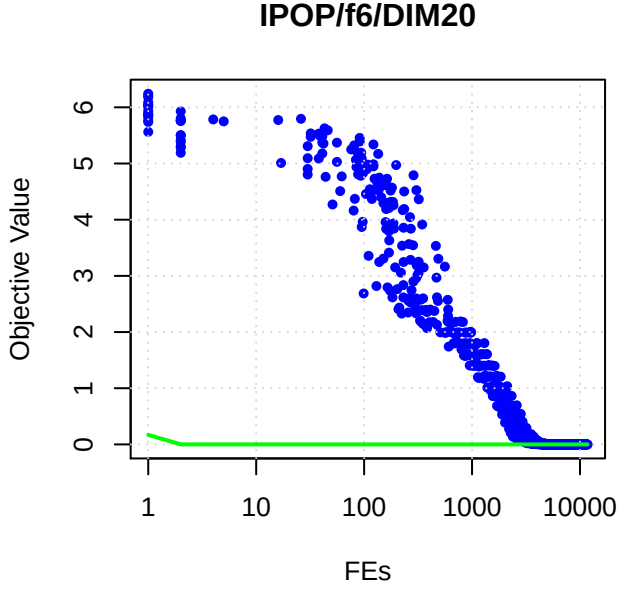
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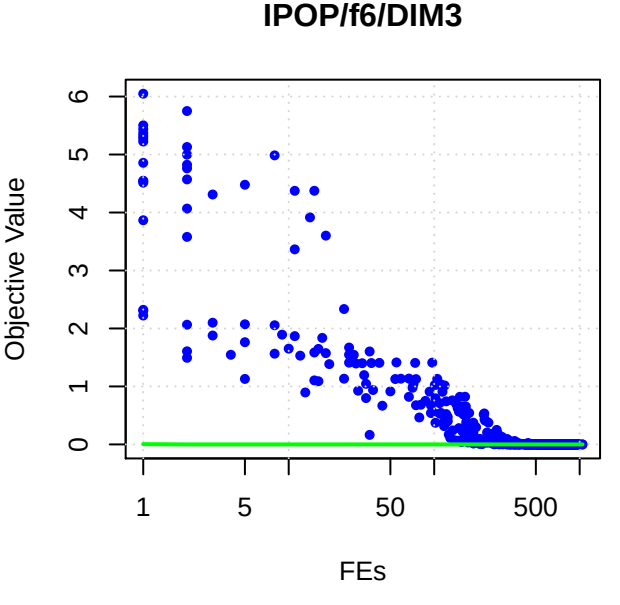
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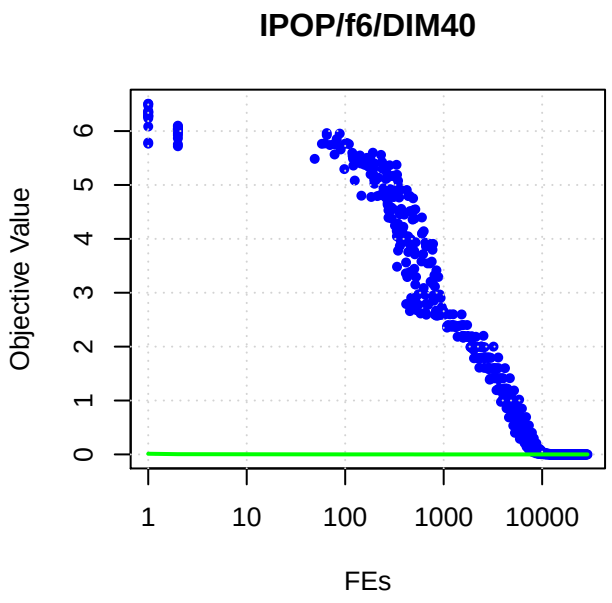
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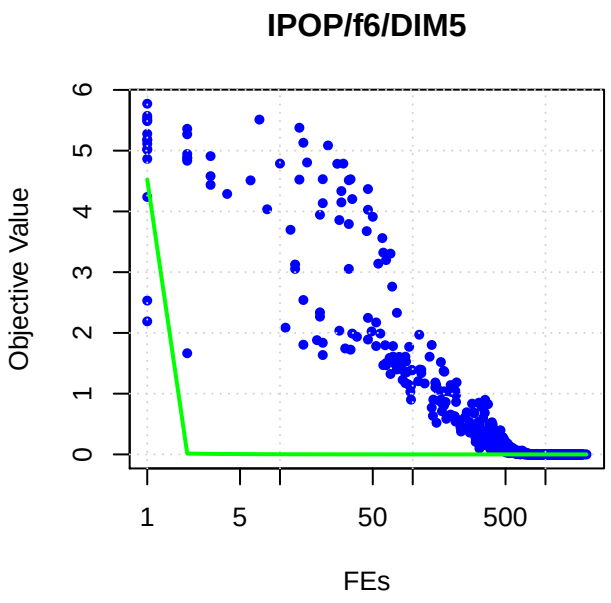
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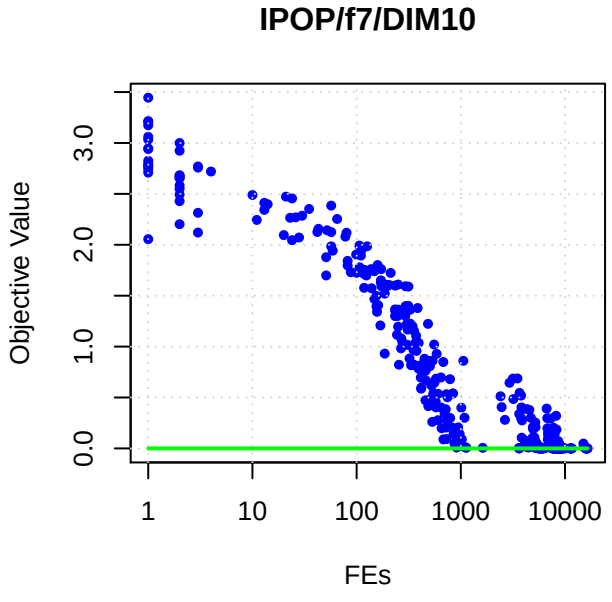
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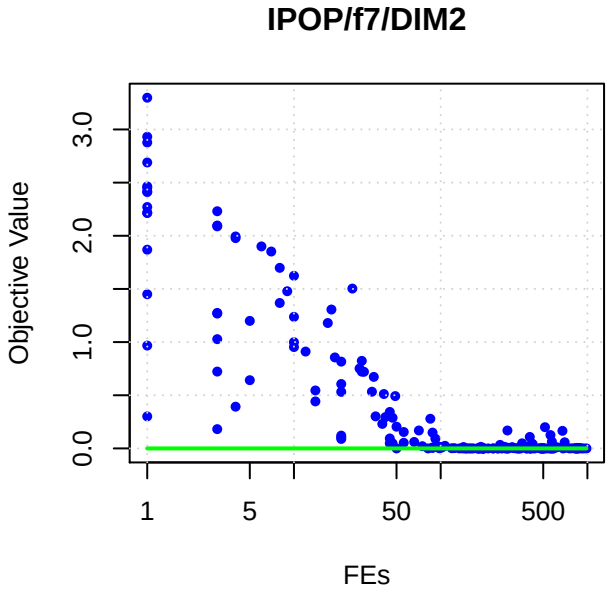
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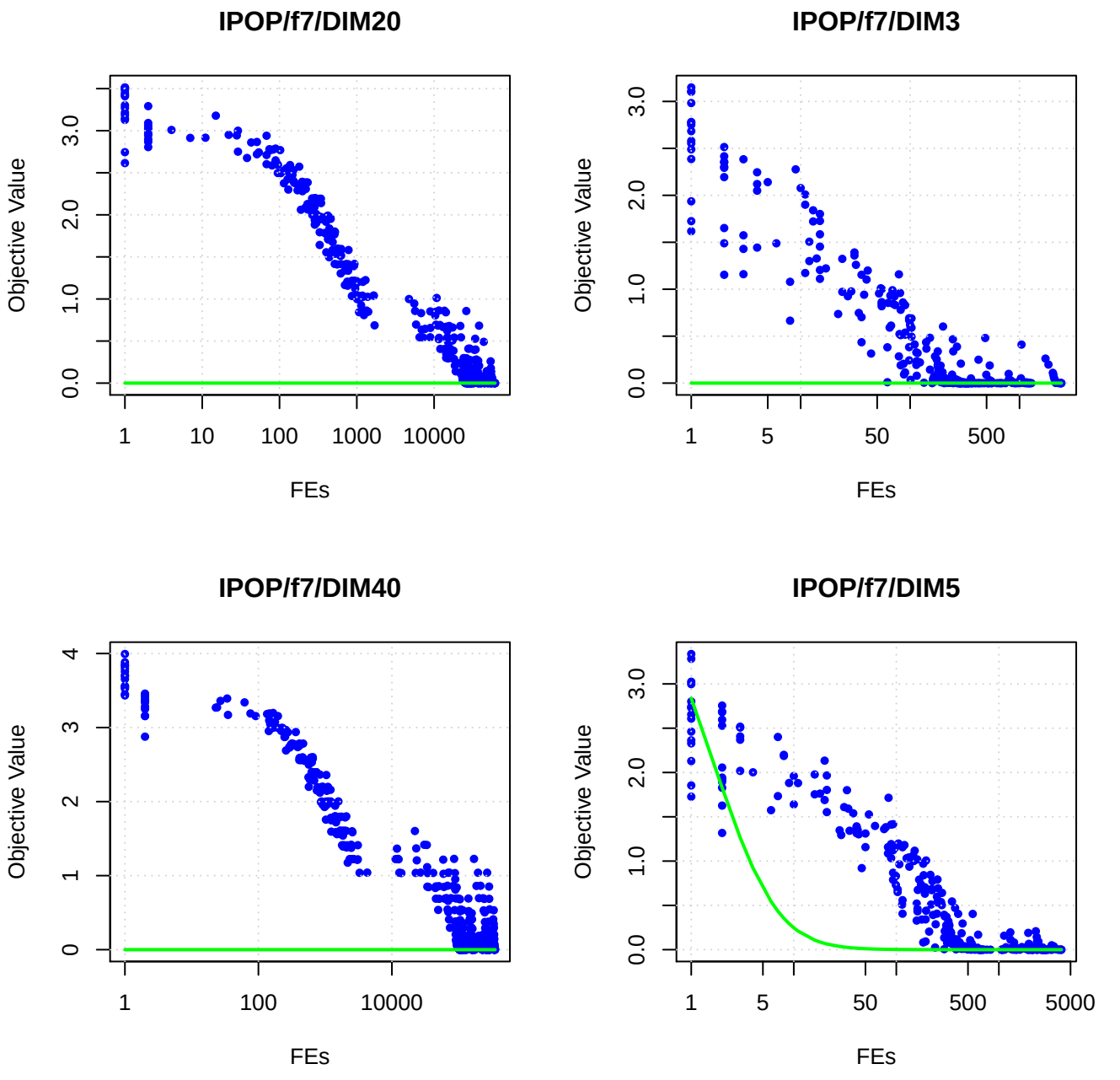
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FEs
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Objective Value
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Objective Value
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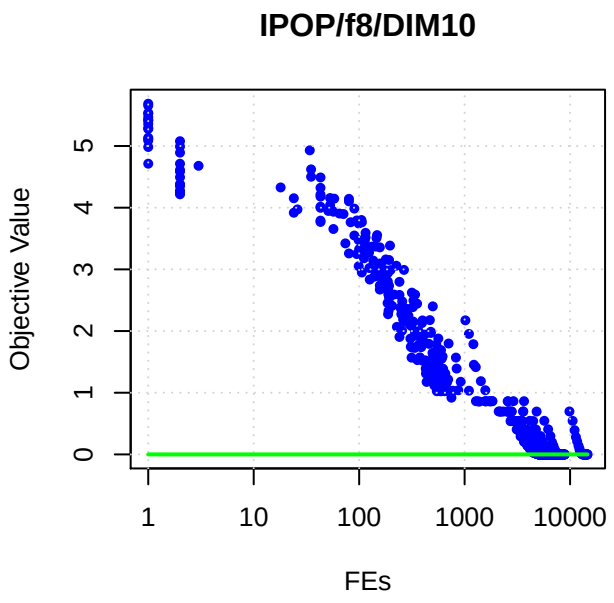
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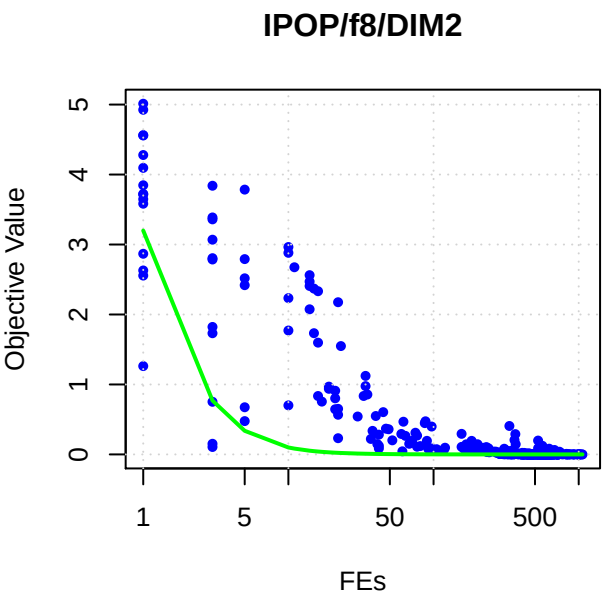
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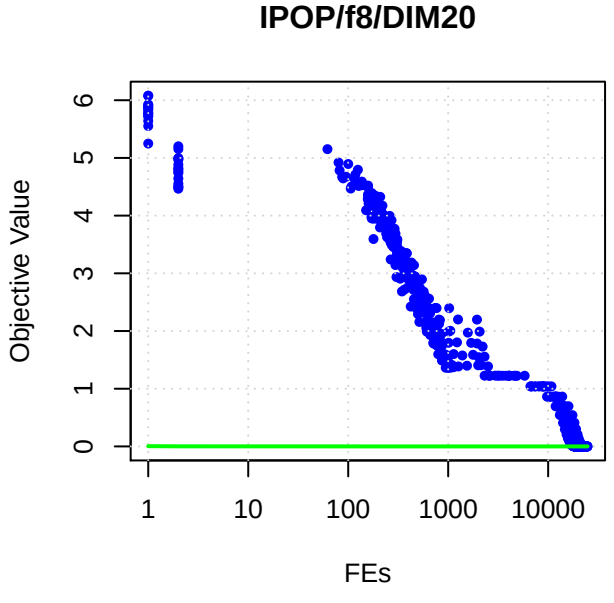
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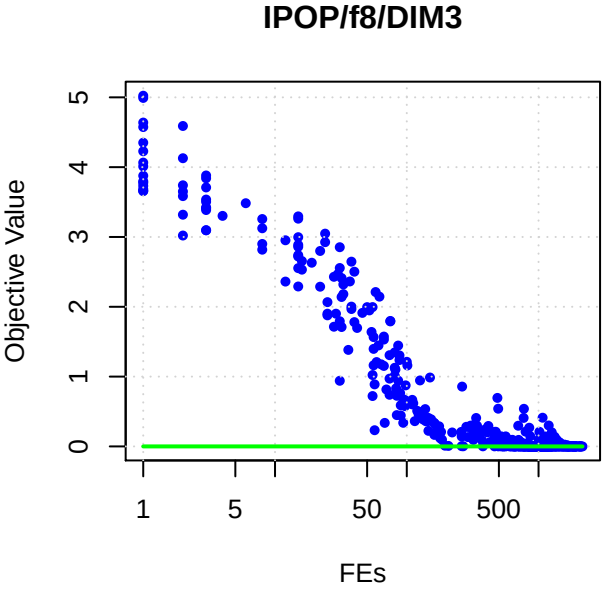
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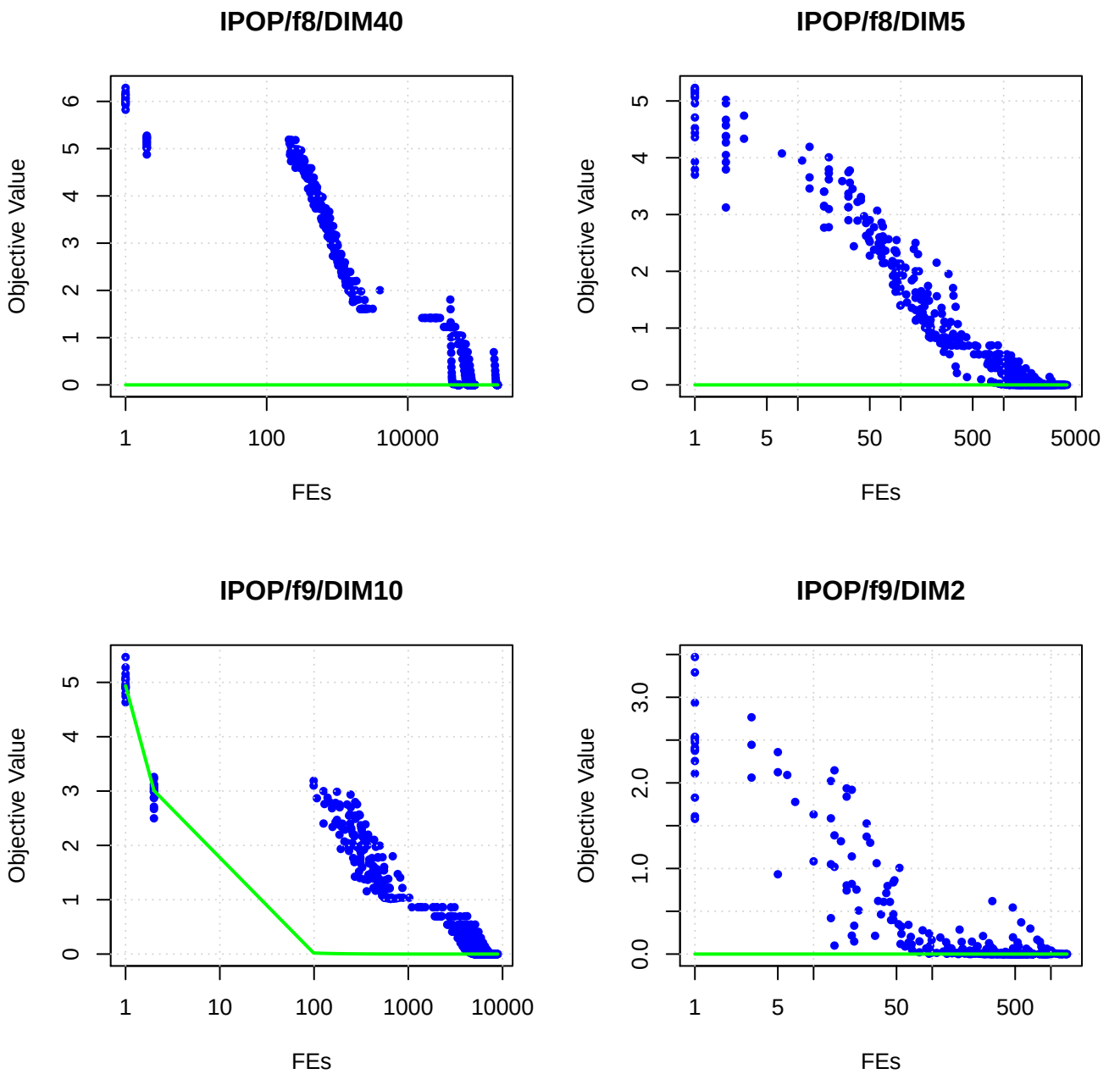
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FEs
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FEs
IPOP/f9/DIM10
Objective Value
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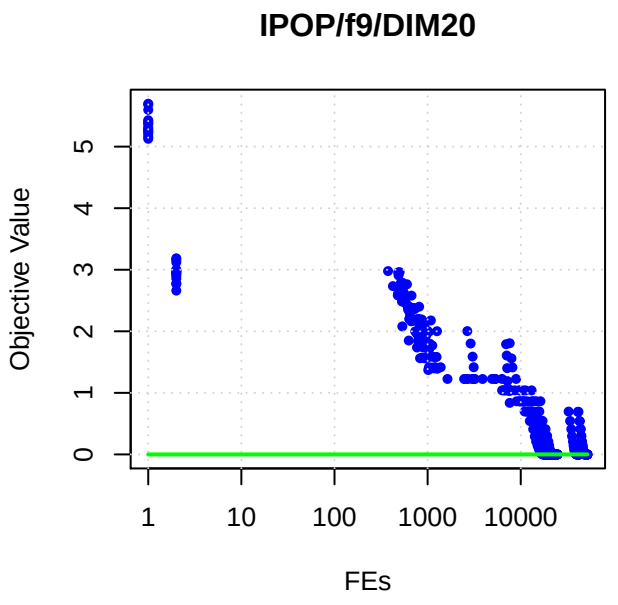
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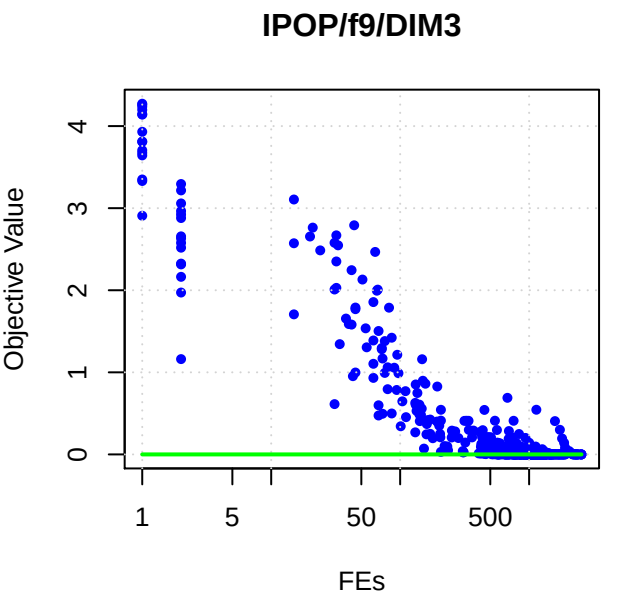
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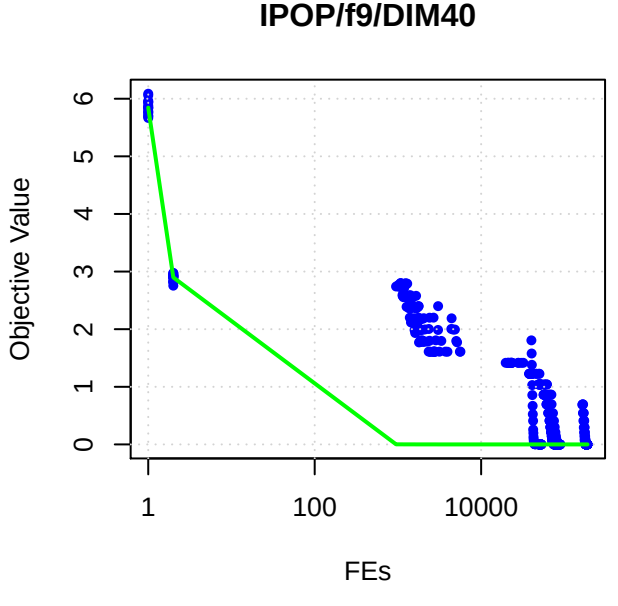
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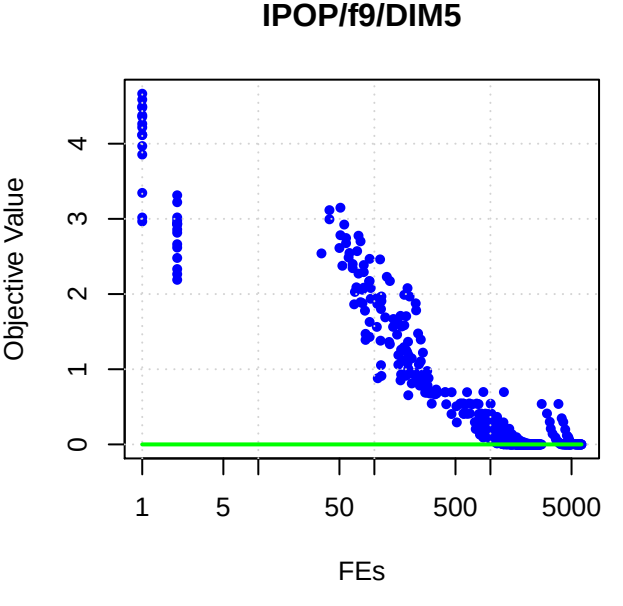
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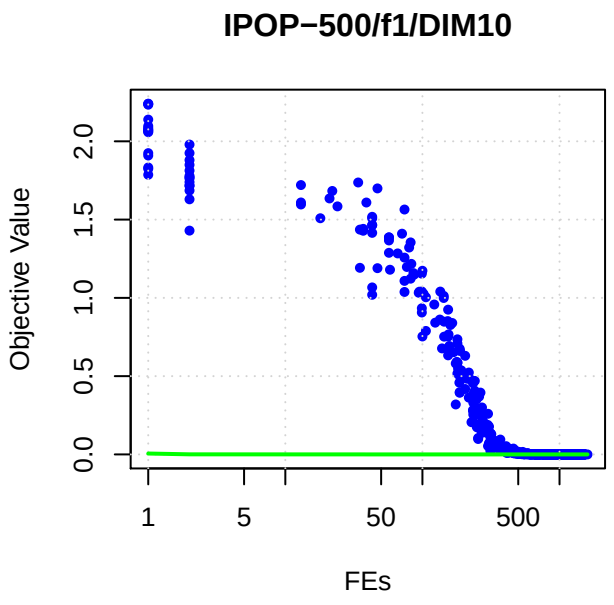
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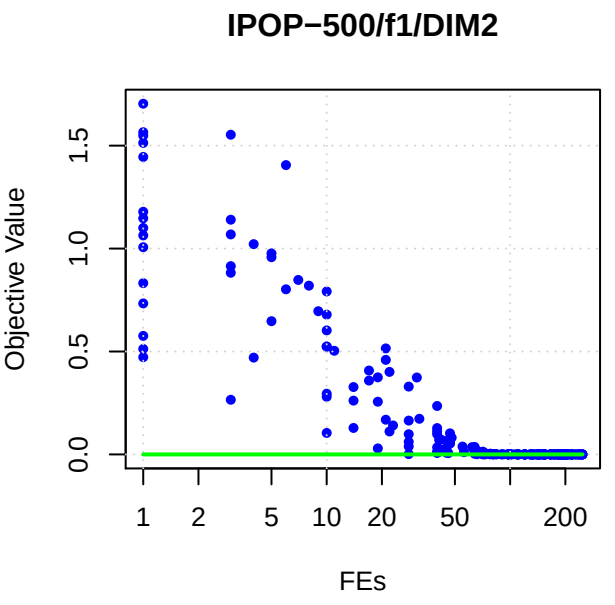
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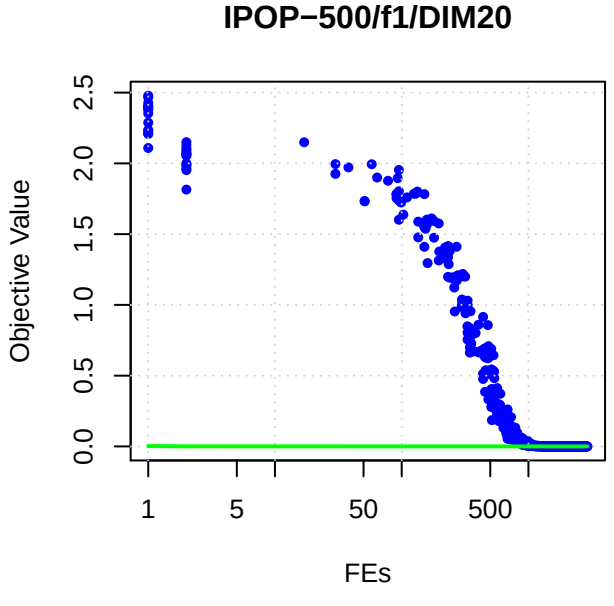
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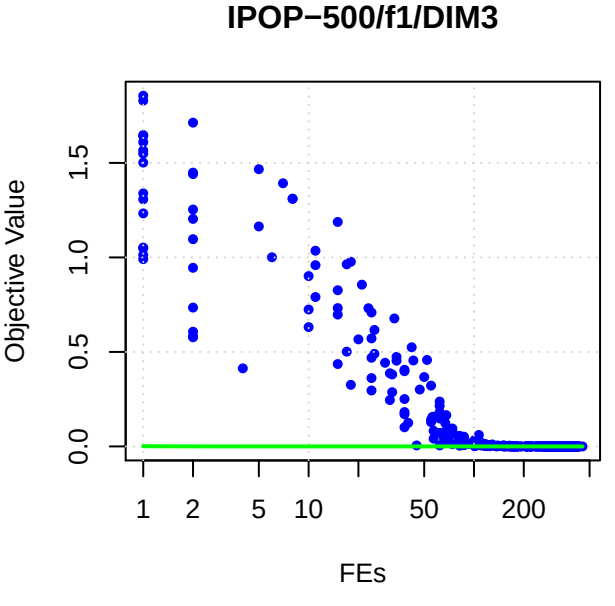
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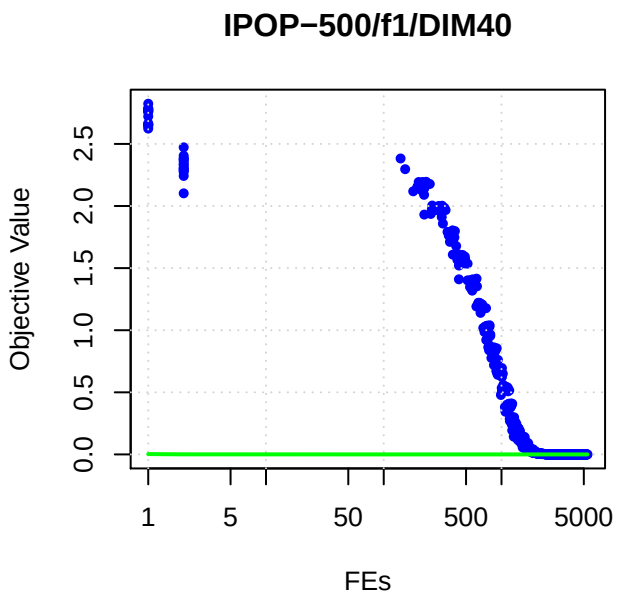
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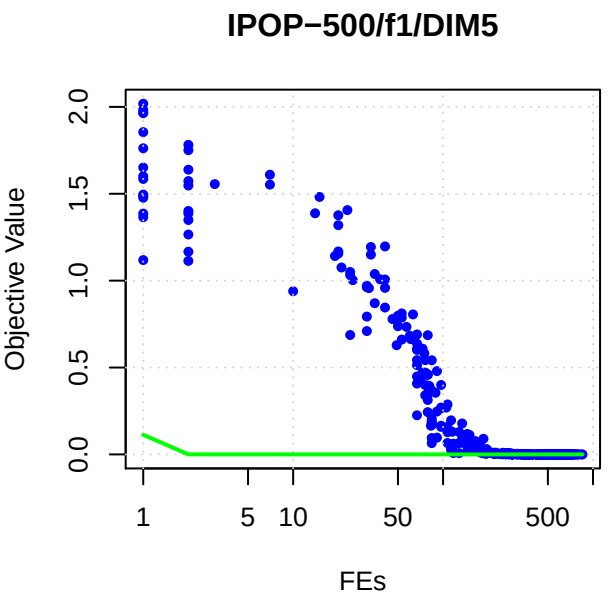
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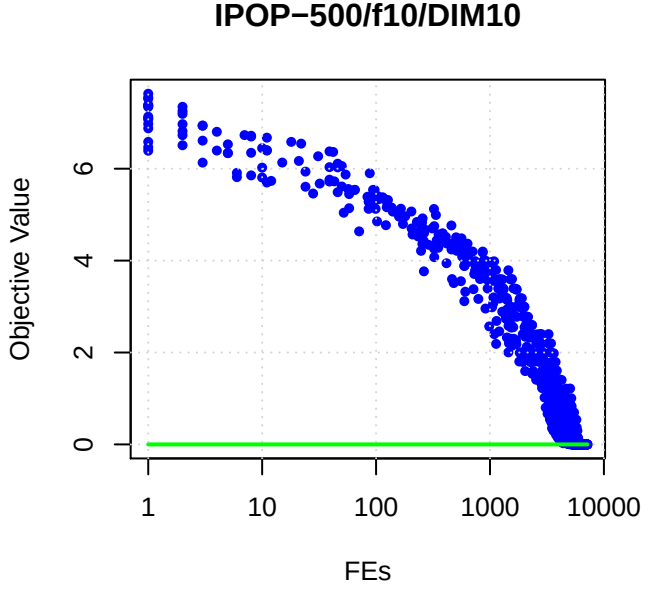
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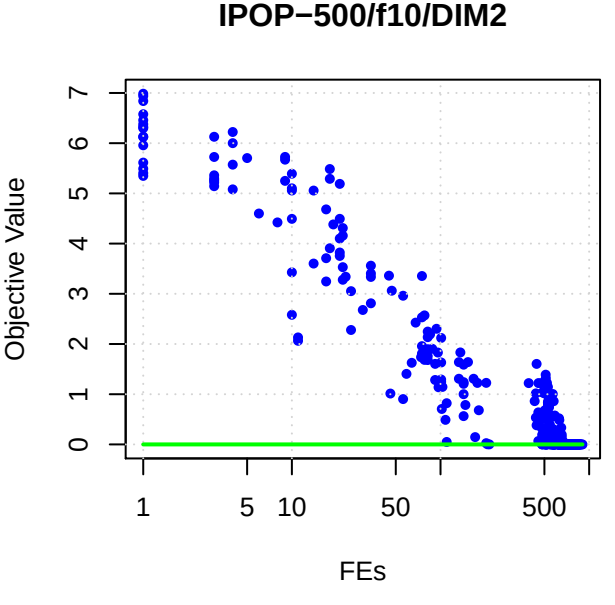
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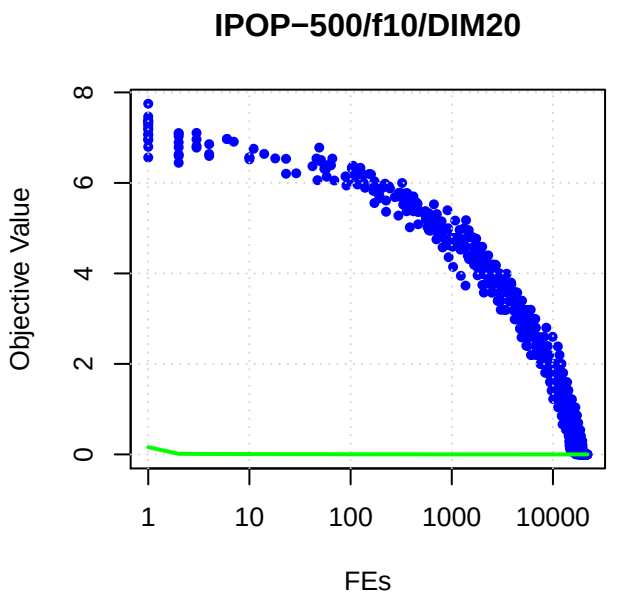
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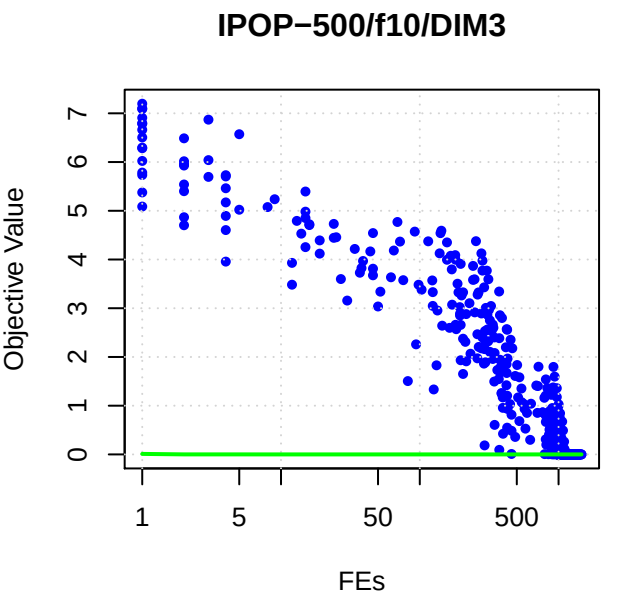
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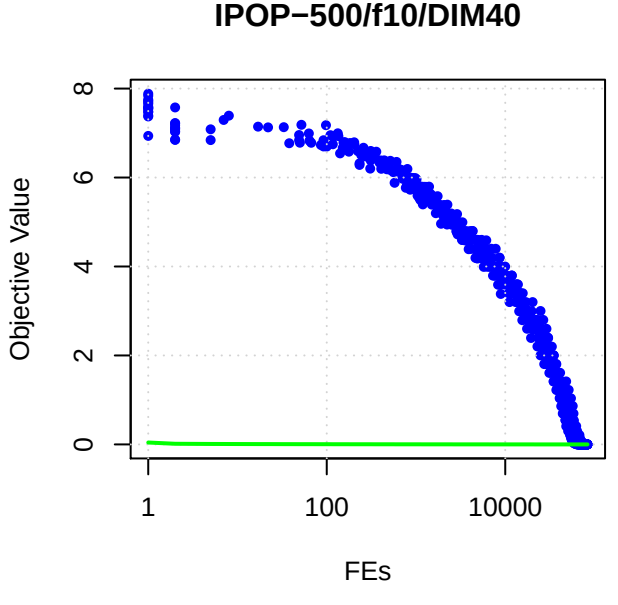
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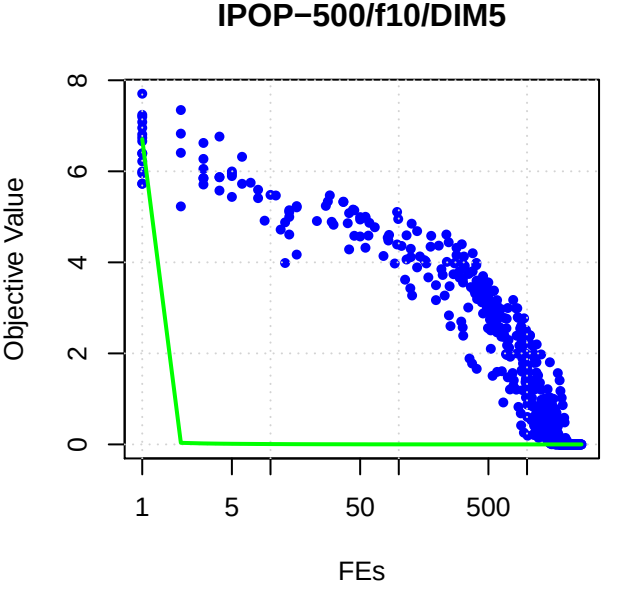
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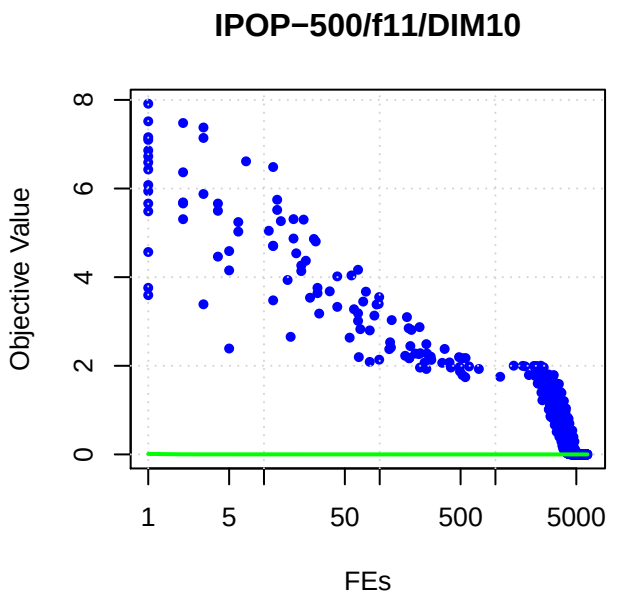
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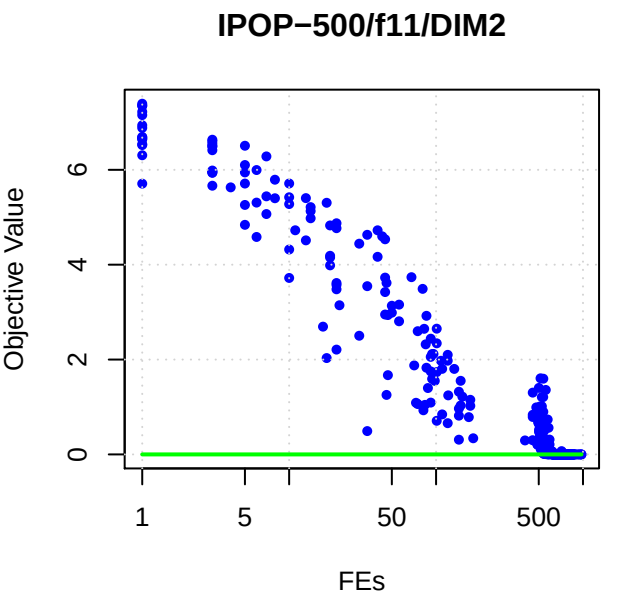
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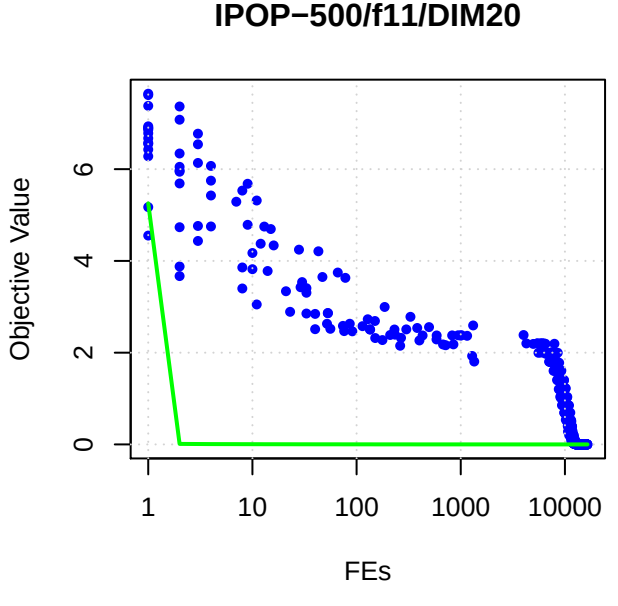
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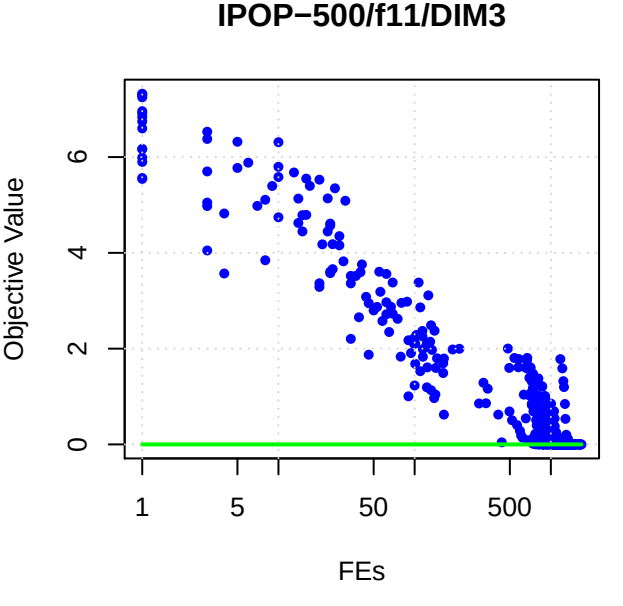
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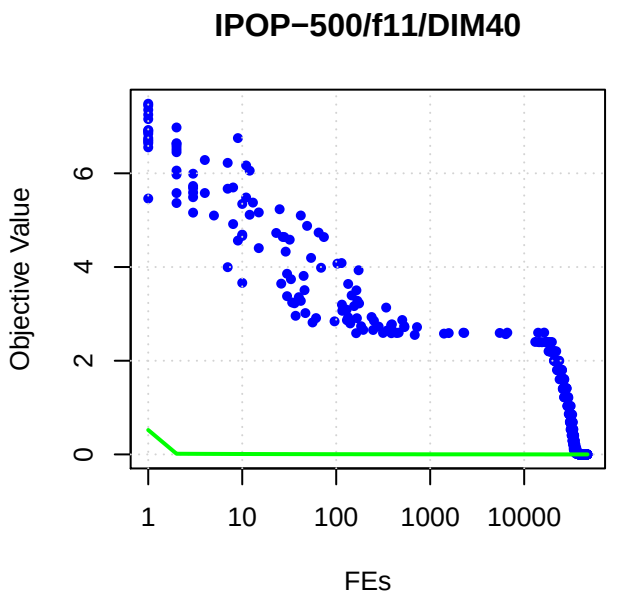
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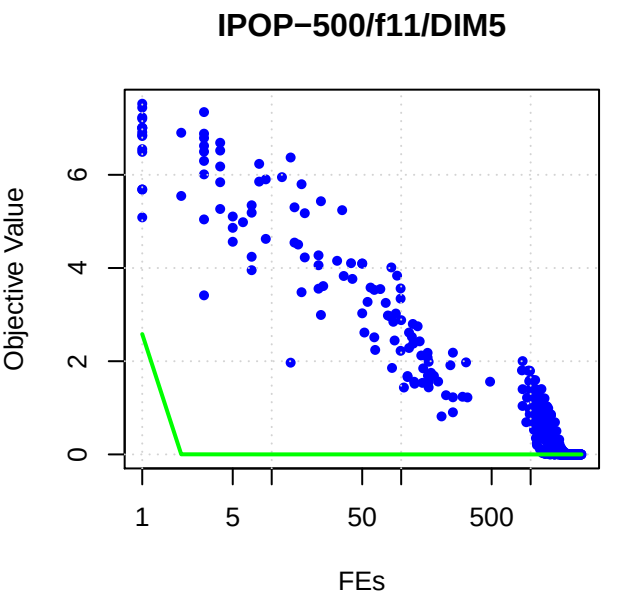
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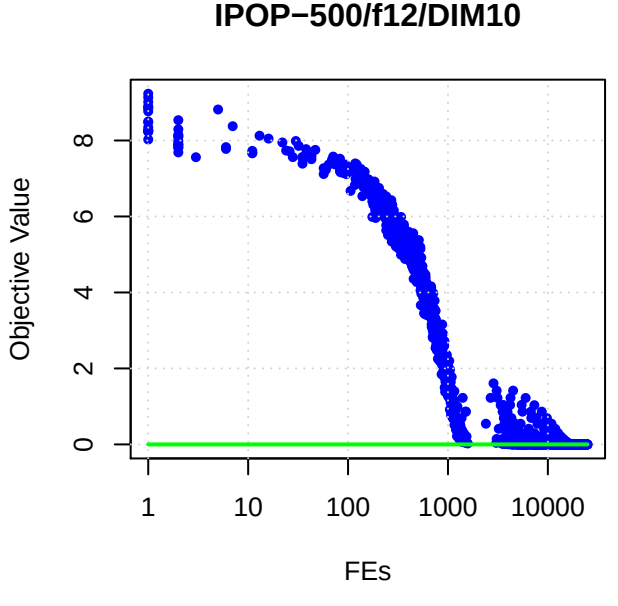
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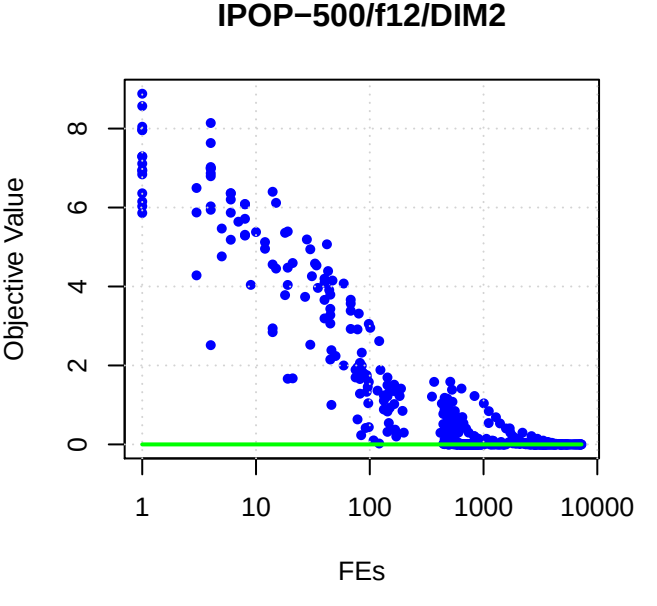
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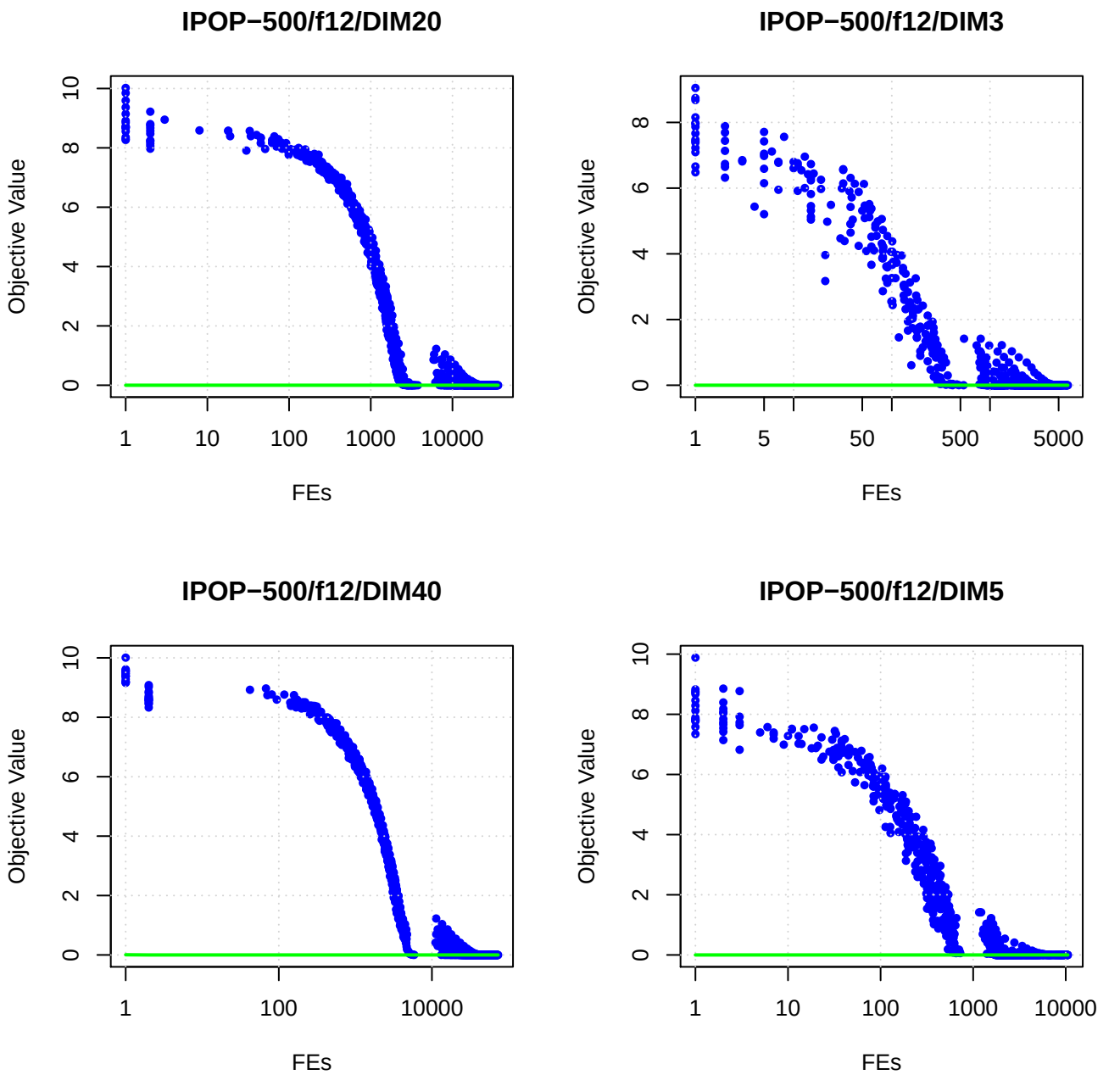
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FEs
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FEs
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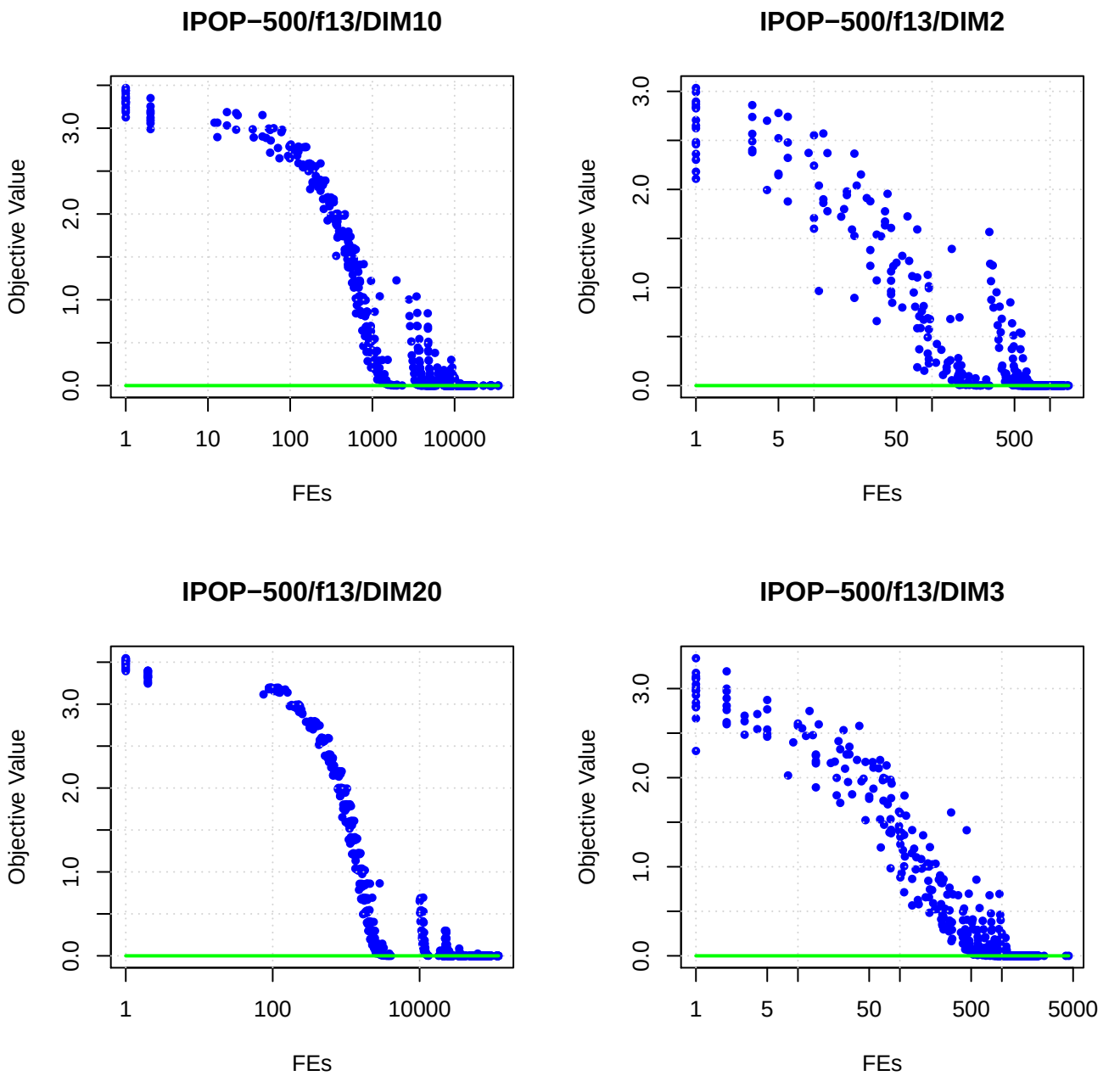
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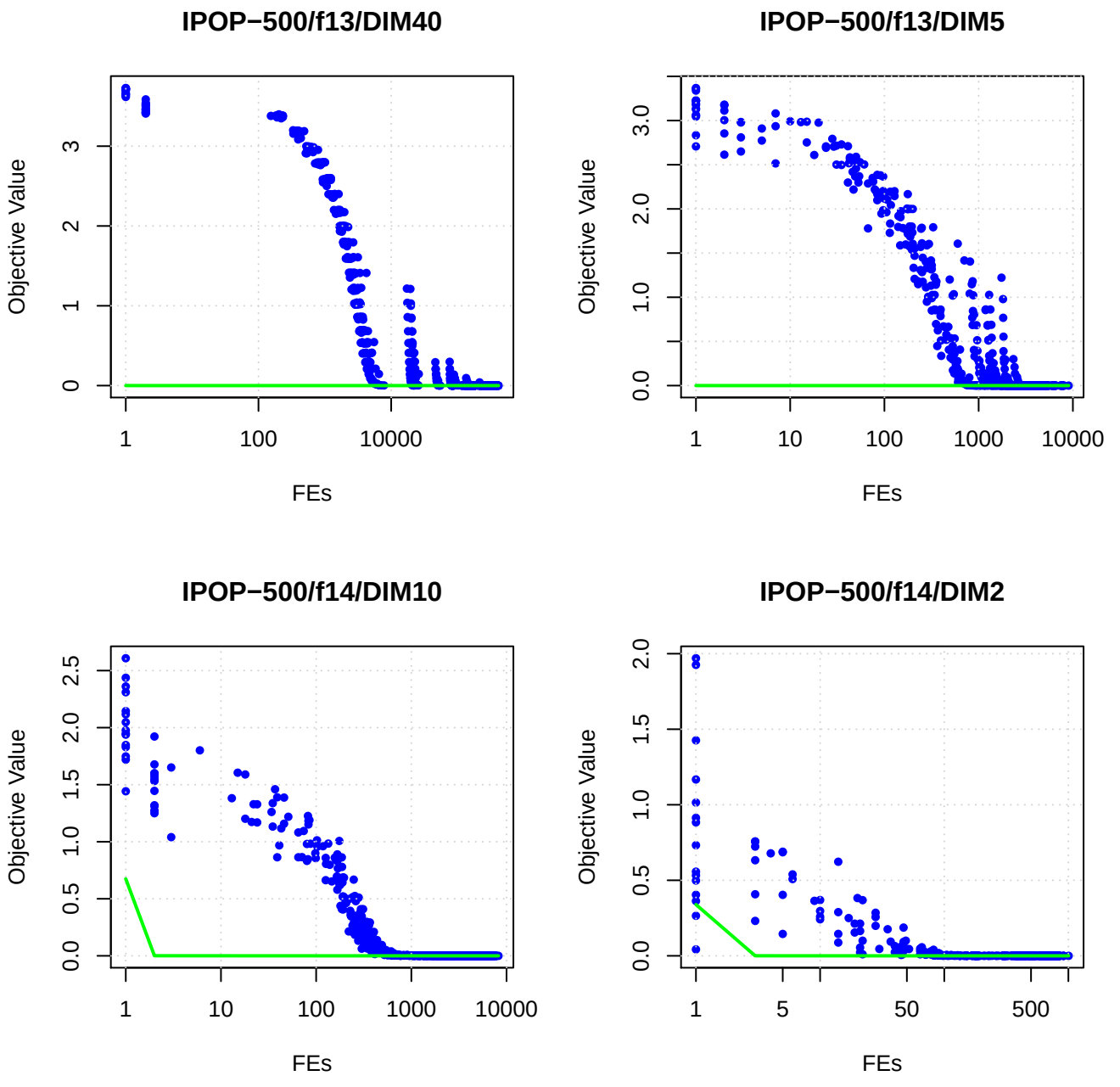
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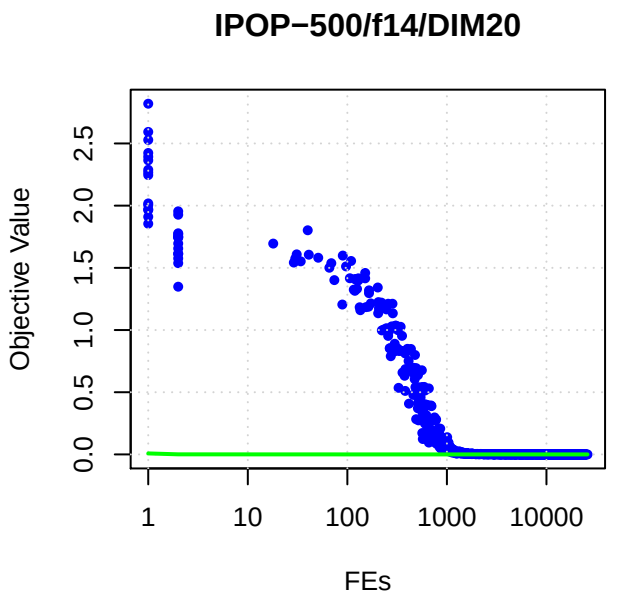
2
3
1
100
10000
FEs
IPOP−500/f13/DIM5
Objective Value
0.0
1.0
2.0
3.0
1
10
100
1000
10000
FEs
IPOP−500/f14/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs
IPOP−500/f14/DIM2
Objective Value
0.0
0.5
1.0
1.5
2.0
1
5
50
500
FEs


IPOP−500/f14/DIM20
Objective Value
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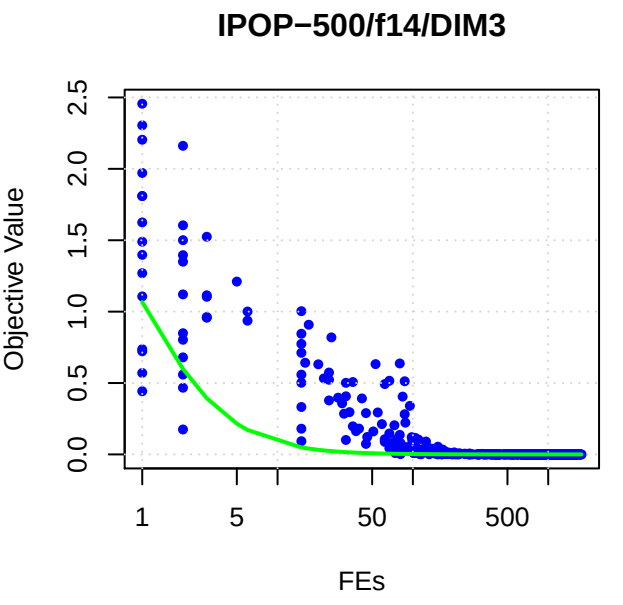
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs


IPOP−500/f14/DIM3
Objective Value
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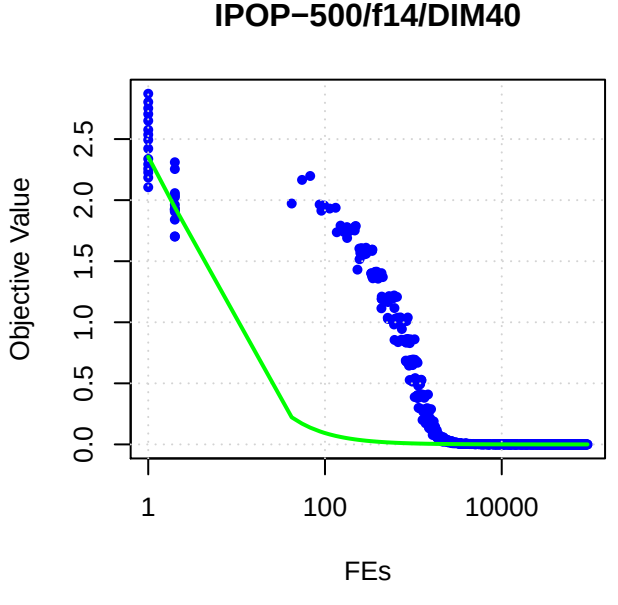
0.5
1.0
1.5
2.0
2.5
1
5
50
500
FEs


IPOP−500/f14/DIM40
Objective Value
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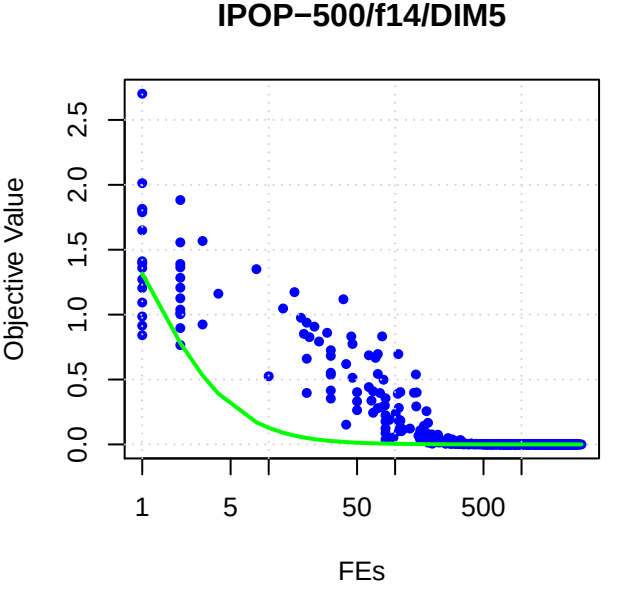
0.5
1.0
1.5
2.0
2.5
1
100
10000
FEs


IPOP−500/f14/DIM5
Objective Value
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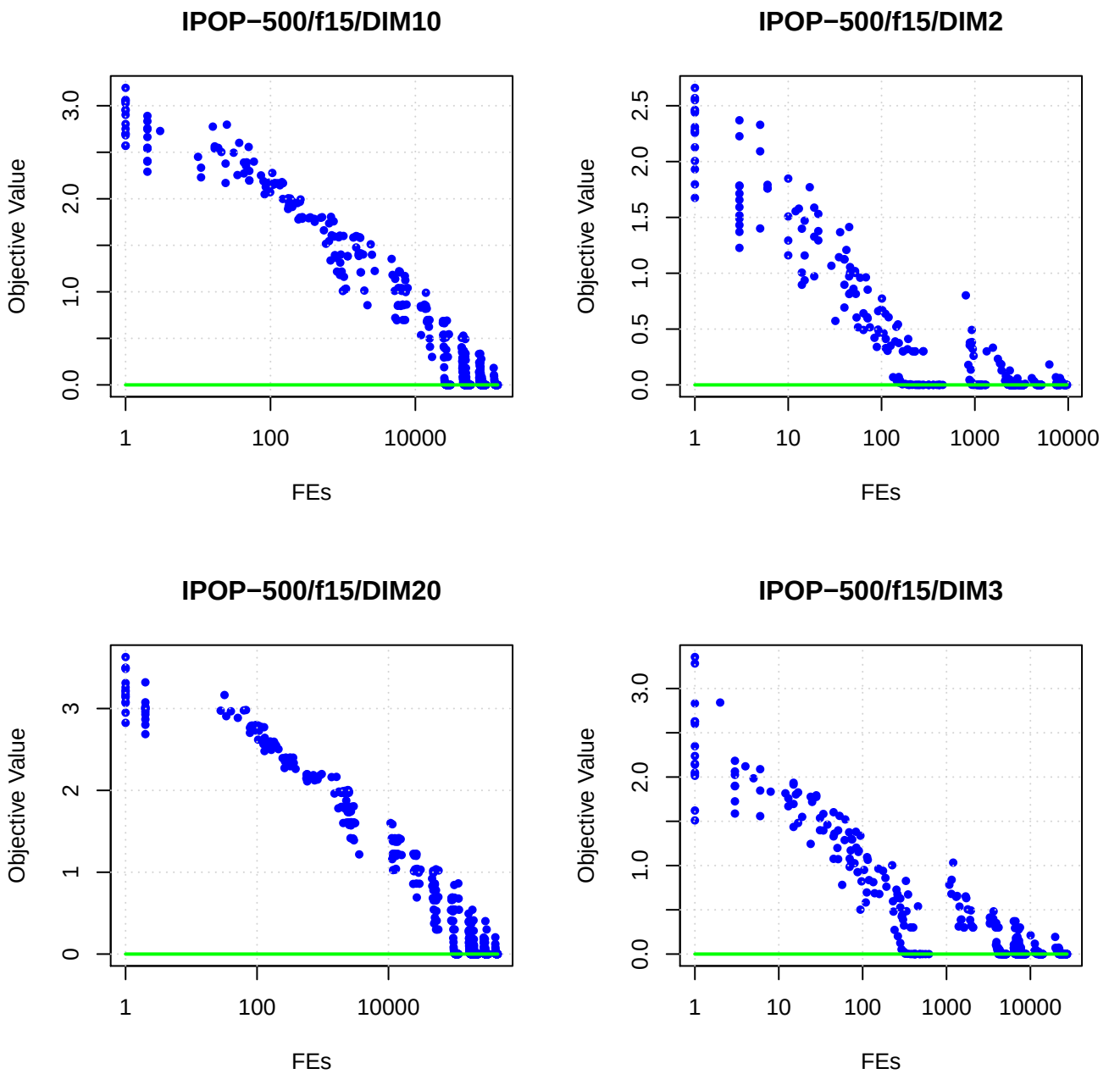
0.5
1.0
1.5
2.0
2.5
1
5
50
500
FEs


IPOP−500/f15/DIM10
Objective Value
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1.0
2.0
3.0
1
100
10000
FEs
IPOP−500/f15/DIM2
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs
IPOP−500/f15/DIM20
Objective Value
0
1
2
3
1
100
10000
FEs
IPOP−500/f15/DIM3
Objective Value
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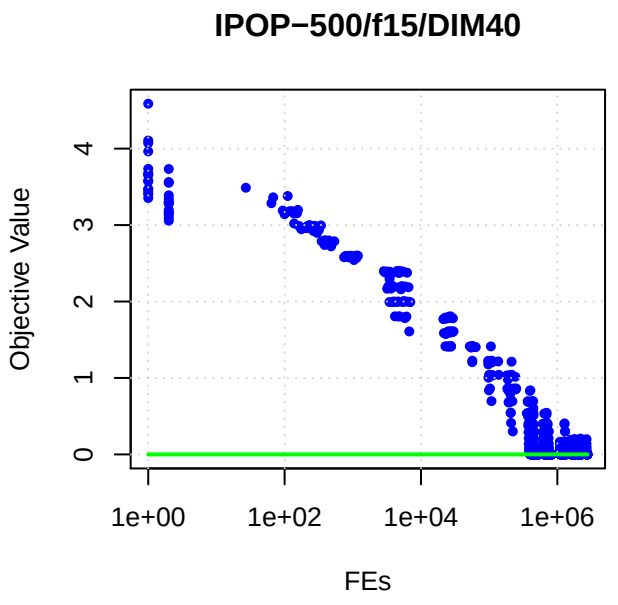
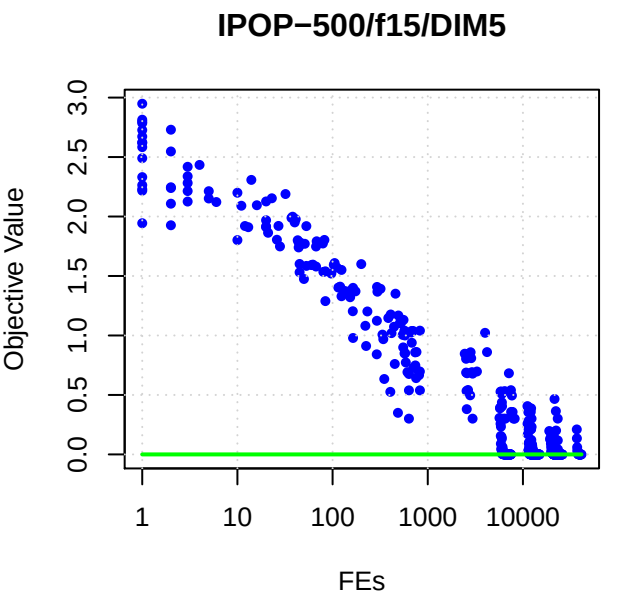
1.0
2.0
3.0
1
10
100
1000
10000
FEs


IPOP−500/f15/DIM40
Objective Value
0
1
2
3
4
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f15/DIM5
Objective Value
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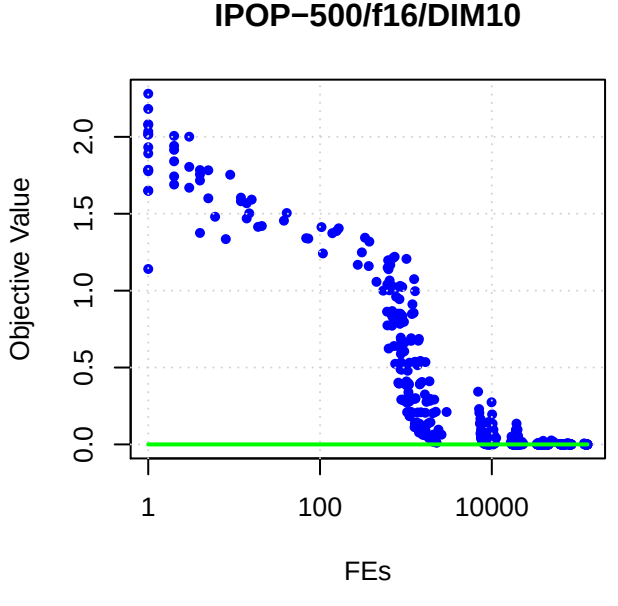
0.5
1.0
1.5
2.0
2.5
3.0
1
10
100
1000
10000
FEs


IPOP−500/f16/DIM10
Objective Value
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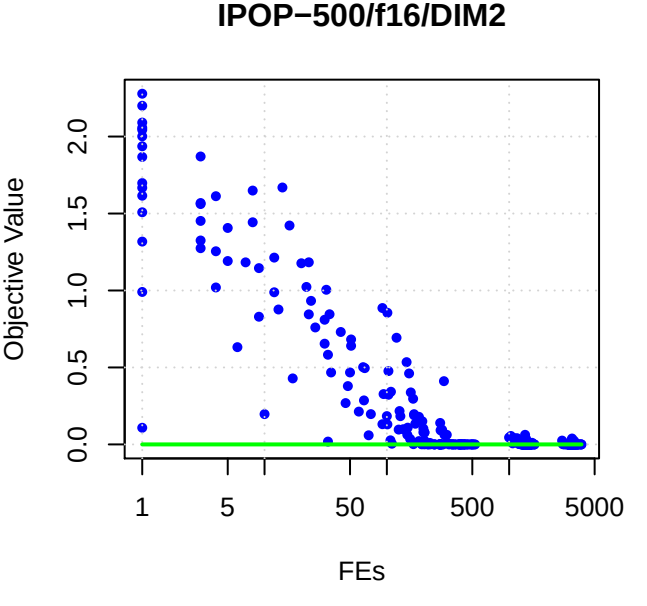
0.5
1.0
1.5
2.0
1
100
10000
FEs


IPOP−500/f16/DIM2
Objective Value
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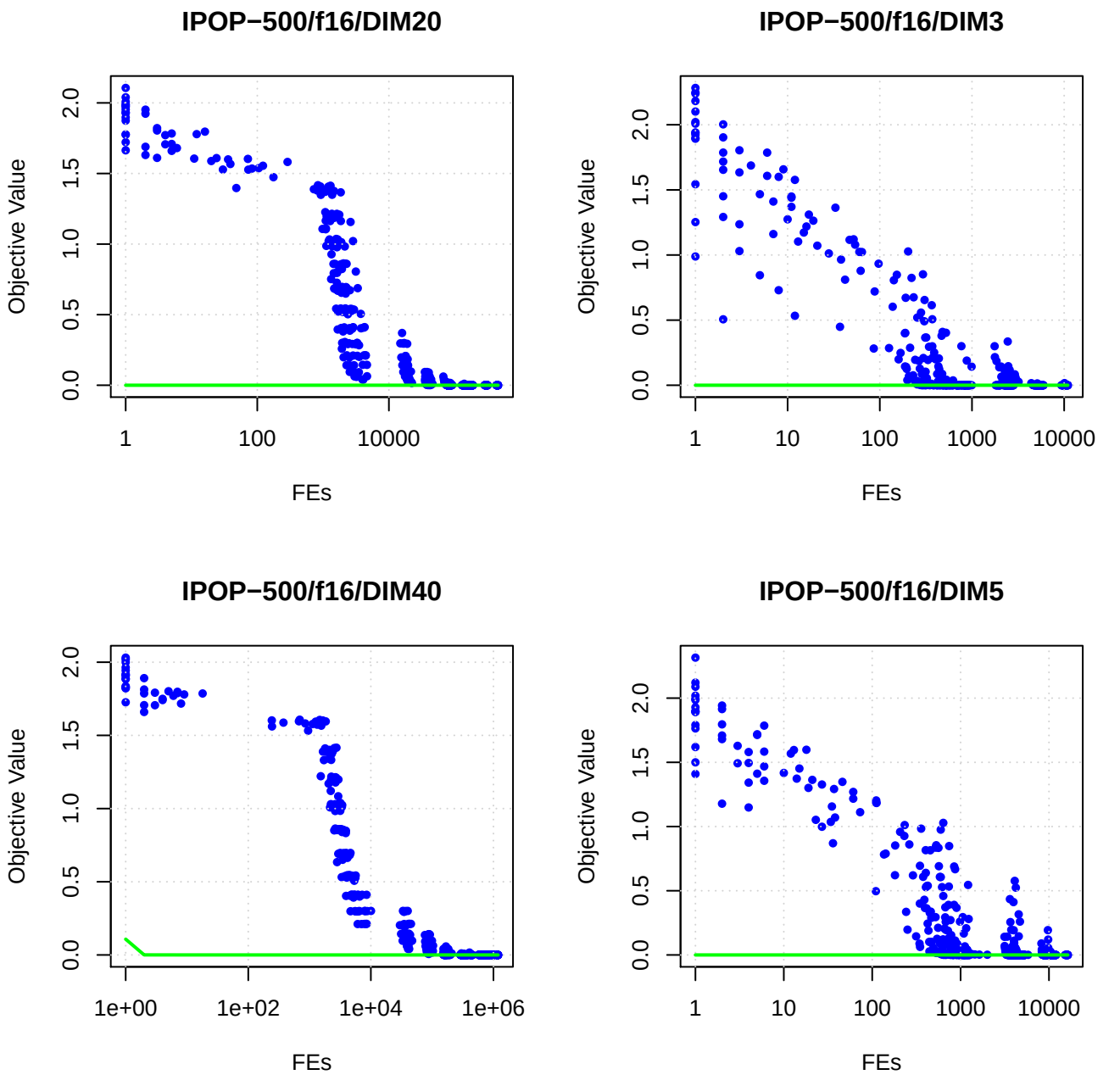
0.5
1.0
1.5
2.0
1
5
50
500
5000
FEs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Objective Value
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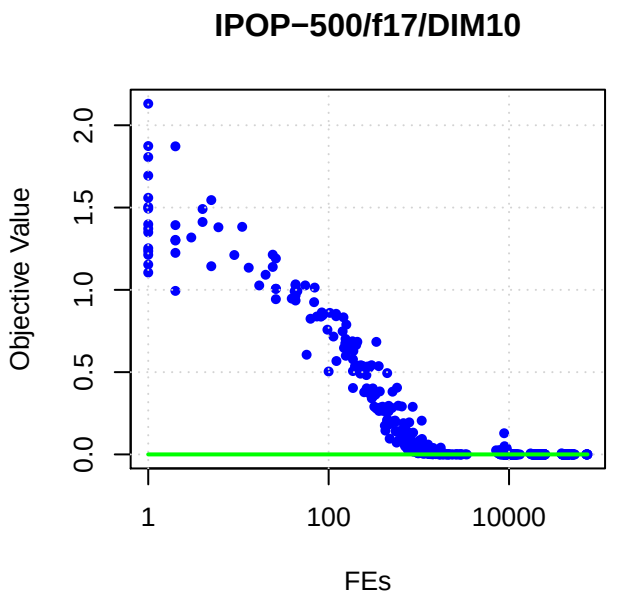
1.0
1.5
2.0
1
100
10000
FEs
IPOP−500/f16/DIM3
Objective Value
0.0
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs
IPOP−500/f16/DIM40
Objective Value
0.0
0.5
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f16/DIM5
Objective Value
0.0
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs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Objective Value
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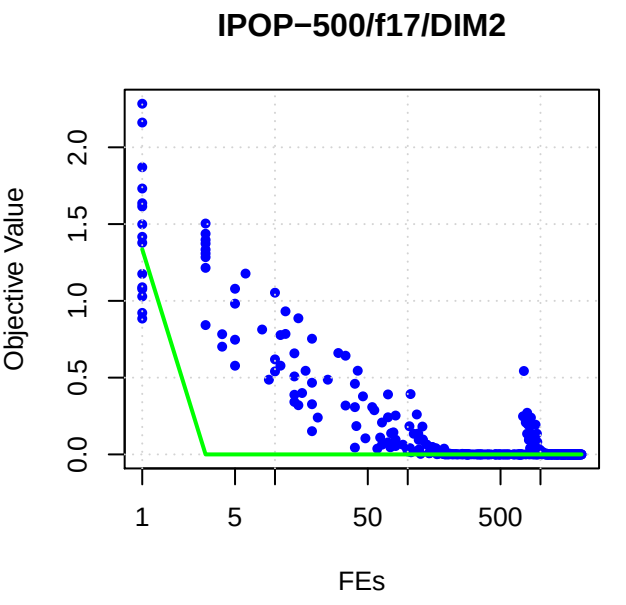
1.0
1.5
2.0
1
100
10000
FEs


IPOP−500/f17/DIM2
Objective Value
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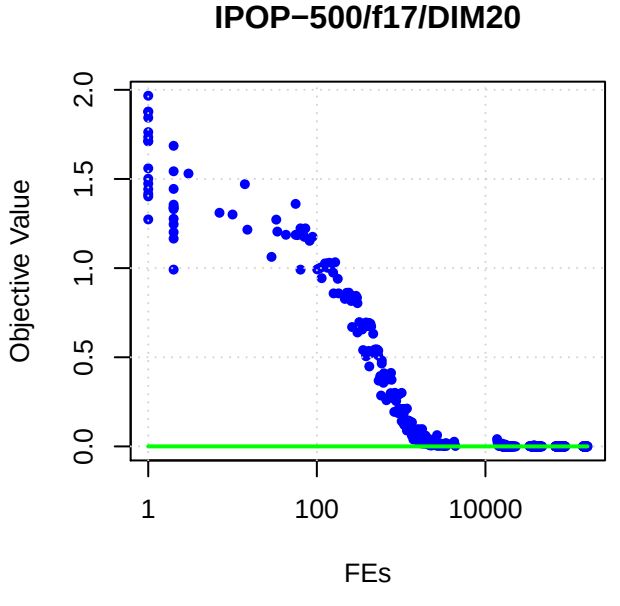
0.5
1.0
1.5
2.0
1
5
50
500
FEs


IPOP−500/f17/DIM20
Objective Value
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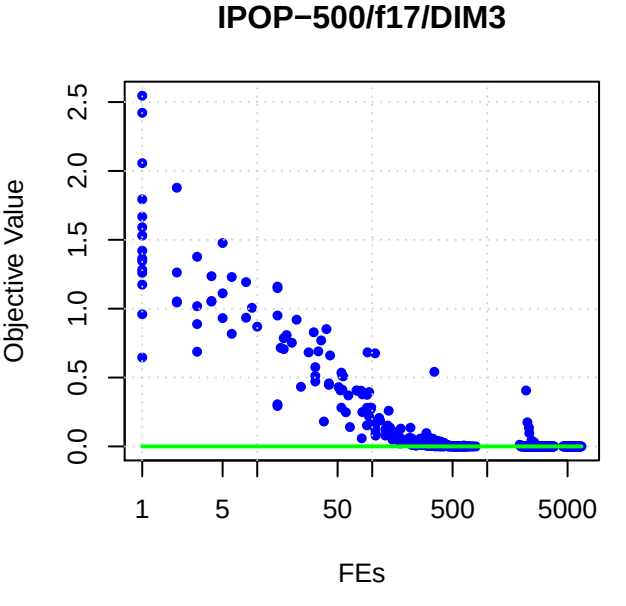
0.5
1.0
1.5
2.0
1
100
10000
FEs


IPOP−500/f17/DIM3
Objective Value
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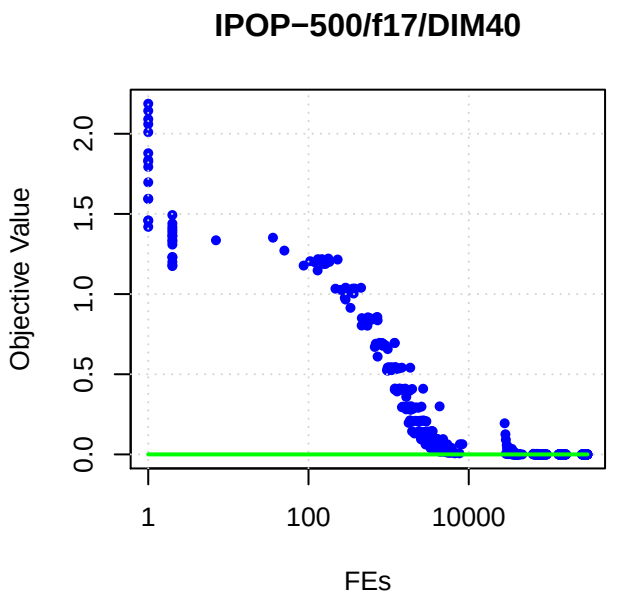
0.5
1.0
1.5
2.0
2.5
1
5
50
500
5000
FEs


IPOP−500/f17/DIM40
Objective Value
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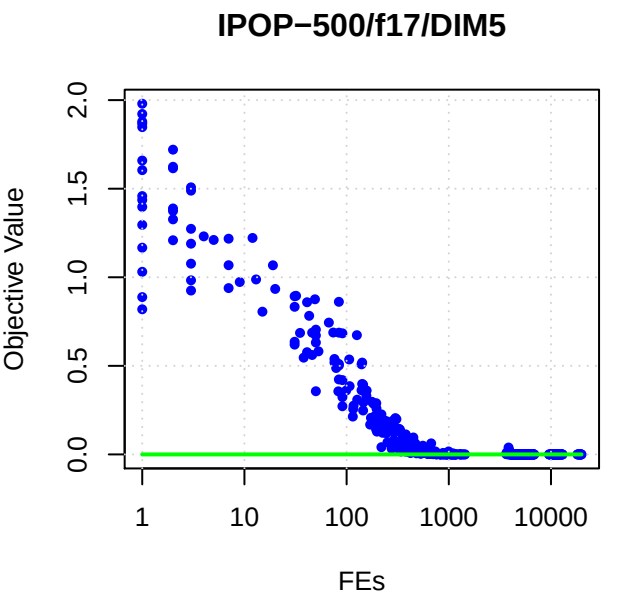
0.5
1.0
1.5
2.0
1
100
10000
FEs


IPOP−500/f17/DIM5
Objective Value
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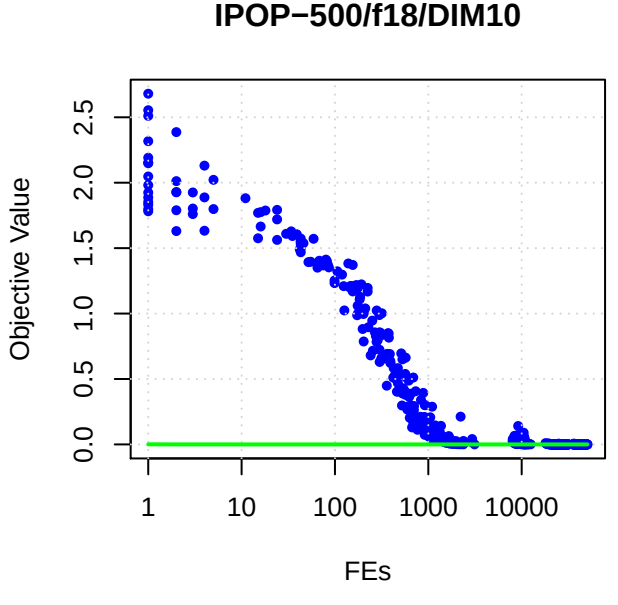
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs


IPOP−500/f18/DIM10
Objective Value
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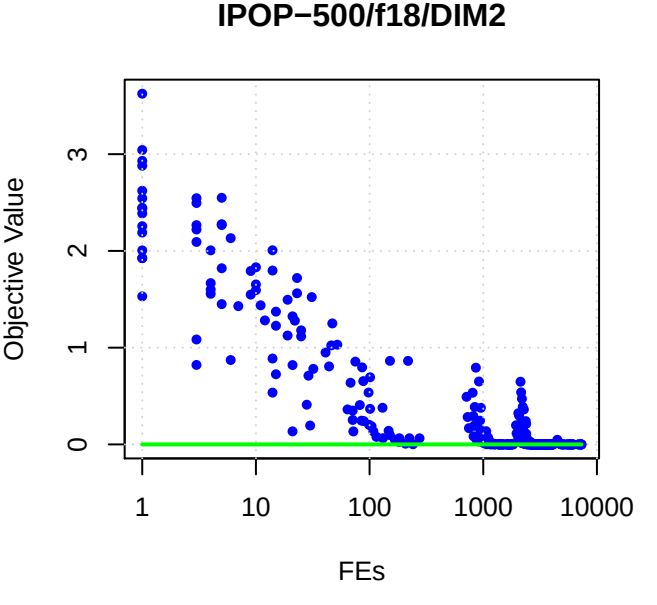
1.5
2.0
2.5
1
10
100
1000
10000
FEs


IPOP−500/f18/DIM2
Objective Value
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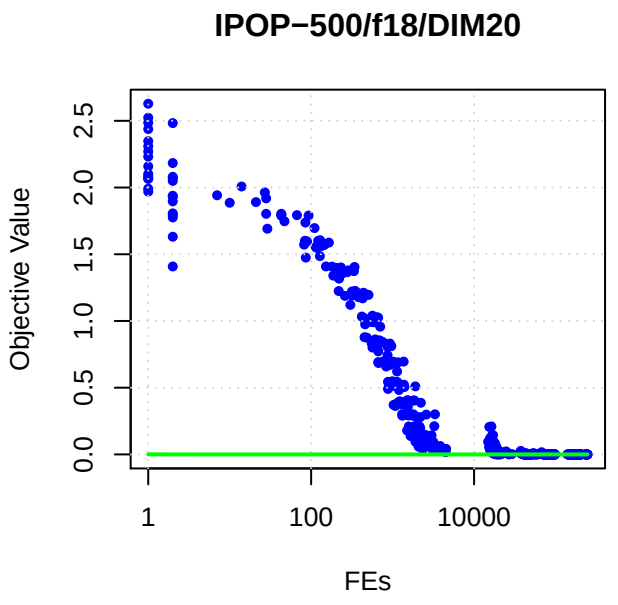
2
3
1
10
100
1000
10000
FEs


IPOP−500/f18/DIM20
Objective Value
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1.5
2.0
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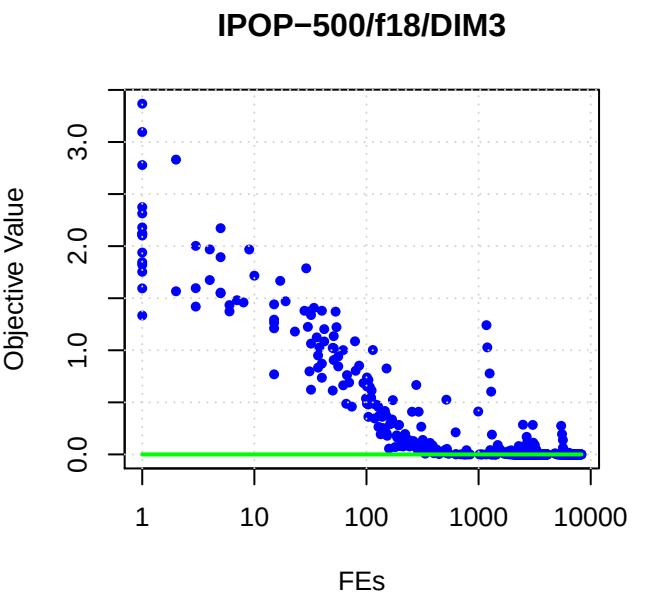
1
100
10000
FEs


IPOP−500/f18/DIM3
Objective Value
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2.0
3.0
1
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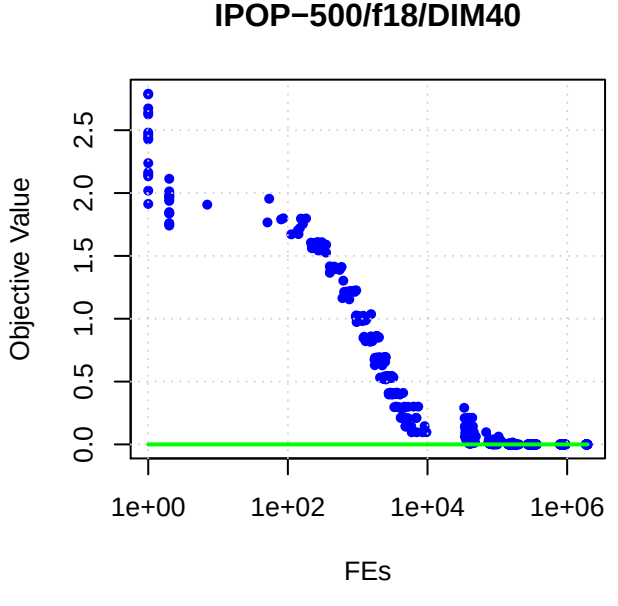
100
1000
10000
FEs


IPOP−500/f18/DIM40
Objective Value
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1.5
2.0
2.5
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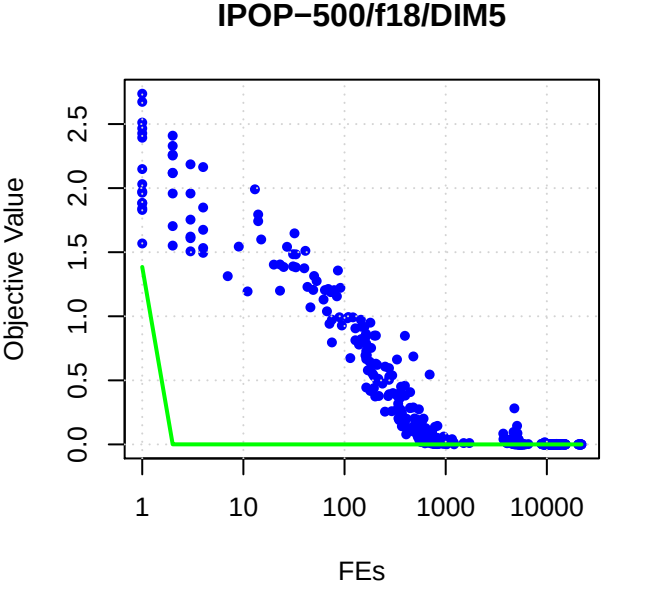
1e+02
1e+04
1e+06
FEs


IPOP−500/f18/DIM5
Objective Value
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2.5
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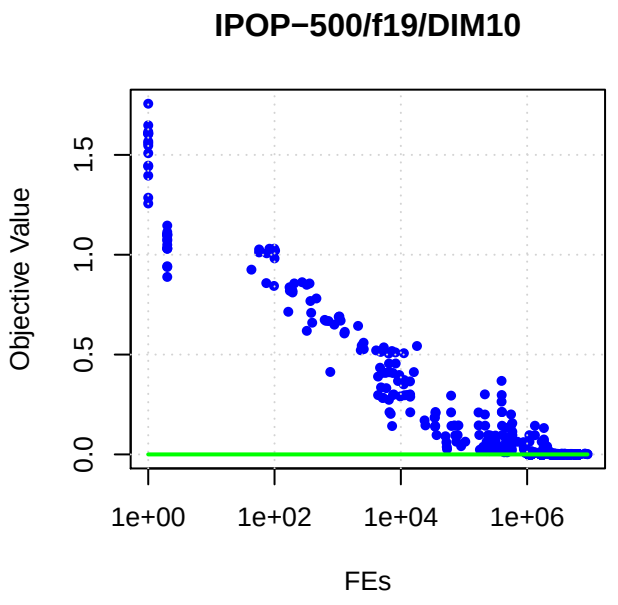
100
1000
10000
FEs


IPOP−500/f19/DIM10
Objective Value
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1.5
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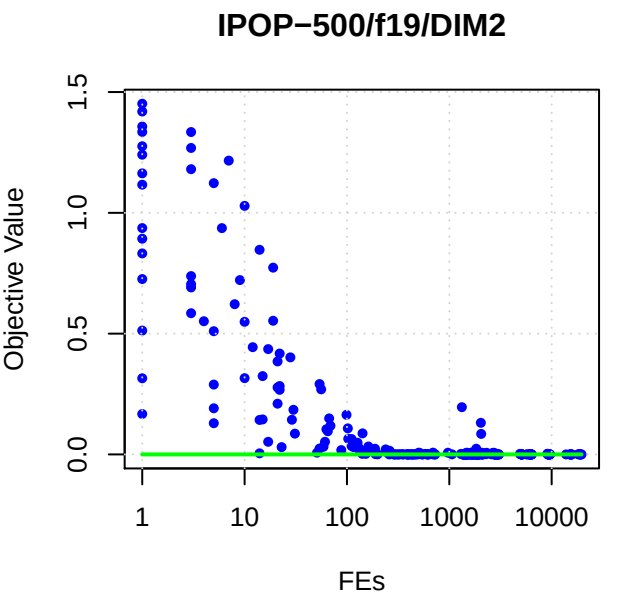
1e+02
1e+04
1e+06
FEs


IPOP−500/f19/DIM2
Objective Value
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1.5
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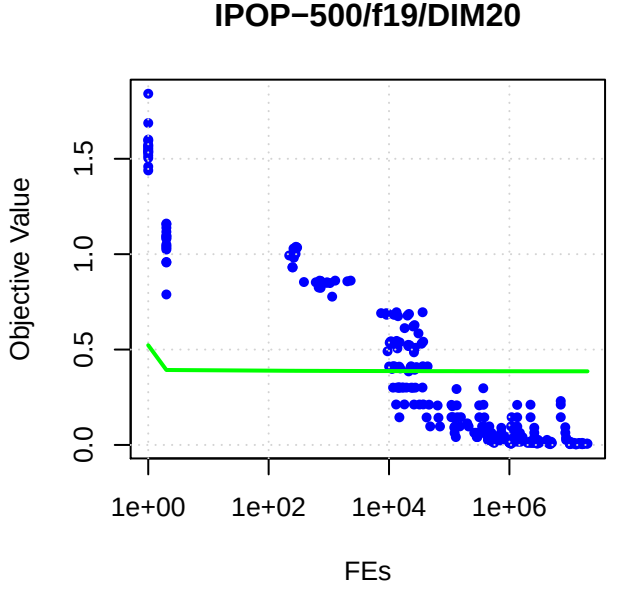
1000
10000
FEs


IPOP−500/f19/DIM20
Objective Value
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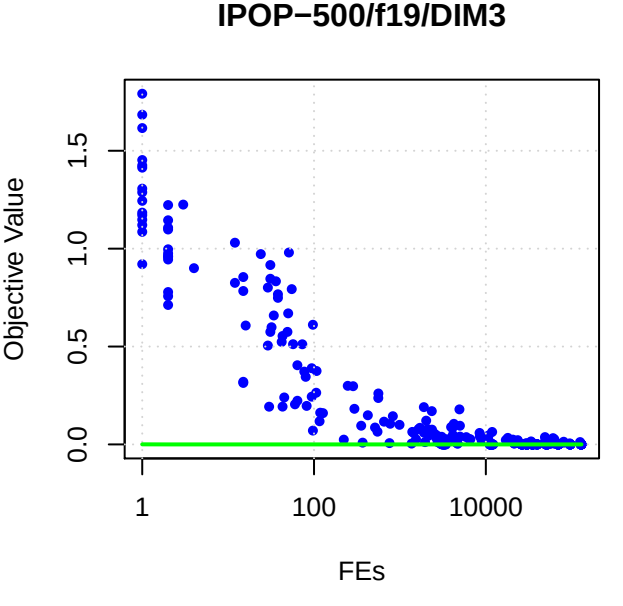
0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f19/DIM3
Objective Value
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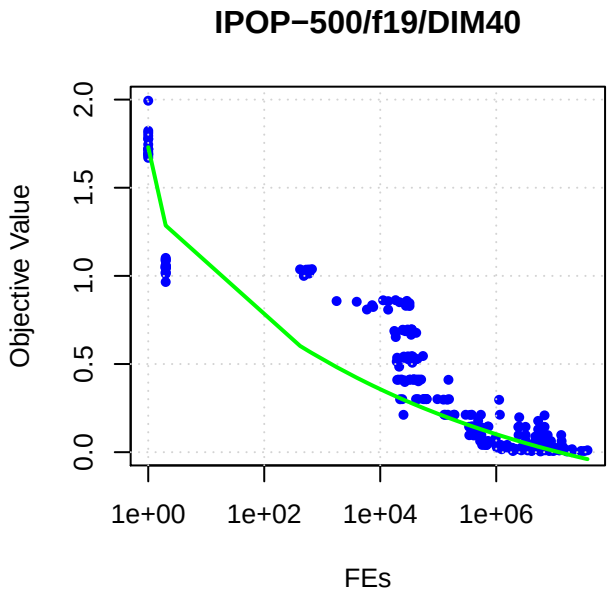
1.5
1
100
10000
FEs


IPOP−500/f19/DIM40
Objective Value
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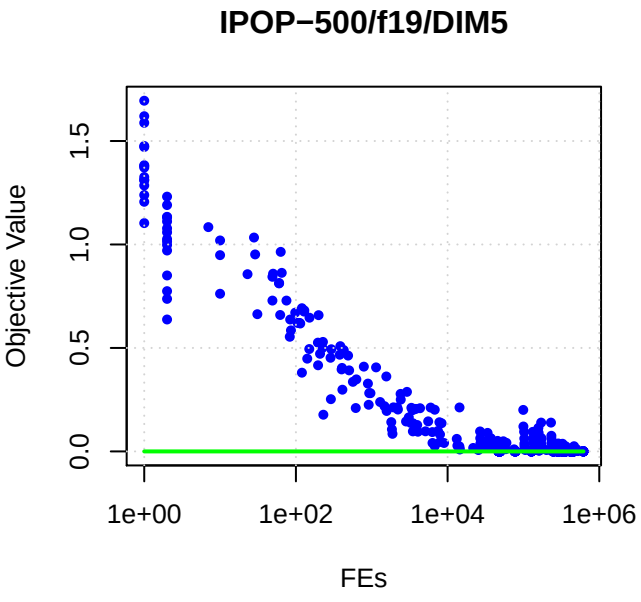
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f19/DIM5
Objective Value
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1.5
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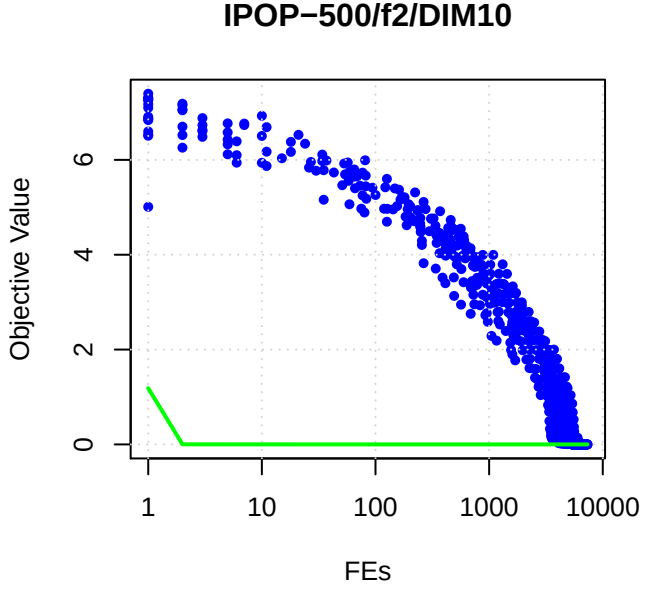
1e+02
1e+04
1e+06
FEs


IPOP−500/f2/DIM10
Objective Value
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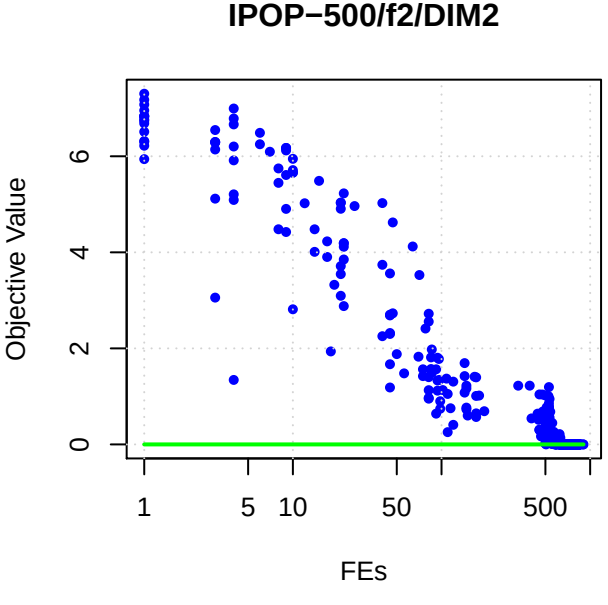
4
6
1
10
100
1000
10000
FEs


IPOP−500/f2/DIM2
Objective Value
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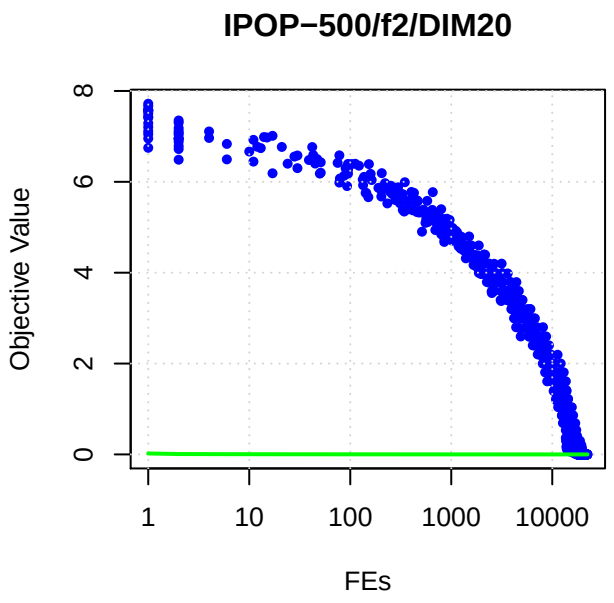
6
1
5
10
50
500
FEs


IPOP−500/f2/DIM20
Objective Value
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6
8
1
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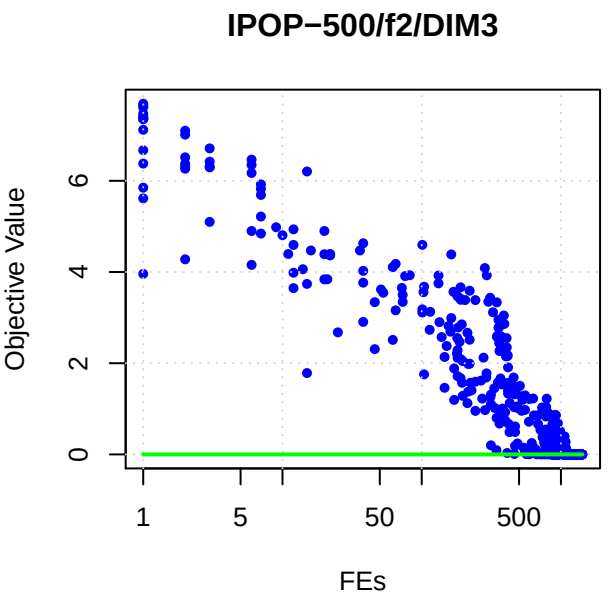
1000
10000
FEs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Objective Value
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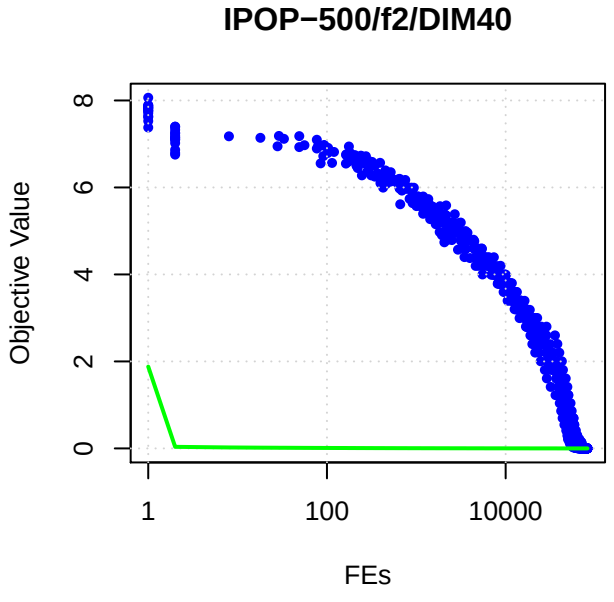
FEs


IPOP−500/f2/DIM40
Objective Value
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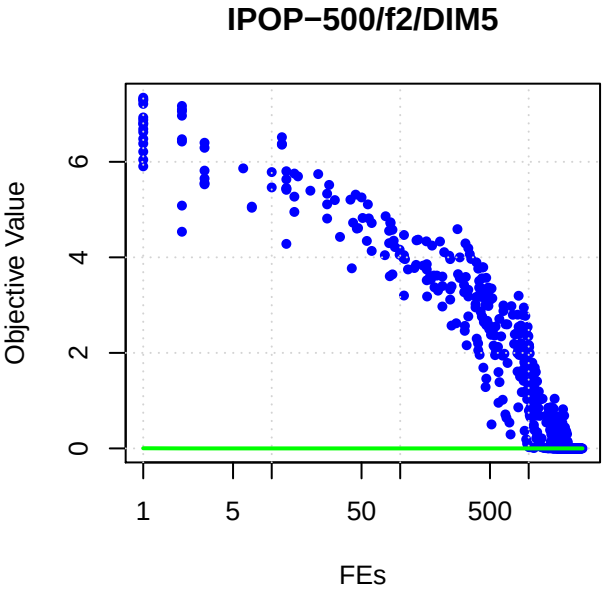
4
6
8
1
100
10000
FEs


IPOP−500/f2/DIM5
Objective Value
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4
6
1
5
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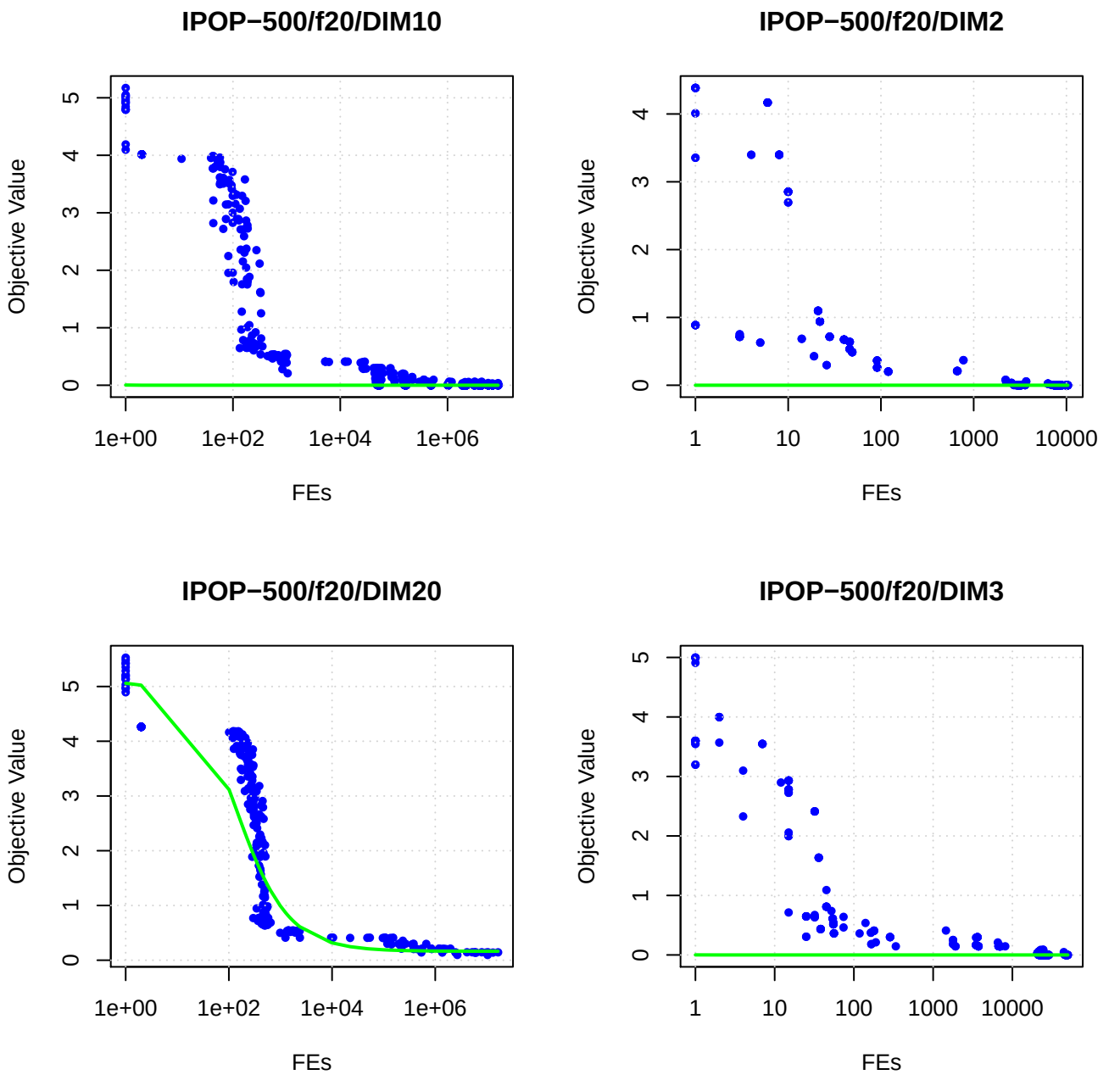
500
FEs


IPOP−500/f20/DIM10
Objective Value
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2
3
4
5
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f20/DIM2
Objective Value
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2
3
4
1
10
100
1000
10000
FEs
IPOP−500/f20/DIM20
Objective Value
0
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2
3
4
5
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f20/DIM3
Objective Value
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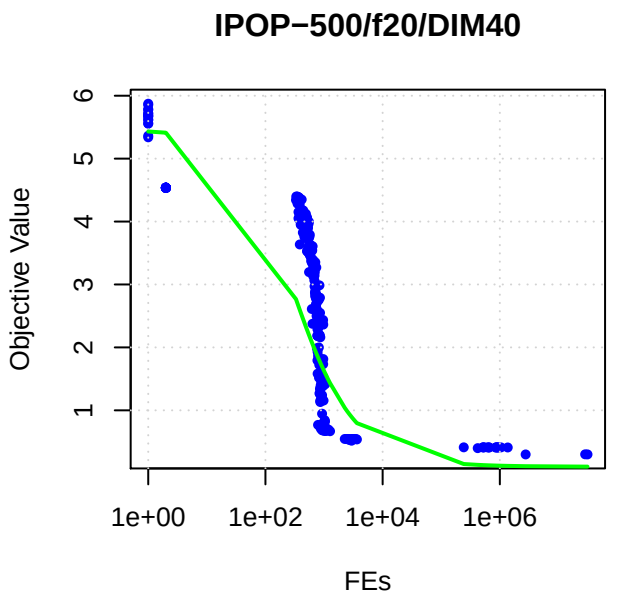
3
4
5
1
10
100
1000
10000
FEs


IPOP−500/f20/DIM40
Objective Value
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6
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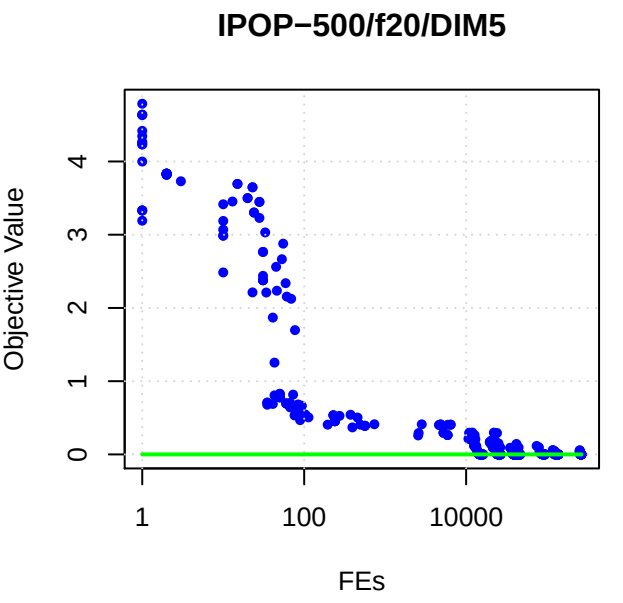
1e+02
1e+04
1e+06
FEs


IPOP−500/f20/DIM5
Objective Value
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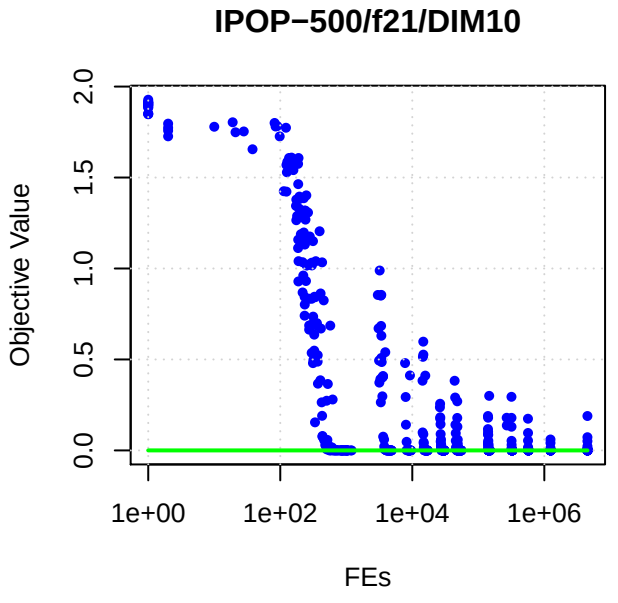
1
2
3
4
1
100
10000
FEs


IPOP−500/f21/DIM10
Objective Value
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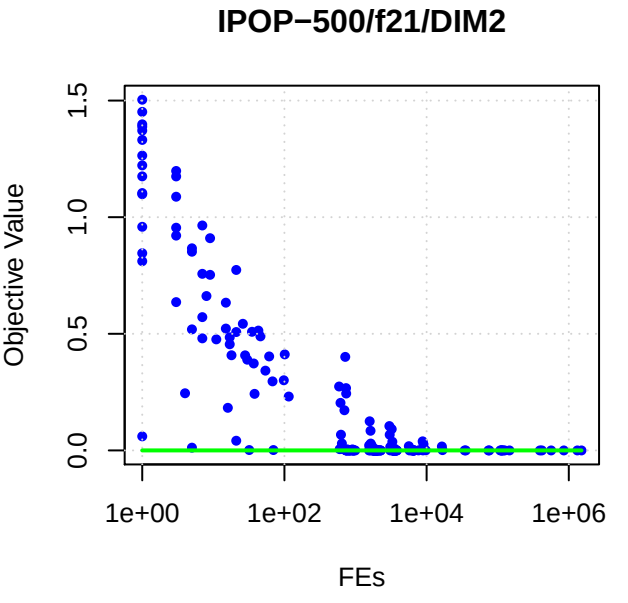
0.5
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f21/DIM2
Objective Value
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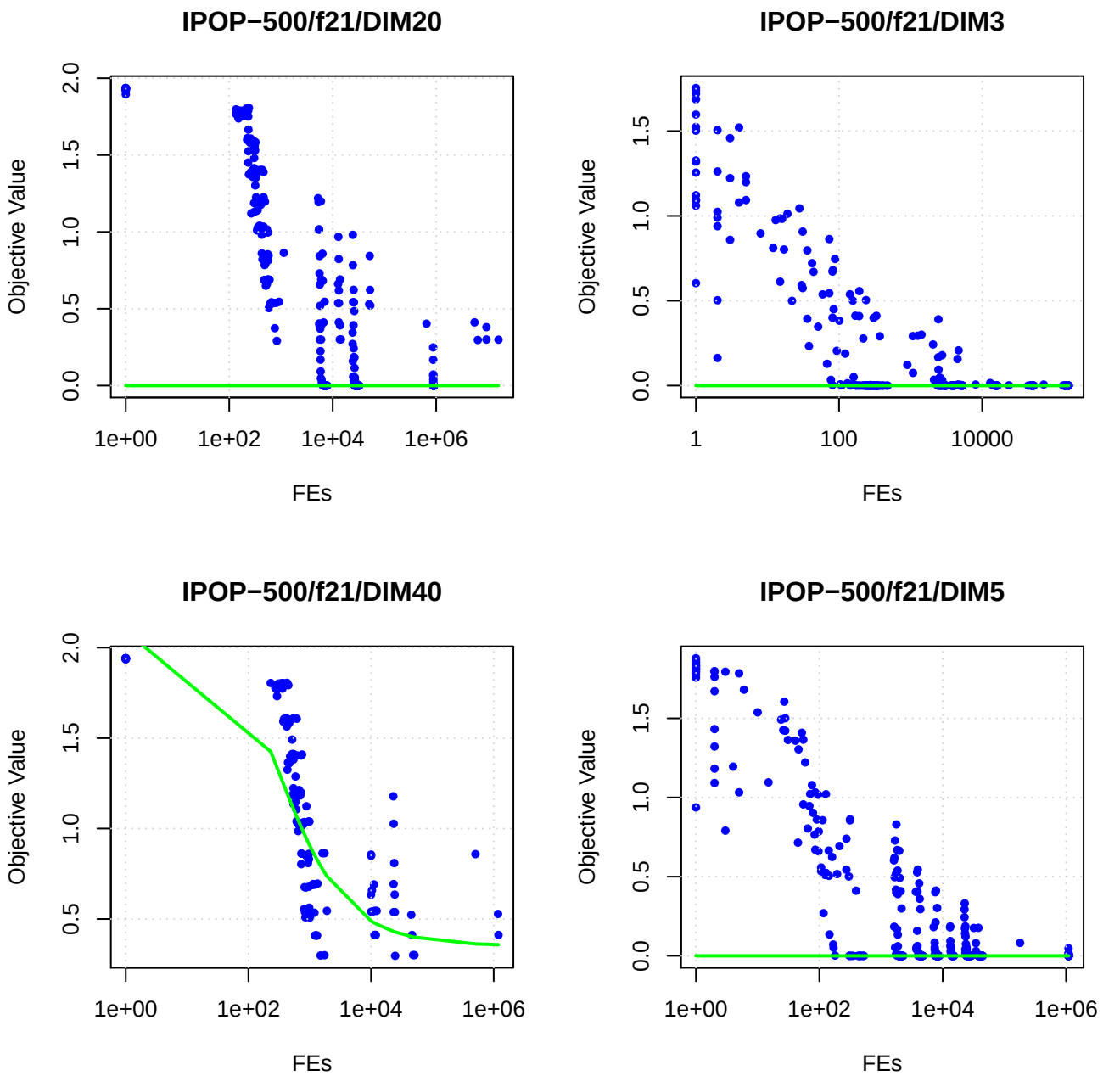
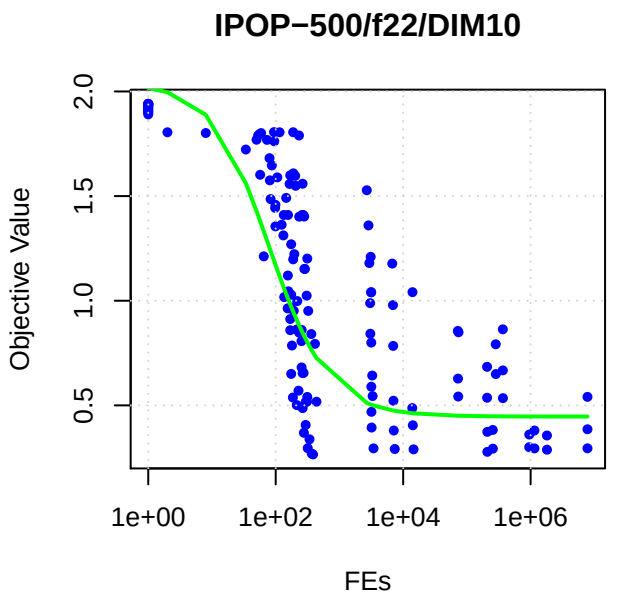
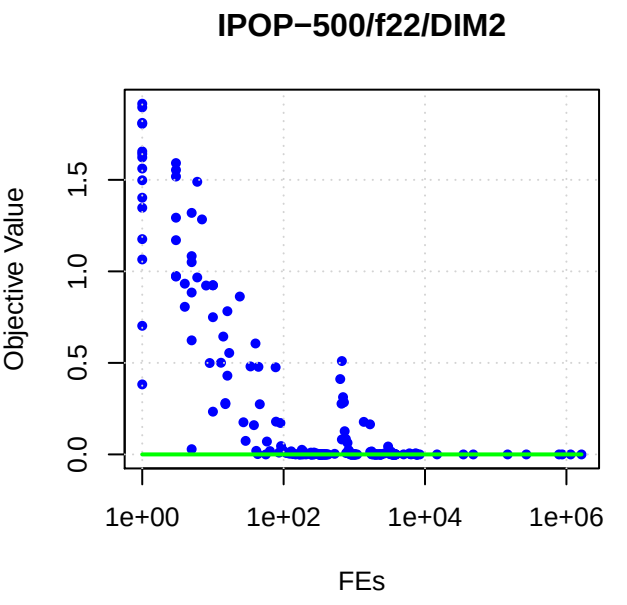
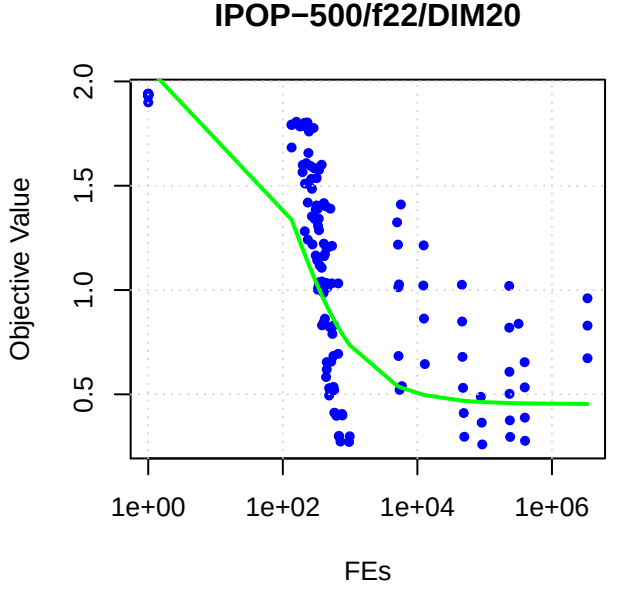
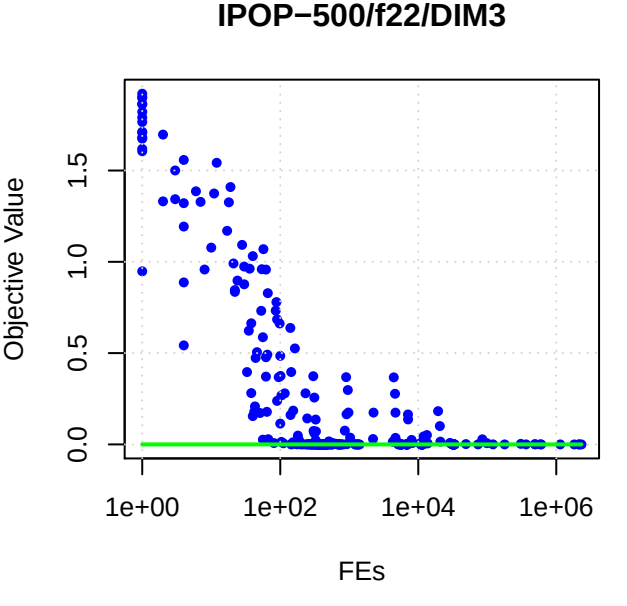
0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs

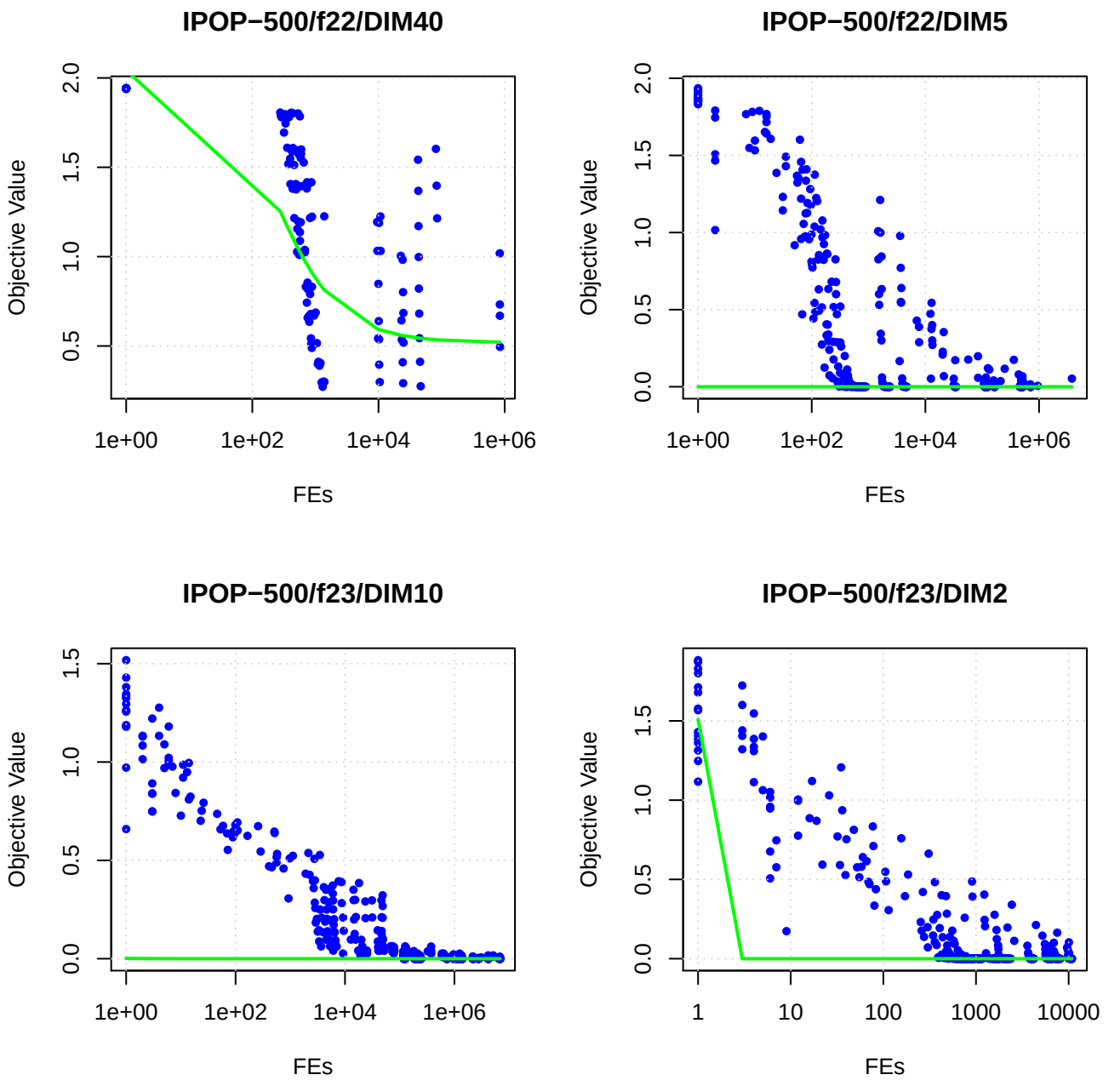

IPOP−500/f21/DIM20
Objective Value
0.0
0.5
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f21/DIM3
Objective Value
0.0
0.5
1.0
1.5
1
100
10000
FEs
IPOP−500/f21/DIM40
Objective Value
0.5
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f21/DIM5
Objective Value
0.0
0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs

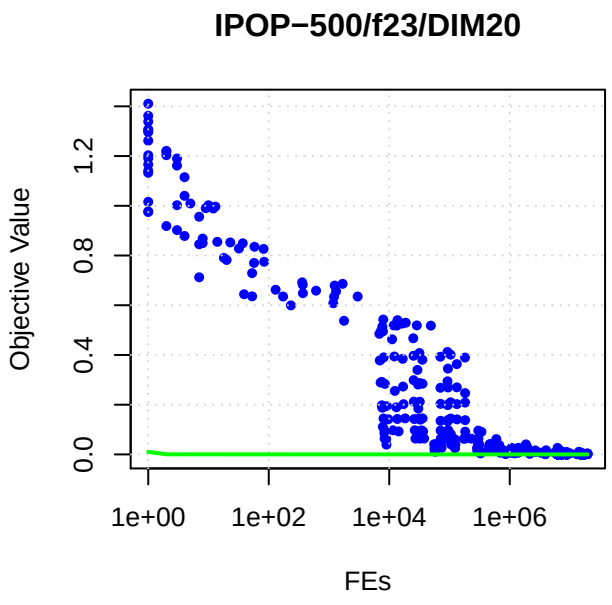

IPOP−500/f22/DIM10
Objective Value
2.0
1.5
1.0
0.5
1e+00
1e+02
1e+04
1e+06
FEs

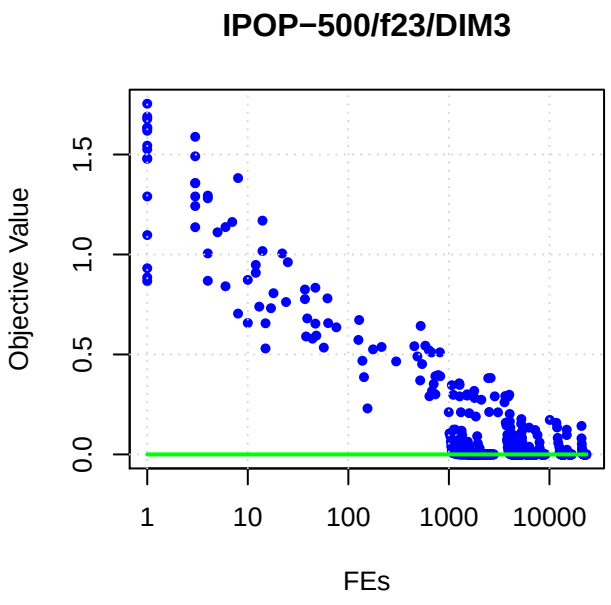

IPOP−500/f22/DIM2
Objective Value
1.5
1.0
0.5
0.0
1e+00
1e+02
1e+04
1e+06
FEs

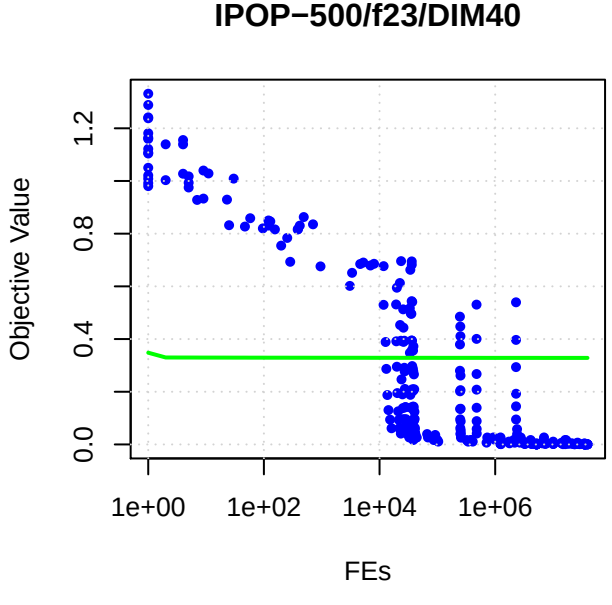

IPOP−500/f22/DIM20
Objective Value
2.0
1.5
1.0
0.5
1e+00
1e+02
1e+04
1e+06
FEs

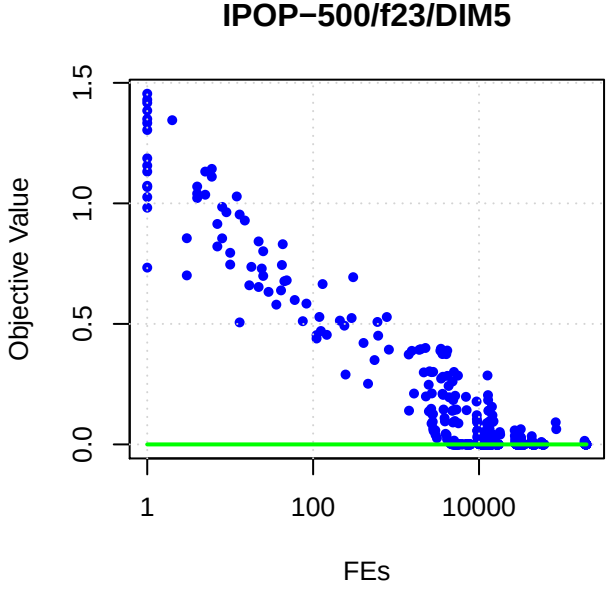

IPOP−500/f22/DIM3
Objective Value
1.5
1.0
0.5
0.0
1e+00
1e+02
1e+04
1e+06
FEs

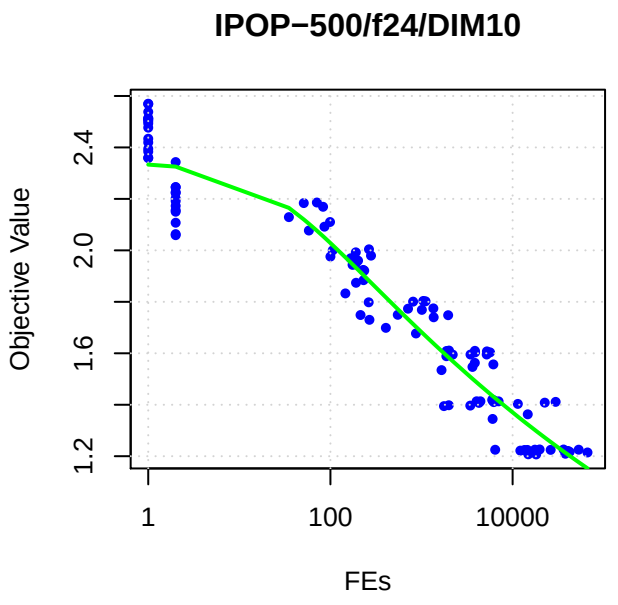

IPOP−500/f22/DIM40
Objective Value
2.0
1.5
1.0
0.5
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f22/DIM5
Objective Value
2.0
1.5
1.0
0.5
0.0
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f23/DIM10
Objective Value
1.5
1.0
0.5
0.0
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f23/DIM2
Objective Value
1.5
1.0
0.5
0.0
1
10
100
1000
10000
FEs


IPOP−500/f23/DIM20
Objective Value
0.0
0.4
0.8
1.2
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f23/DIM3
Objective Value
0.0
0.5
1.0
1.5
1
10
100
1000
10000
FEs


IPOP−500/f23/DIM40
Objective Value
0.0
0.4
0.8
1.2
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f23/DIM5
Objective Value
0.0
0.5
1.0
1.5
1
100
10000
FEs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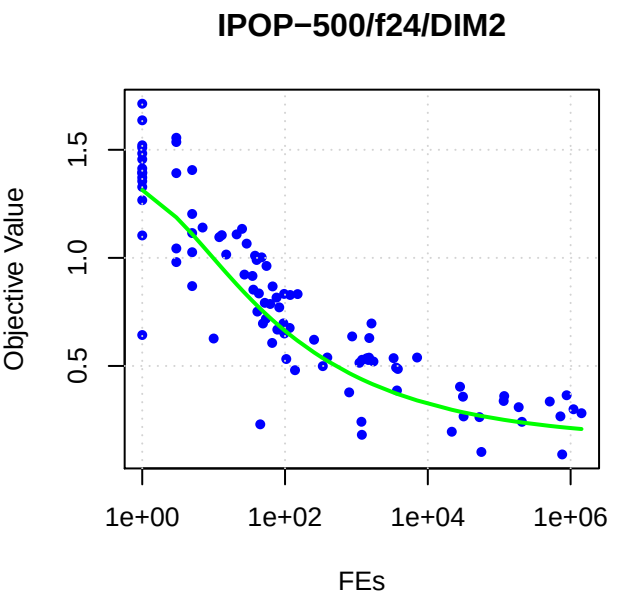
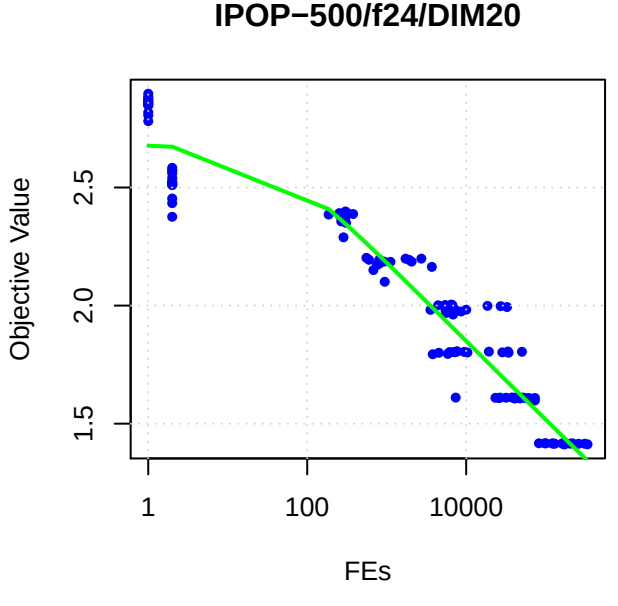
Objective Value
2.4
2.0
1.6
1.2
1
100
10000
FEs


IPOP−500/f24/DIM2
Objective Value
1.5
1.0
0.5
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f24/DIM20
Objective Value
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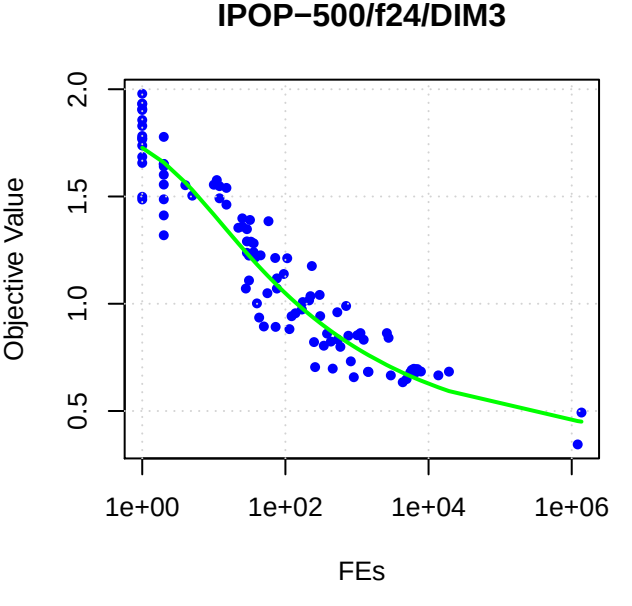
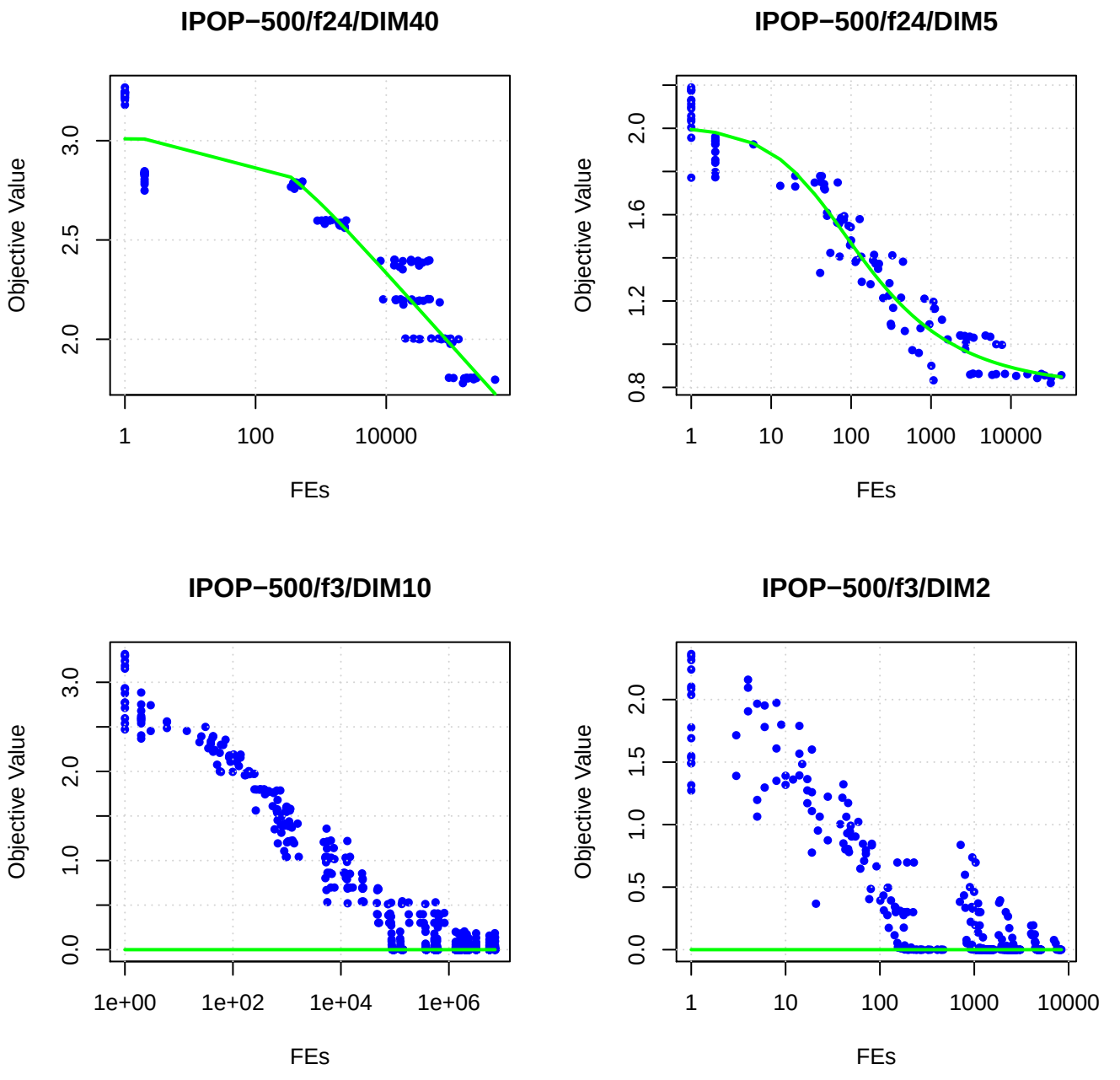
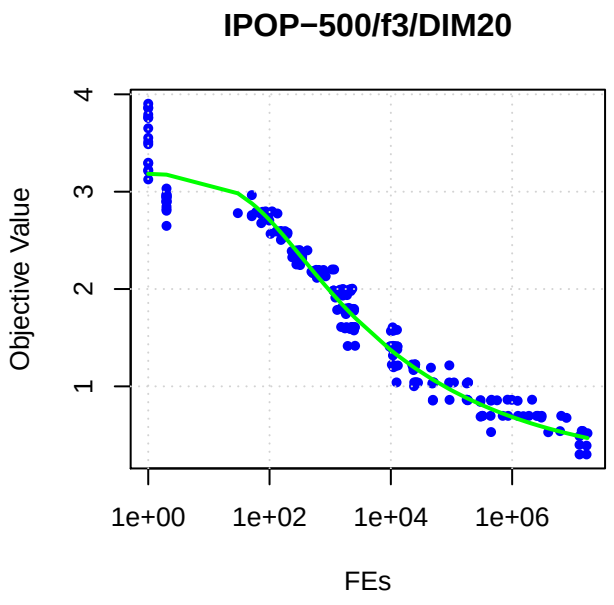
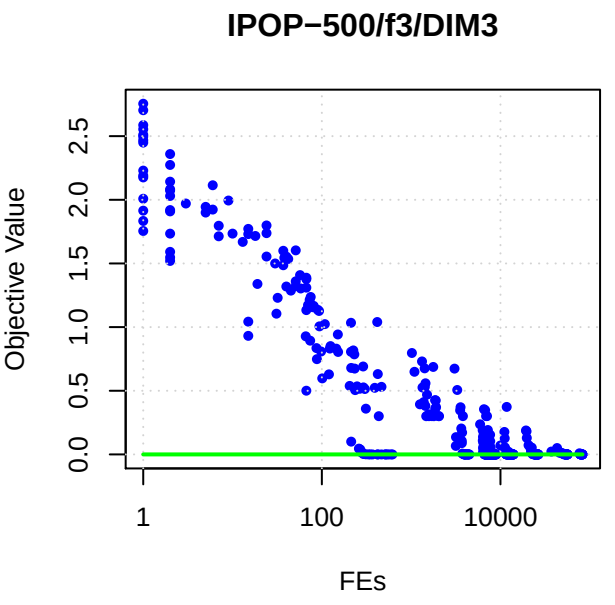
2.0
1.5
1
100
10000
FEs


IPOP−500/f24/DIM3
Objective Value
2.0
1.5
1.0
0.5
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f24/DIM40
Objective Value
3.0
2.5
2.0
1
100
10000
FEs
IPOP−500/f24/DIM5
Objective Value
2.0
1.6
1.2
0.8
1
10
100
1000
10000
FEs
IPOP−500/f3/DIM10
Objective Value
3.0
2.0
1.0
0.0
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−500/f3/DIM2
Objective Value
2.0
1.5
1.0
0.5
0.0
1
10
100
1000
10000
FEs


IPOP−500/f3/DIM20
Objective Value
FEs
1
2
3
4
1e+00
1e+02
1e+04
1e+06


IPOP−500/f3/DIM3
Objective Value
FEs
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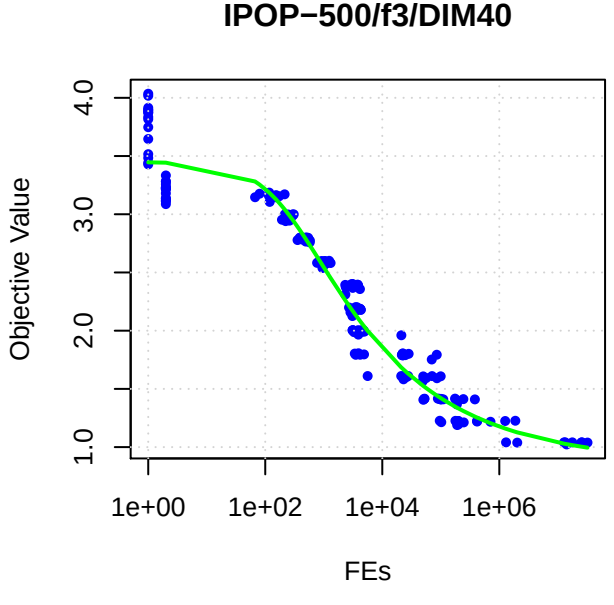
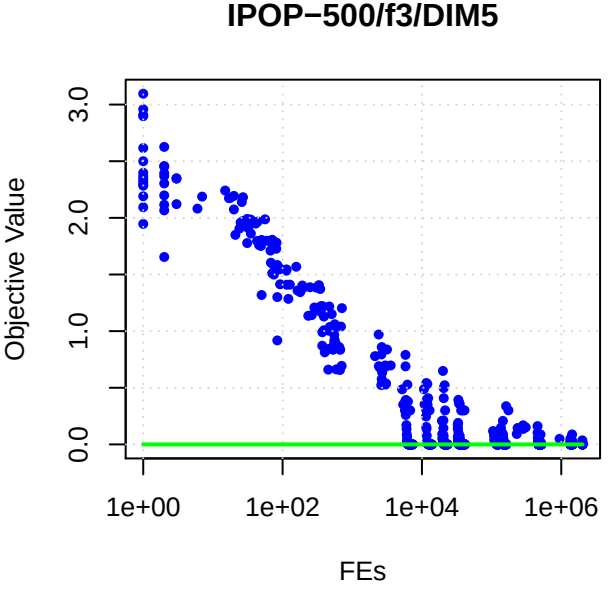
1.0
1.5
2.0
2.5
1
100
10000


IPOP−500/f3/DIM40
Objective Value
FEs
1.0
2.0
3.0
4.0
1e+00
1e+02
1e+04
1e+06


IPOP−500/f3/DIM5
Objective Value
FEs
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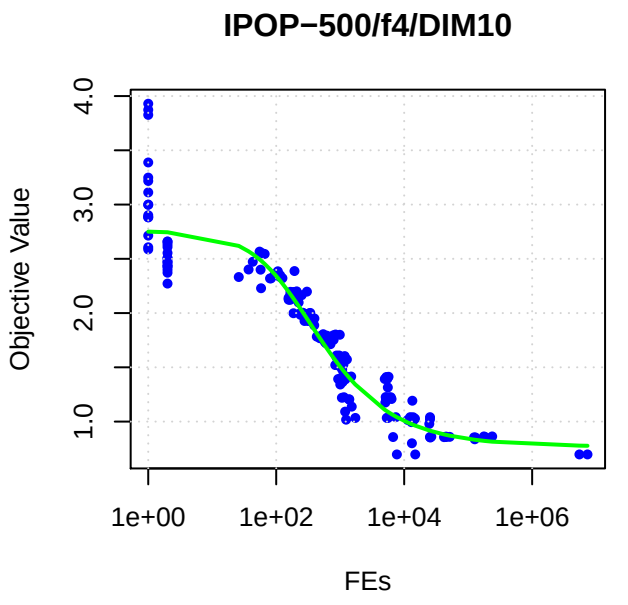
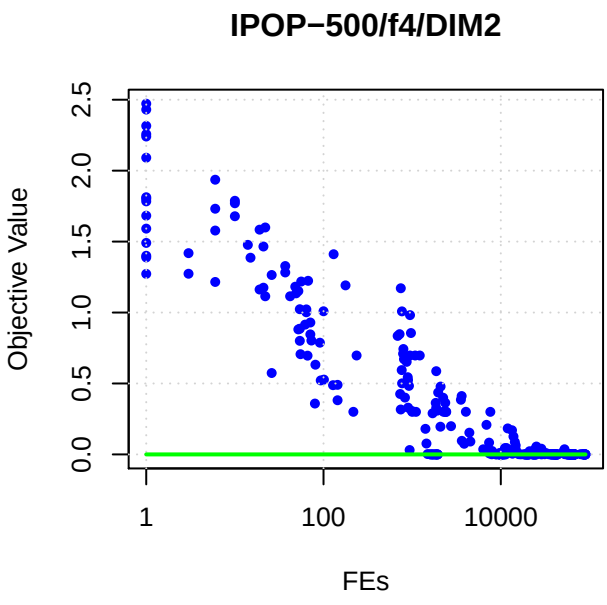
1.0
2.0
3.0
1e+00
1e+02
1e+04
1e+06


IPOP−500/f4/DIM10
Objective Value
4.0
3.0
2.0
1.0
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f4/DIM2
Objective Value
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2.0
1.5
1.0
0.5
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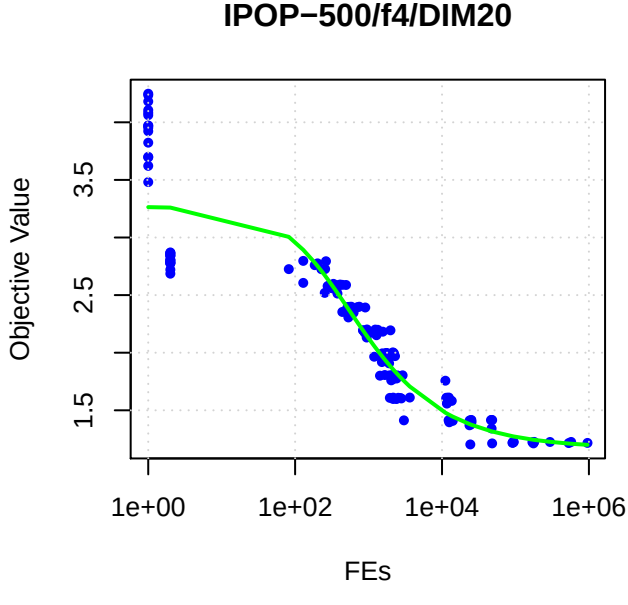
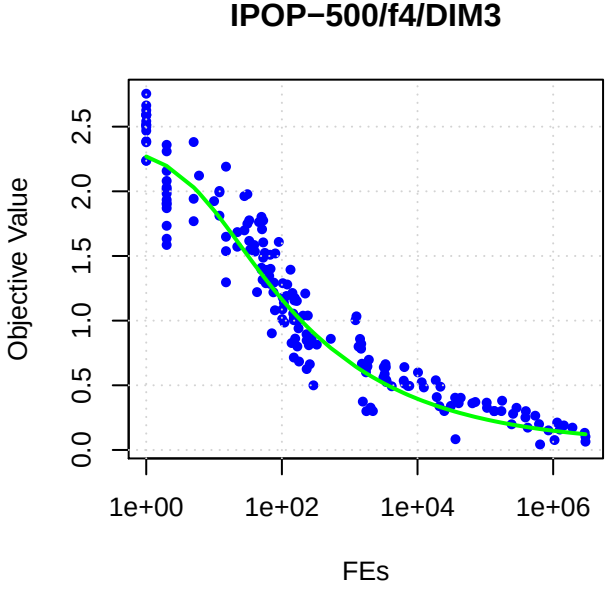
1
100
10000
FEs


IPOP−500/f4/DIM20
Objective Value
3.5
2.5
1.5
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f4/DIM3
Objective Value
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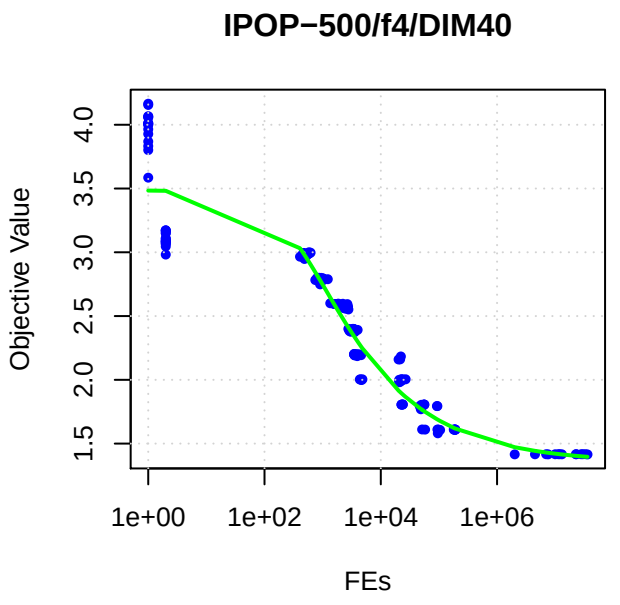
1.5
1.0
0.5
0.0
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f4/DIM40
Objective Value
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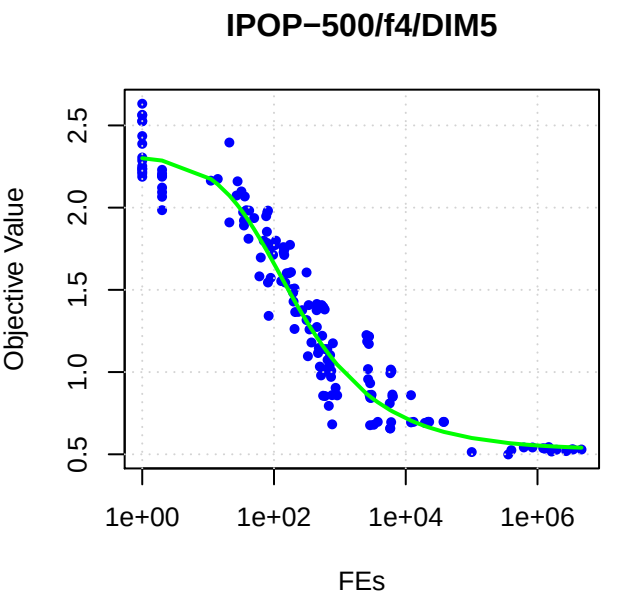
3.0
2.5
2.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f4/DIM5
Objective Value
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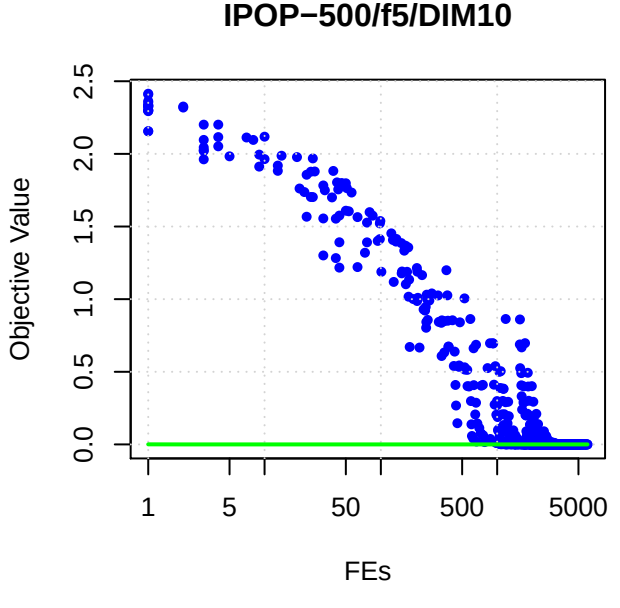
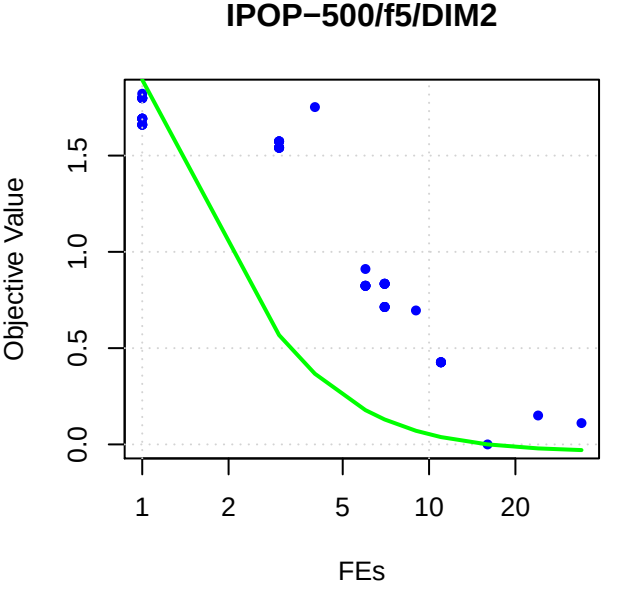
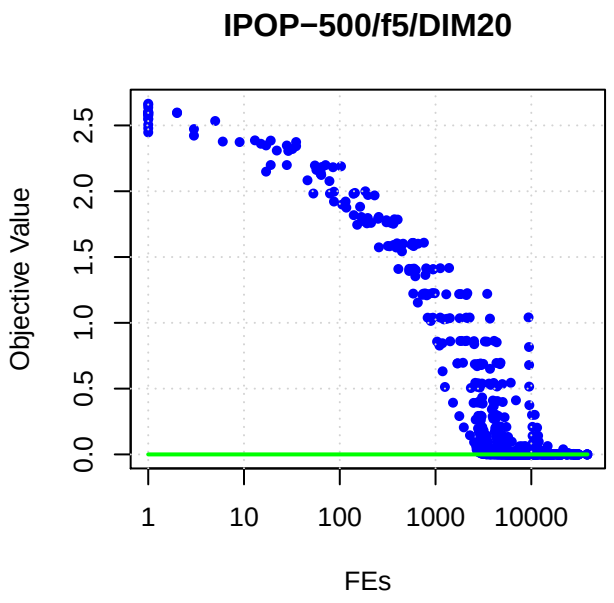
2.0
1.5
1.0
0.5
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−500/f5/DIM10
Objective Value
2.5
2.0
1.5
1.0
0.5
0.0
1
5
50
500
5000
FEs


IPOP−500/f5/DIM2
Objective Value
1.5
1.0
0.5
0.0
1
2
5
10
20
FEs


IPOP−500/f5/DIM20
Objective Value
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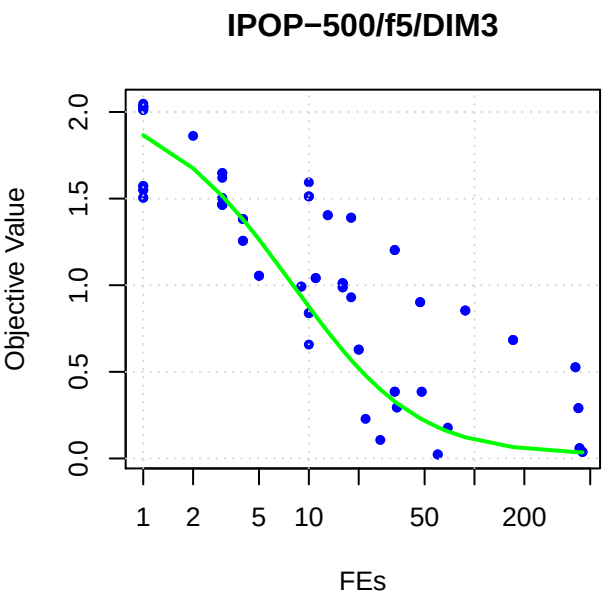
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs


IPOP−500/f5/DIM3
Objective Value
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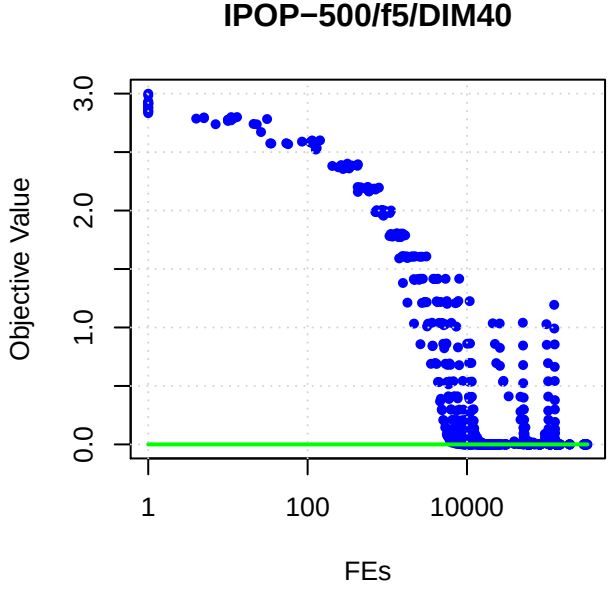
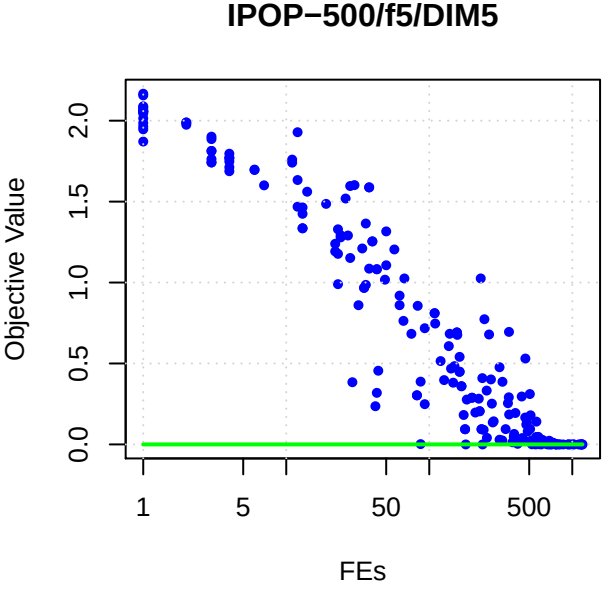
1.0
1.5
2.0
1
2
5
10
50
200
FEs


IPOP−500/f5/DIM40
Objective Value
0.0
1.0
2.0
3.0
1
100
10000
FEs


IPOP−500/f5/DIM5
Objective Value
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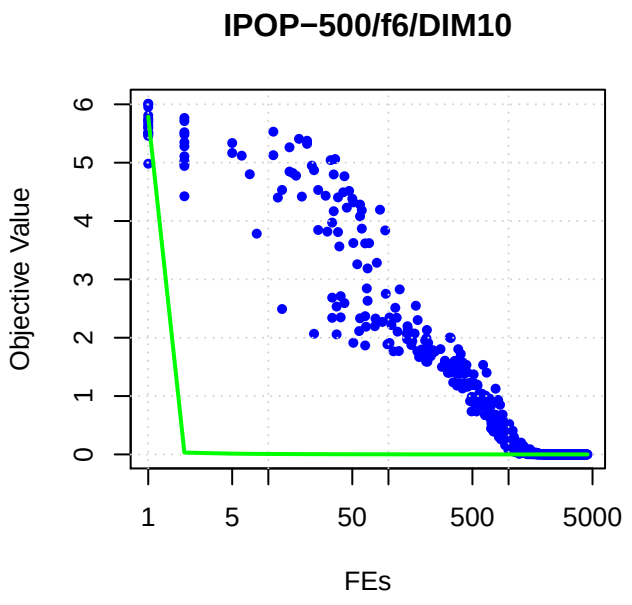
0.5
1.0
1.5
2.0
1
5
50
500
FEs


IPOP−500/f6/DIM10
Objective Value
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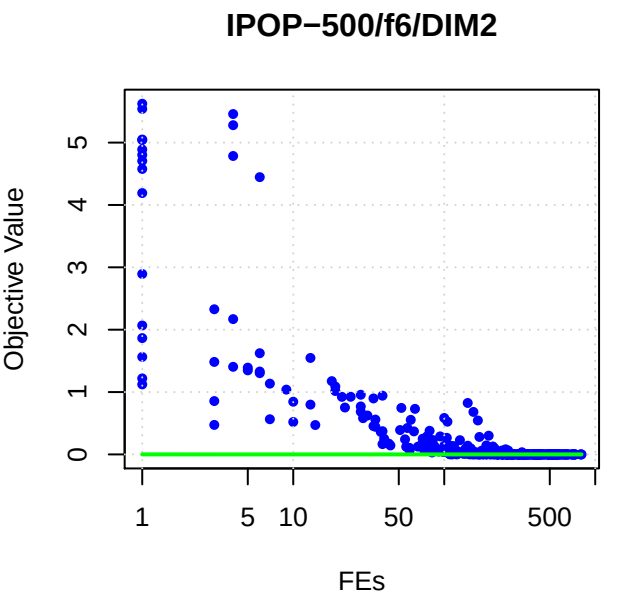
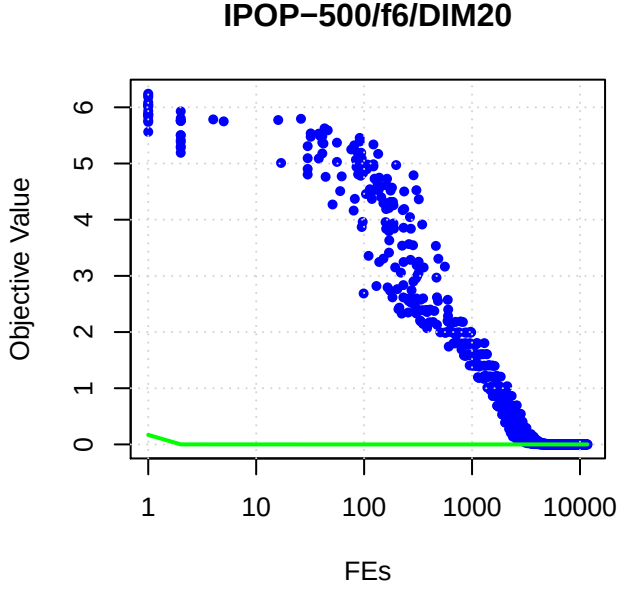
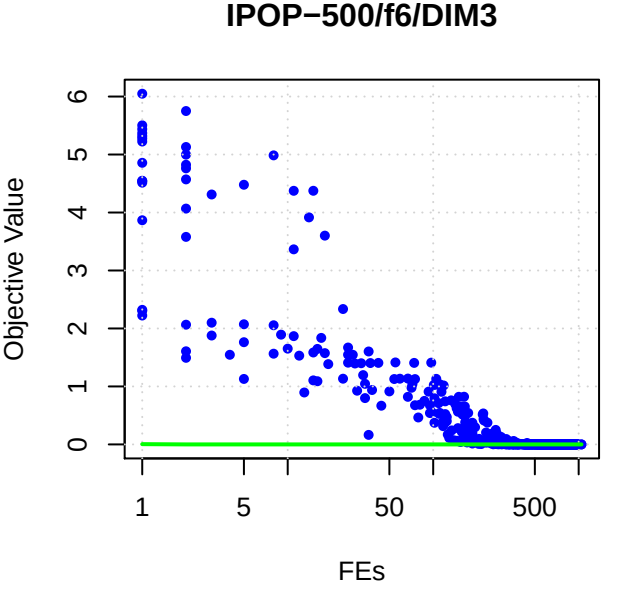
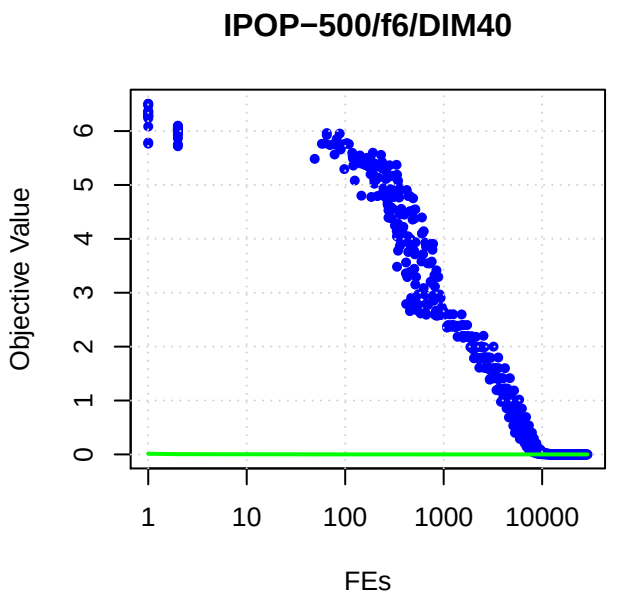
1
2
3
4
5
6
1
5
50
500
5000
FEs


IPOP−500/f6/DIM2
Objective Value
0
1
2
3
4
5
1
5
10
50
500
FEs


IPOP−500/f6/DIM20
Objective Value
0
1
2
3
4
5
6
1
10
100
1000
10000
FEs


IPOP−500/f6/DIM3
Objective Value
0
1
2
3
4
5
6
1
5
50
500
FEs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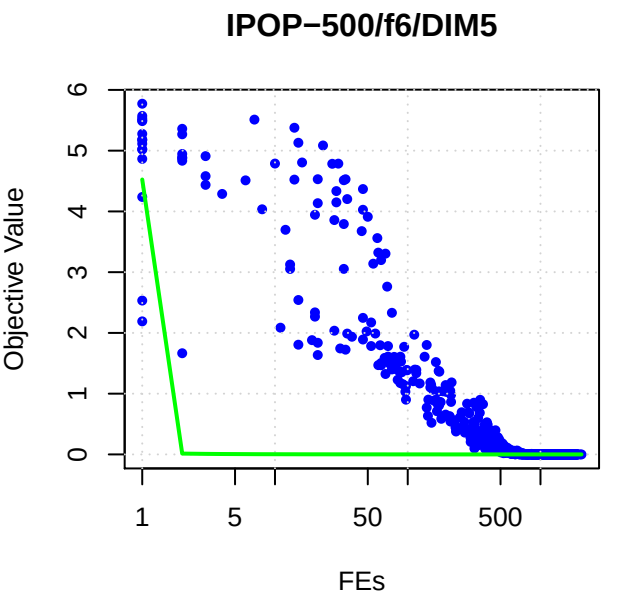
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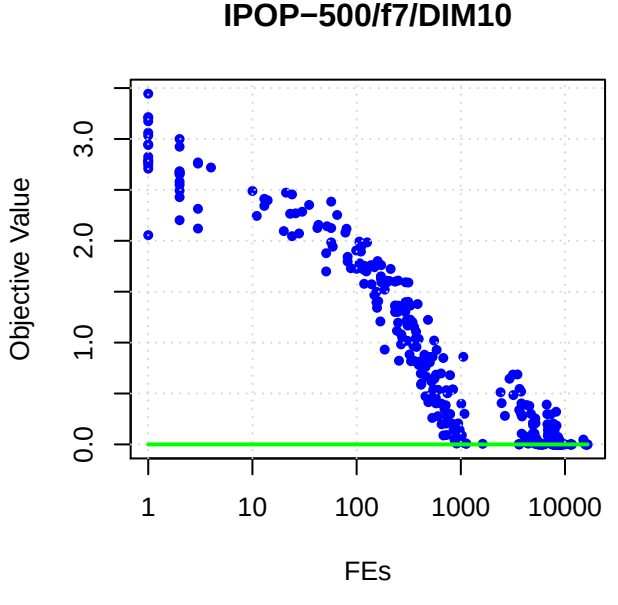
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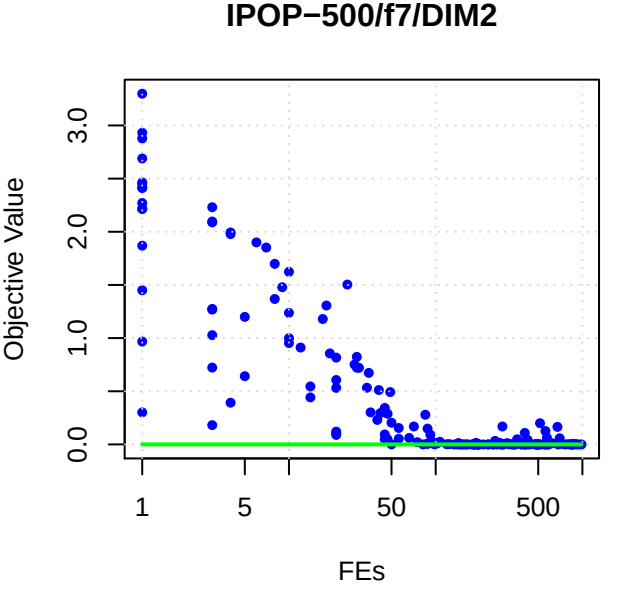
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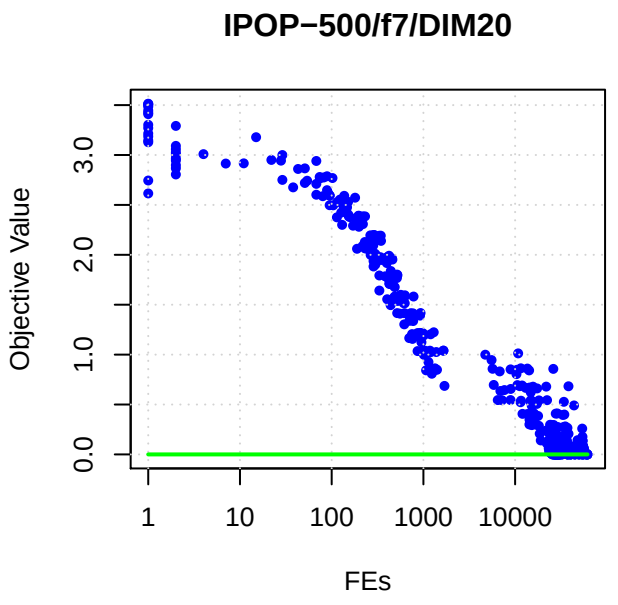
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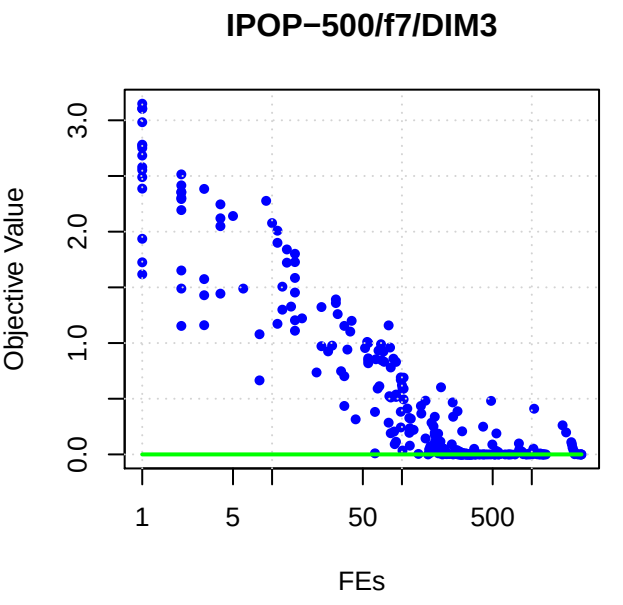
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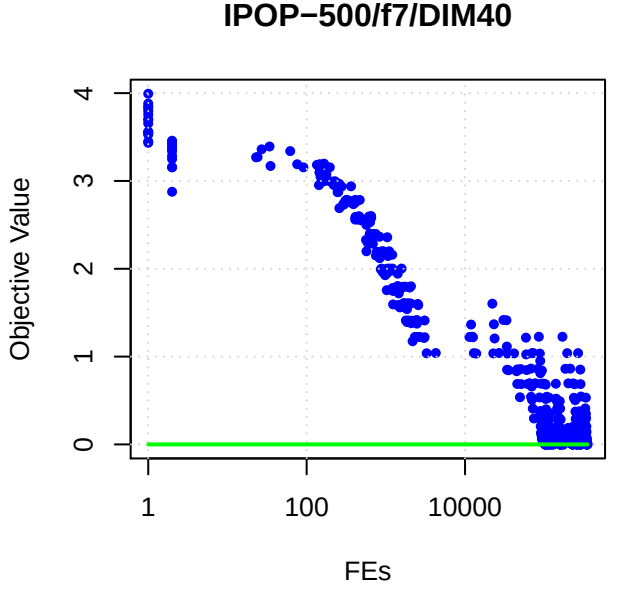
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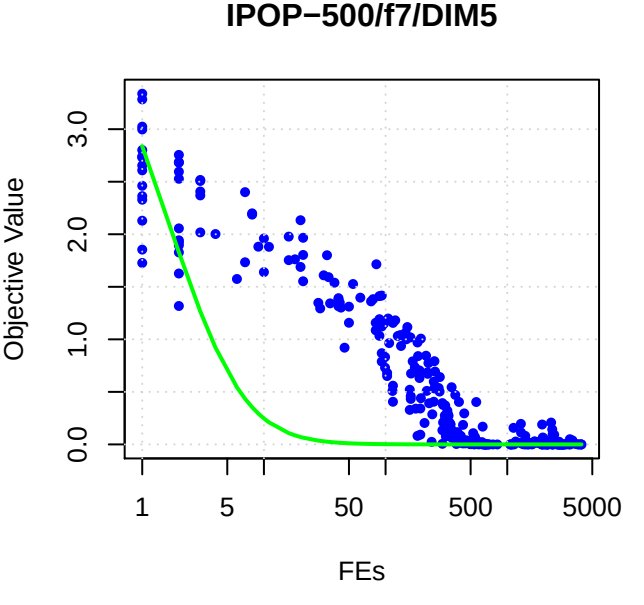
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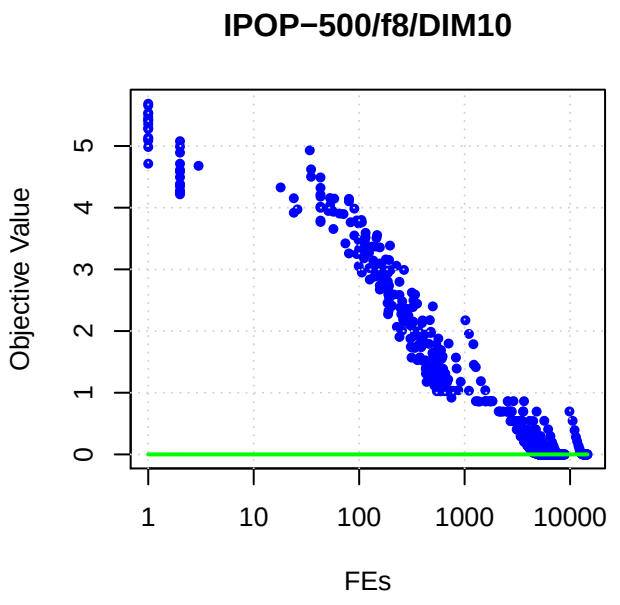
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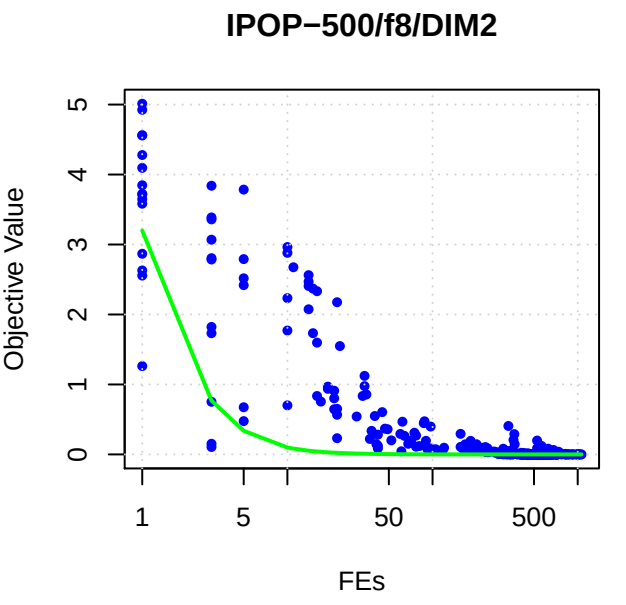
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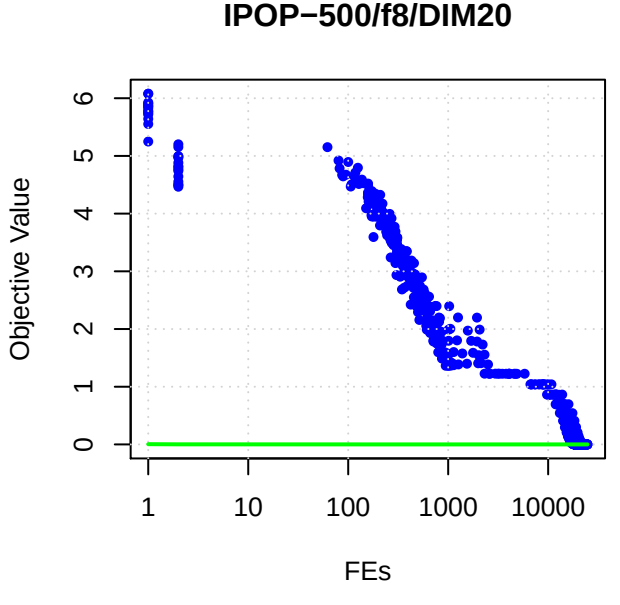
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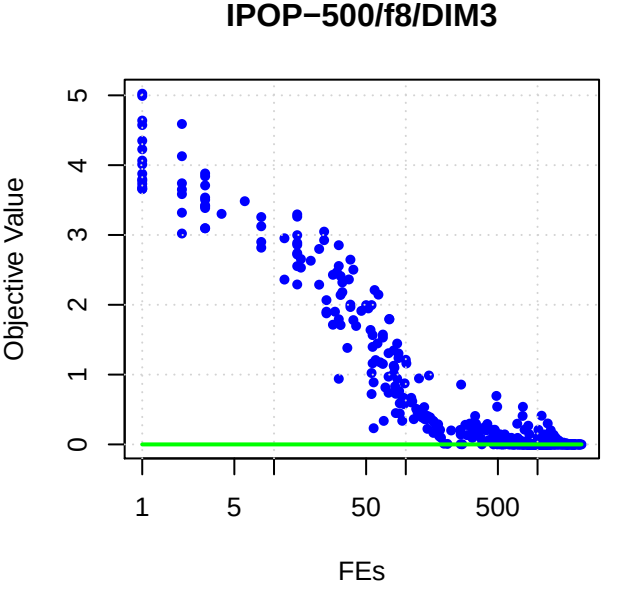
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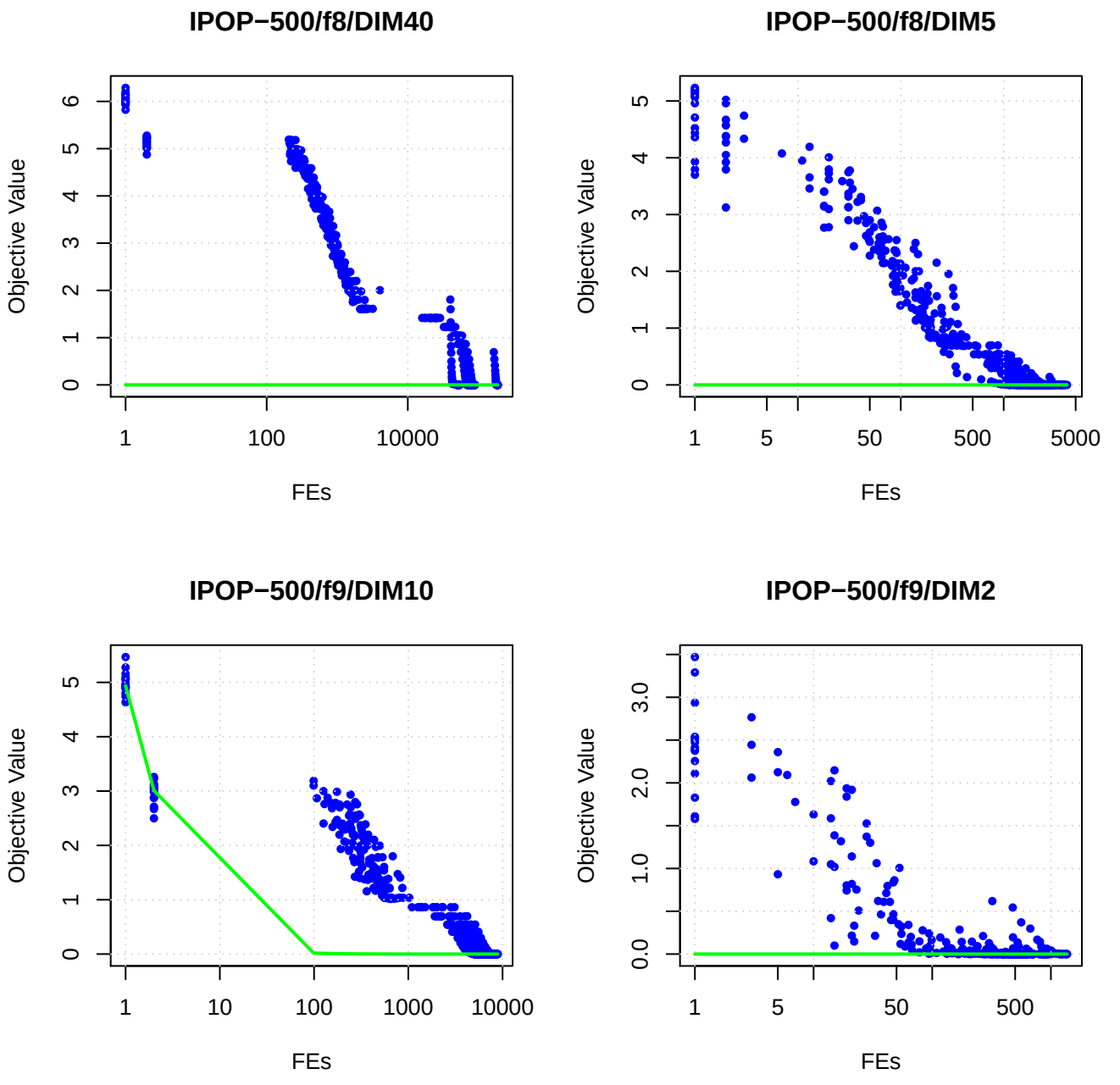
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FEs
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Objective Value
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1
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5000
FEs
IPOP−500/f9/DIM10
Objective Value
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1000
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Objective Value
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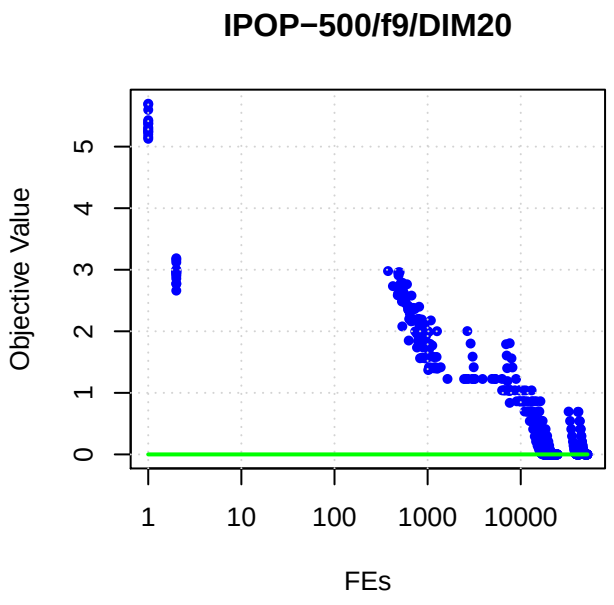
FEs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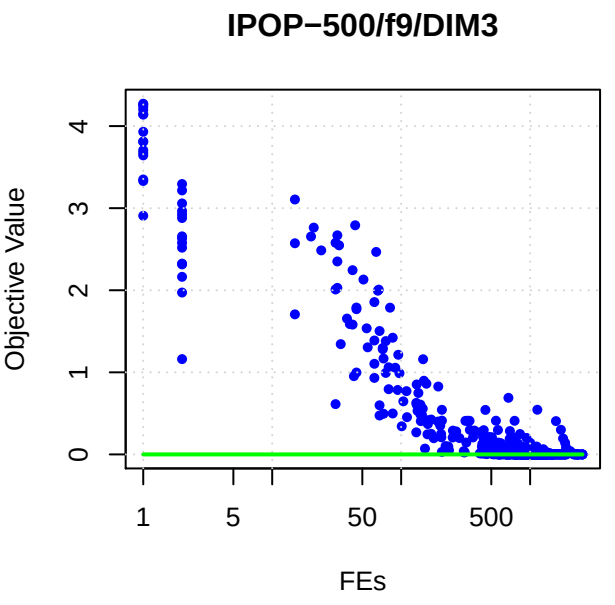
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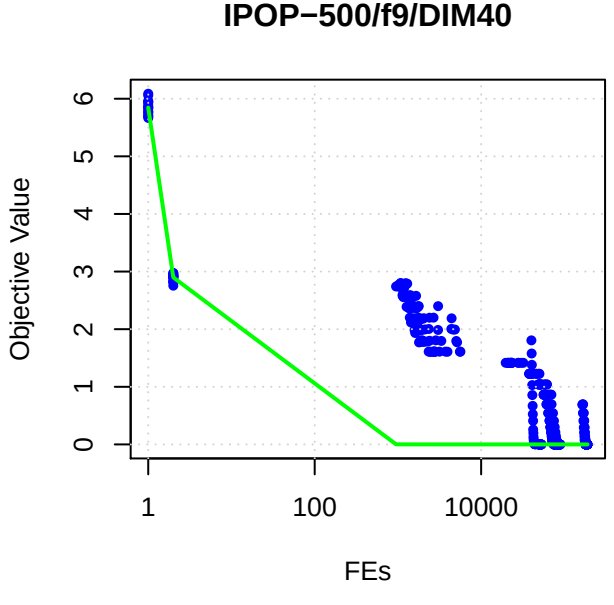
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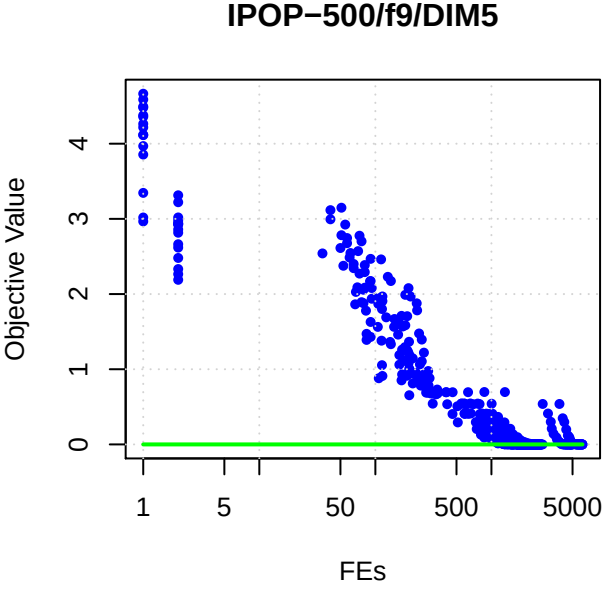
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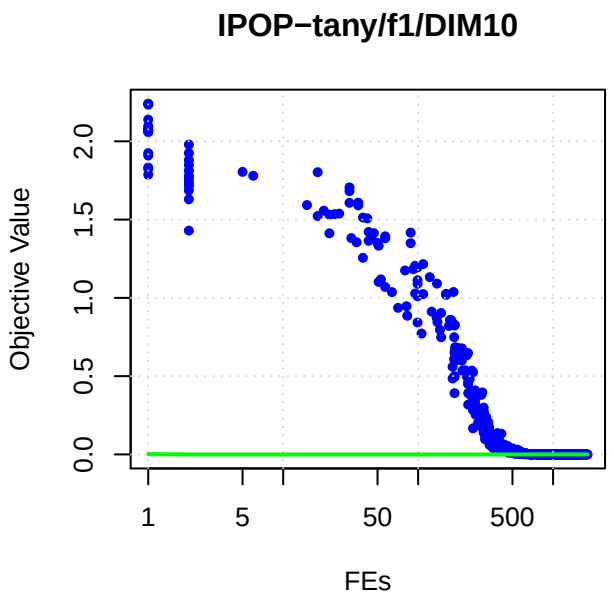
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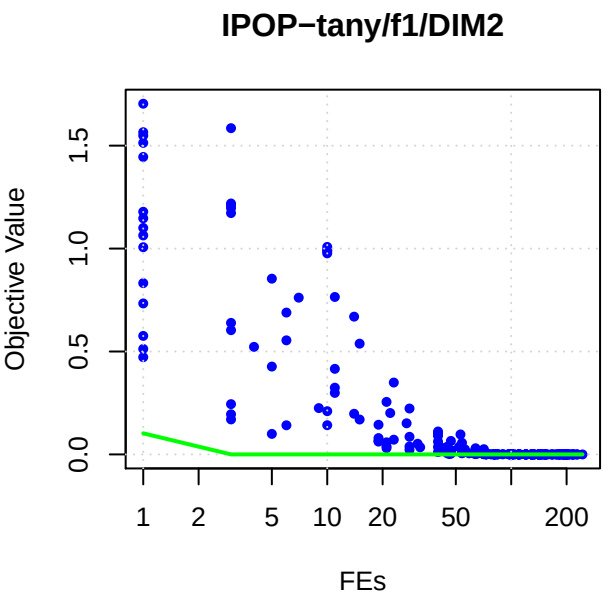
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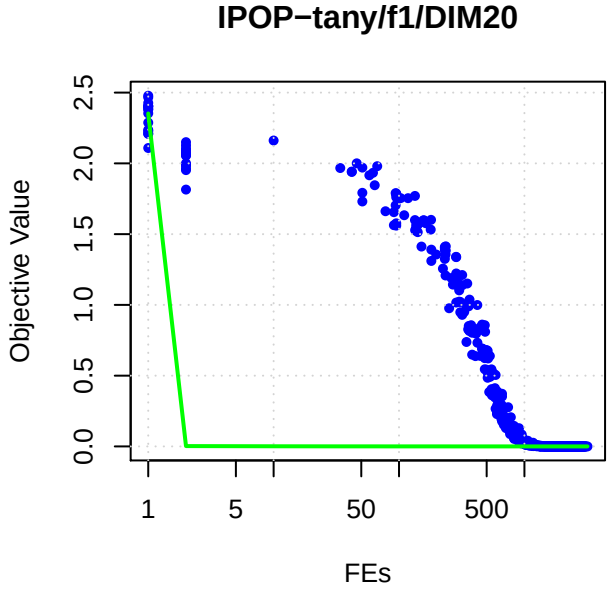
FEs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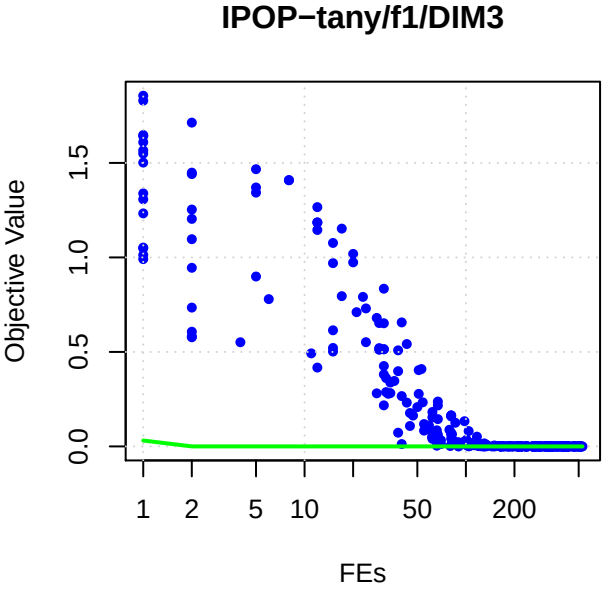
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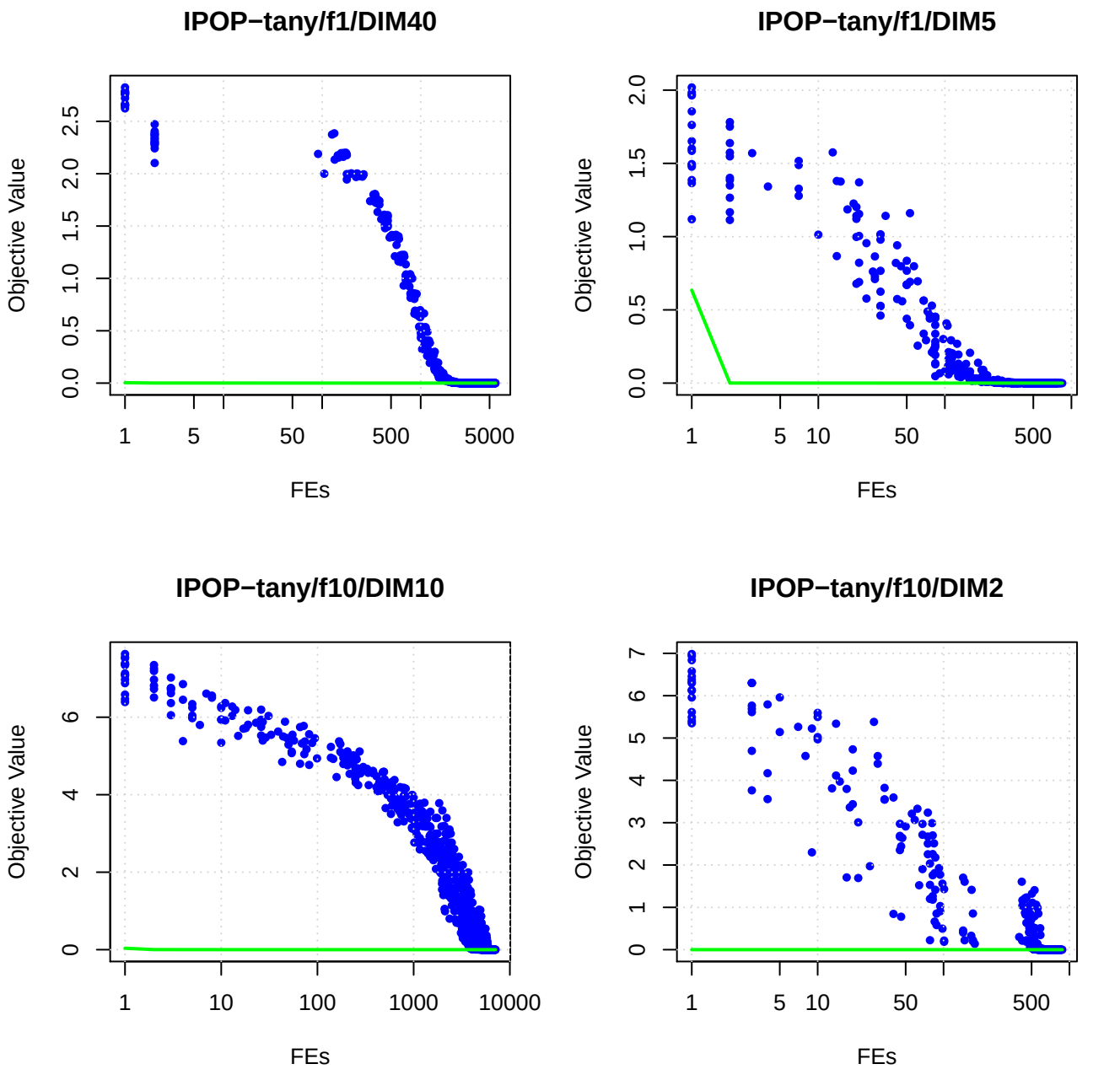
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FEs
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Objective Value
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FEs
IPOP−tany/f10/DIM10
Objective Value
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FEs
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Objective Value
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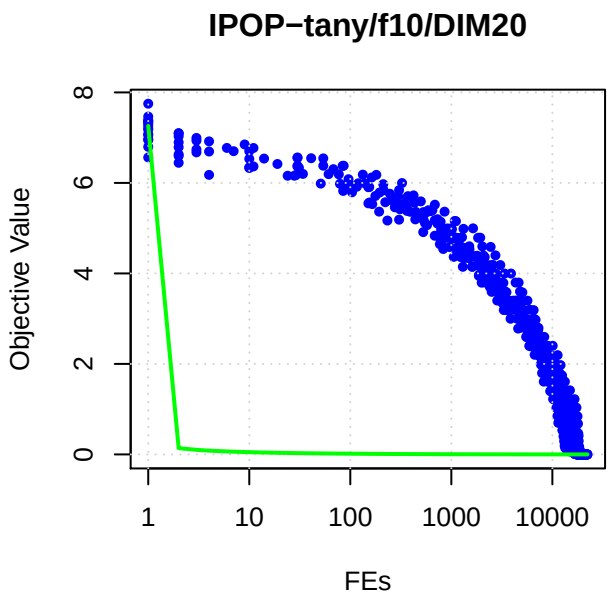
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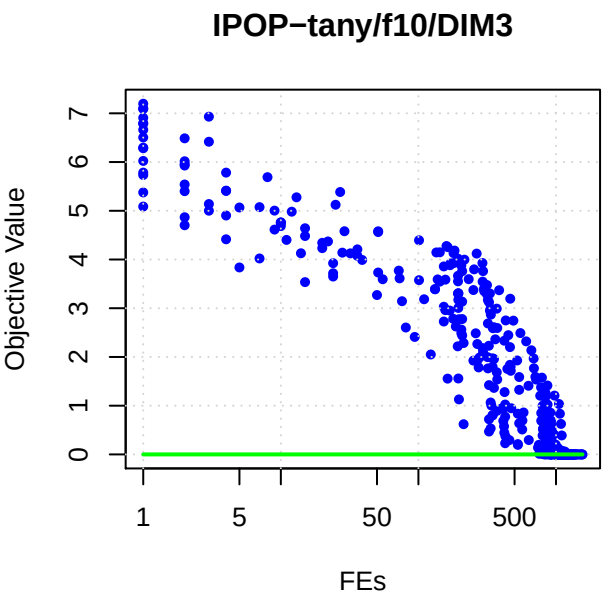
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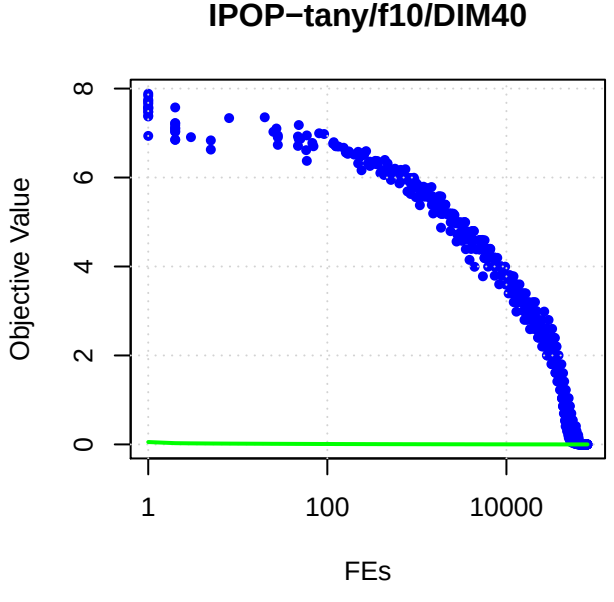
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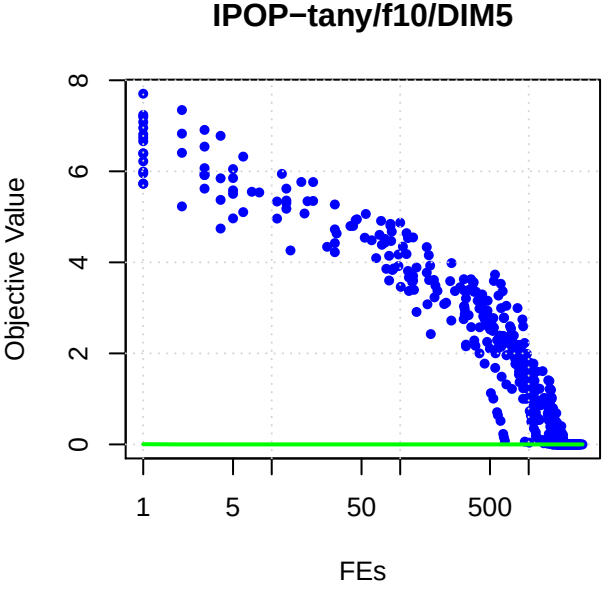
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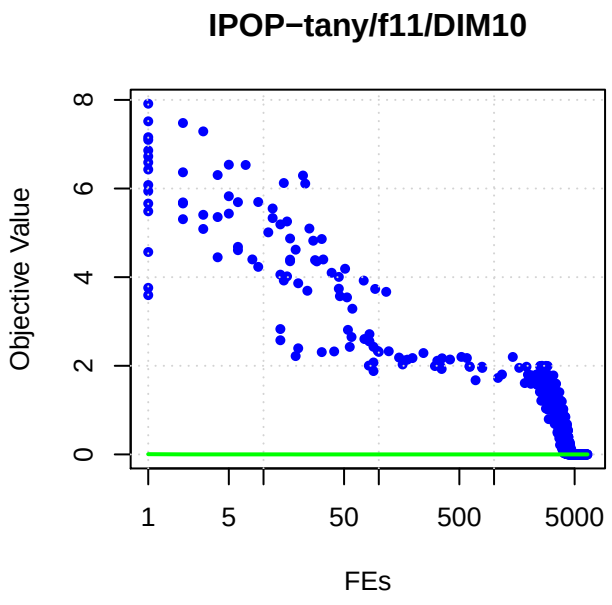
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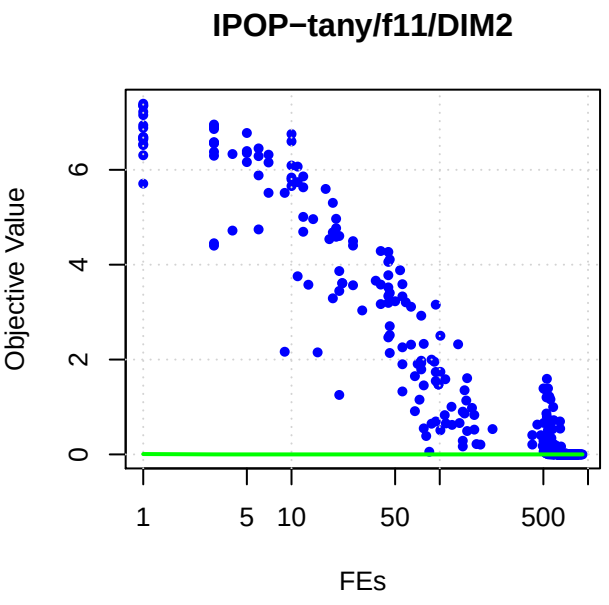
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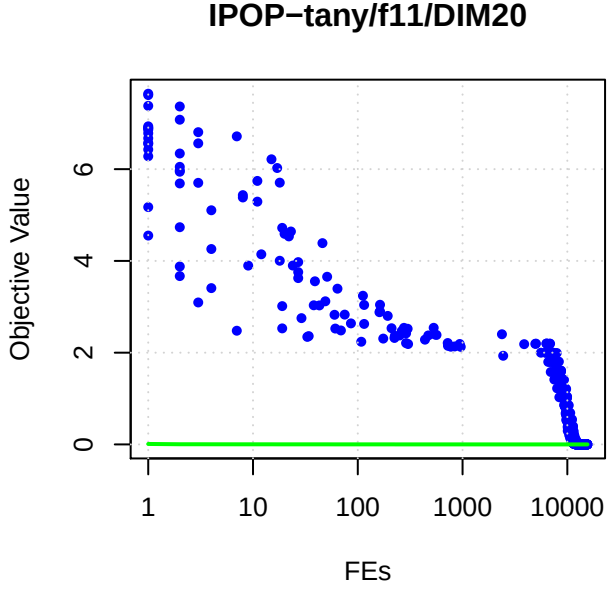
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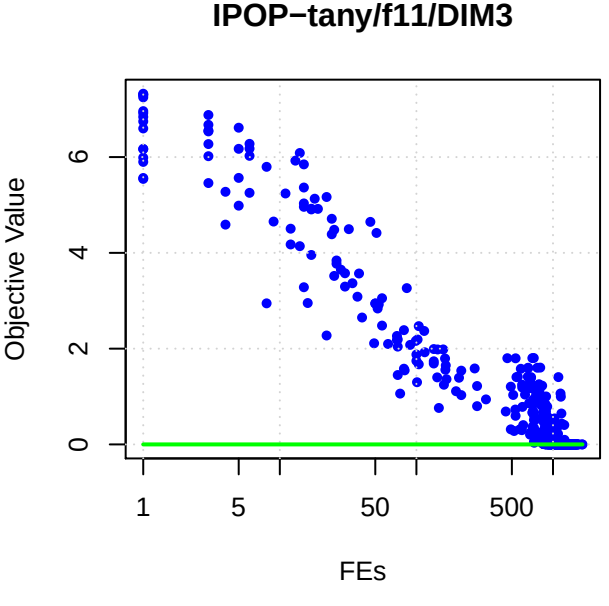
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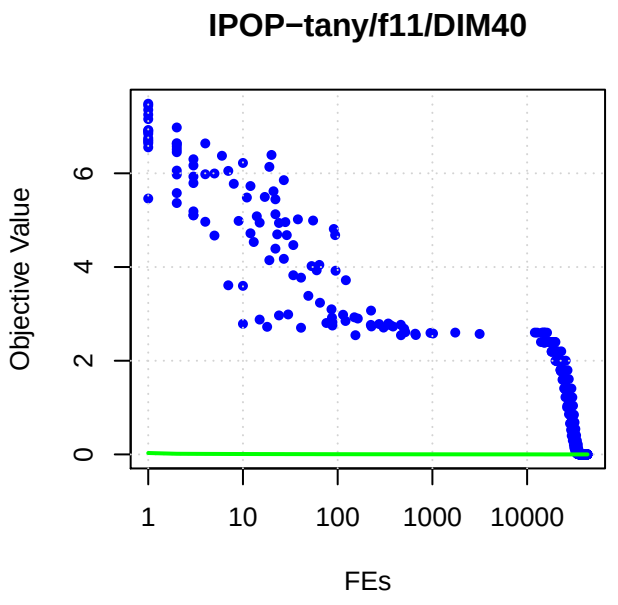
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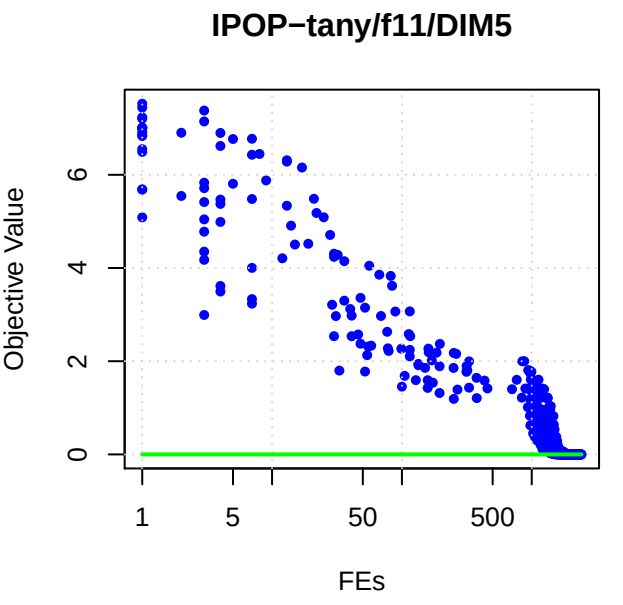
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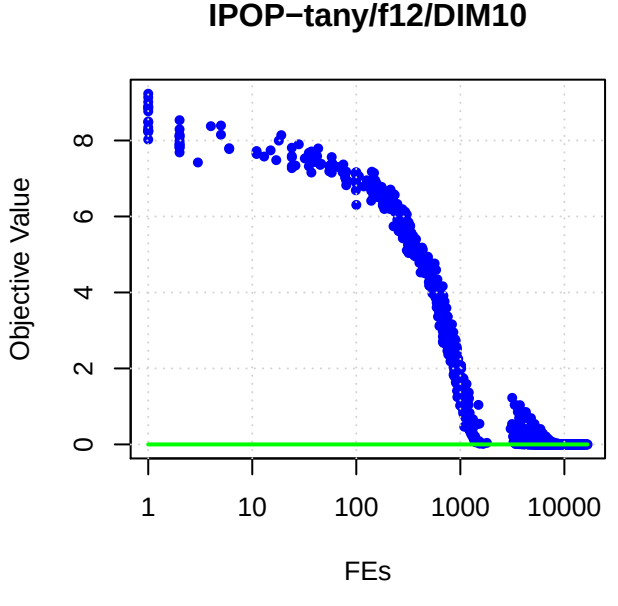
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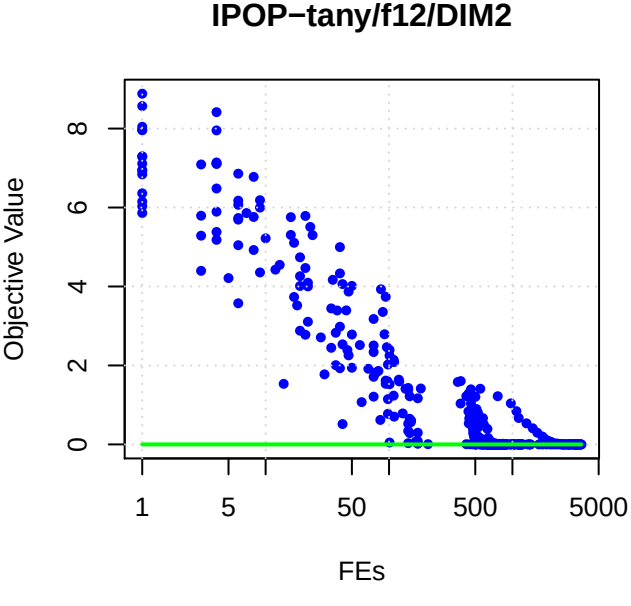
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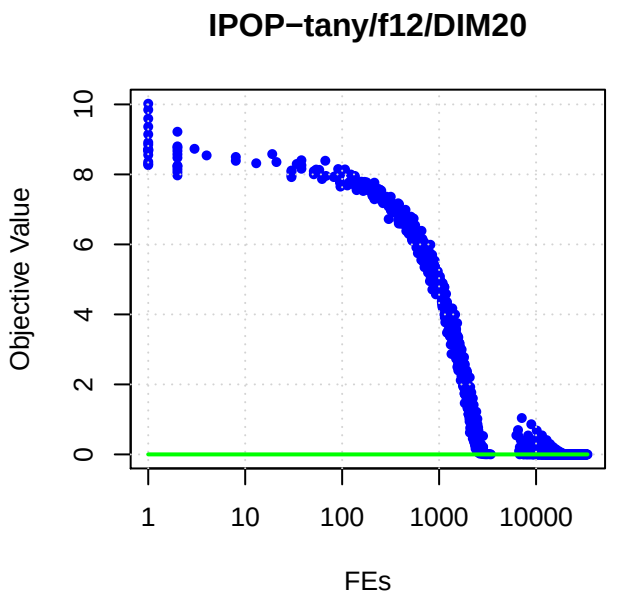
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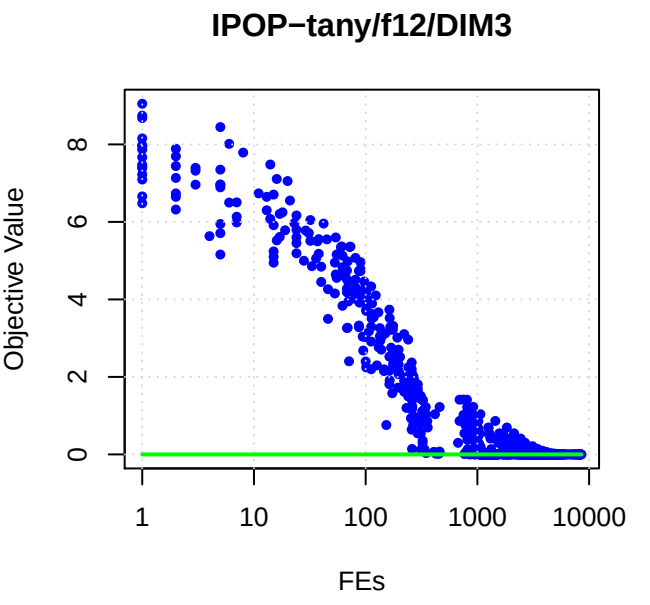
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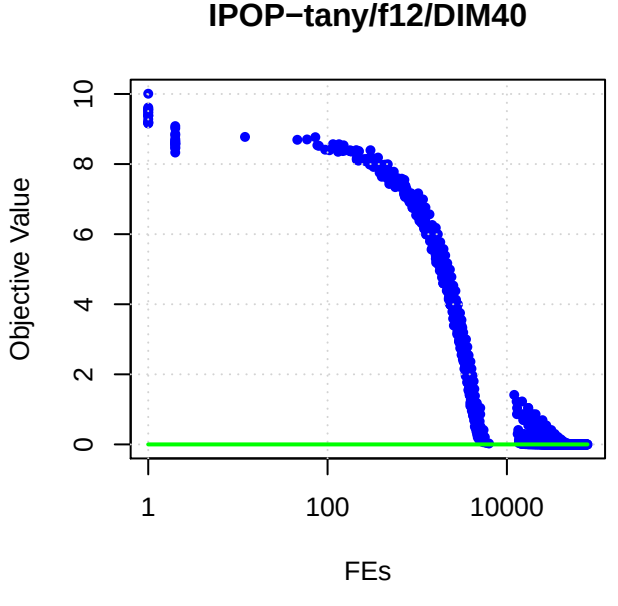
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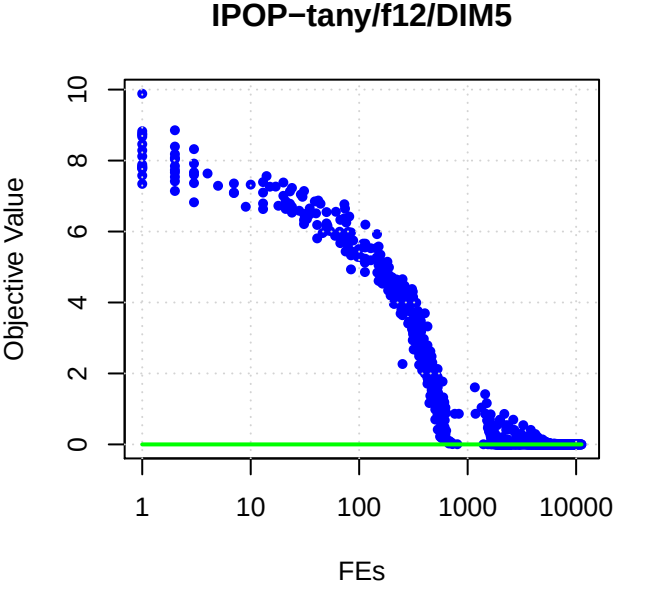
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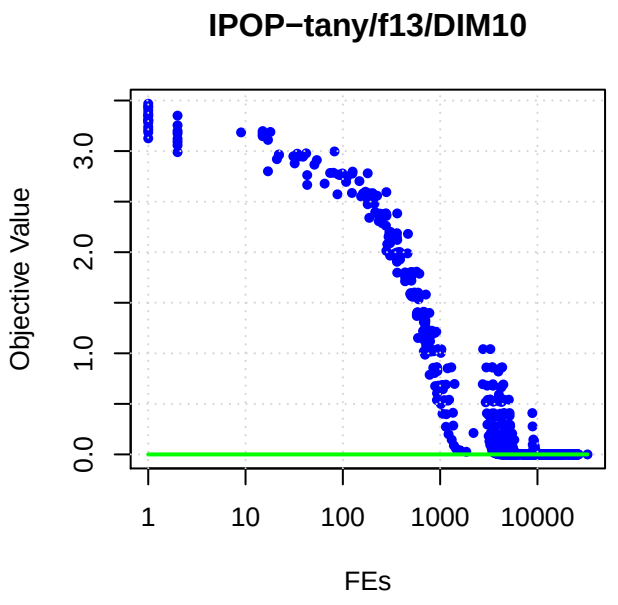
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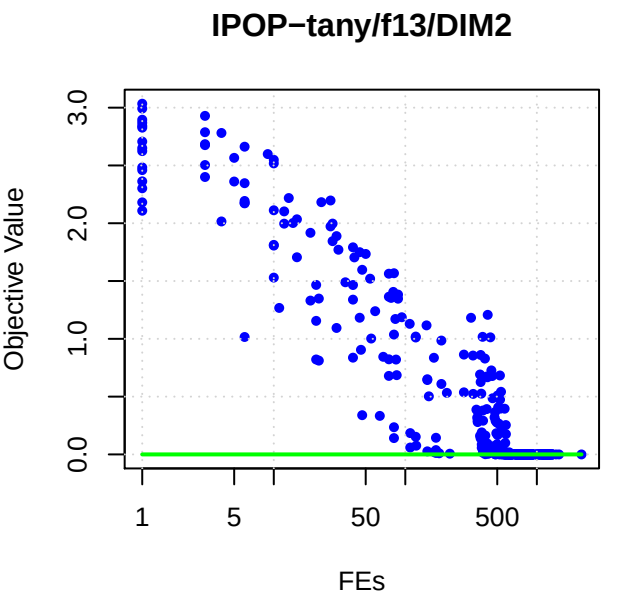
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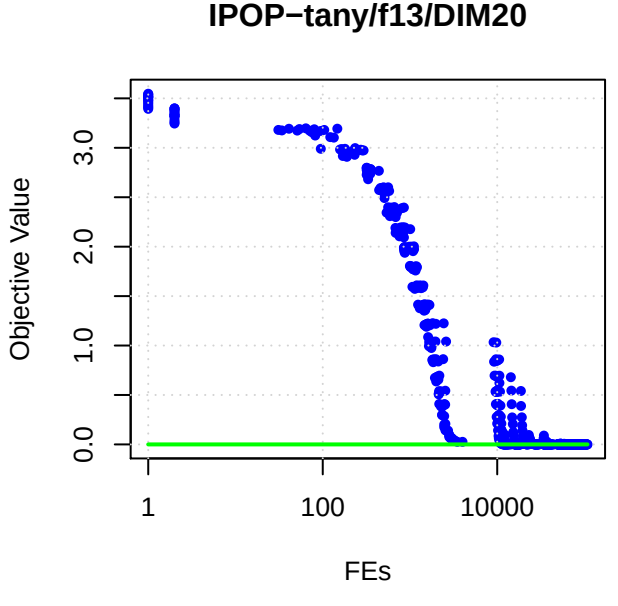
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10000
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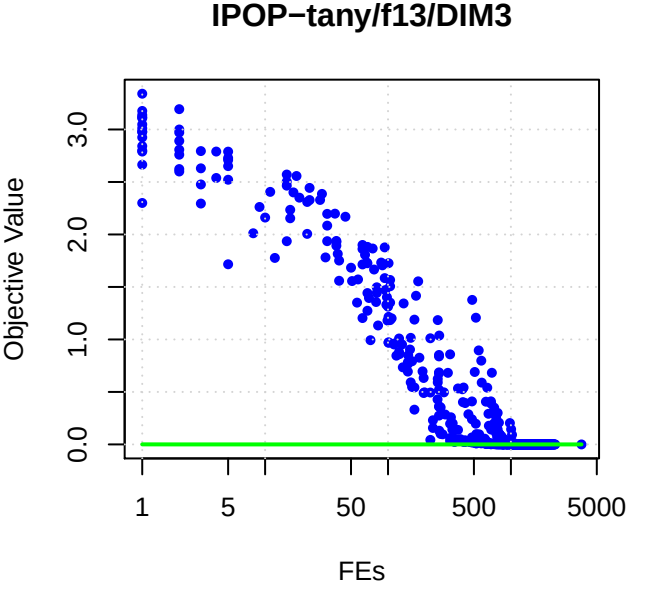
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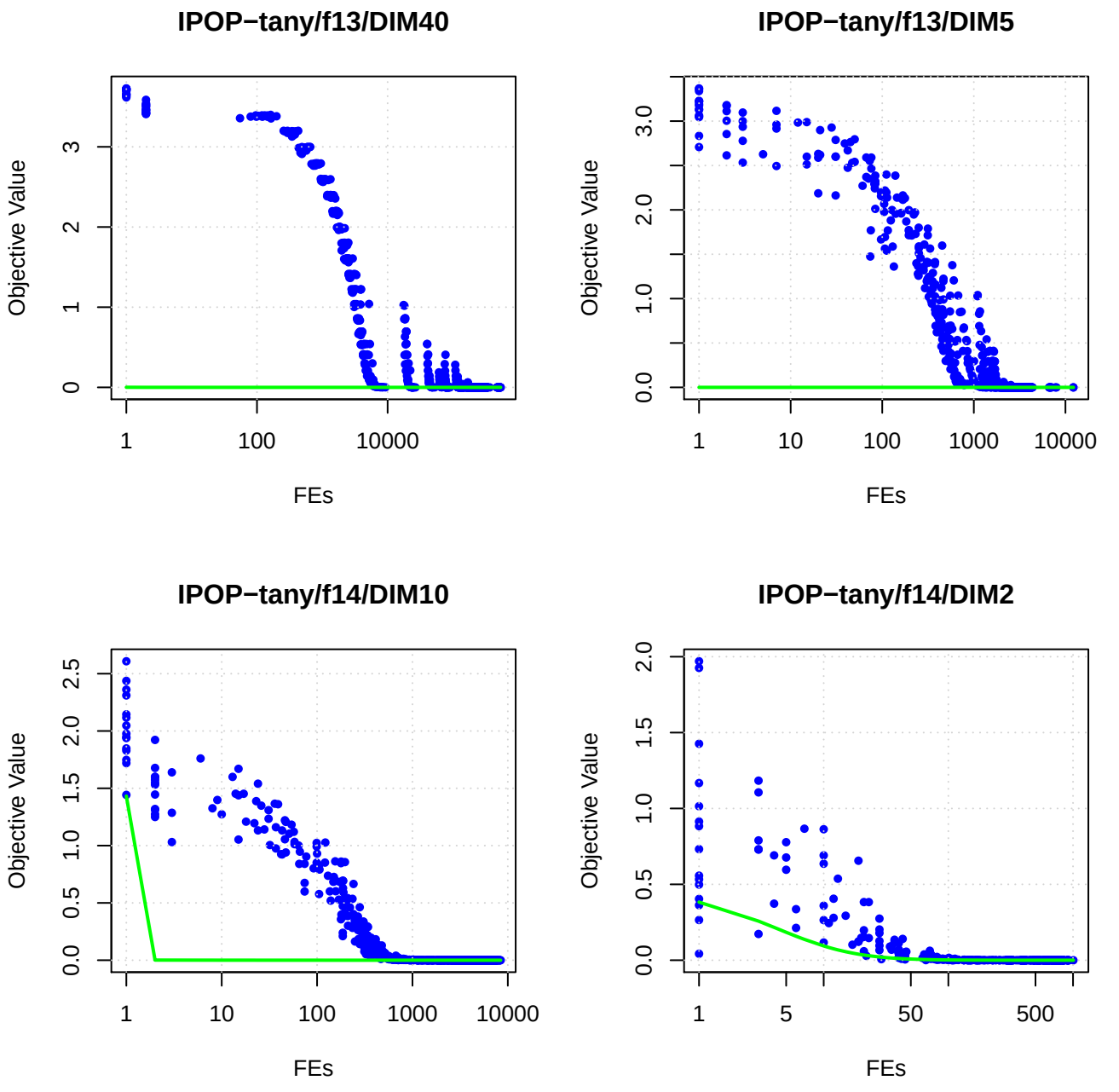
FEs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3
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100
10000
FEs
IPOP−tany/f13/DIM5
Objective Value
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1.0
2.0
3.0
1
10
100
1000
10000
FEs
IPOP−tany/f14/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs
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Objective Value
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1.5
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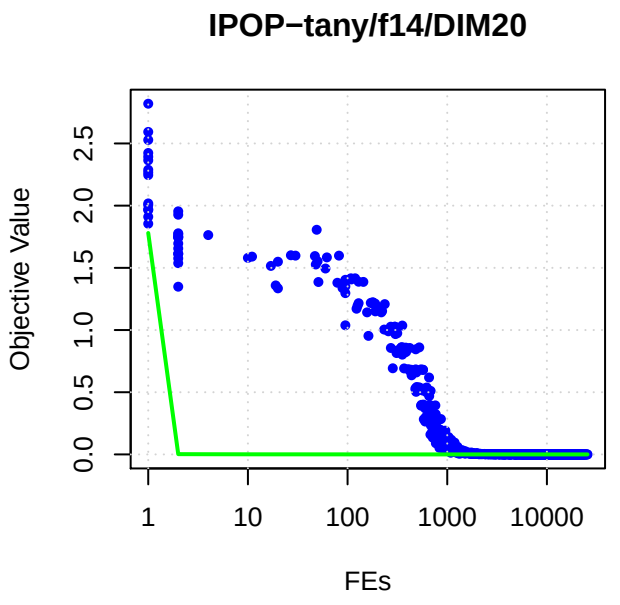
1
5
50
500
FEs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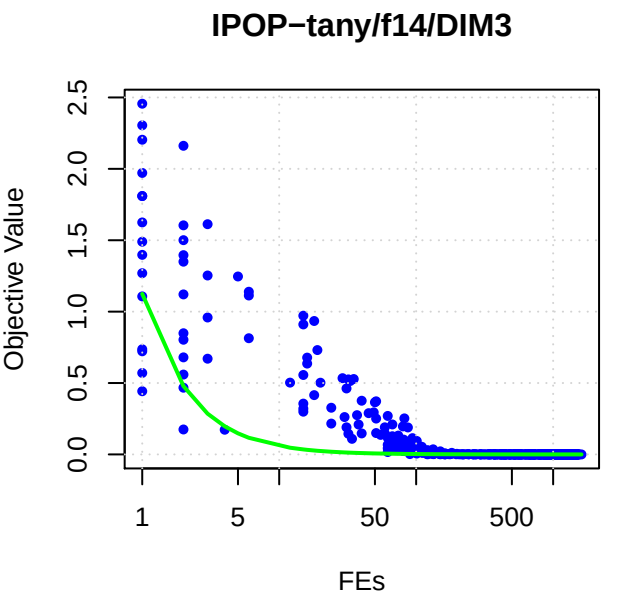
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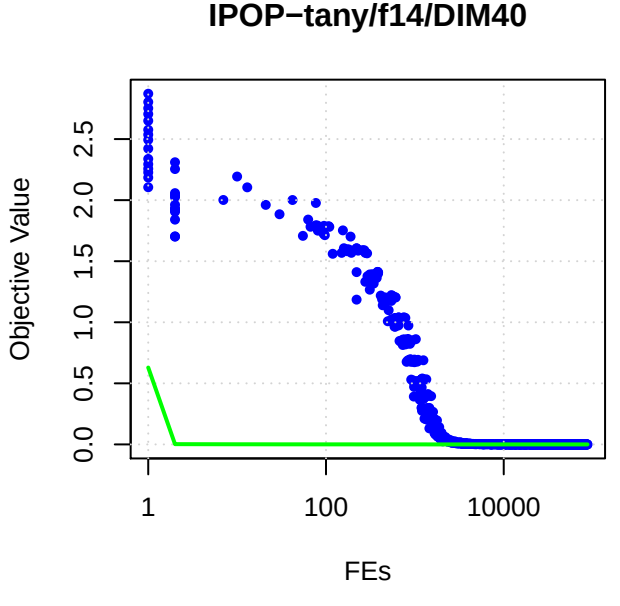
FEs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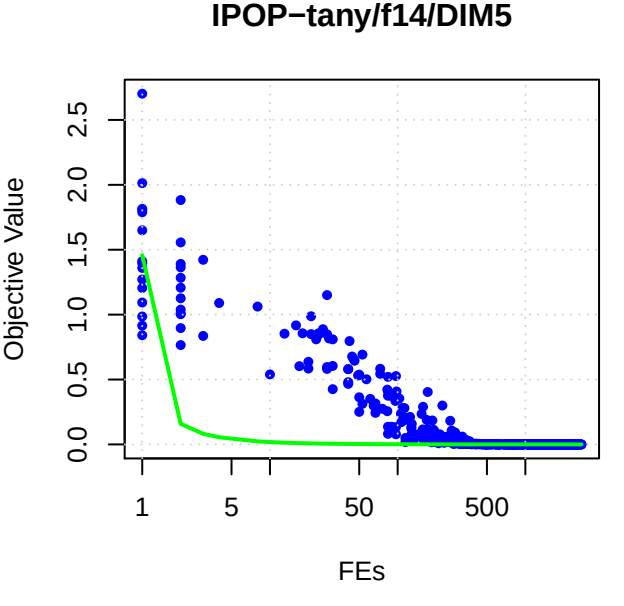
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Objective Value
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1.5
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2.5
1
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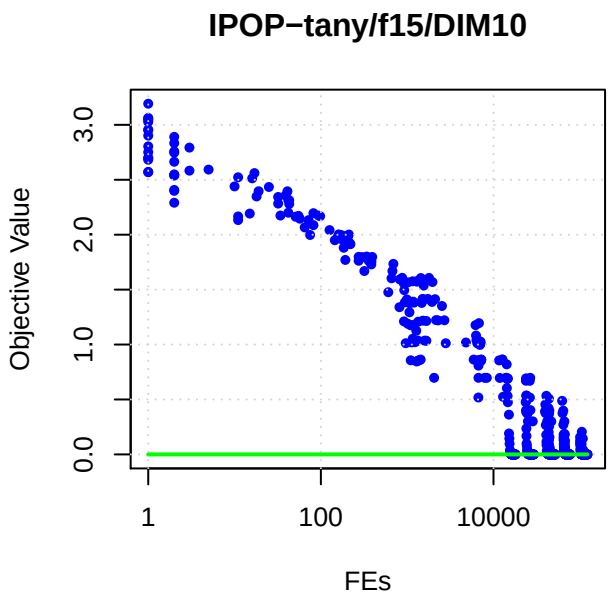
FEs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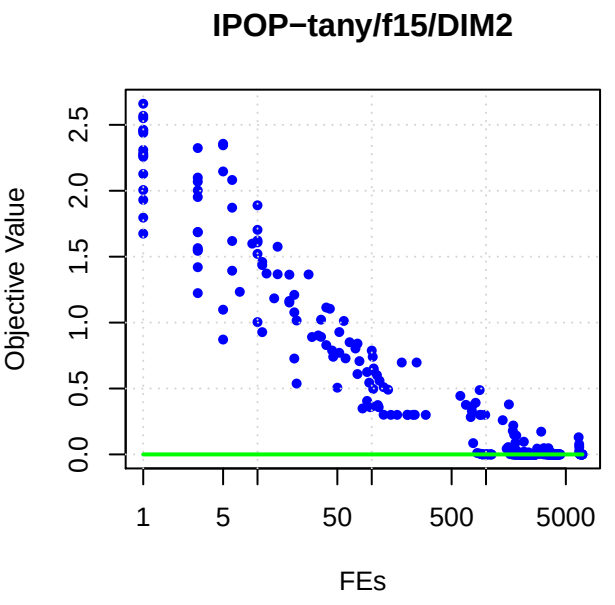
10000
FEs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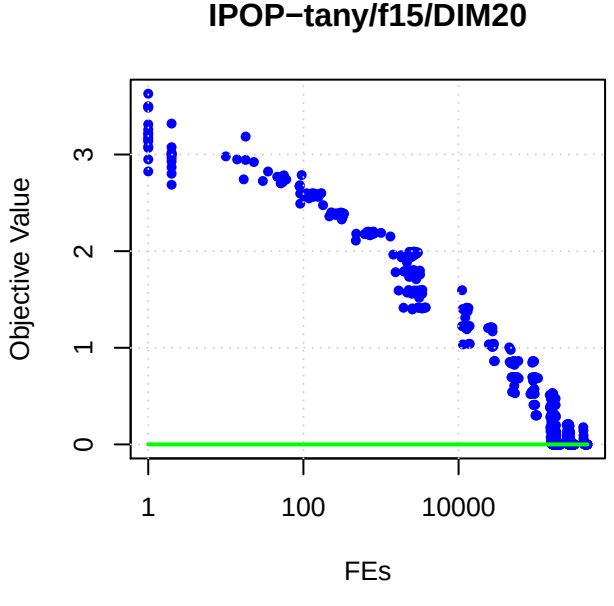
5000
FEs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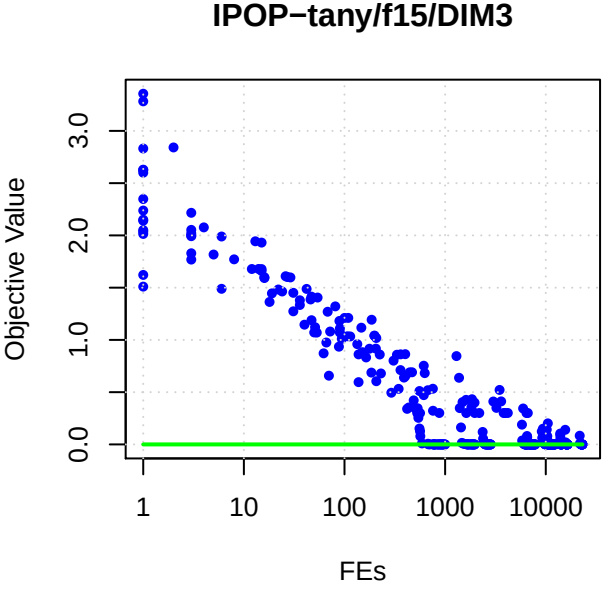
10000
FEs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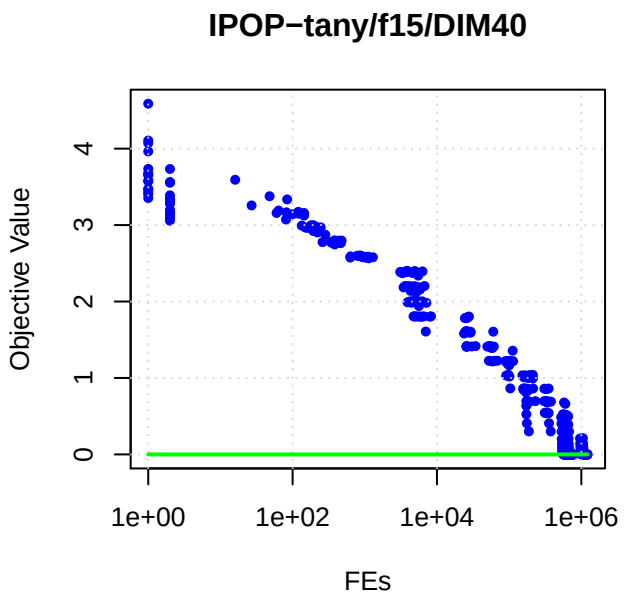
1000
10000
FEs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4
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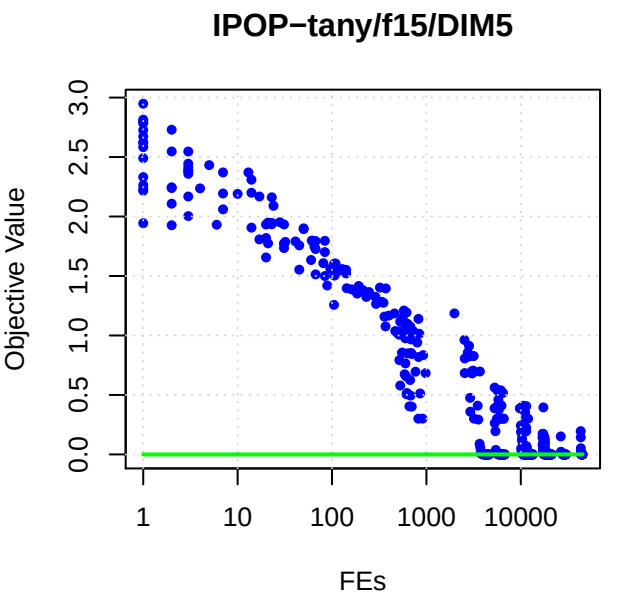
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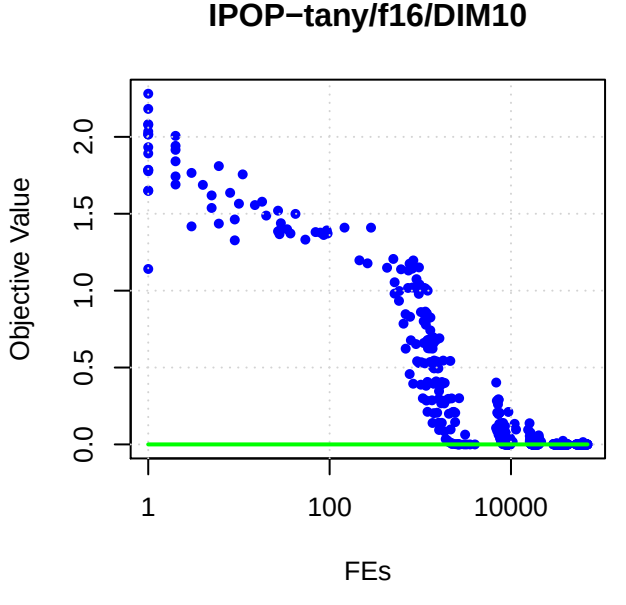
1000
10000
FEs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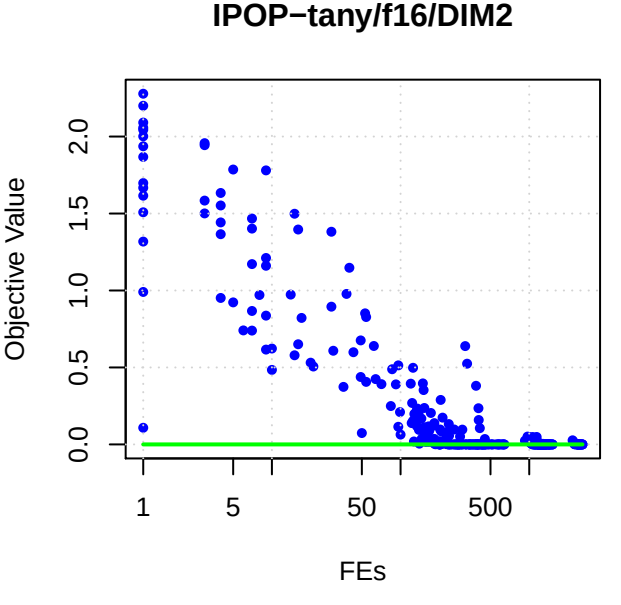
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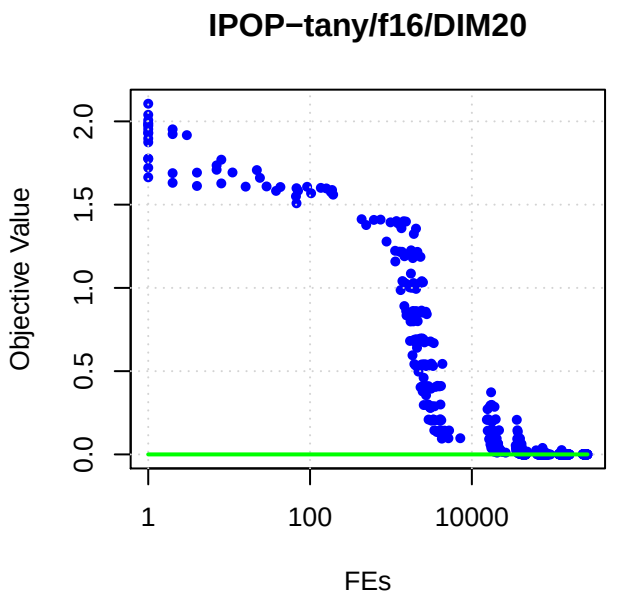
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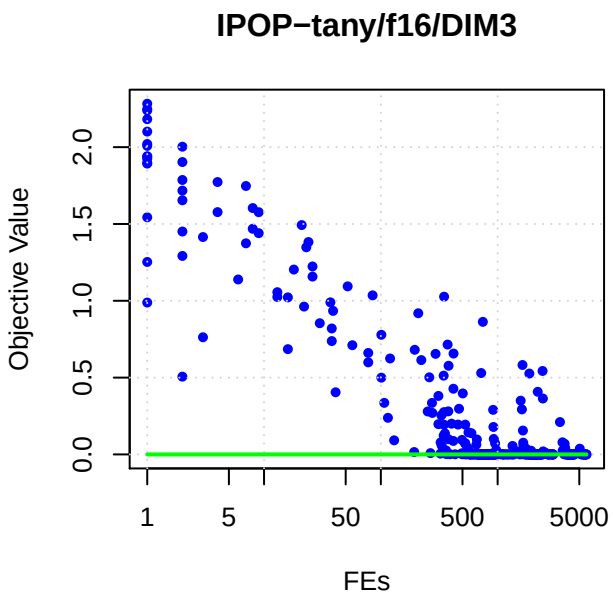
FEs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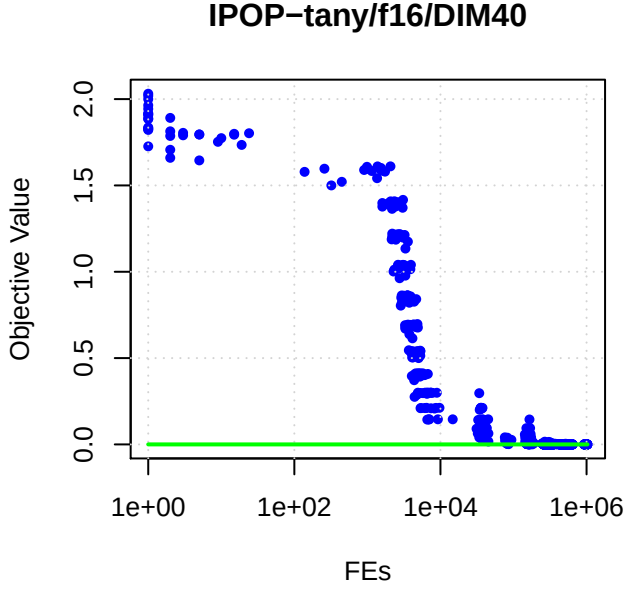
FEs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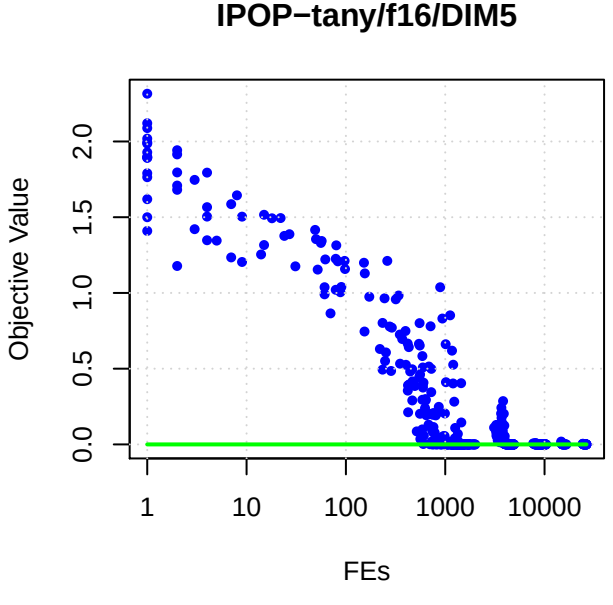
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10000
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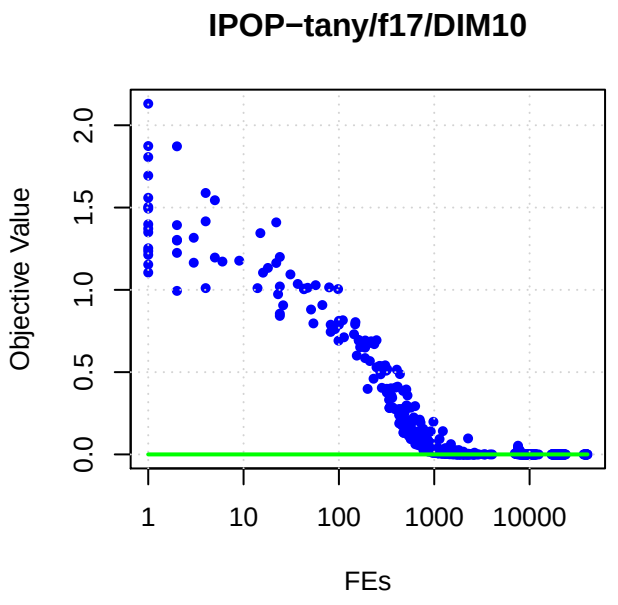
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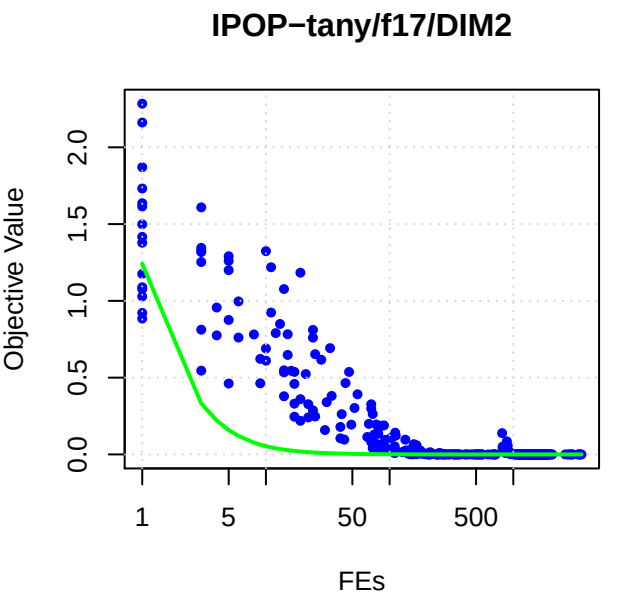
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1
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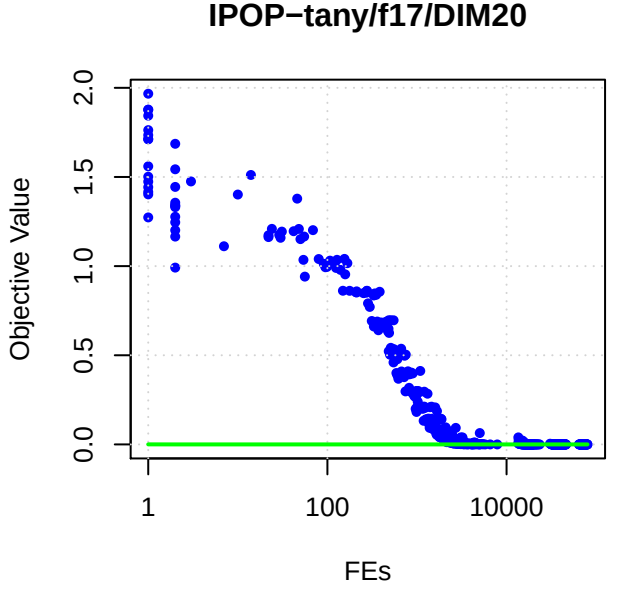
FEs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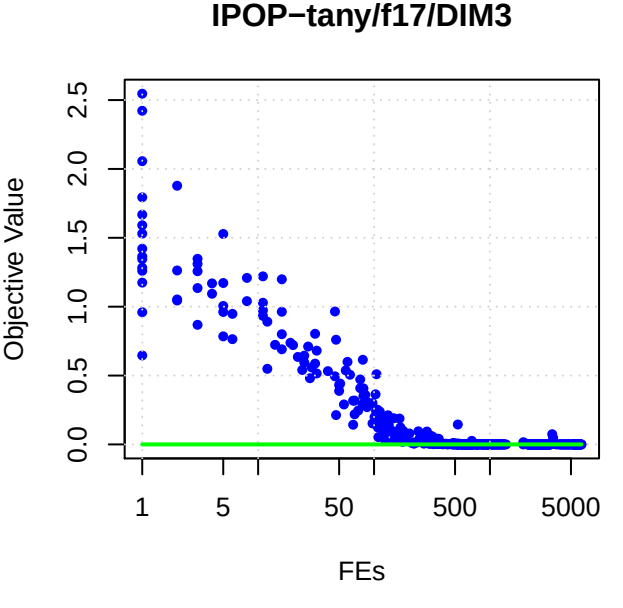
FEs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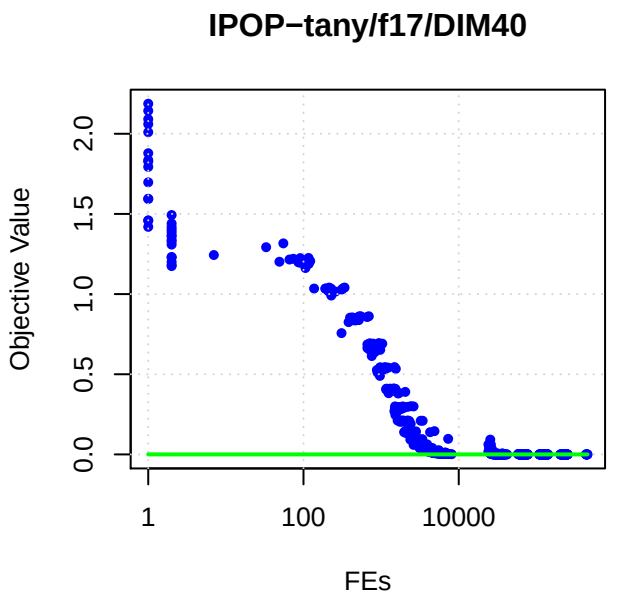
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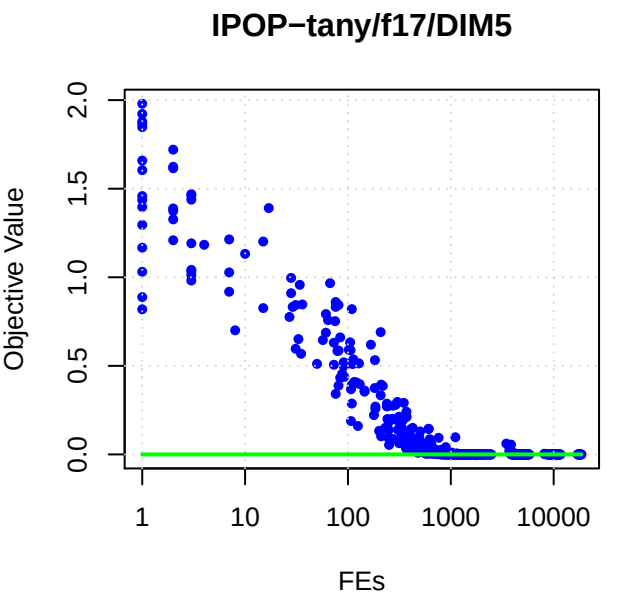
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10
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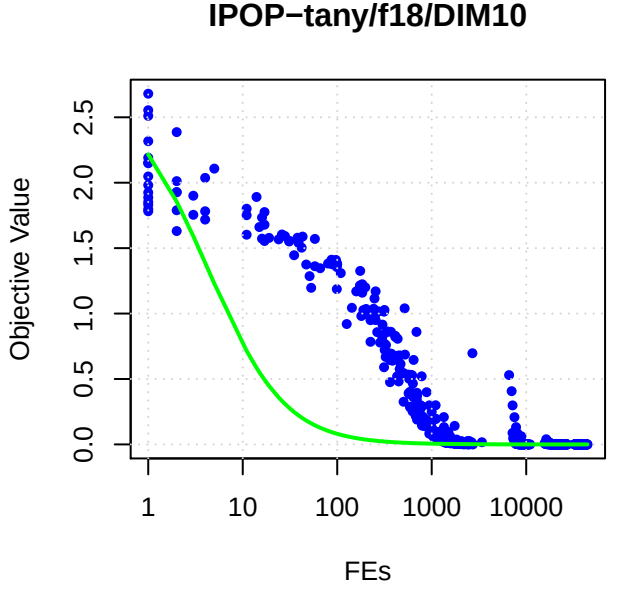
1000
10000
FEs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1000
10000
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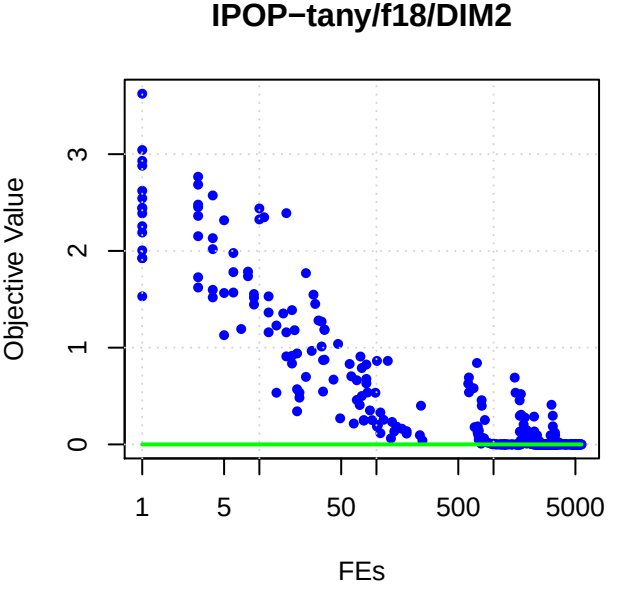
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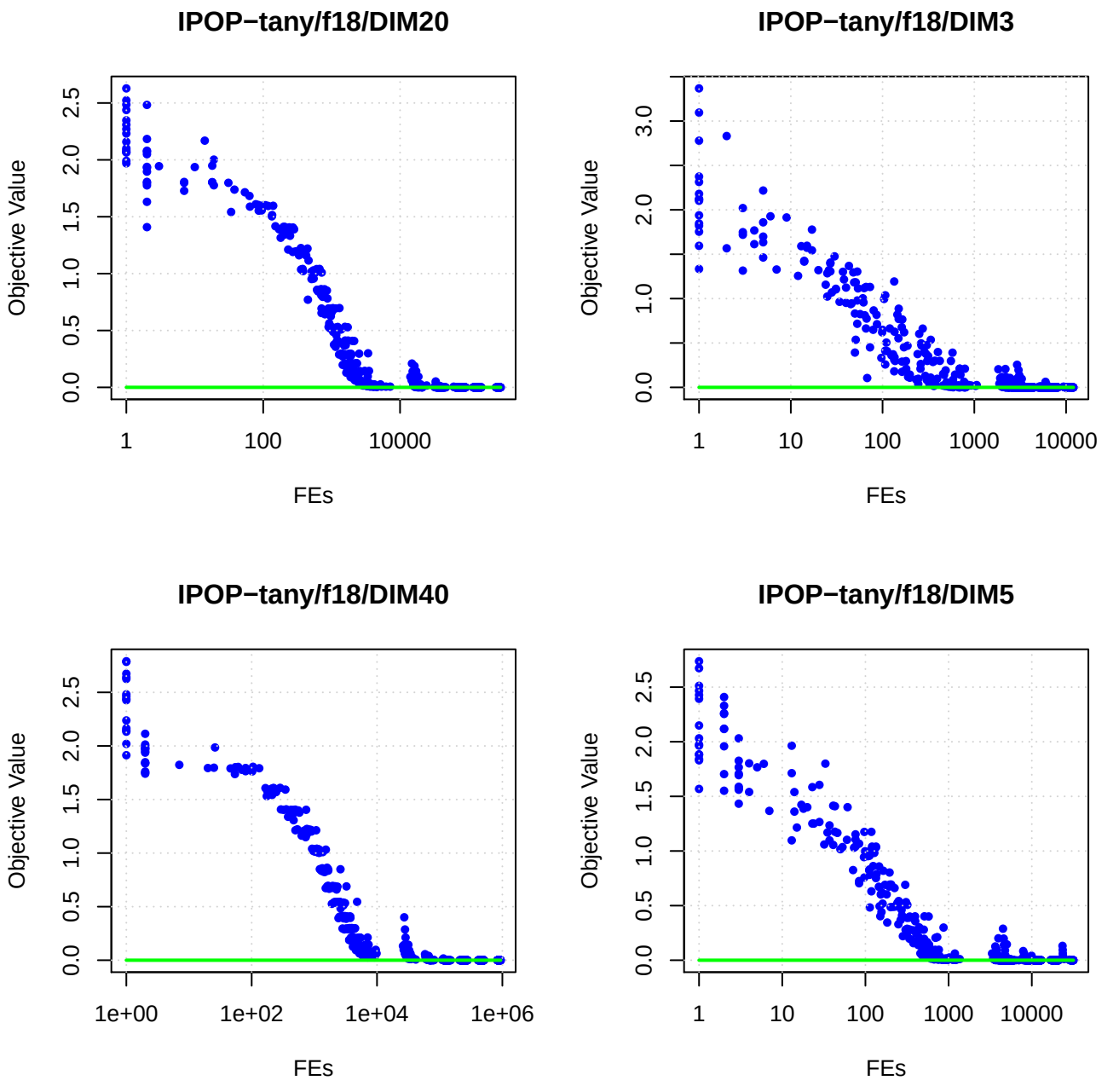
5000
FEs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IPOP−tany/f18/DIM3
Objective Value
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1000
10000
FEs
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Objective Value
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1e+02
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FEs
IPOP−tany/f18/DIM5
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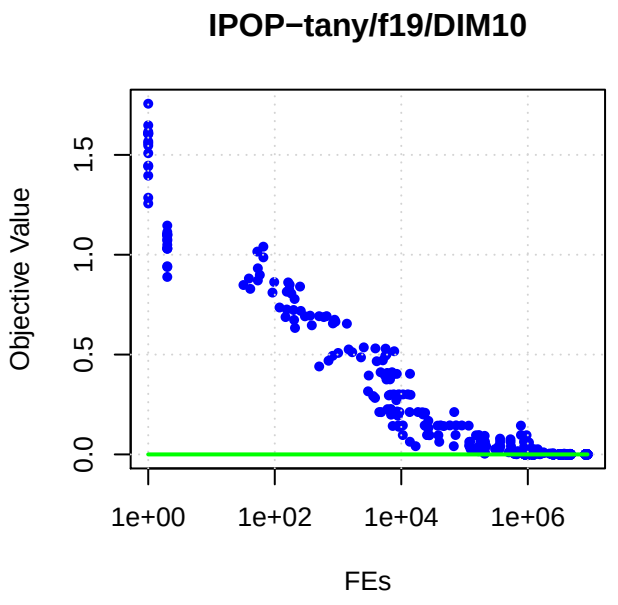
1000
10000
FEs


IPOP−tany/f19/DIM10
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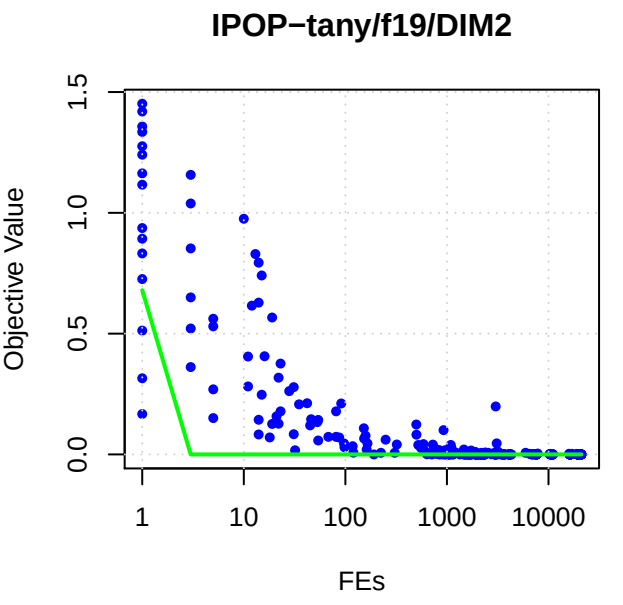
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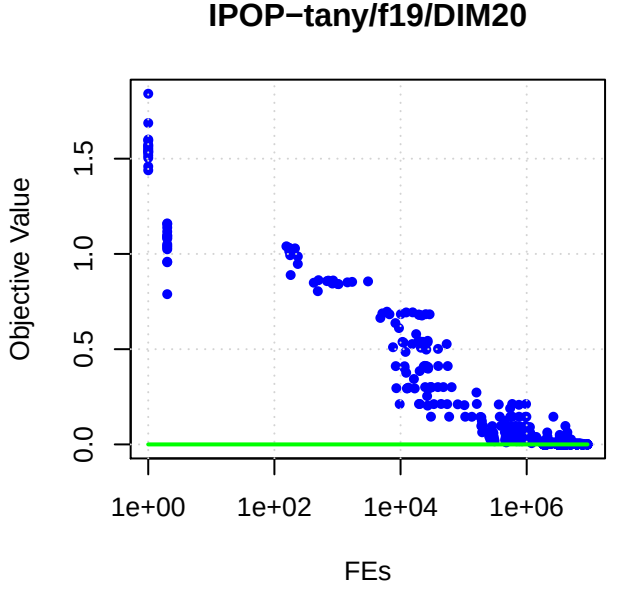
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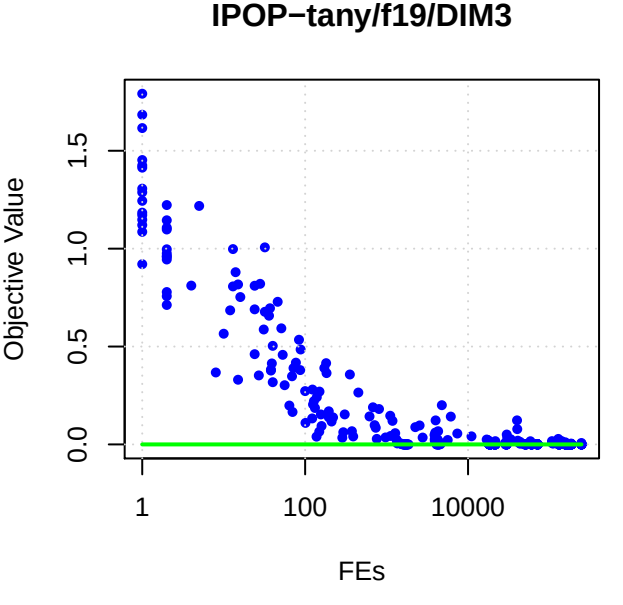
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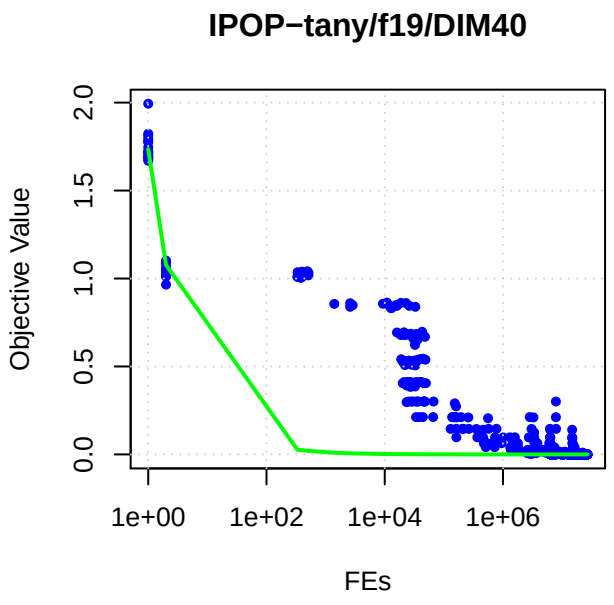
FEs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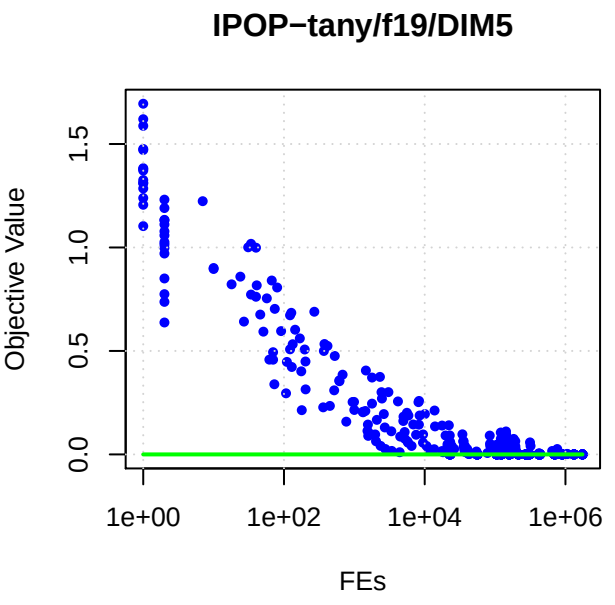
FEs


IPOP−tany/f19/DIM5
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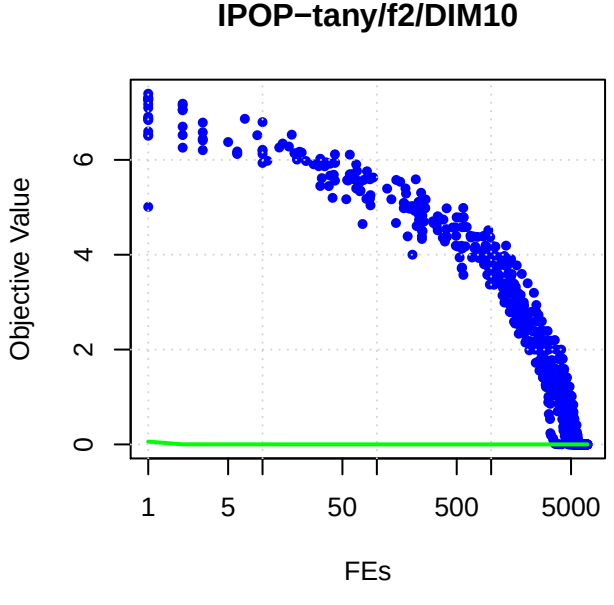
FEs


IPOP−tany/f2/DIM10
Objective Value
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6
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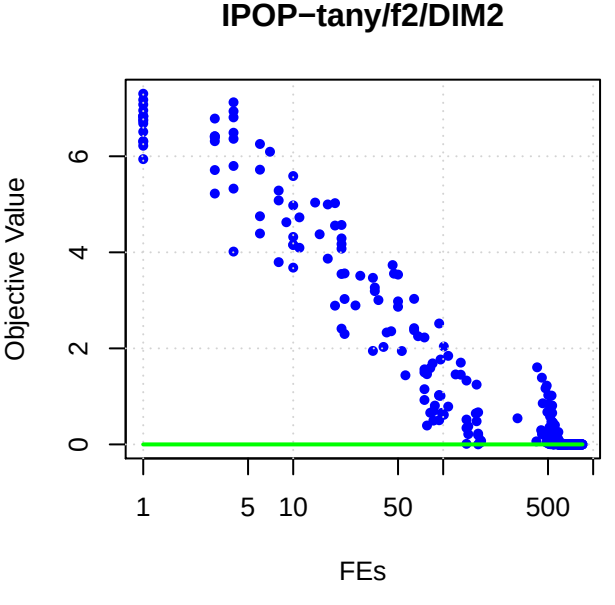
5000
FEs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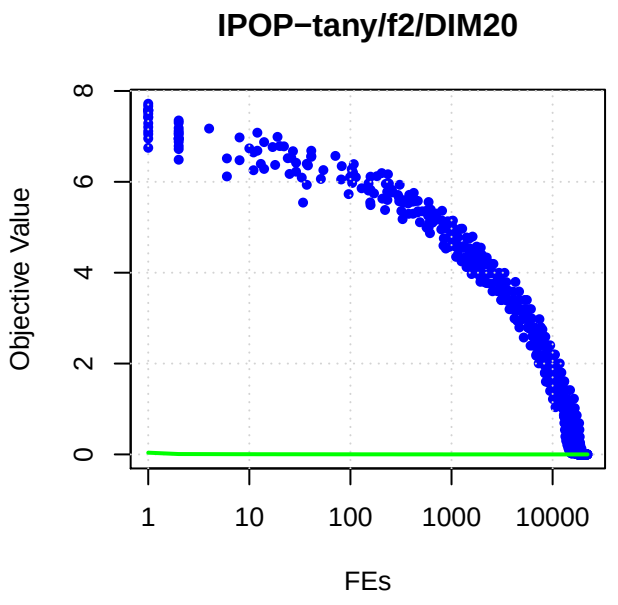
FEs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Objective Value
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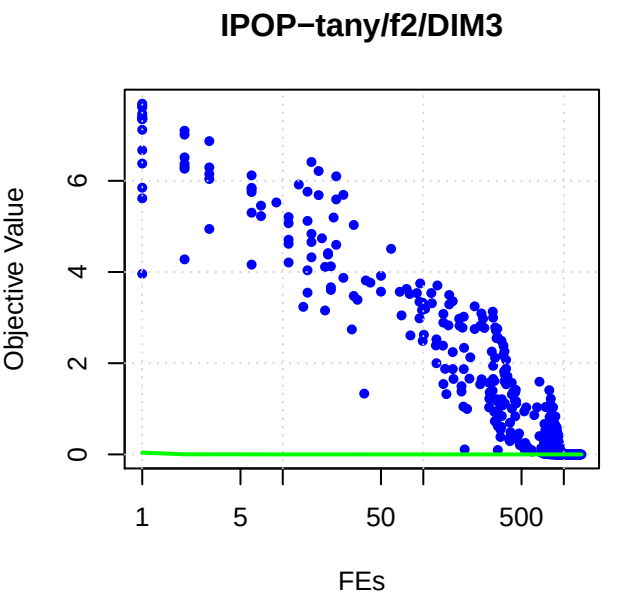
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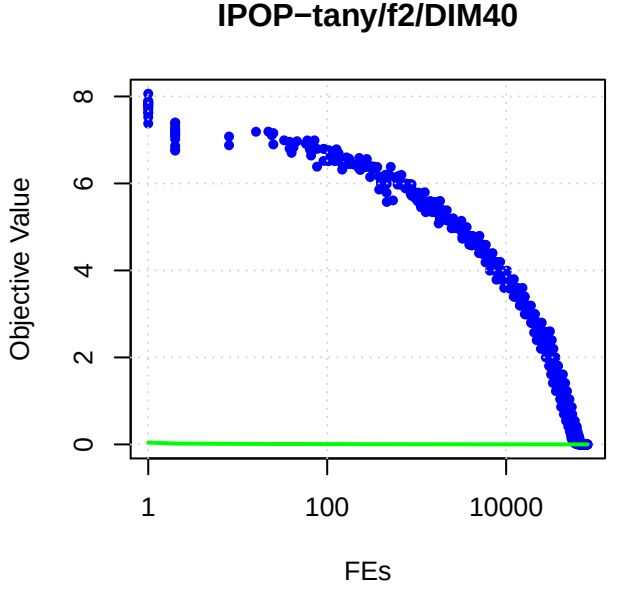
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Objective Value
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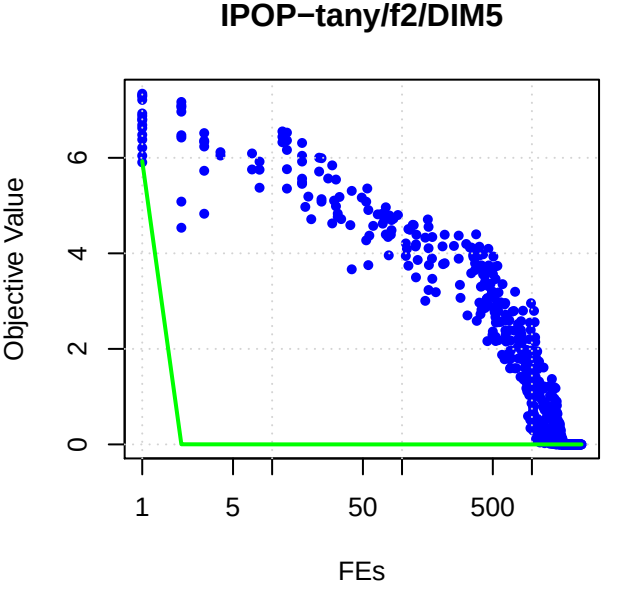
2
4
6
8
1
100
10000
FEs


IPOP−tany/f2/DIM5
Objective Value
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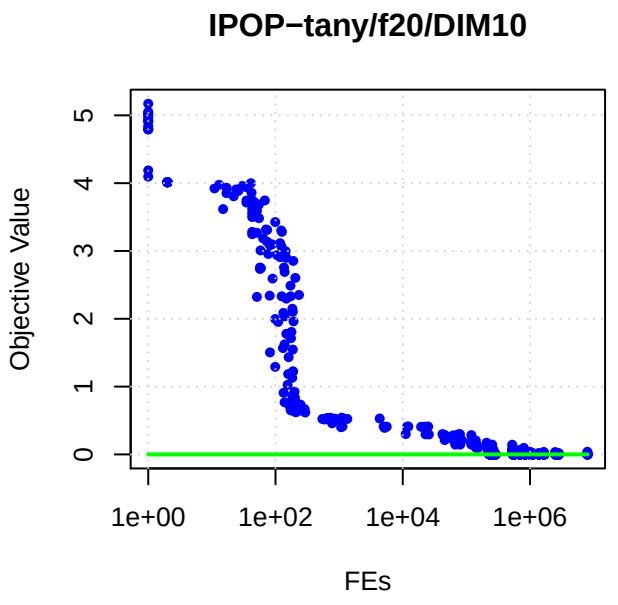
1
5
50
500
FEs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Objective Value
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5
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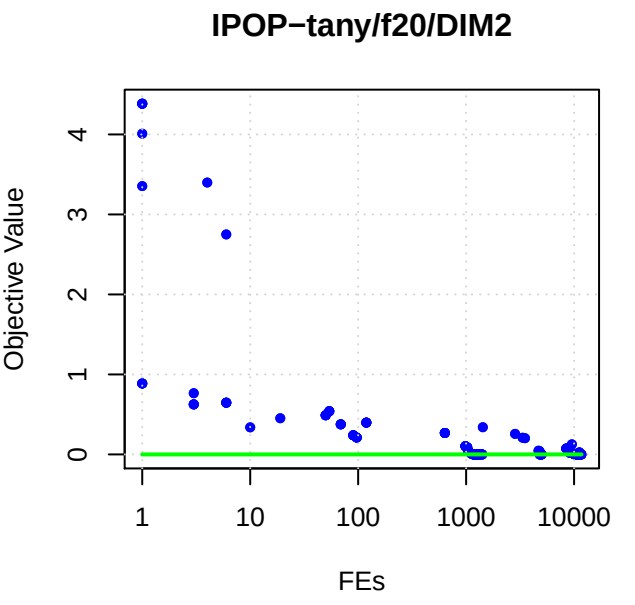
1e+02
1e+04
1e+06
FEs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Objective Value
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4
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10
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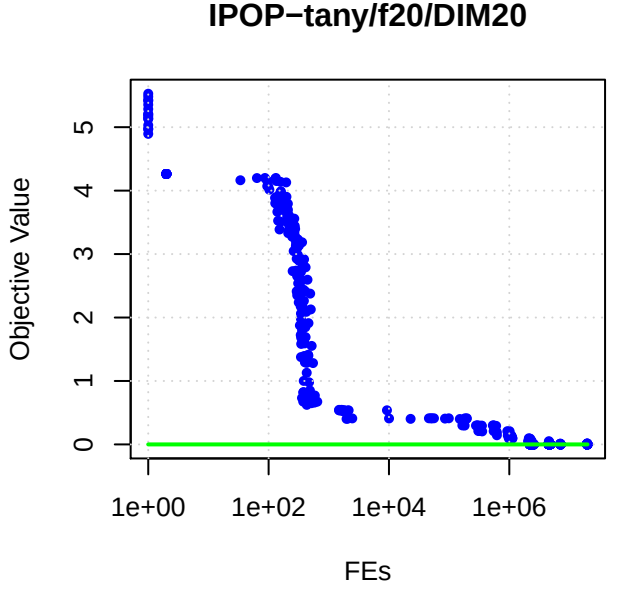
1000
10000
FEs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Objective Value
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2
3
4
5
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1e+02
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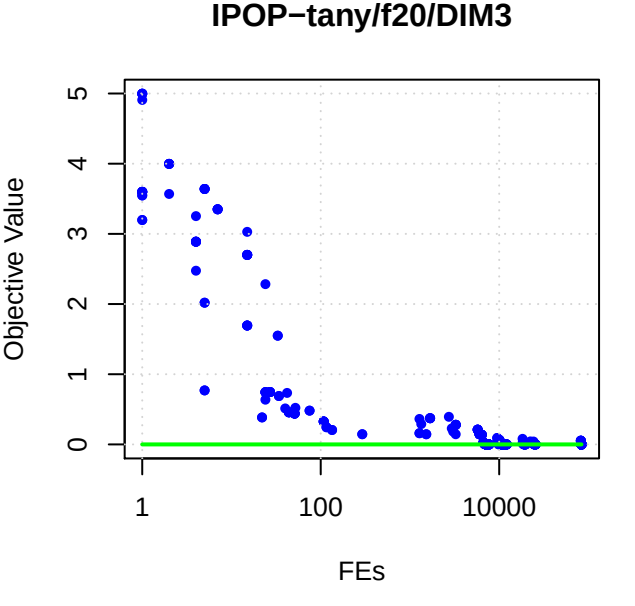
1e+06
FEs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2
3
4
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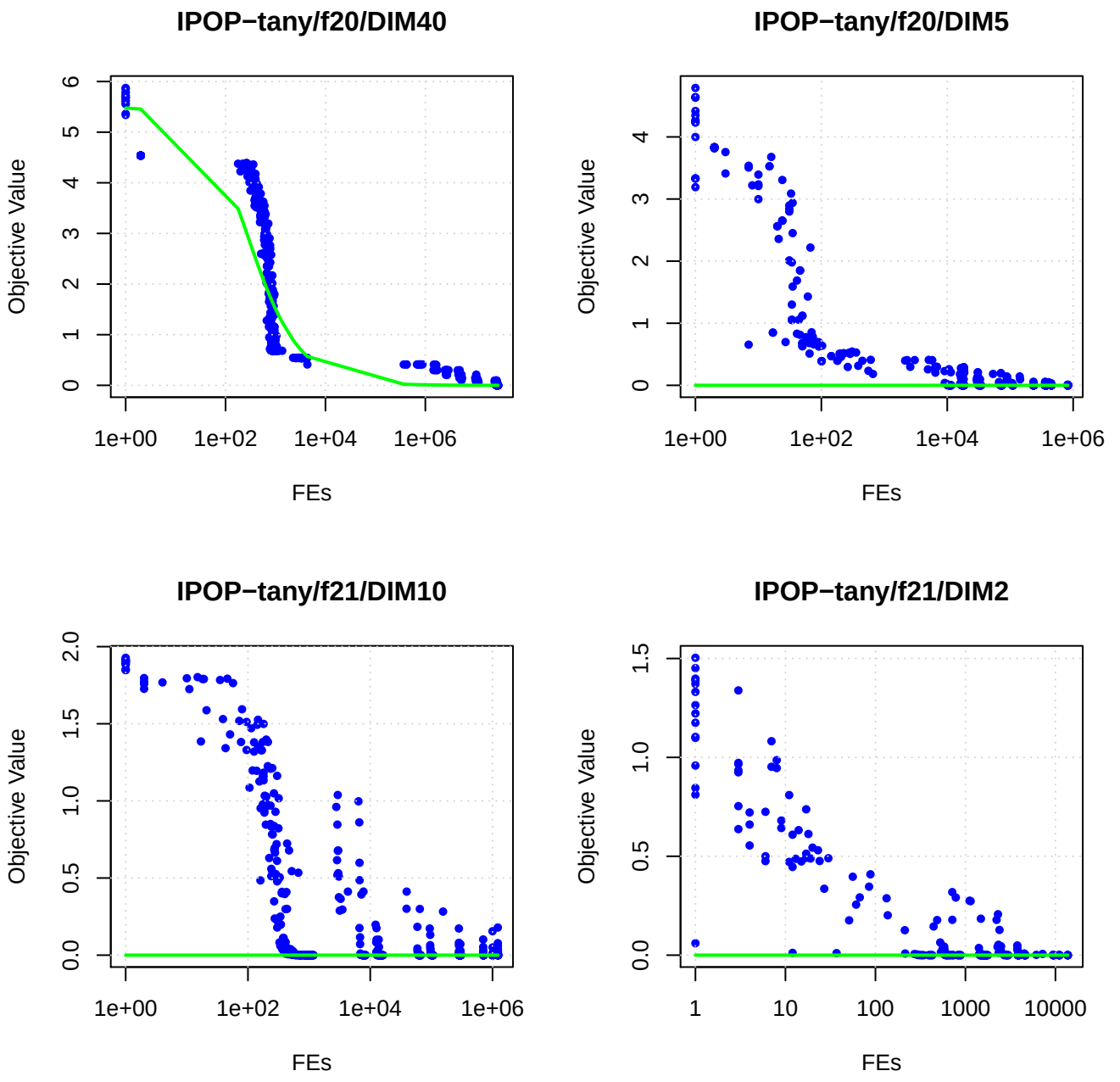
1
100
10000
FEs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Objective Value
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2
3
4
5
6
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−tany/f20/DIM5
Objective Value
0
1
2
3
4
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−tany/f21/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−tany/f21/DIM2
Objective Value
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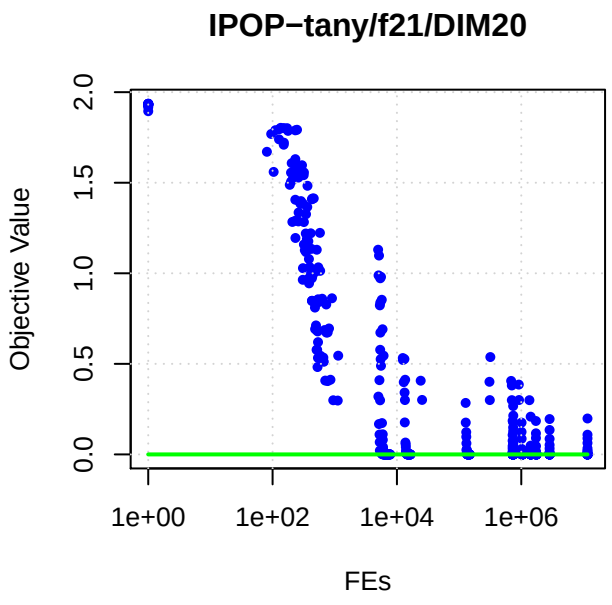
1.5
1
10
100
1000
10000
FEs


IPOP−tany/f21/DIM20
Objective Value
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1.5
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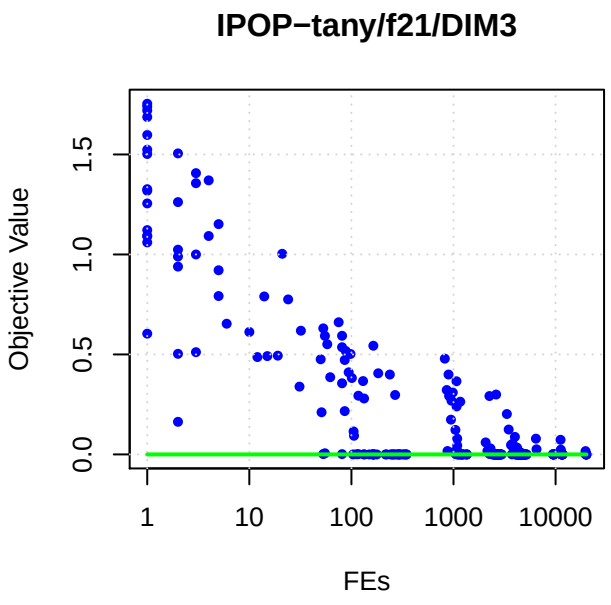
1e+06
FEs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1
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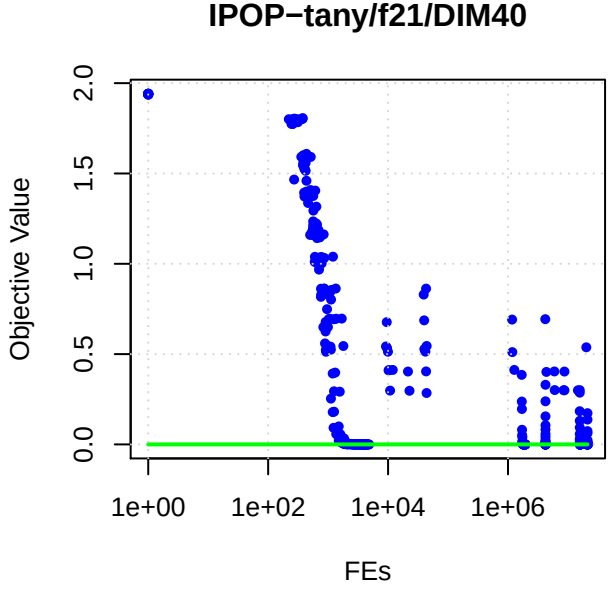
100
1000
10000
FEs


IPOP−tany/f21/DIM40
Objective Value
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1.5
2.0
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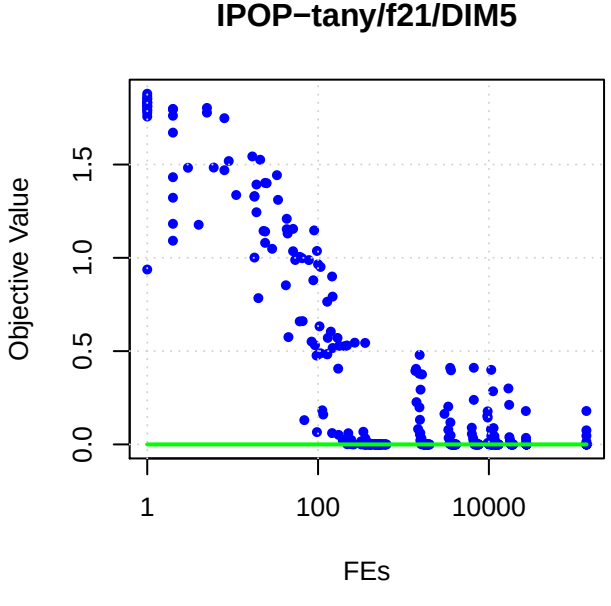
1e+02
1e+04
1e+06
FEs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Objective Value
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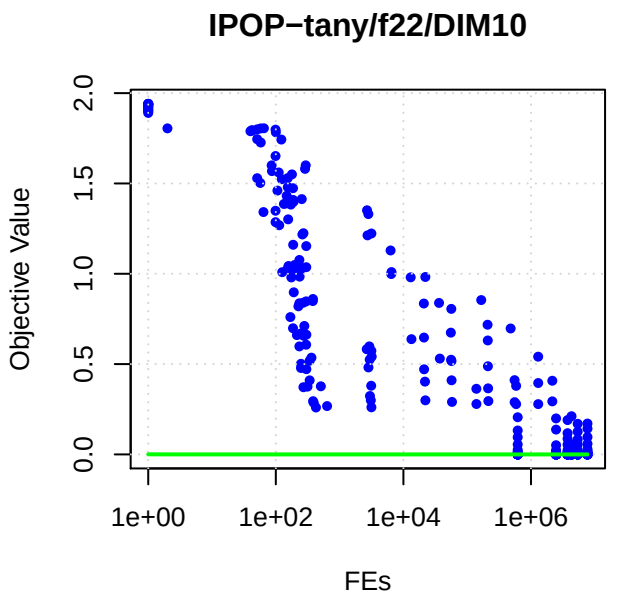
1
100
10000
FEs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Objective Value
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1.5
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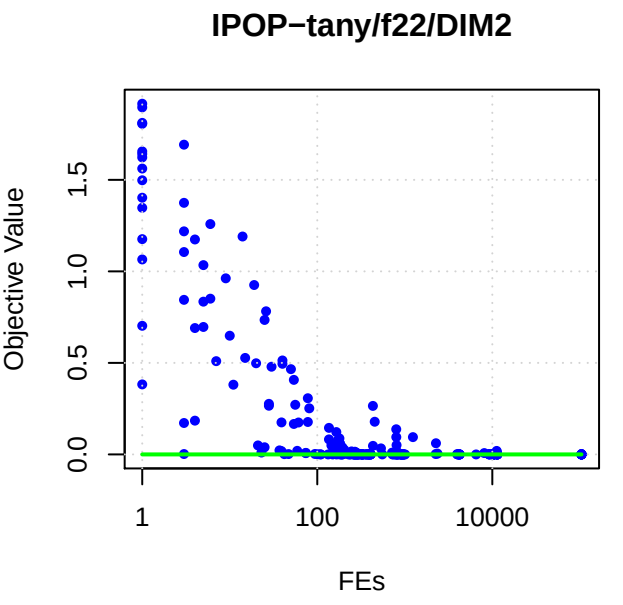
1e+04
1e+06
FEs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Objective Value
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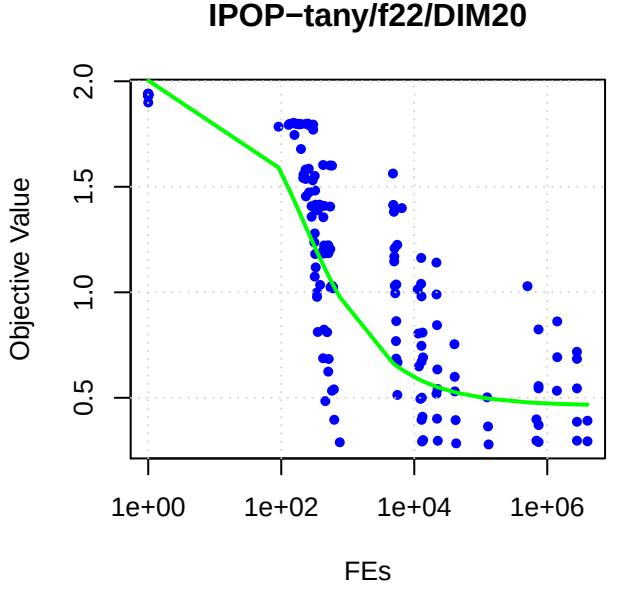
1.0
1.5
1
100
10000
FEs


IPOP−tany/f22/DIM20
Objective Value
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1.0
1.5
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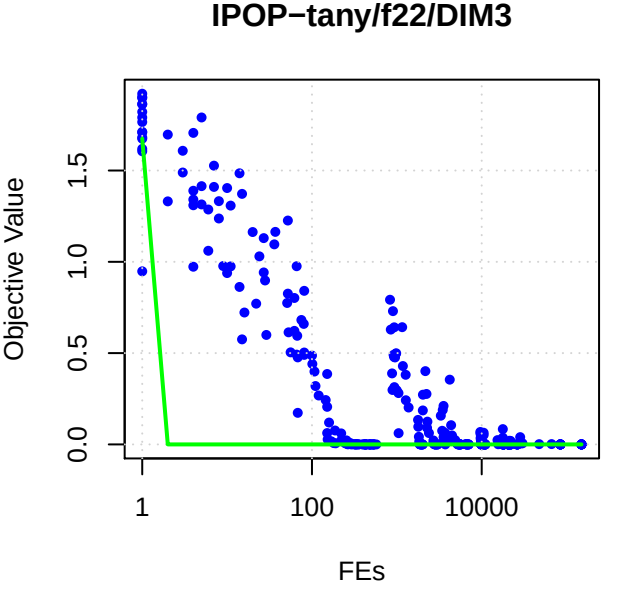
1e+04
1e+06
FEs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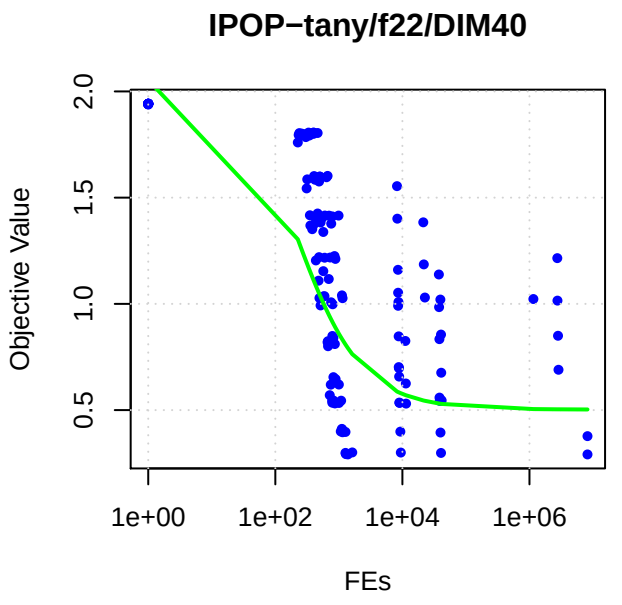
10000
FEs


IPOP−tany/f22/DIM40
Objective Value
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1.5
1.0
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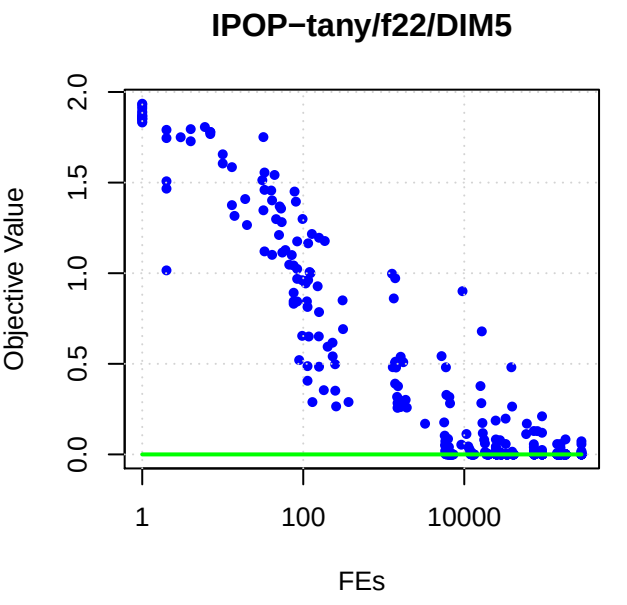
1e+02
1e+04
1e+06
FEs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Objective Value
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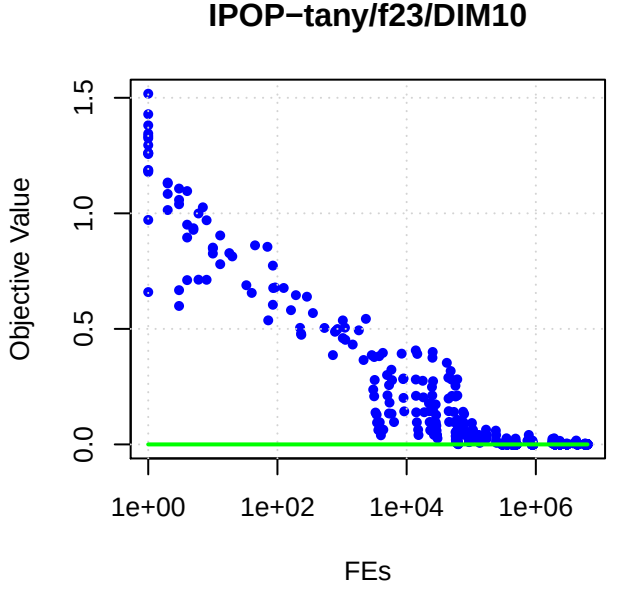
0.0
1
100
10000
FEs


IPOP−tany/f23/DIM10
Objective Value
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1.0
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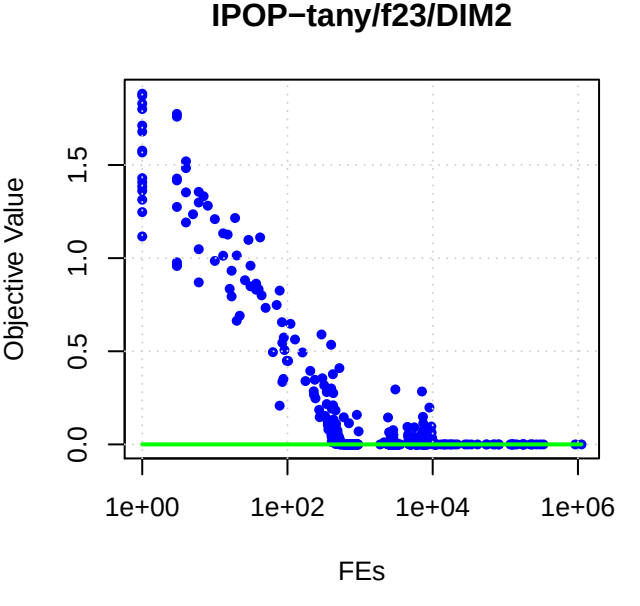
1e+04
1e+06
FEs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Objective Value
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0.0
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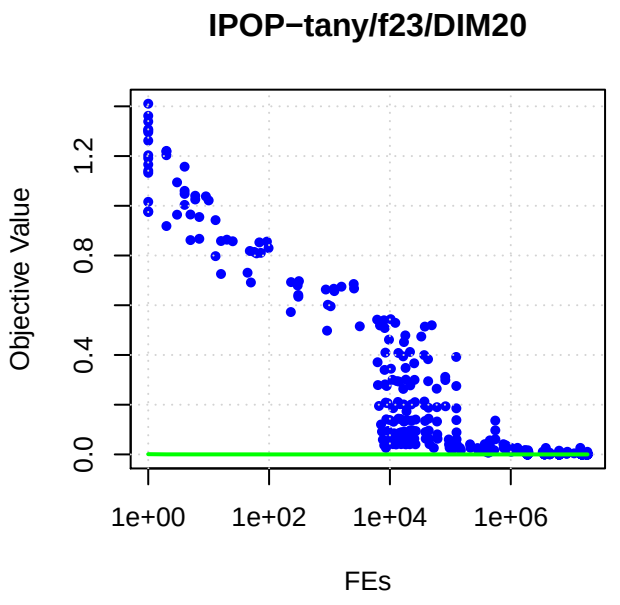
1e+02
1e+04
1e+06
FEs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0.8
1.2
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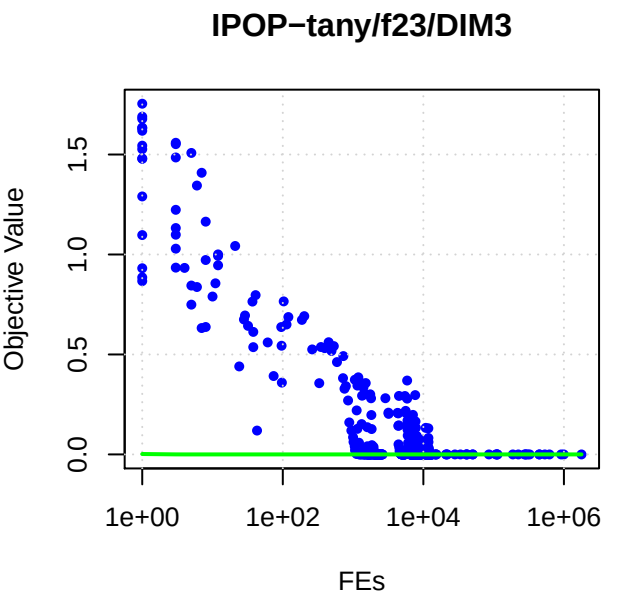
1e+02
1e+04
1e+06
FEs


IPOP−tany/f23/DIM3
Objective Value
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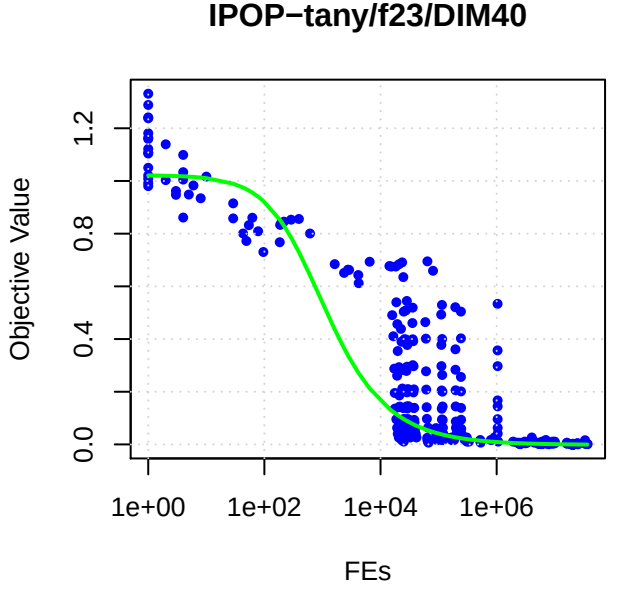
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−tany/f23/DIM40
Objective Value
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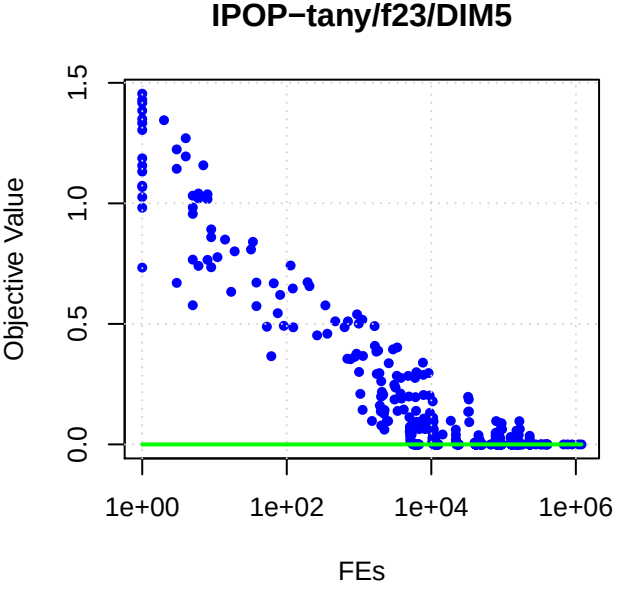
0.8
1.2
1e+00
1e+02
1e+04
1e+06
FEs


IPOP−tany/f23/DIM5
Objective Value
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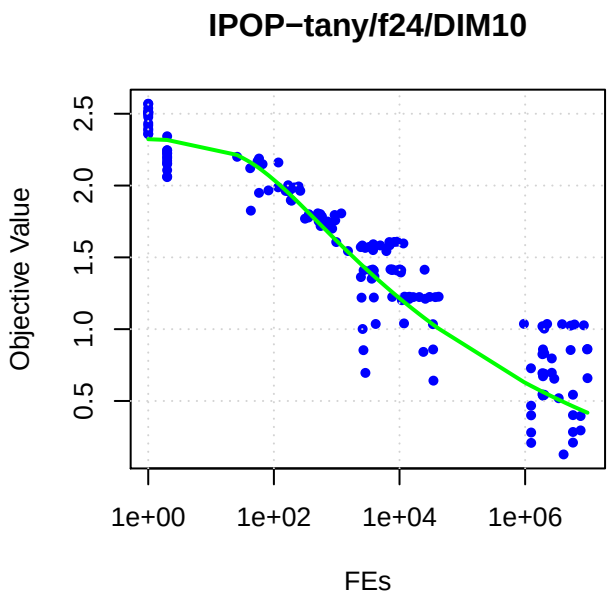
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs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2.5
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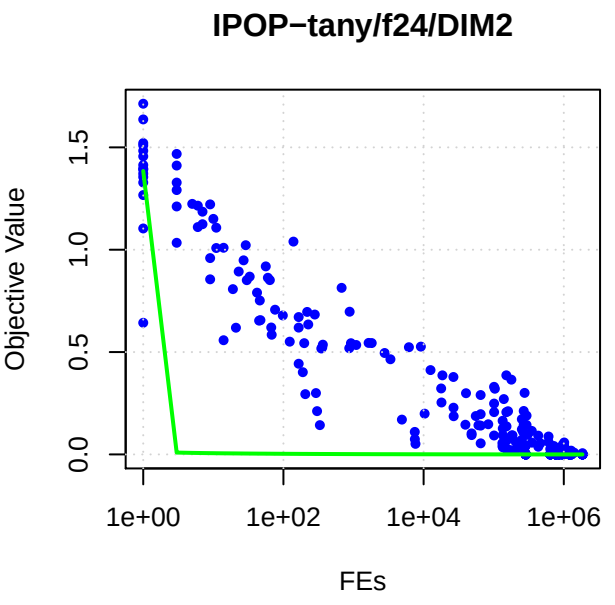
1e+06
FEs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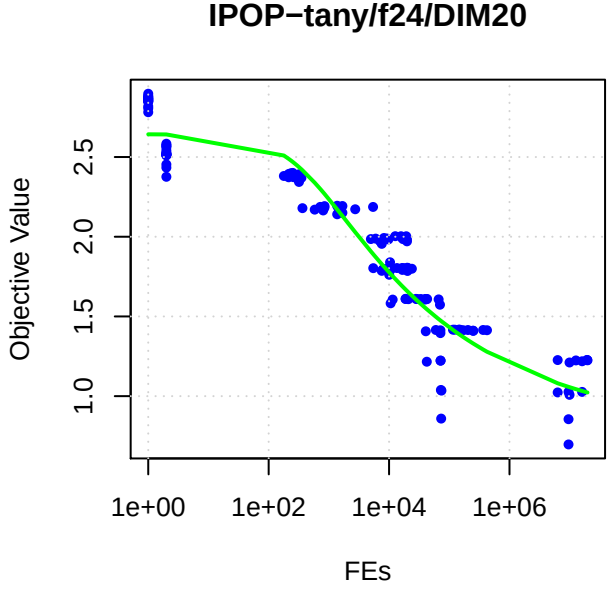
1e+06
FEs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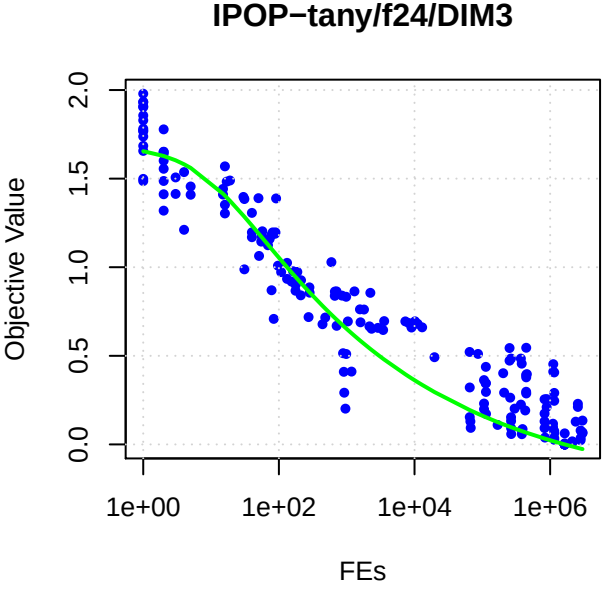
1e+06
FEs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Objective Value
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1e+02
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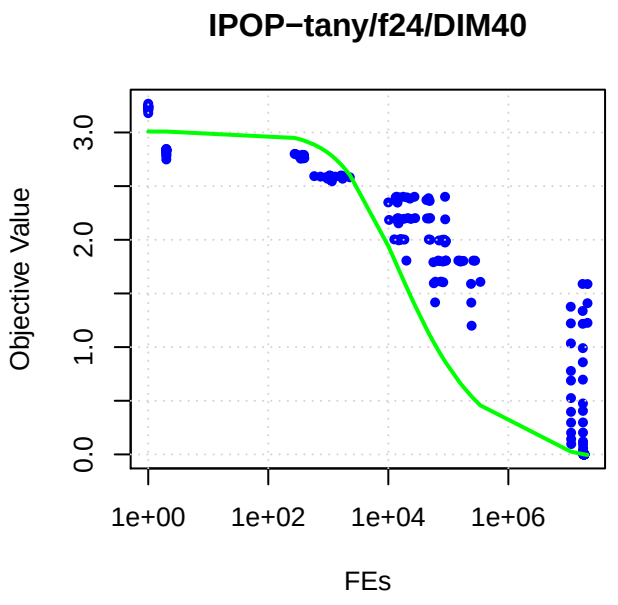
1e+06
FEs


IPOP−tany/f24/DIM40
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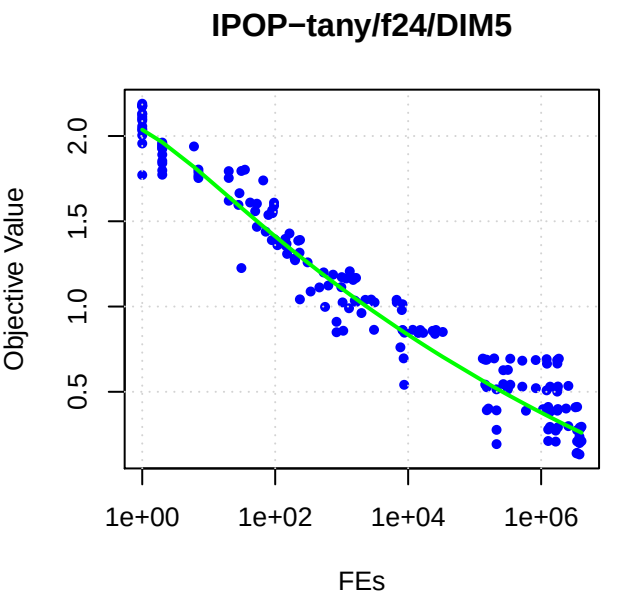
1e+04
1e+06
FEs


IPOP−tany/f24/DIM5
Objective Value
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2.0
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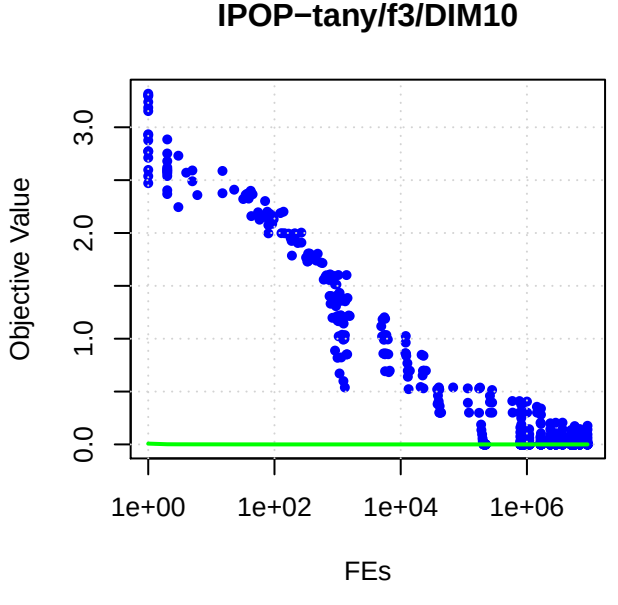
1e+02
1e+04
1e+06
FEs


IPOP−tany/f3/DIM10
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1e+02
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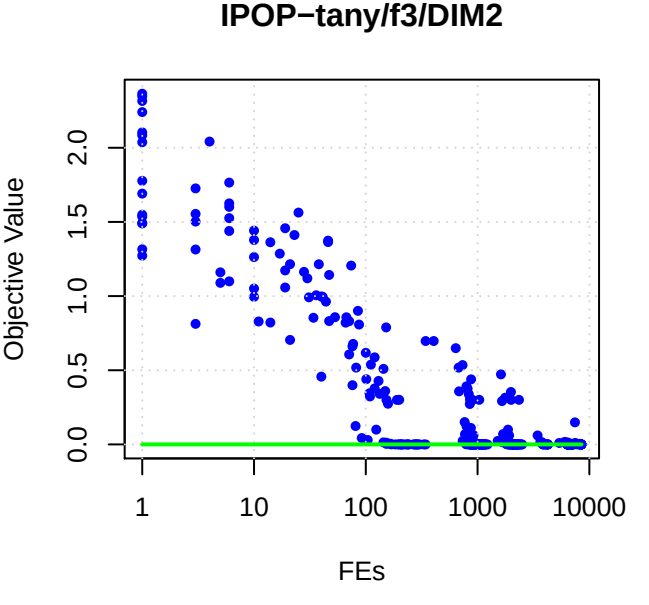
1e+06
FEs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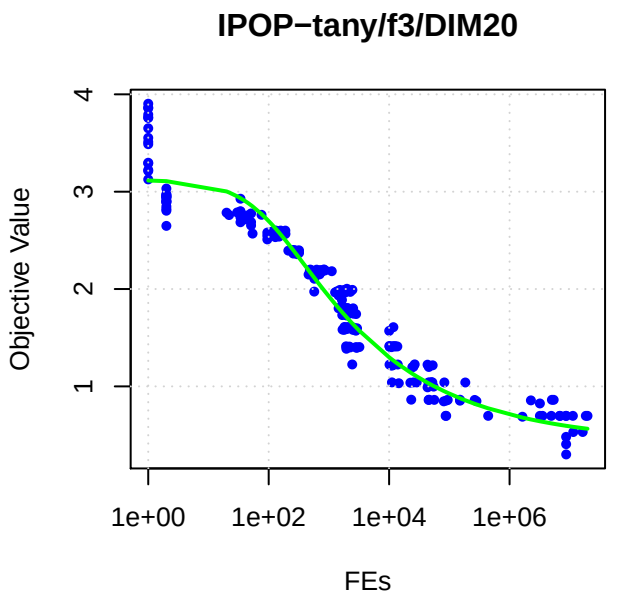
10
100
1000
10000
FEs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2
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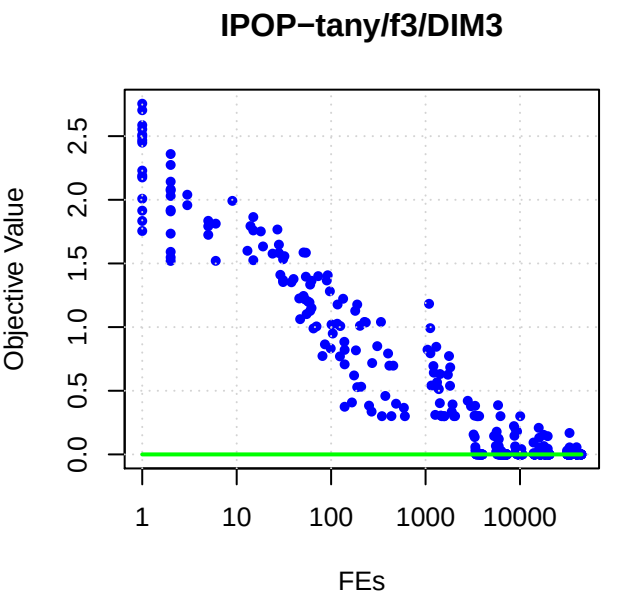
1e+04
1e+06
FEs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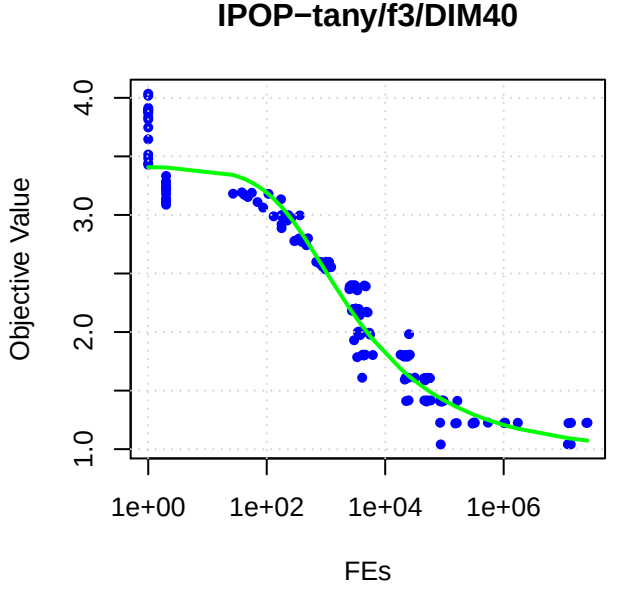
1000
10000
FEs


IPOP−tany/f3/DIM40
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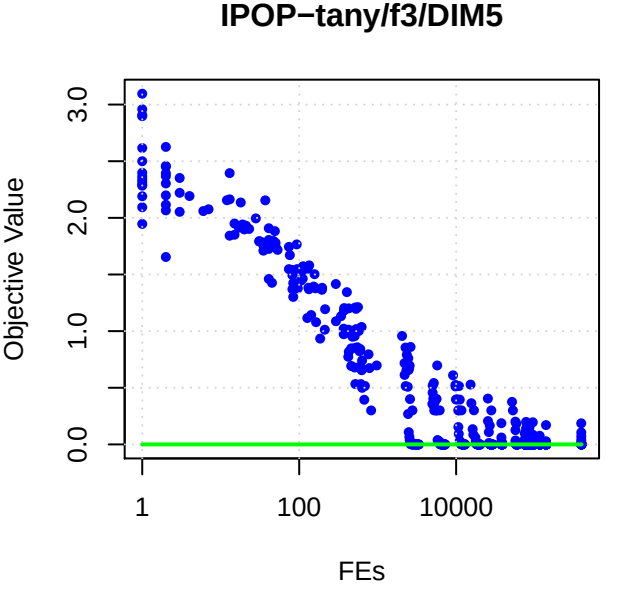
1e+04
1e+06
FEs


IPOP−tany/f3/DIM5
Objective Value
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1
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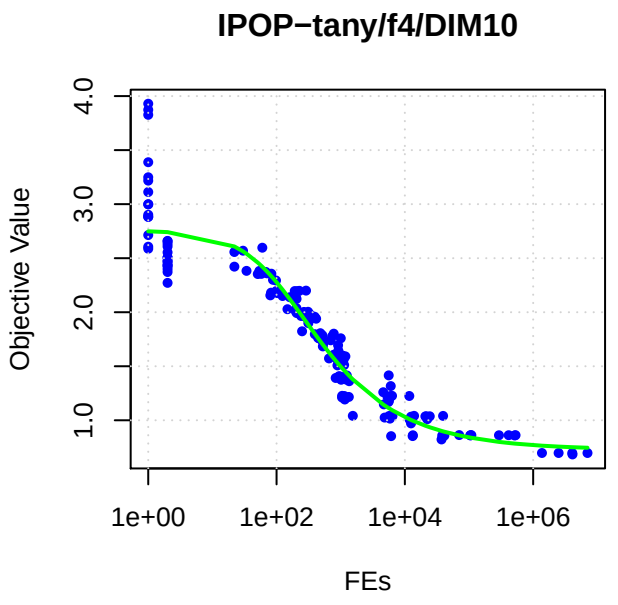
10000
FEs


IPOP−tany/f4/DIM10
Objective Value
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2.0
1.0
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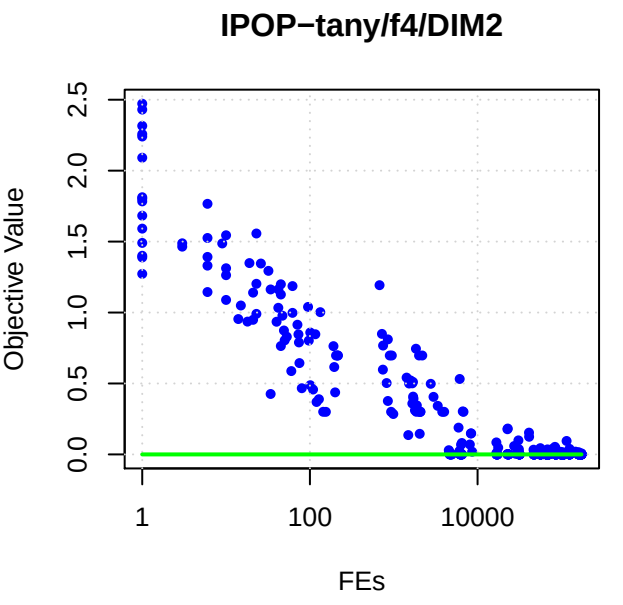
1e+02
1e+04
1e+06
FEs


IPOP−tany/f4/DIM2
Objective Value
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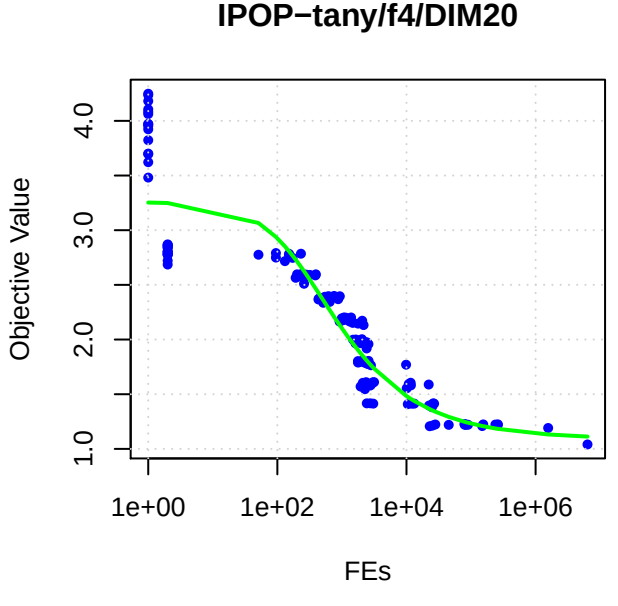
0.0
1
100
10000
FEs


IPOP−tany/f4/DIM20
Objective Value
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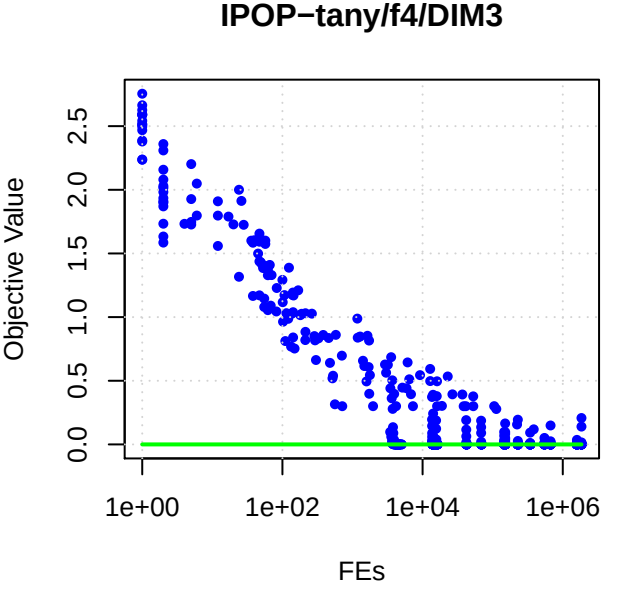
1e+04
1e+06
FEs


IPOP−tany/f4/DIM3
Objective Value
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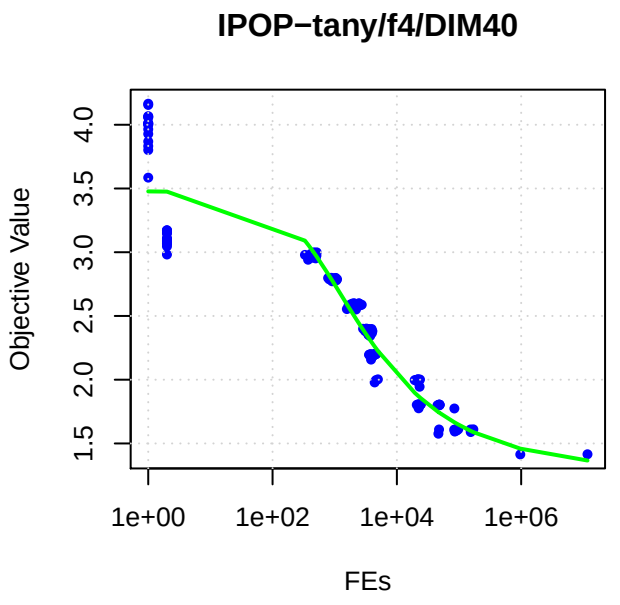
1e+02
1e+04
1e+06
FEs


IPOP−tany/f4/DIM40
Objective Value
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1.5
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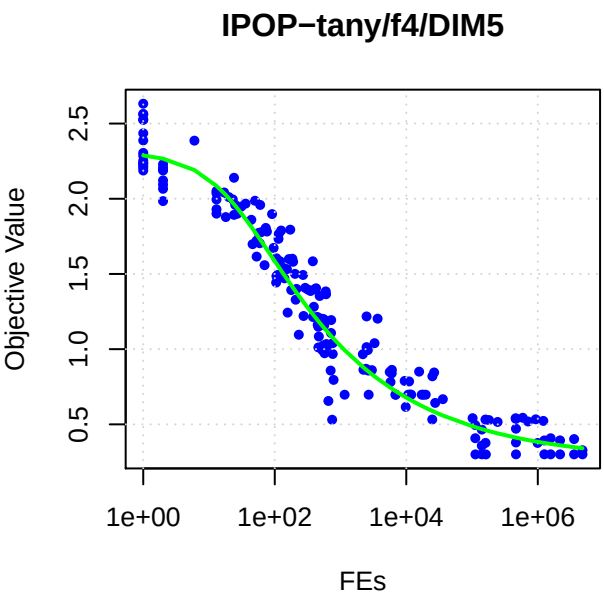
1e+02
1e+04
1e+06
FEs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1e+06
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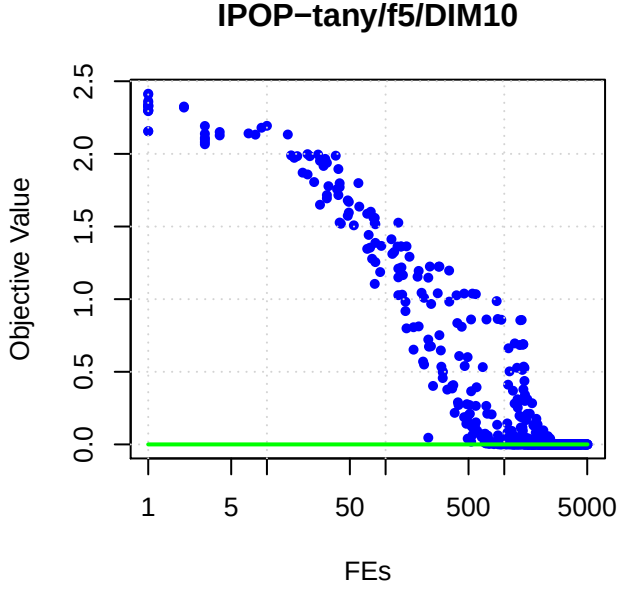
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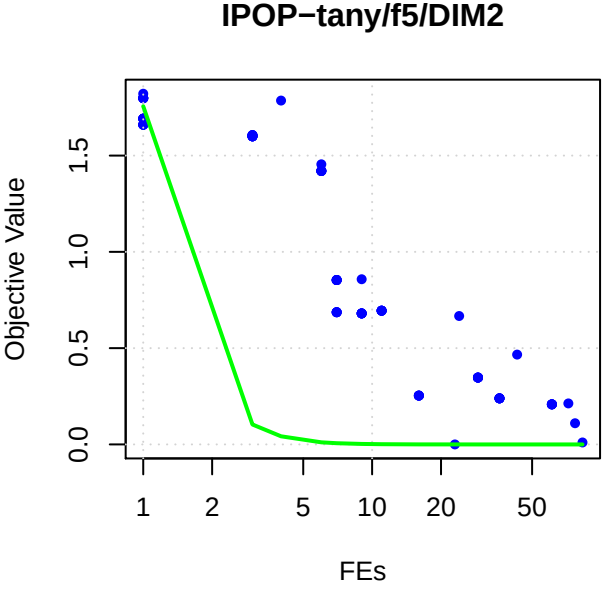
5000
FEs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50
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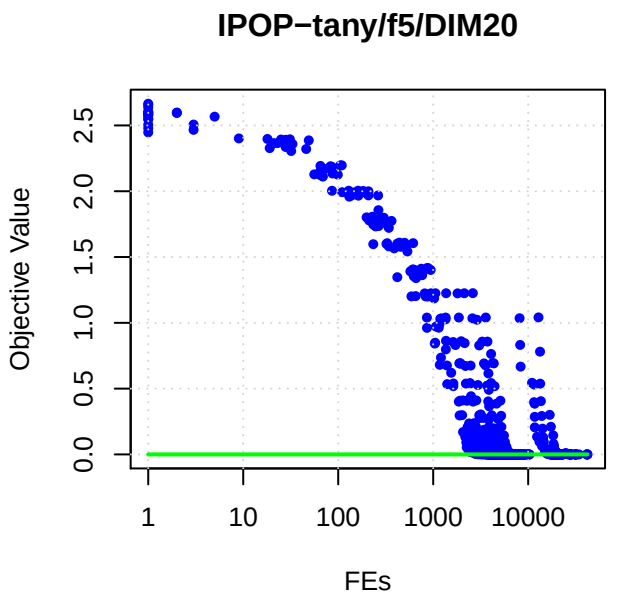
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1000
10000
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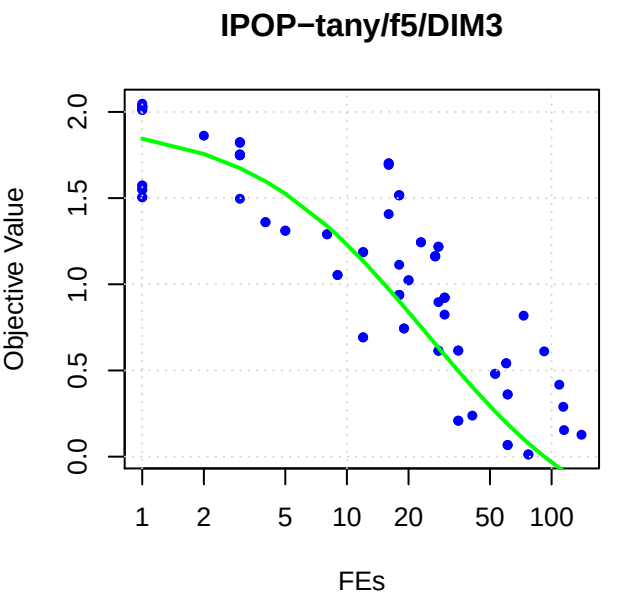
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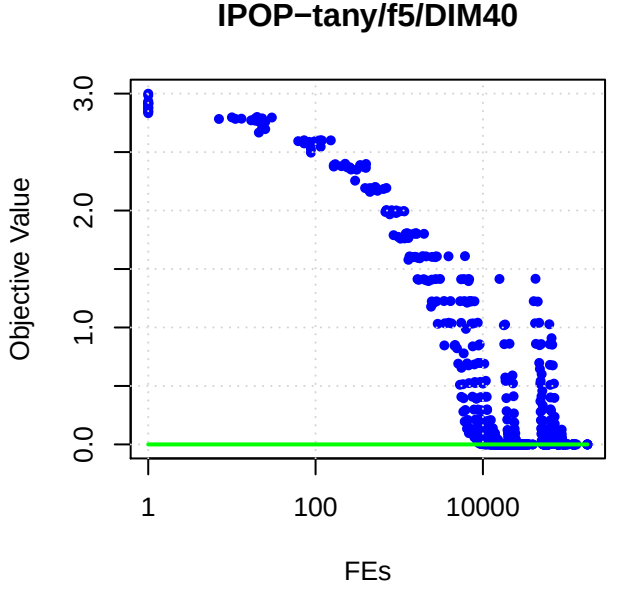
100
FEs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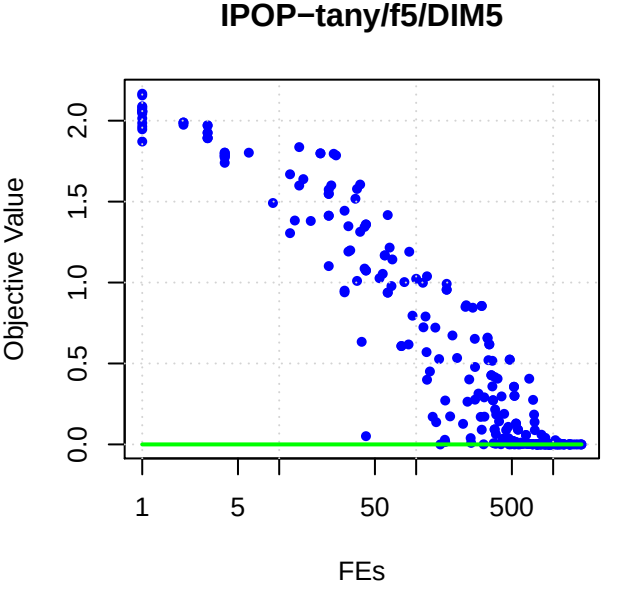
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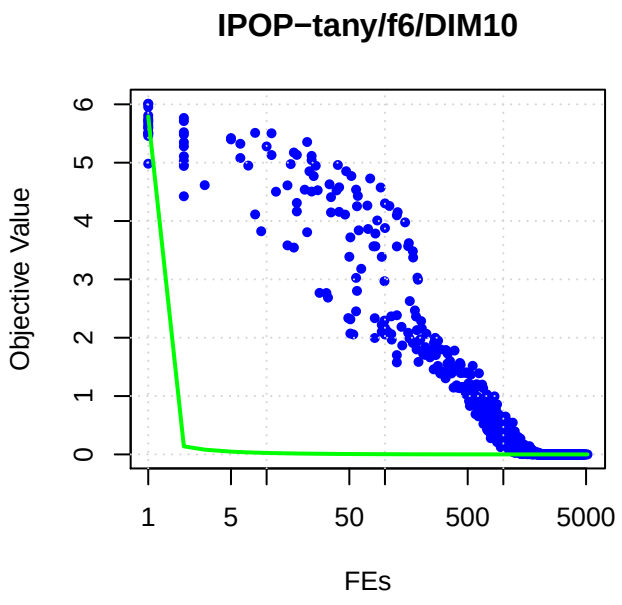
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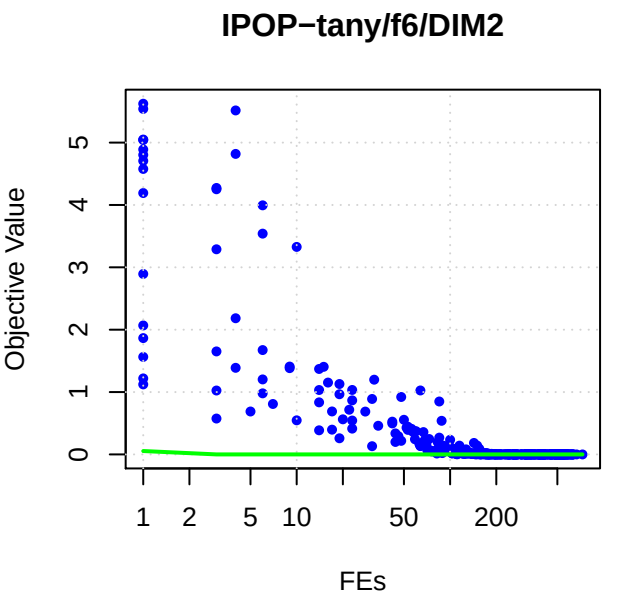
FEs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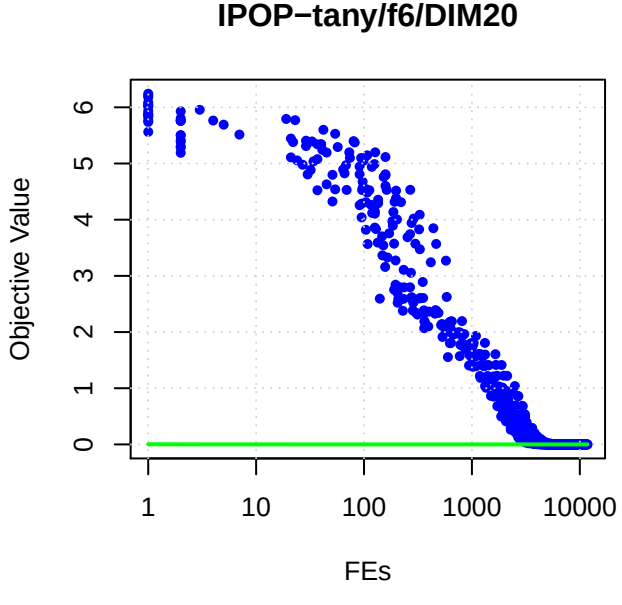
FEs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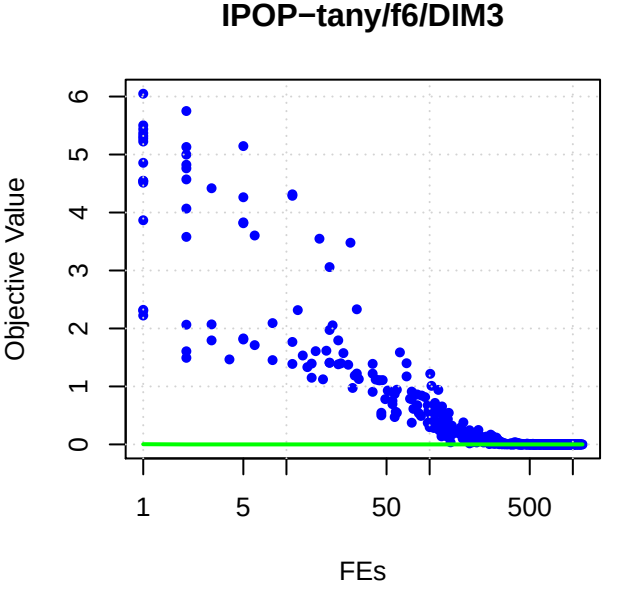
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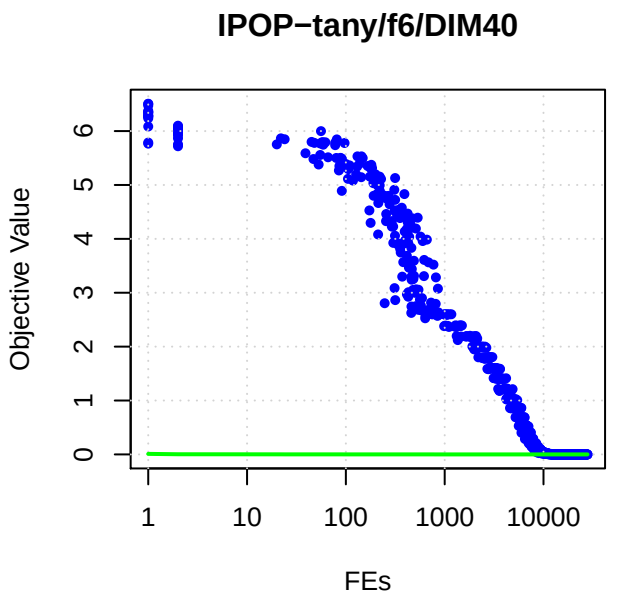
FEs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10000
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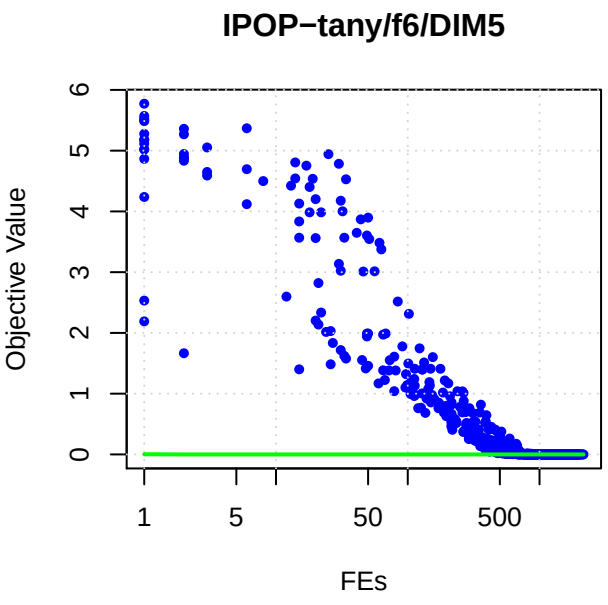
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6
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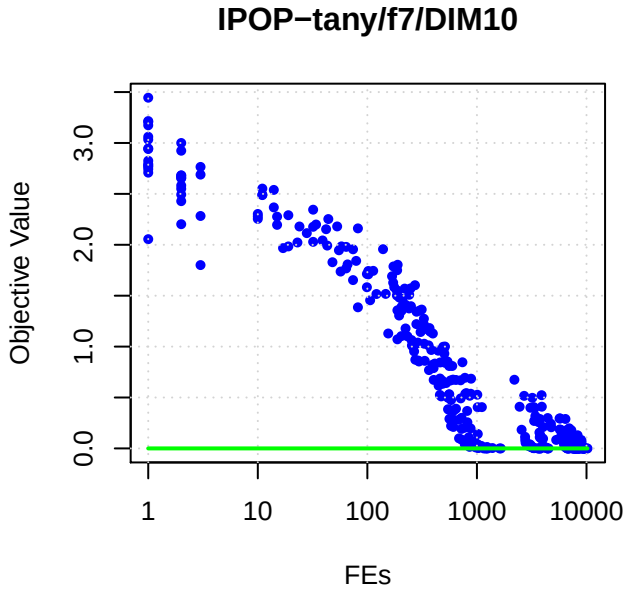
5
50
500
FEs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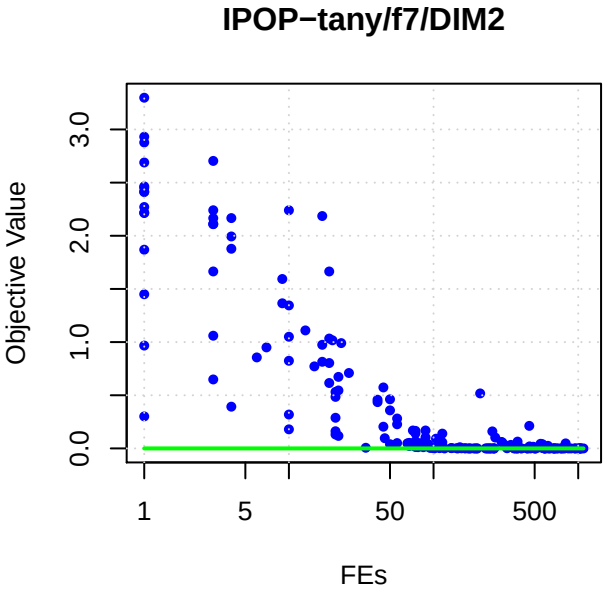
1000
10000
FEs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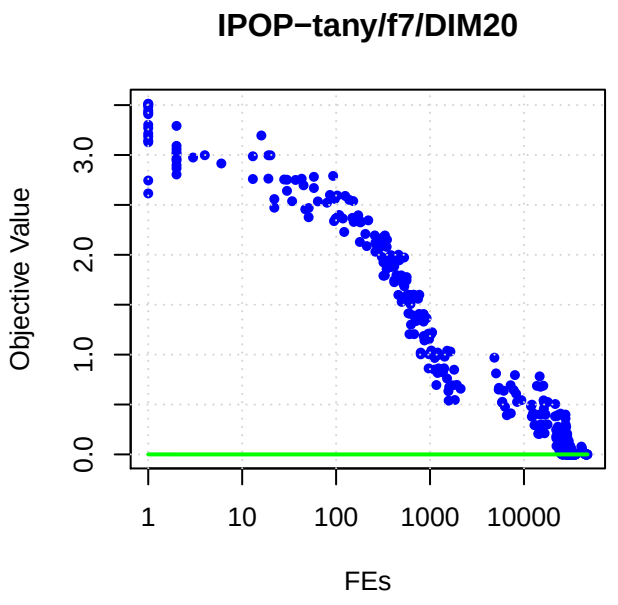
500
FEs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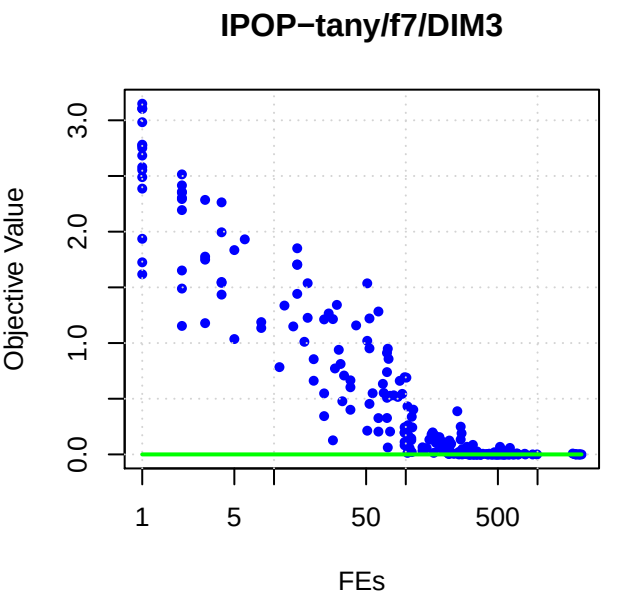
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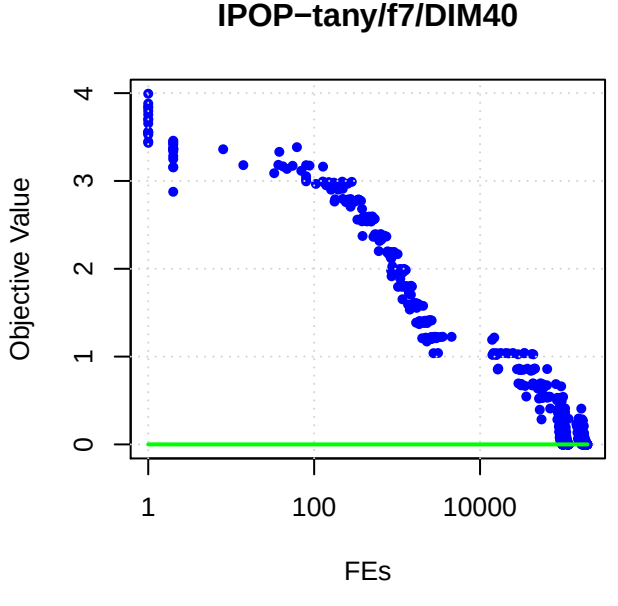
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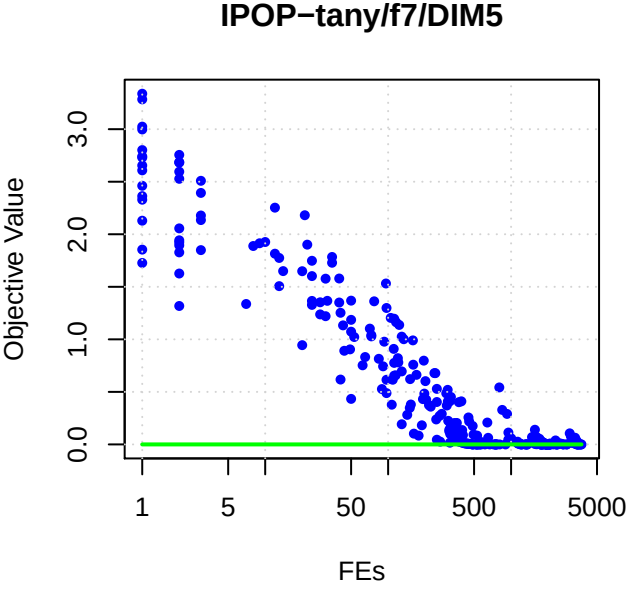
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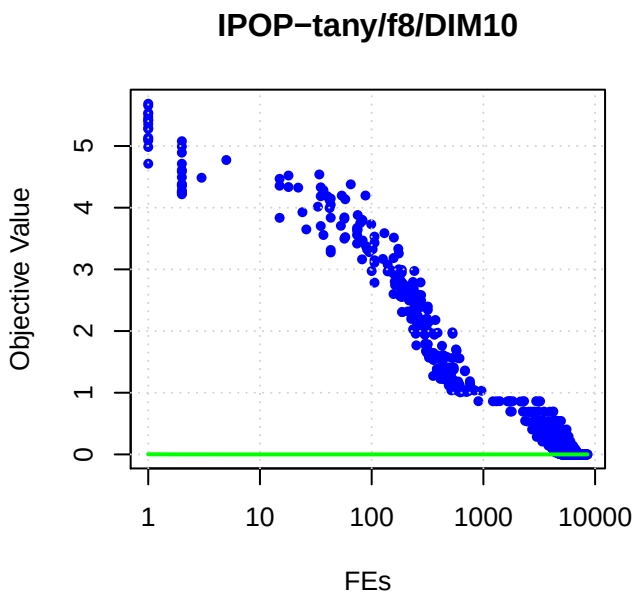
FEs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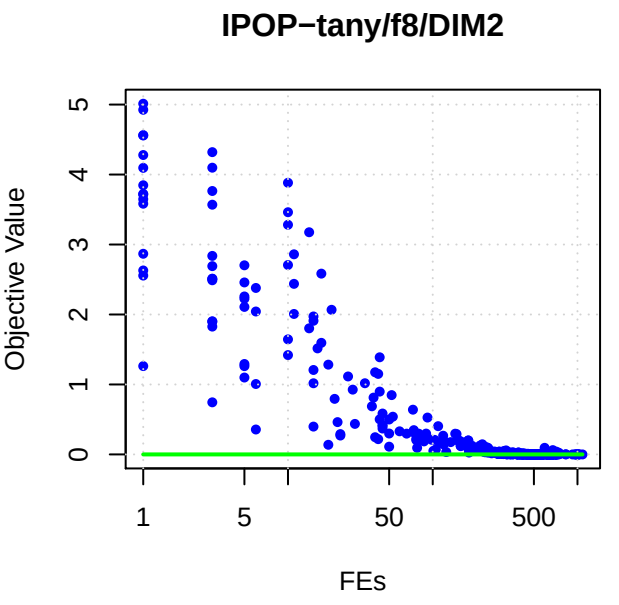
FEs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Objective Value
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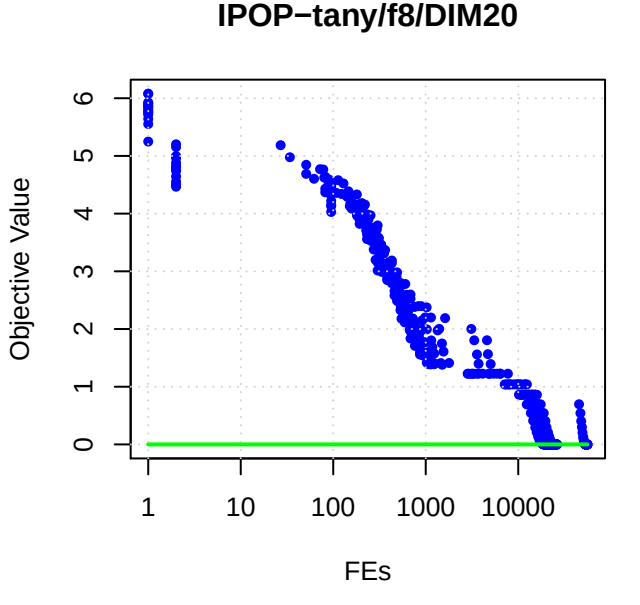
FEs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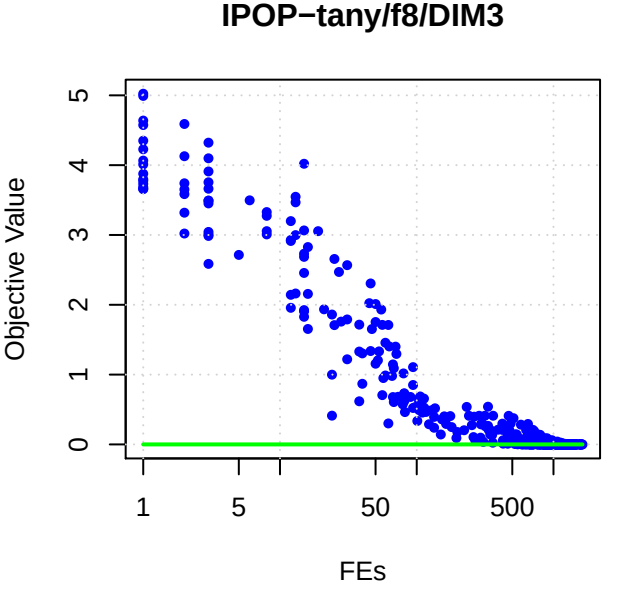
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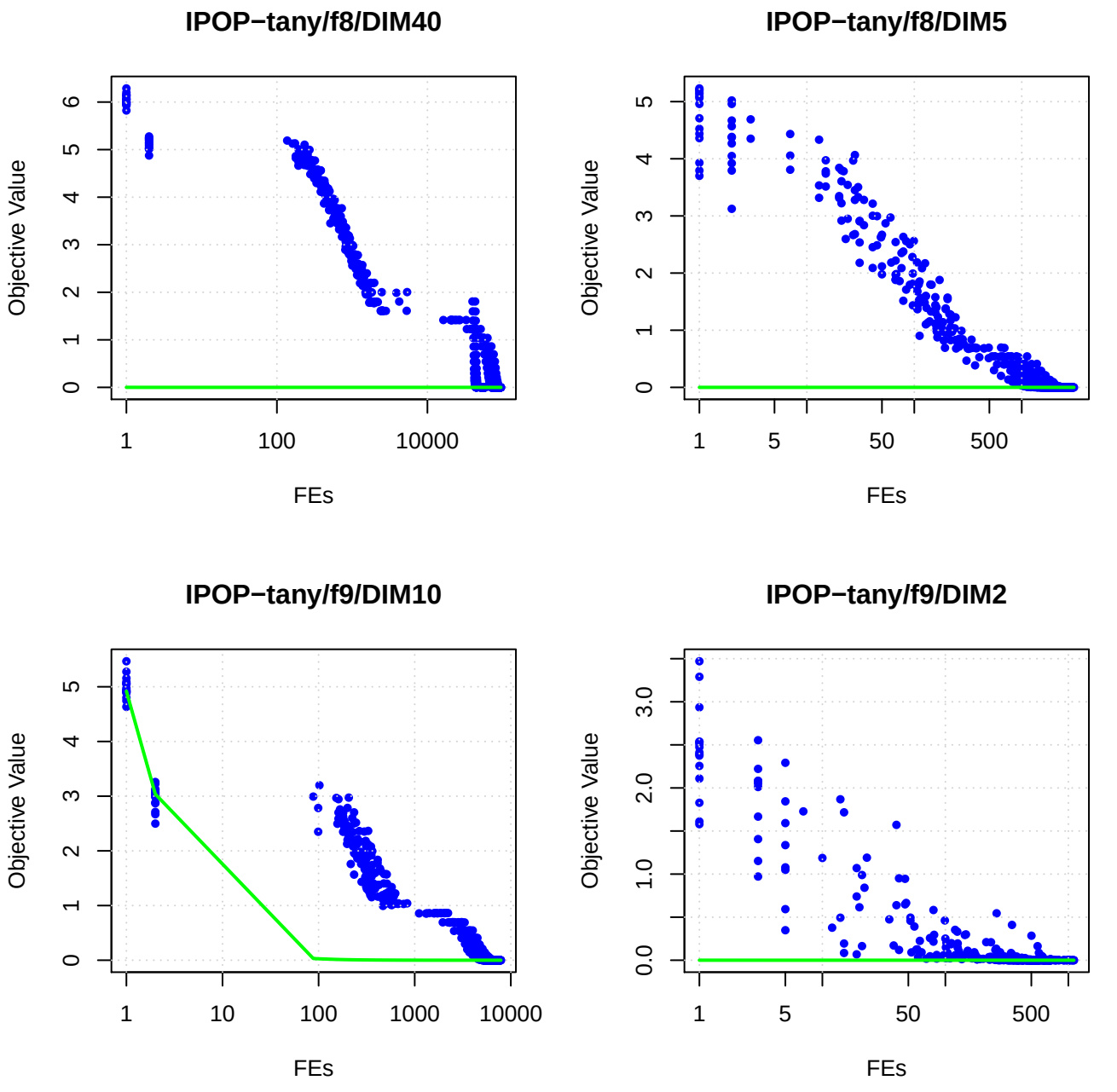
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FEs
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Objective Value
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FEs
IPOP−tany/f9/DIM10
Objective Value
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1000
10000
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Objective Value
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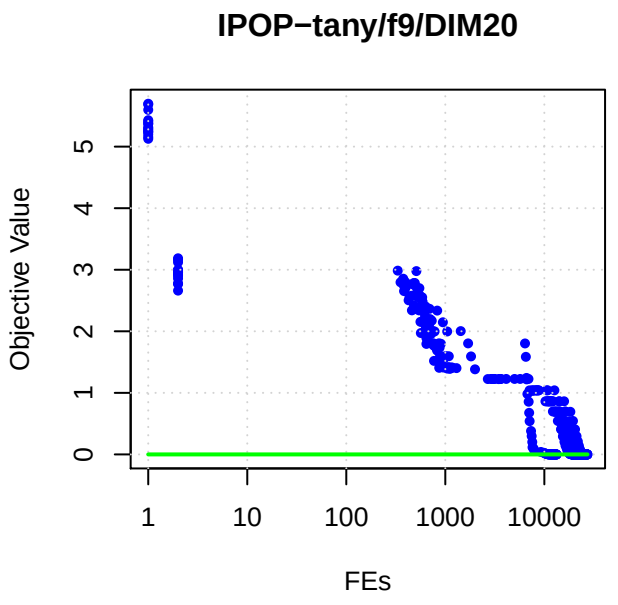
FEs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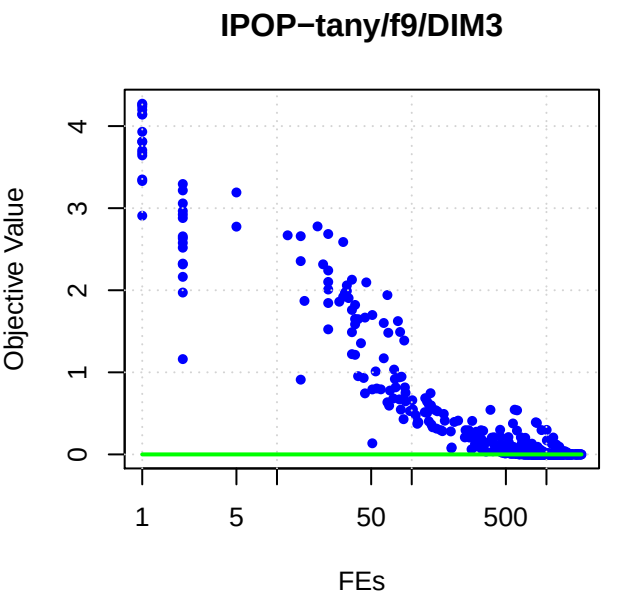
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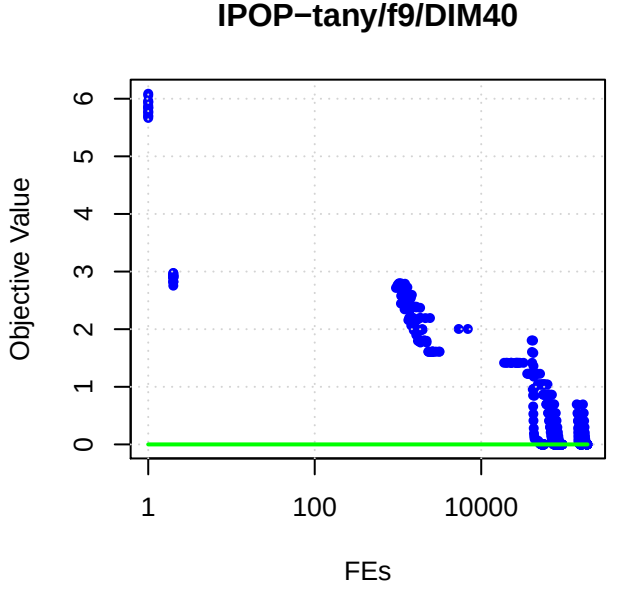
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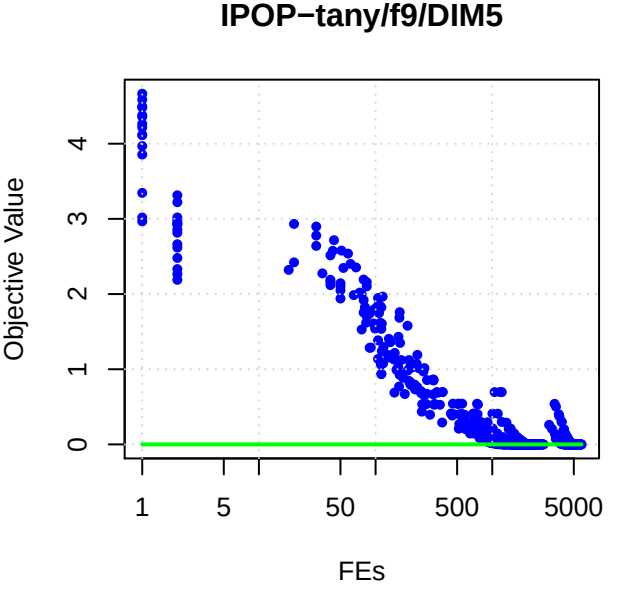
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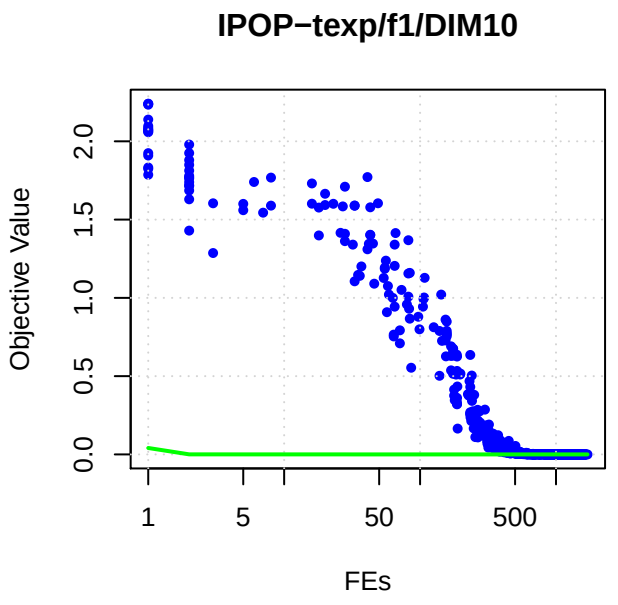
FEs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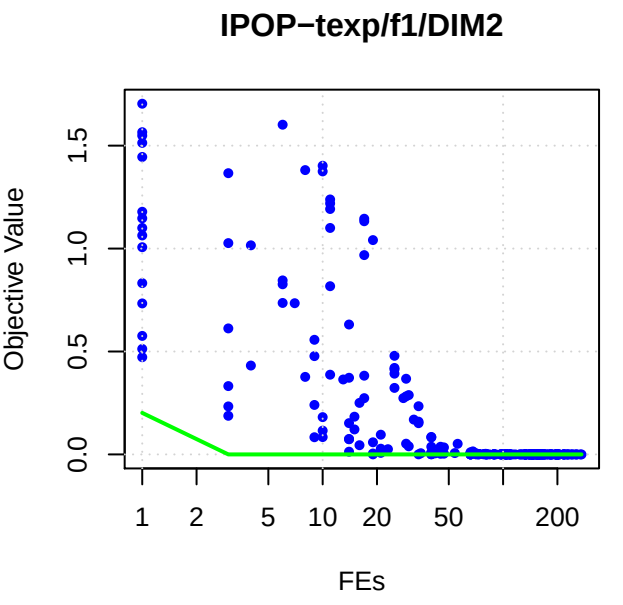
FEs


IPOP−texp/f1/DIM2
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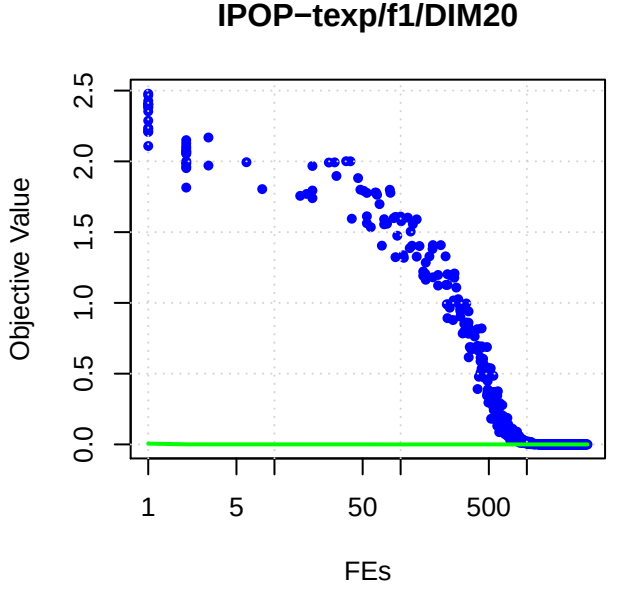
200
FEs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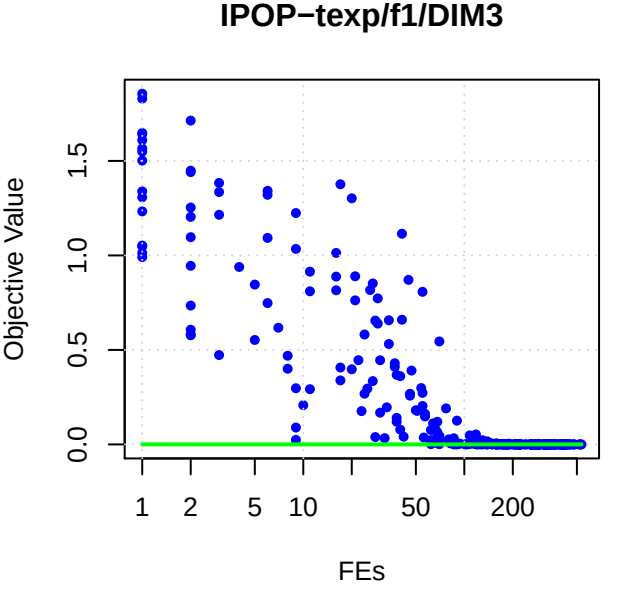
FEs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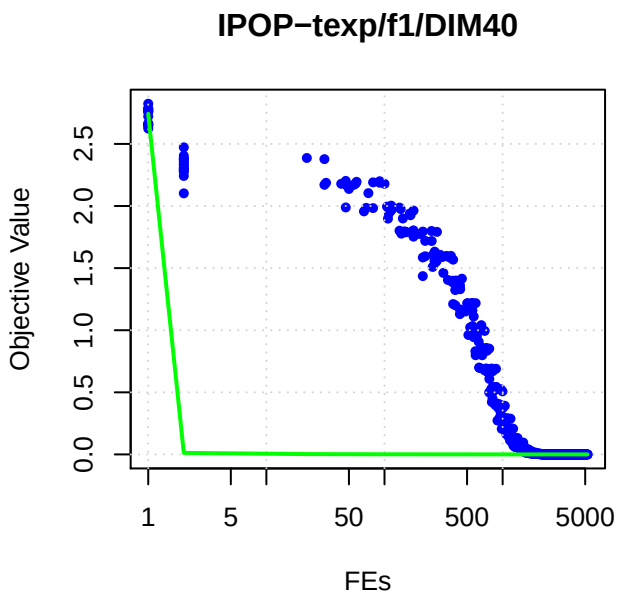
FEs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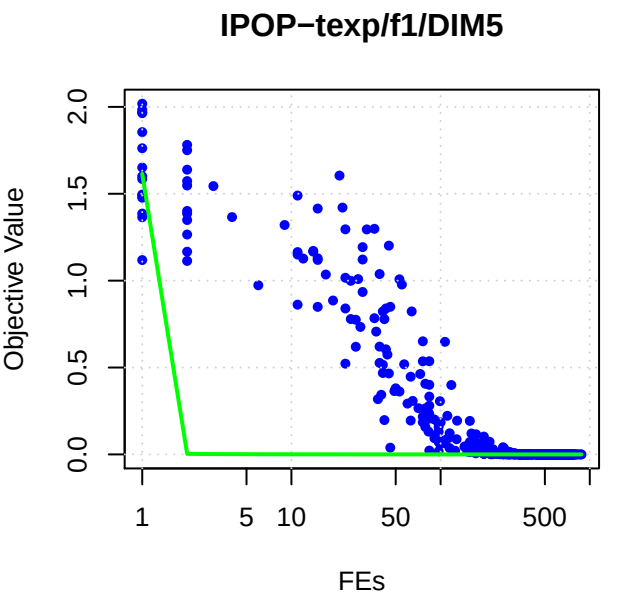
FEs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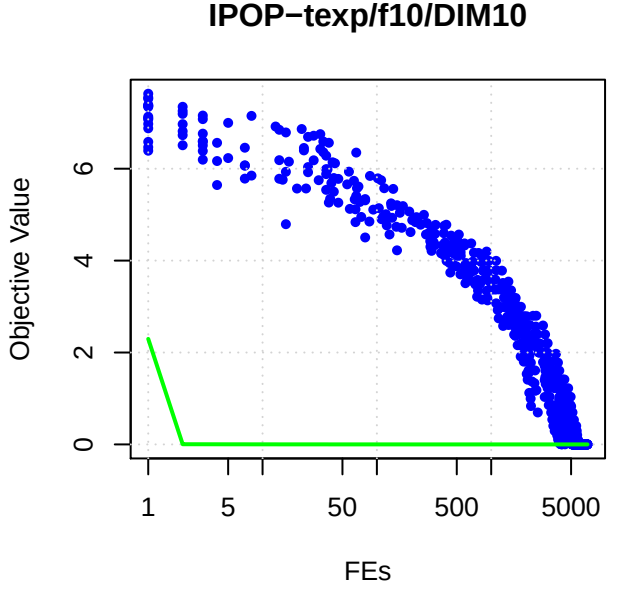
FEs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Objective Value
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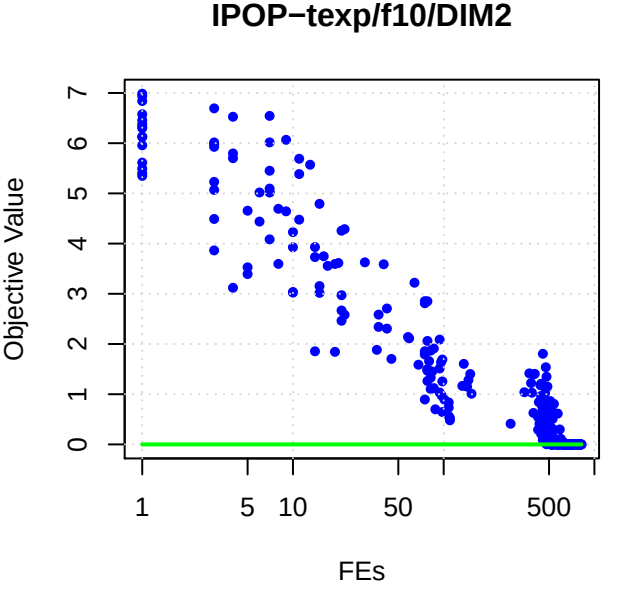
5000
FEs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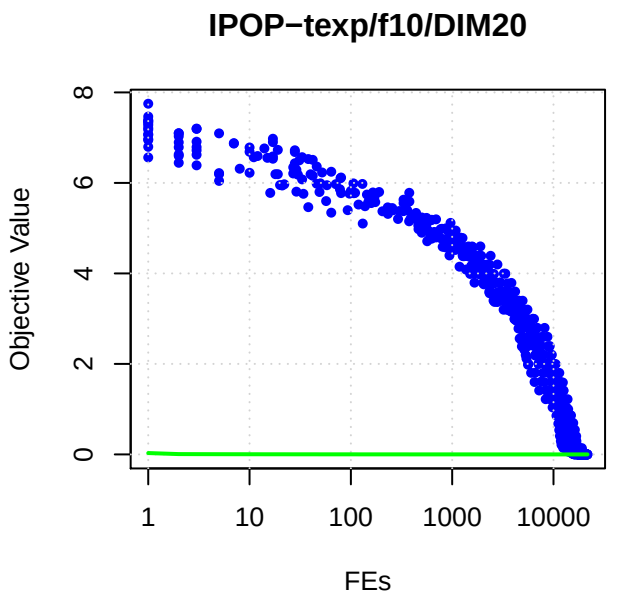
FEs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Objective Value
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1000
10000
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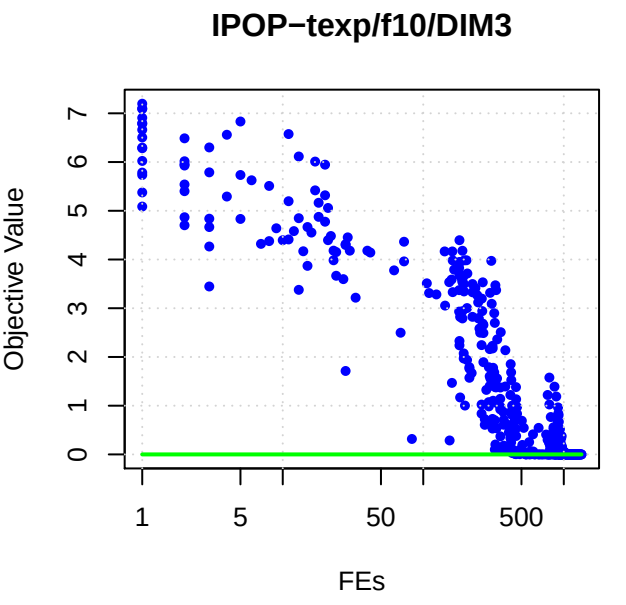
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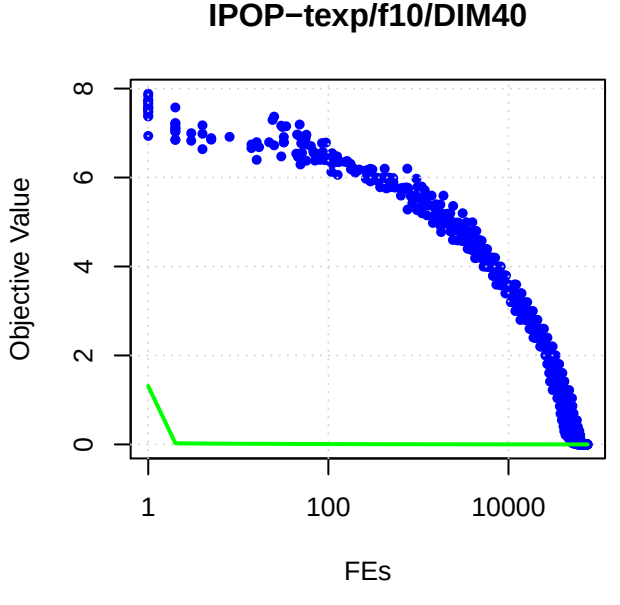
FEs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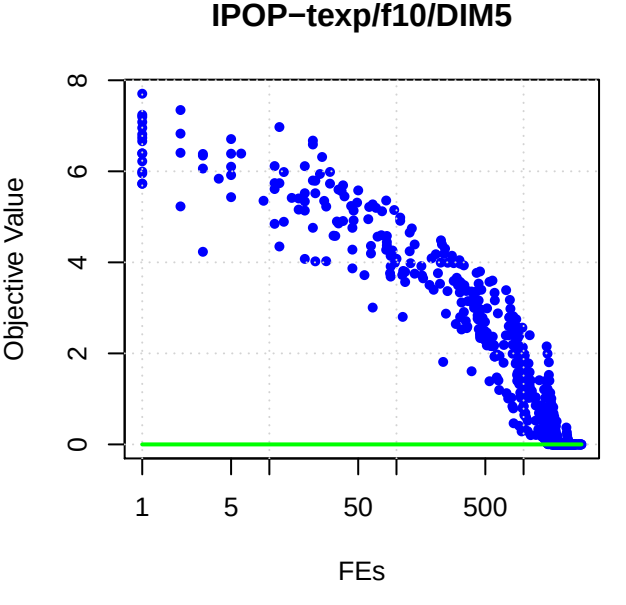
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Objective Value
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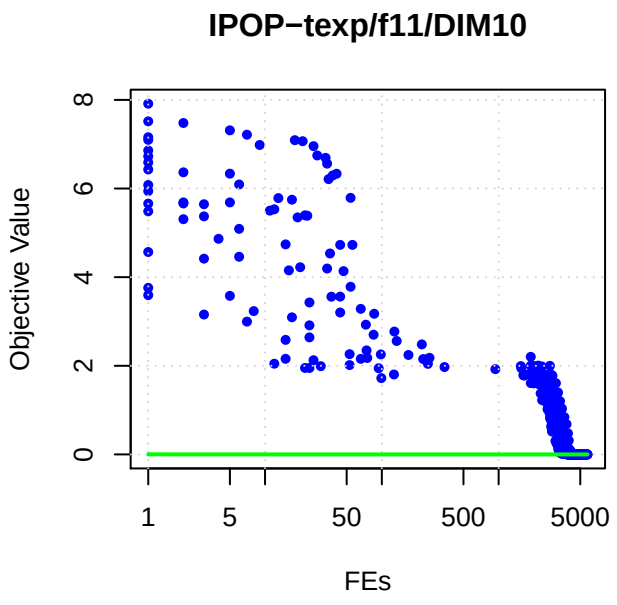
FEs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Objective Value
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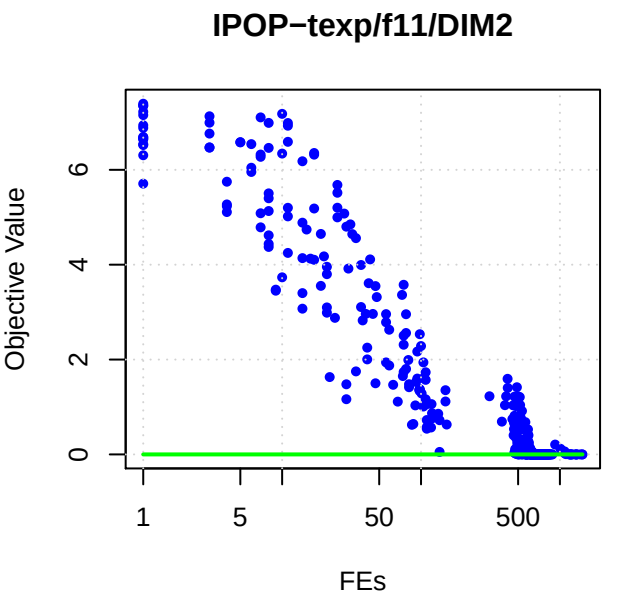
FEs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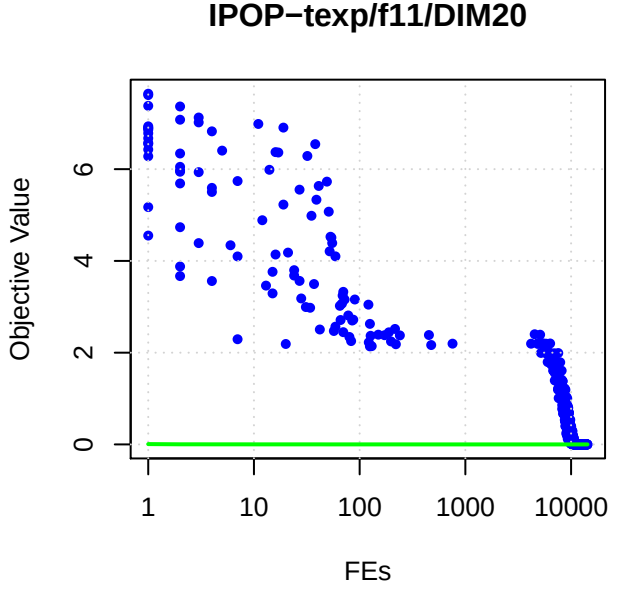
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Objective Value
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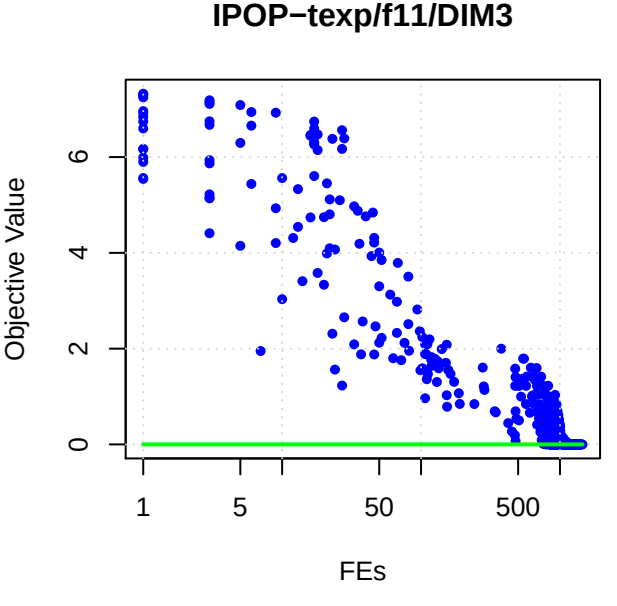
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Objective Value
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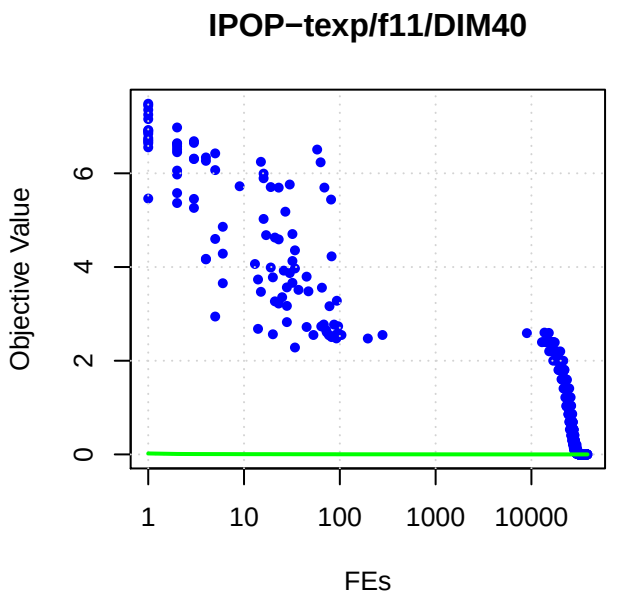
FEs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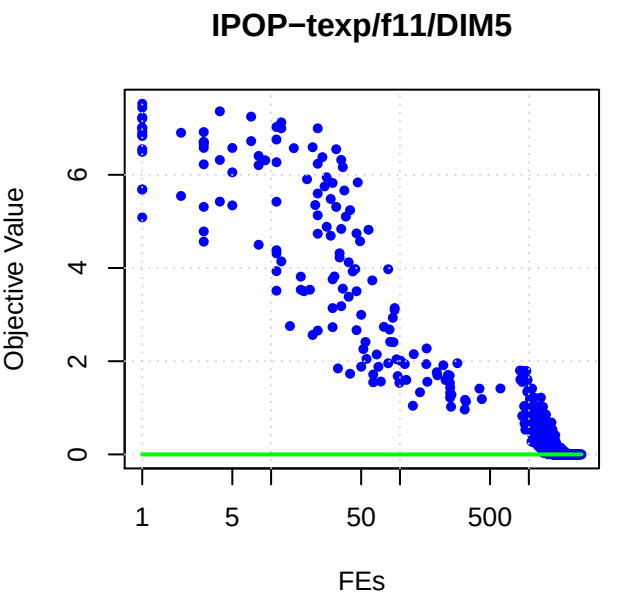
100
1000
10000
FEs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Objective Value
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1
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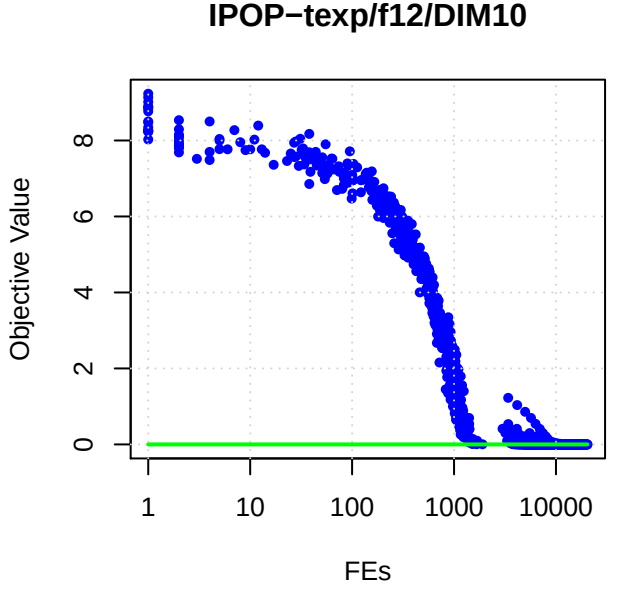
FEs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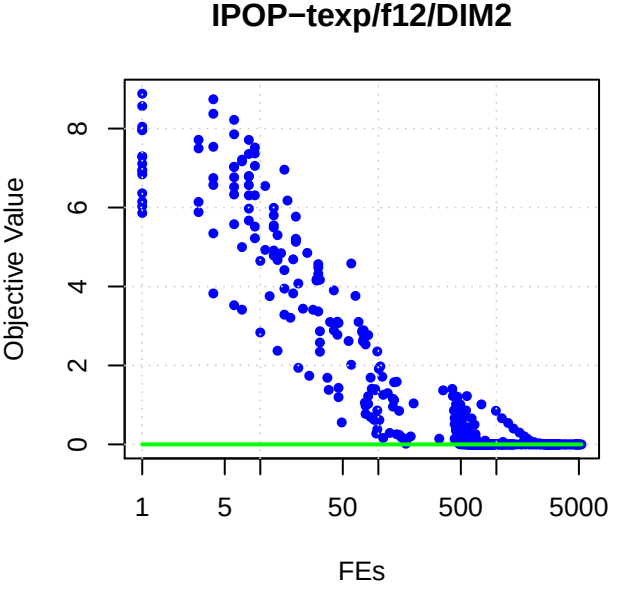
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6
8
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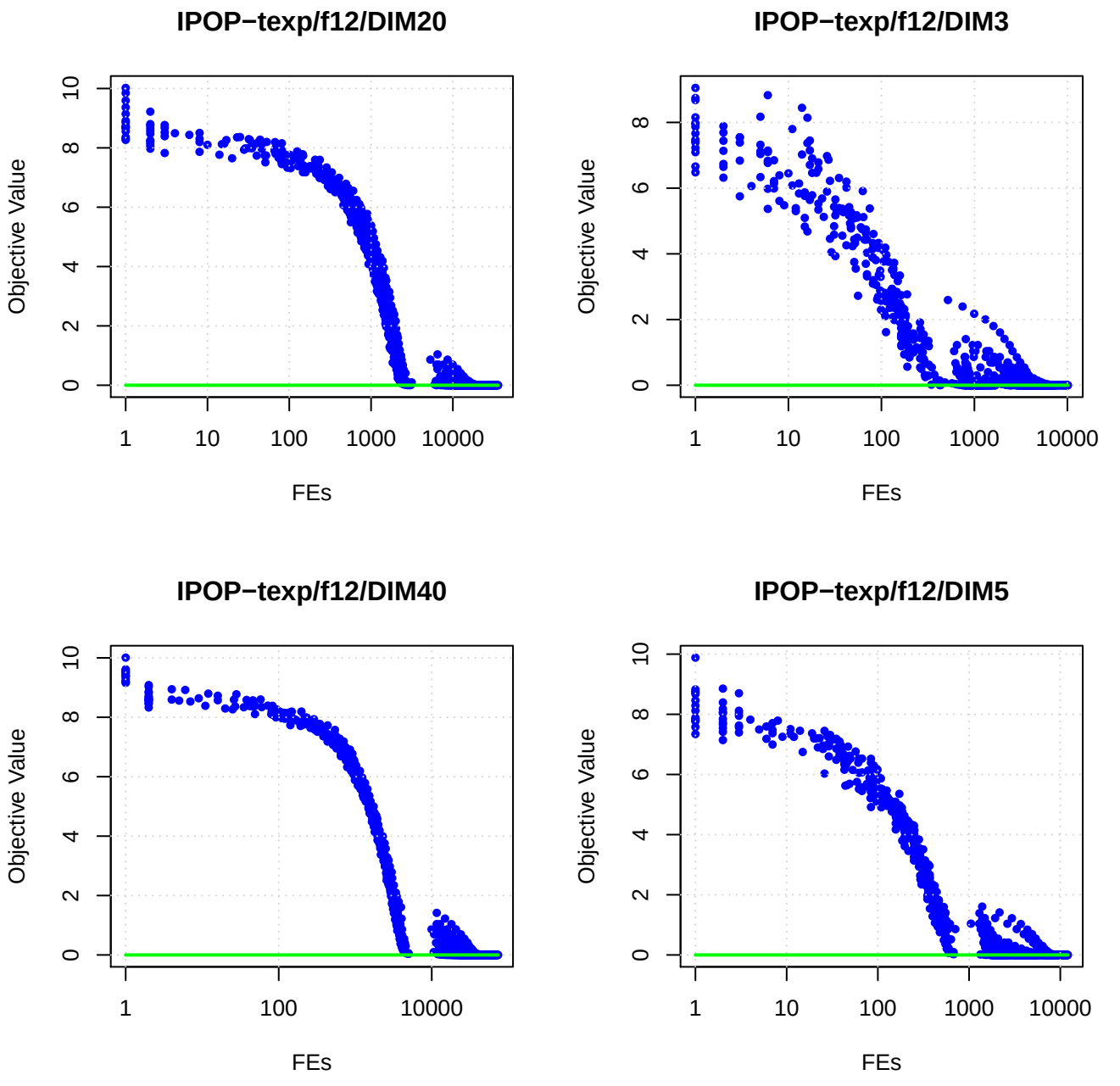
5000
FEs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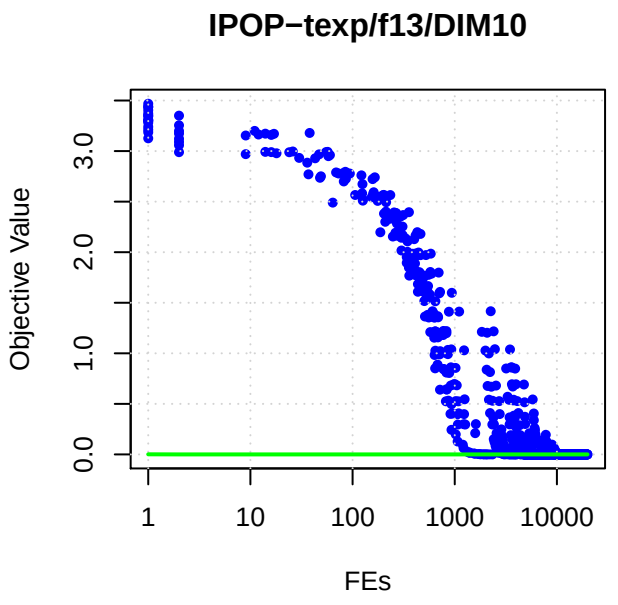
Objective Value
FEs
IPOP−texp/f12/DIM3
Objective Value
FEs
IPOP−texp/f12/DIM40
Objective Value
FEs
IPOP−texp/f12/DIM5
Objective Value
FEs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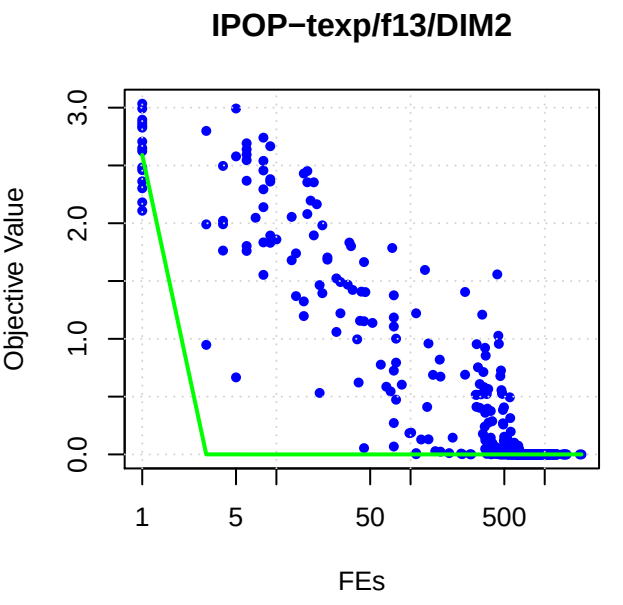
1000
10000
FEs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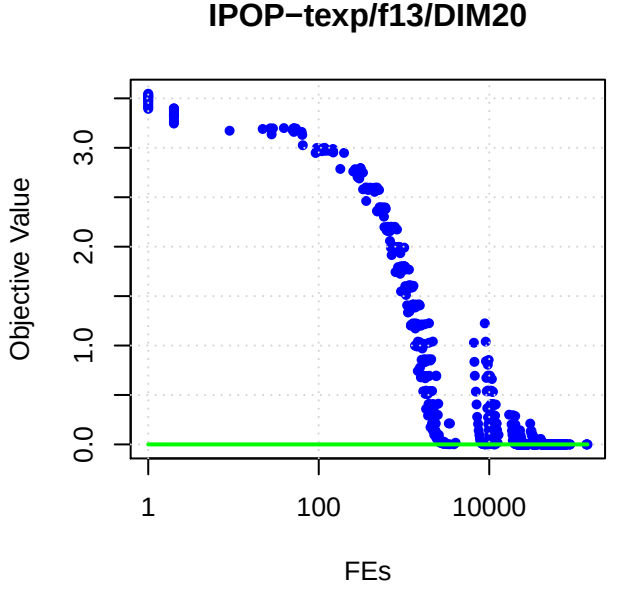
FEs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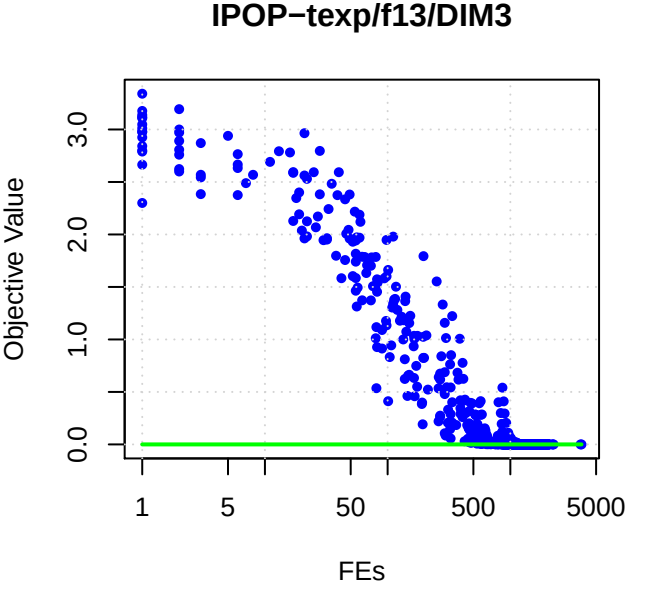
10000
FEs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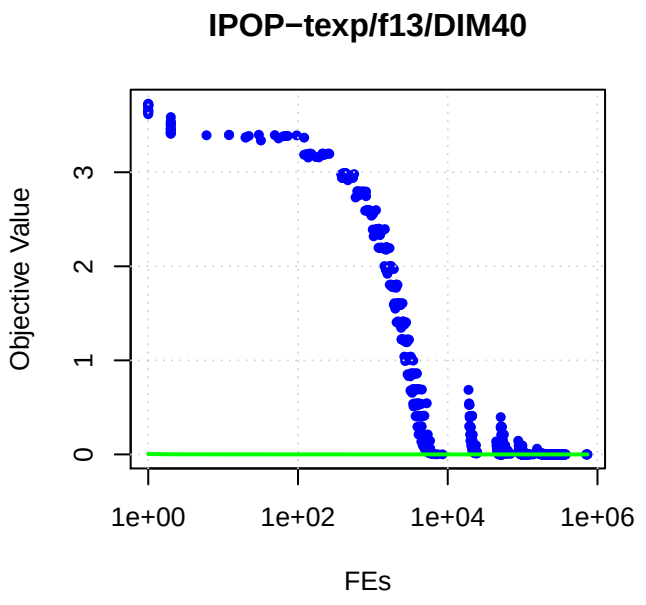
FEs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Objective Value
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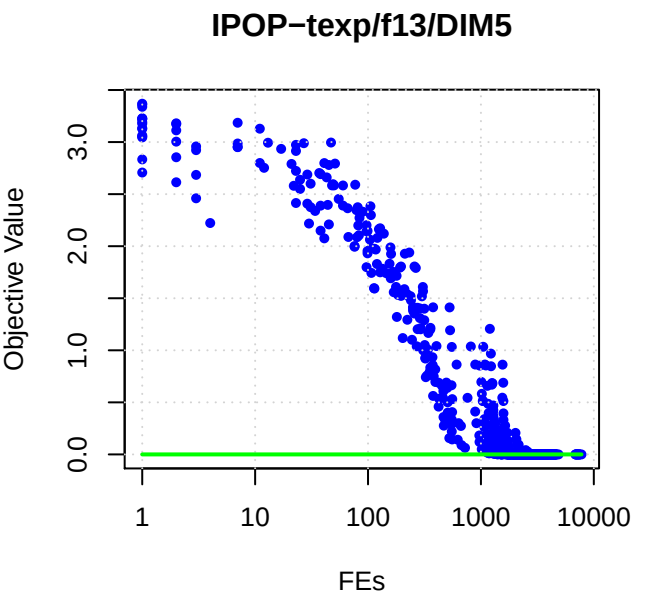
1e+04
1e+06
FEs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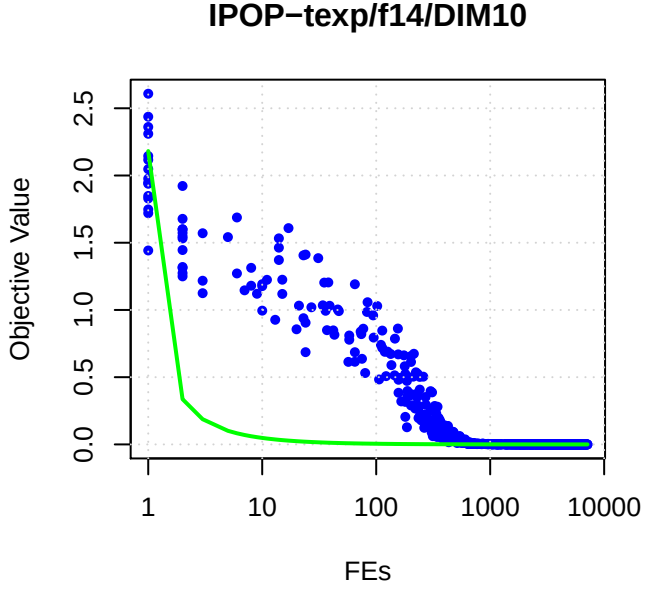
1000
10000
FEs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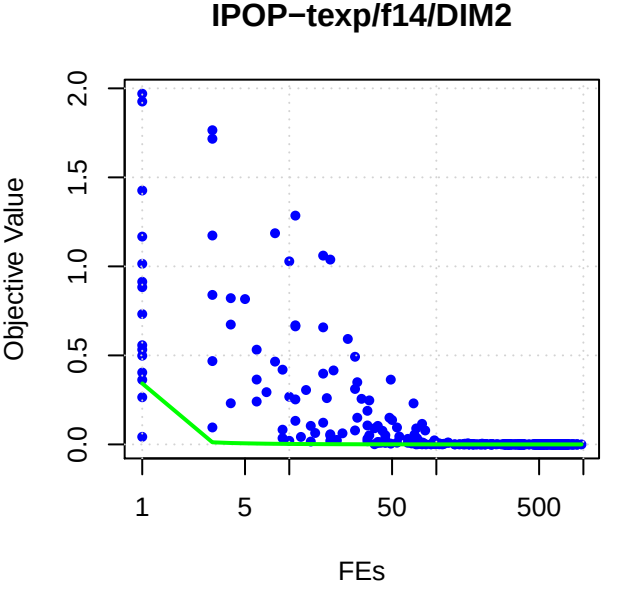
10000
FEs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1
5
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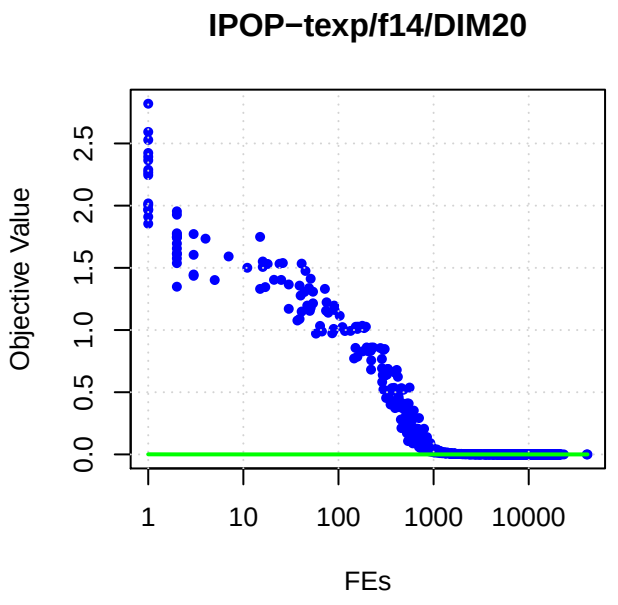
500
FEs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Objective Value
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2.5
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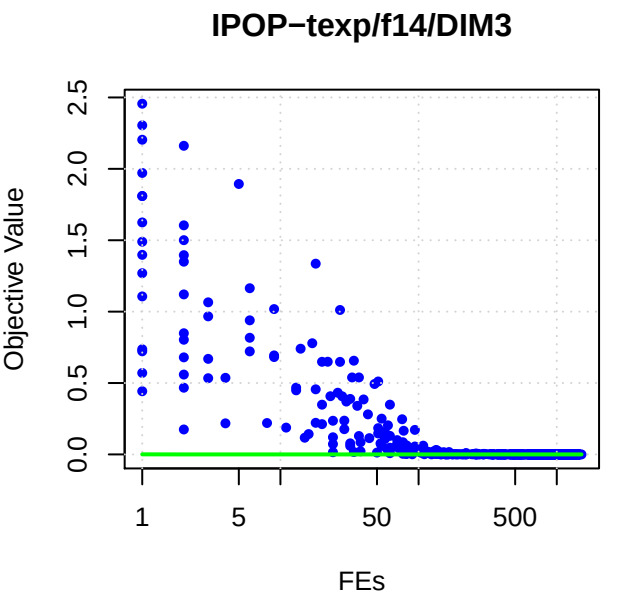
100
1000
10000
FEs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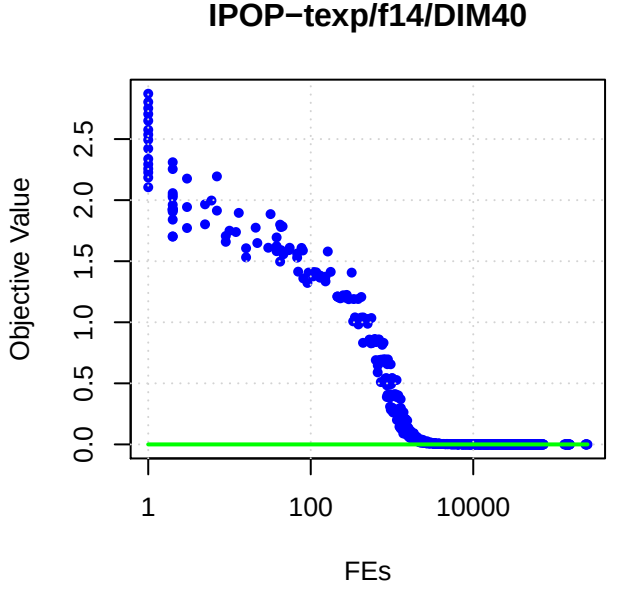
FEs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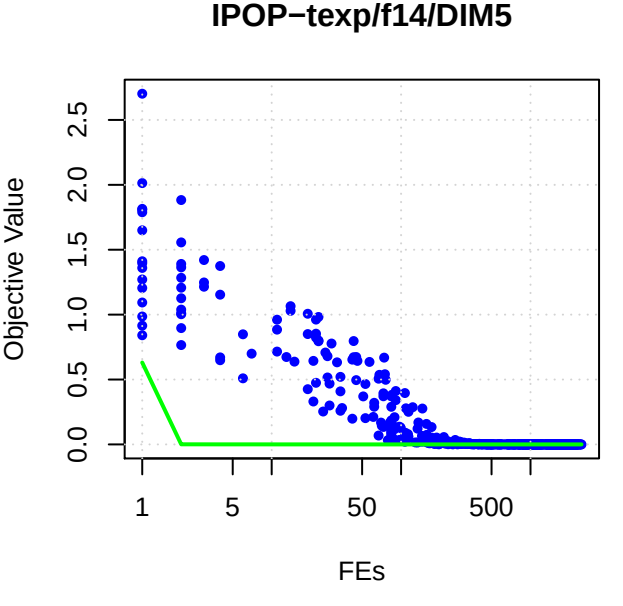
10000
FEs


IPOP−texp/f14/DIM5
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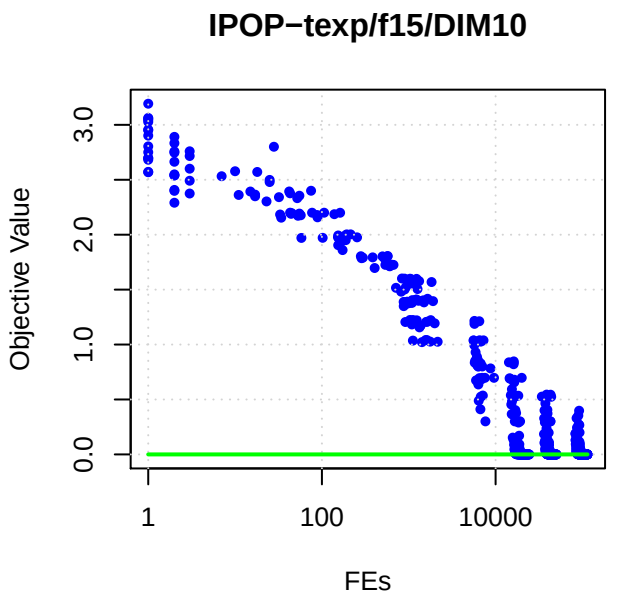
FEs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Objective Value
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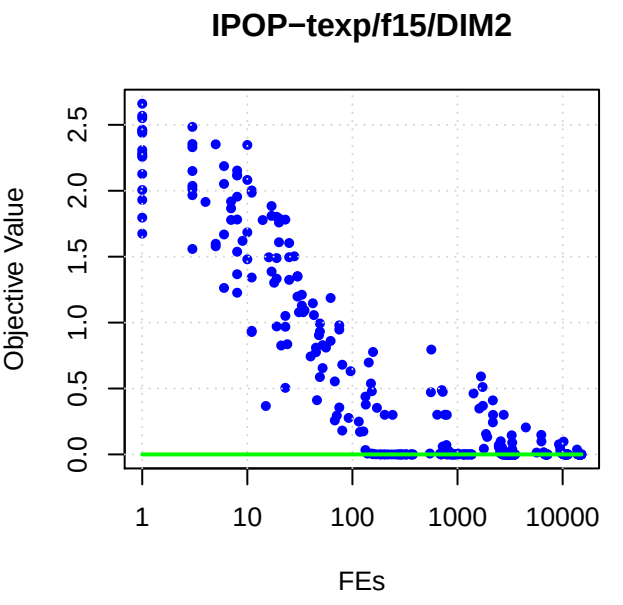
1
100
10000
FEs


IPOP−texp/f15/DIM2
Objective Value
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2.0
2.5
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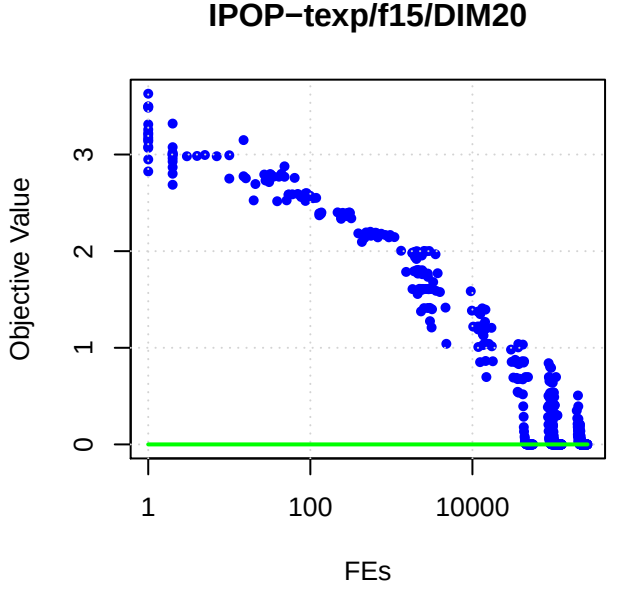
1000
10000
FEs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Objective Value
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1
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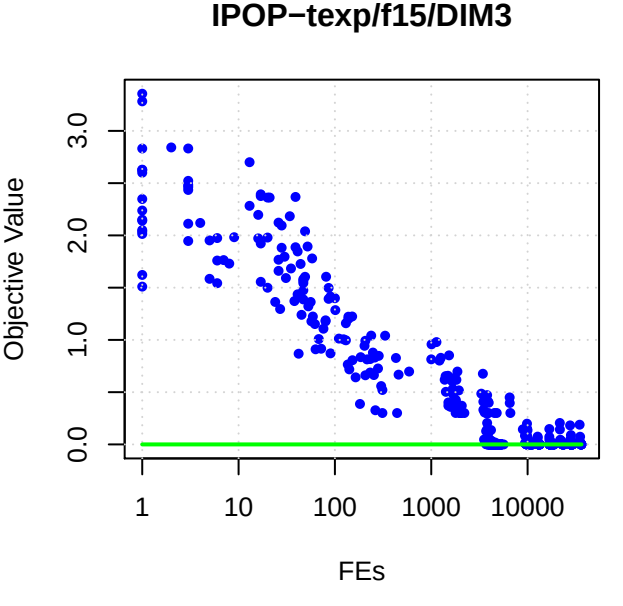
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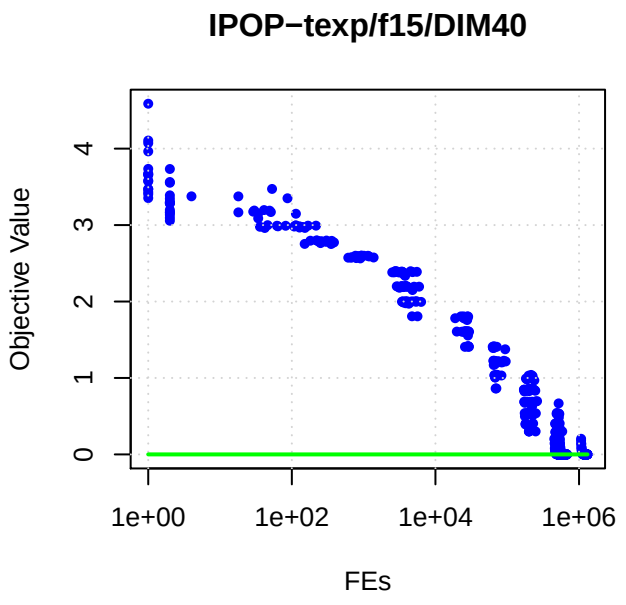
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Objective Value
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1e+02
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1e+06
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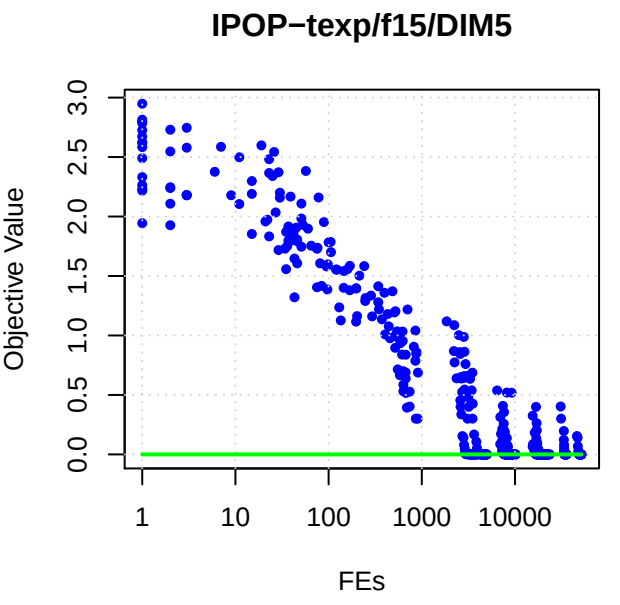
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1000
10000
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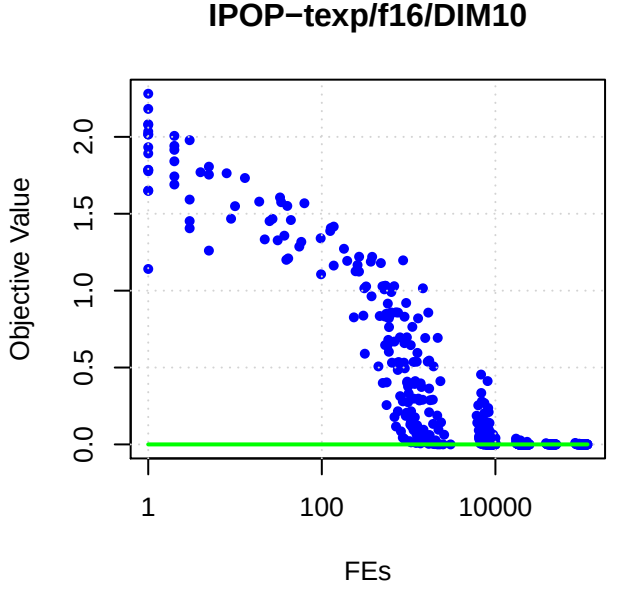
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100
10000
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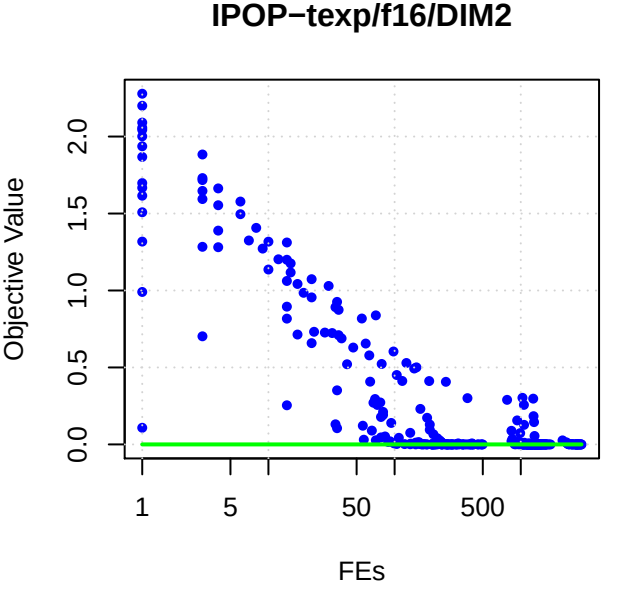
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2.0
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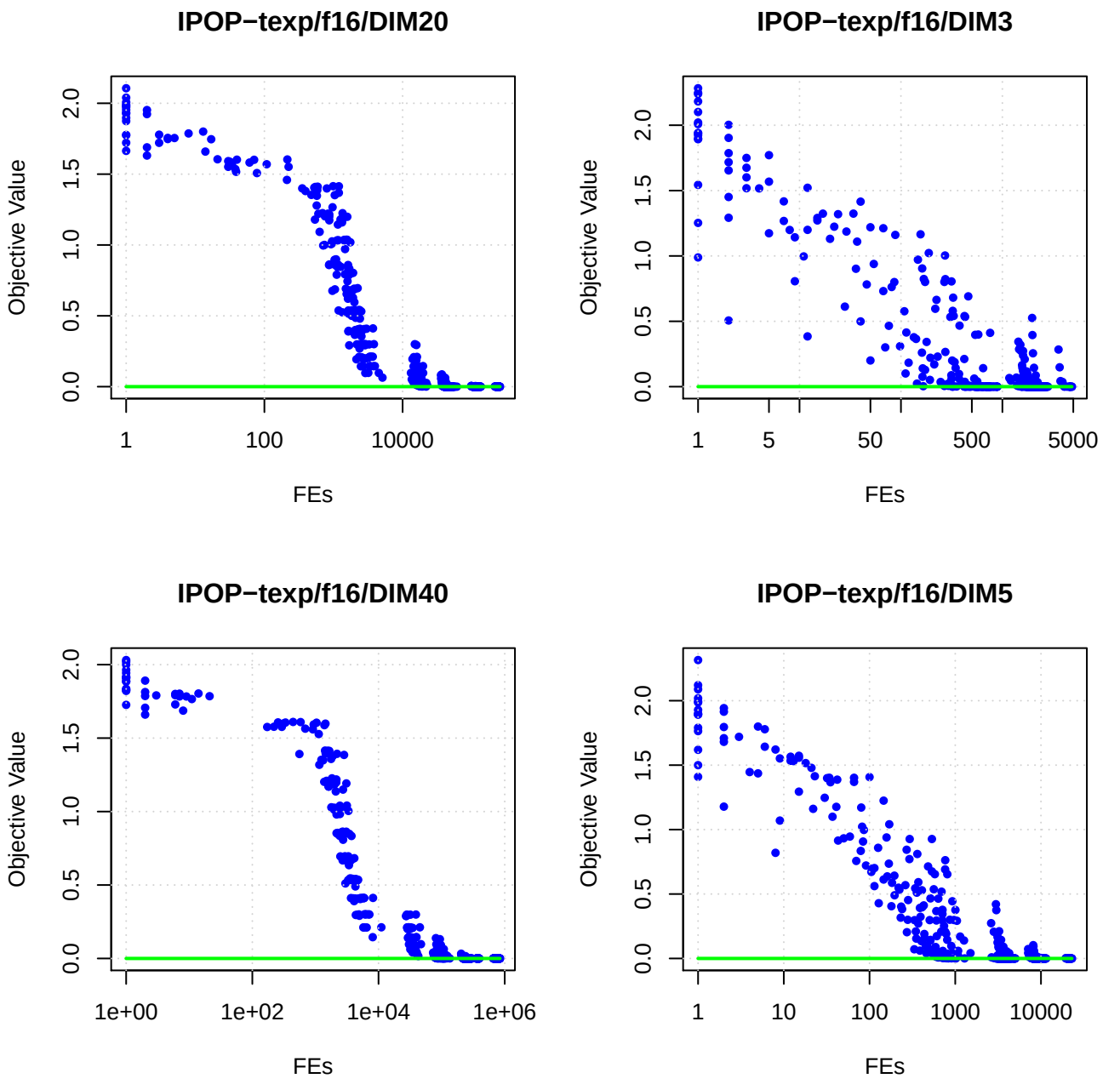
50
500
FEs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Objective Value
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2.0
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100
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FEs
IPOP−texp/f16/DIM3
Objective Value
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1.0
1.5
2.0
1
5
50
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FEs
IPOP−texp/f16/DIM40
Objective Value
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1e+02
1e+04
1e+06
FEs
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Objective Value
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2.0
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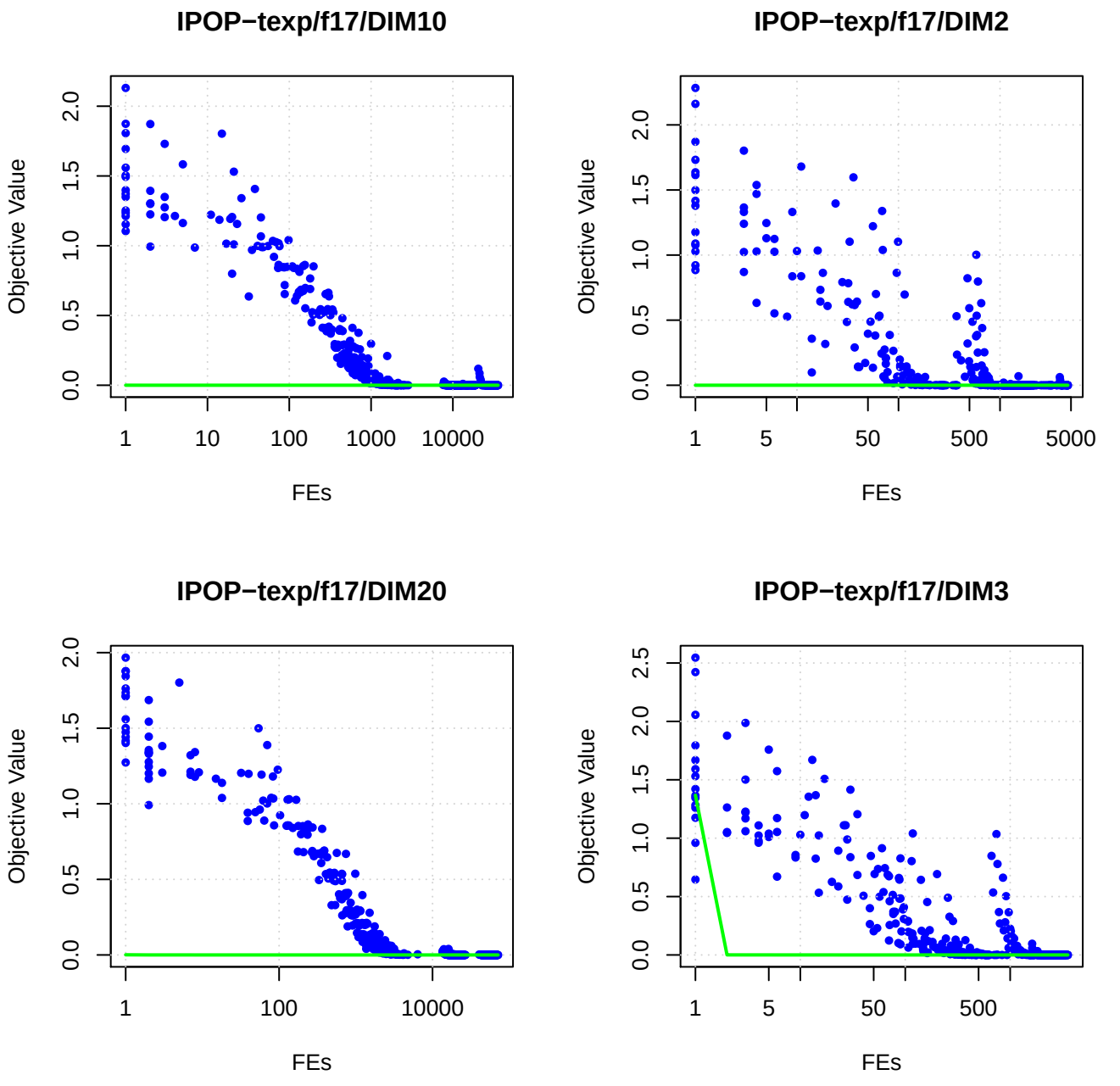
100
1000
10000
FEs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FEs
IPOP−texp/f17/DIM2
Objective Value
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1.0
1.5
2.0
1
5
50
500
5000
FEs
IPOP−texp/f17/DIM20
Objective Value
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1.0
1.5
2.0
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FEs
IPOP−texp/f17/DIM3
Objective Value
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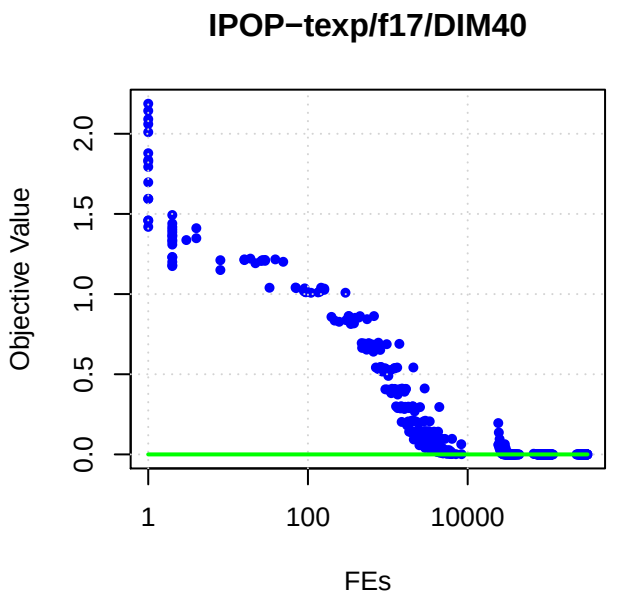
FEs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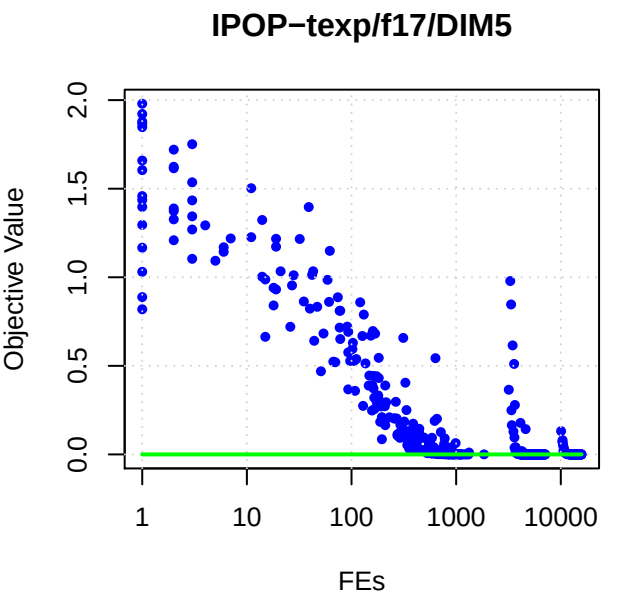
FEs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Objective Value
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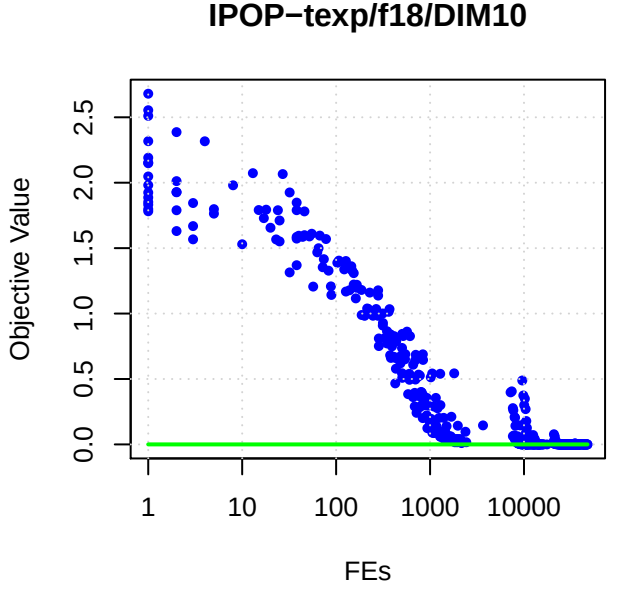
FEs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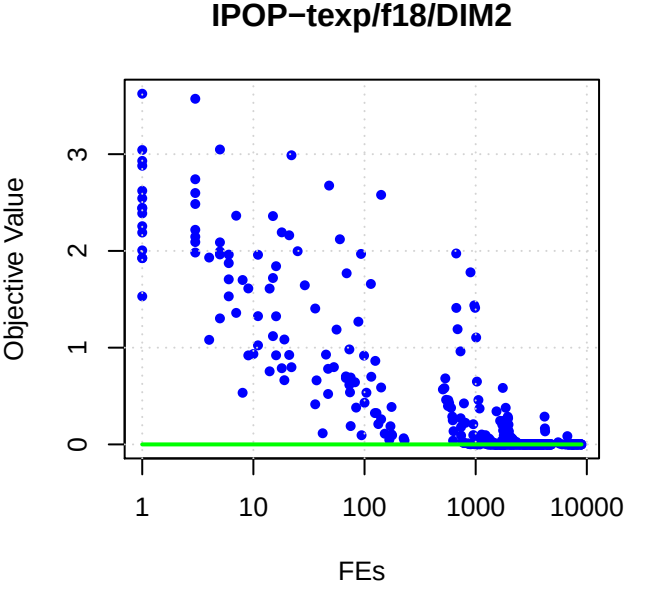
IPOP−texp/f18/DIM2
Objective Value
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3
1
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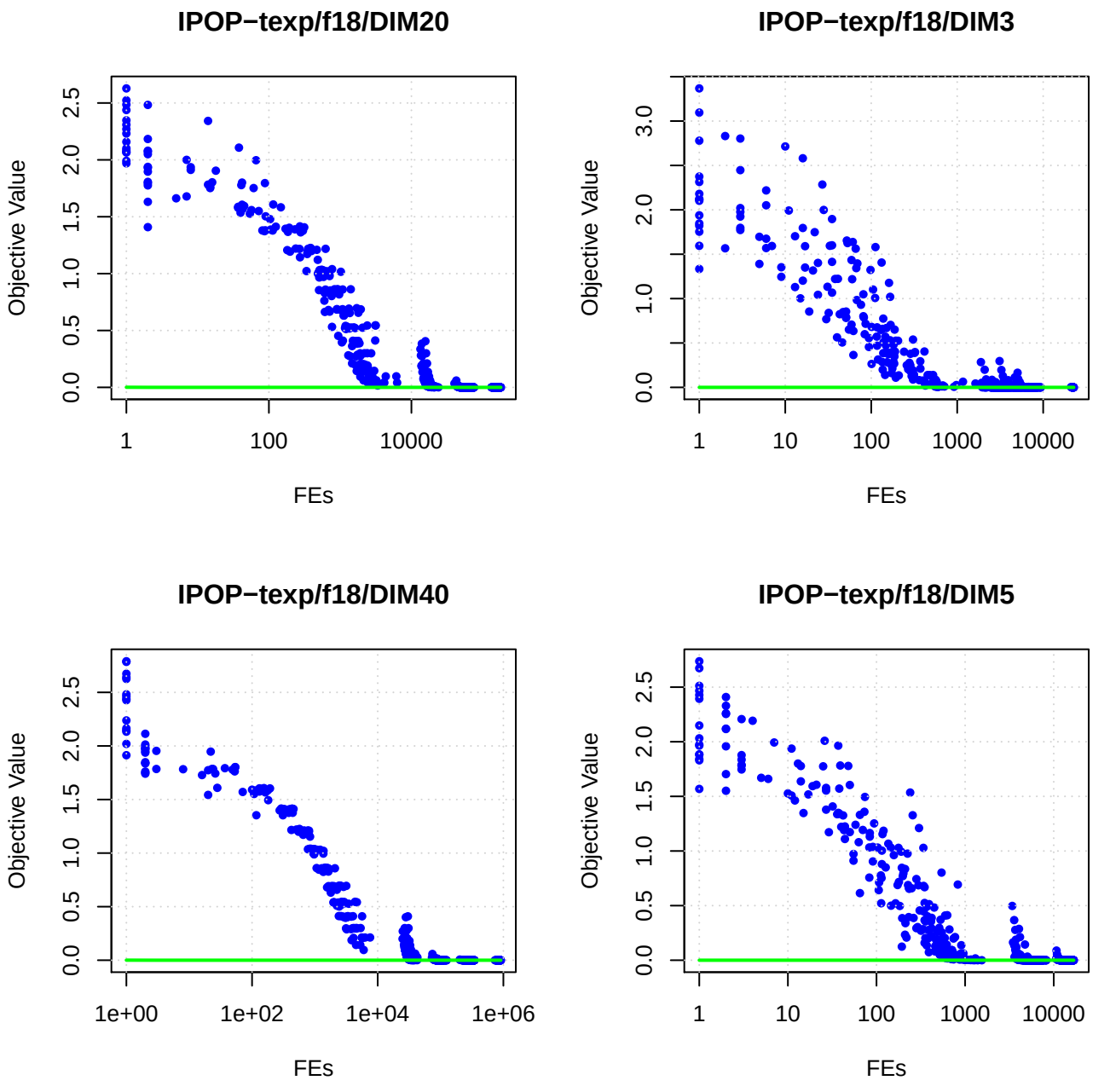
100
1000
10000
FEs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1
100
10000
FEs
IPOP−texp/f18/DIM3
Objective Value
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1.0
2.0
3.0
1
10
100
1000
10000
FEs
IPOP−texp/f18/DIM40
Objective Value
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1.0
1.5
2.0
2.5
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−texp/f18/DIM5
Objective Value
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1.0
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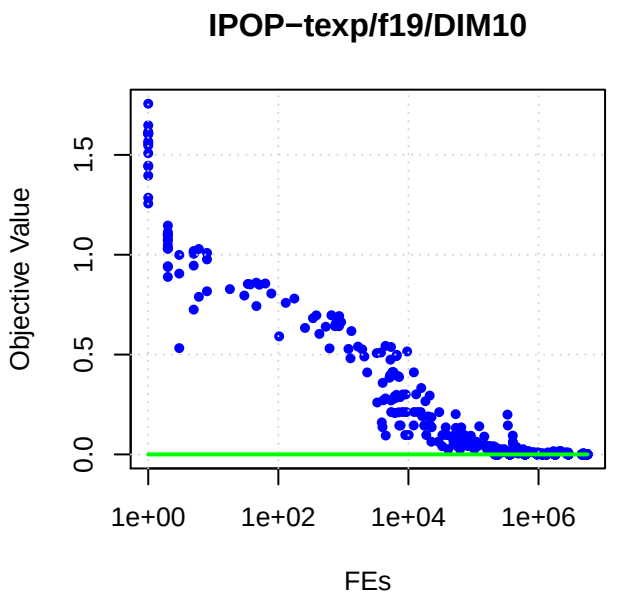
2.0
2.5
1
10
100
1000
10000
FEs


IPOP−texp/f19/DIM10
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1.5
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1e+06
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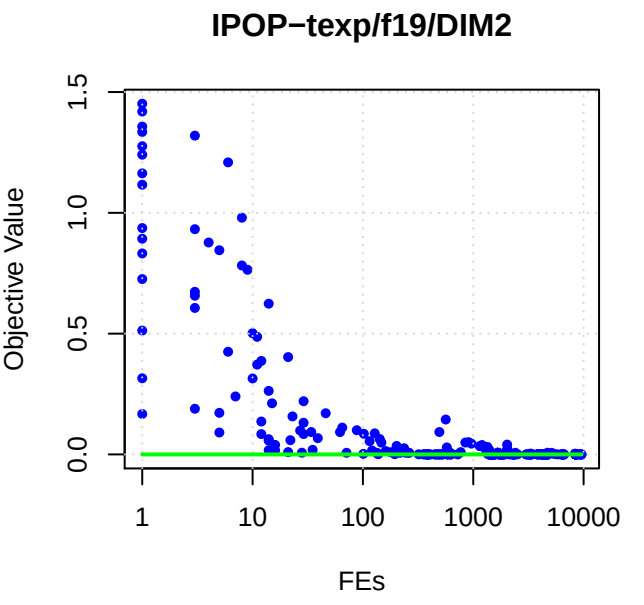
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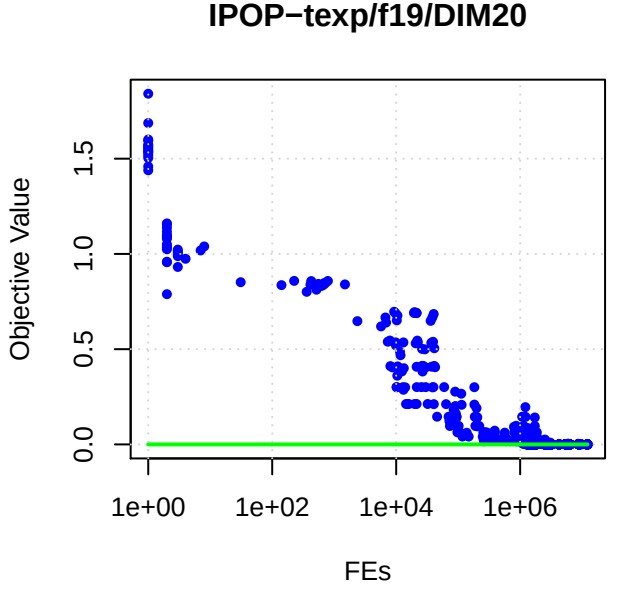
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1e+06
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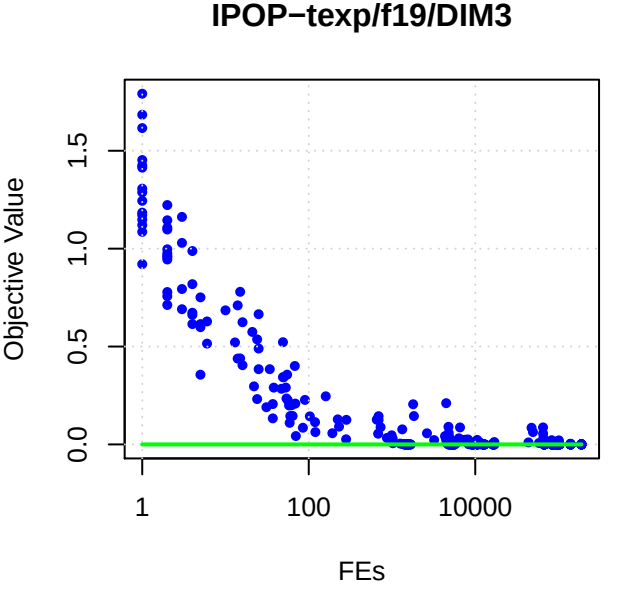
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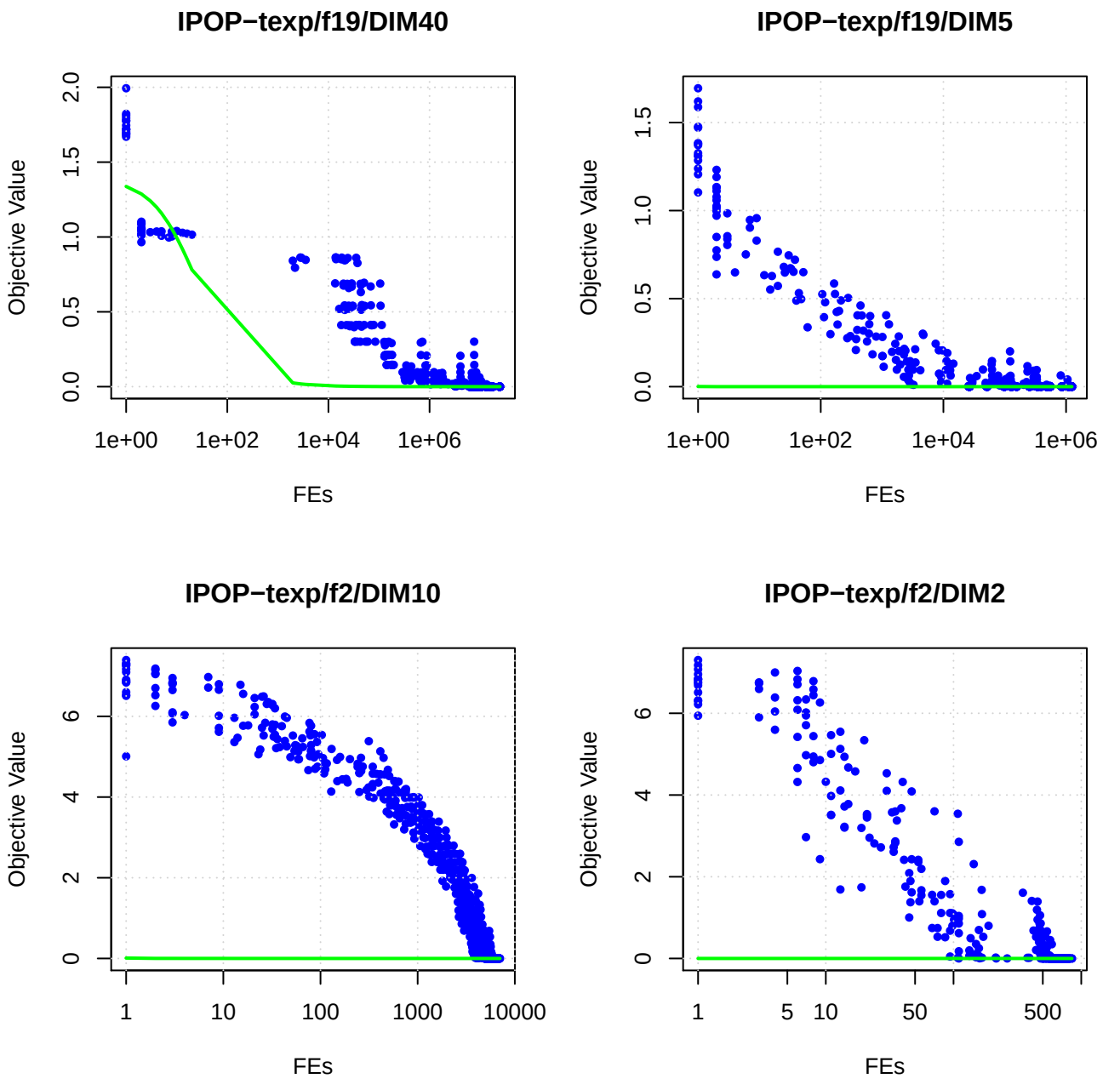
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1e+04
1e+06
FEs
IPOP−texp/f19/DIM5
Objective Value
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0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−texp/f2/DIM10
Objective Value
0
2
4
6
1
10
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Objective Value
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4
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1
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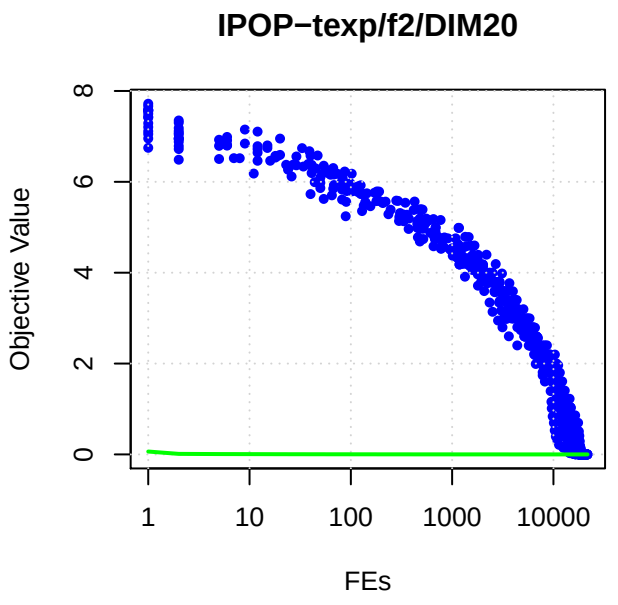
10
50
500
FEs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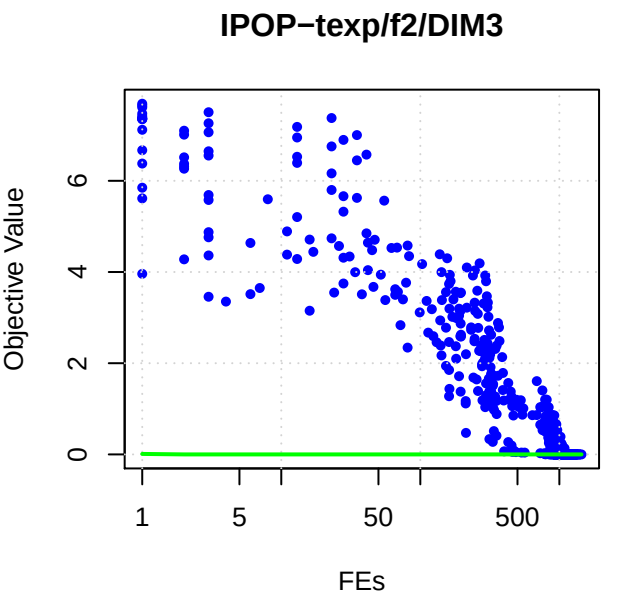
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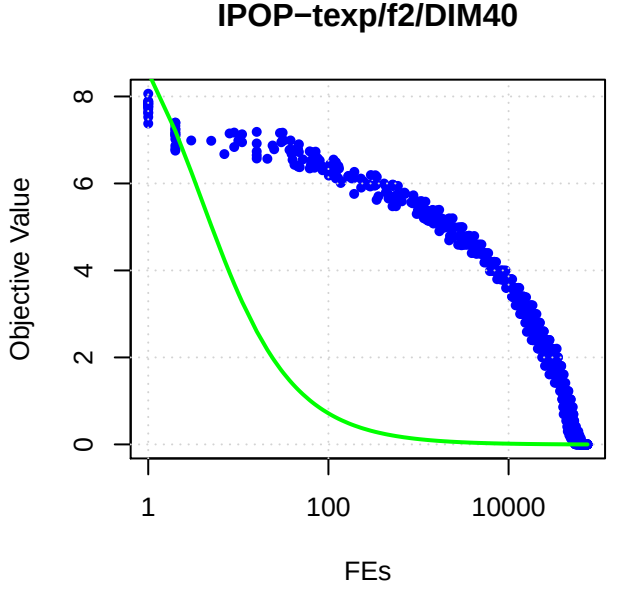
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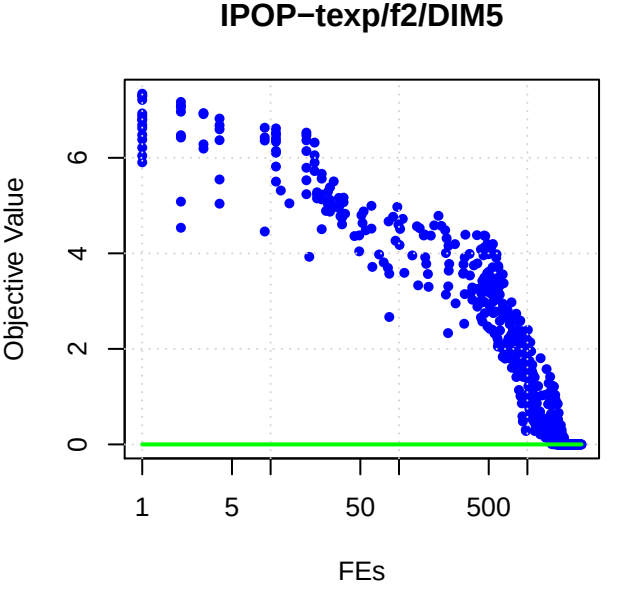
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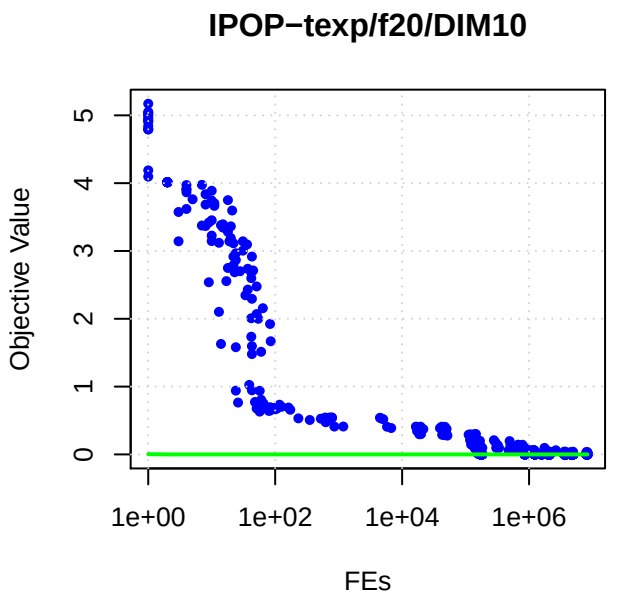
FEs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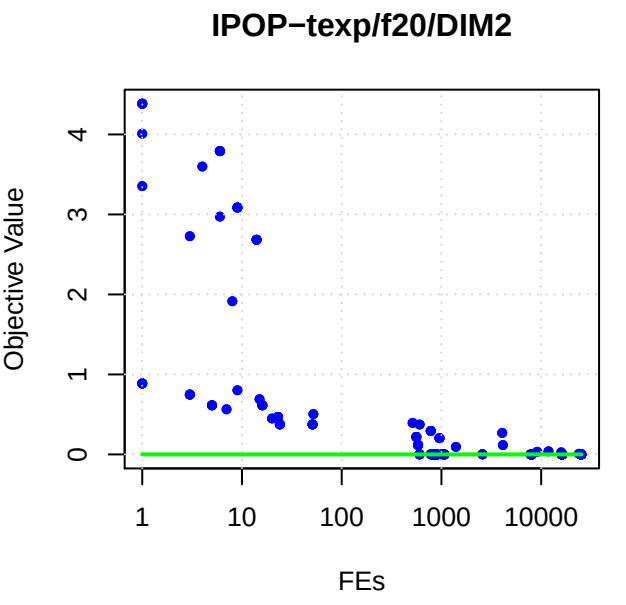
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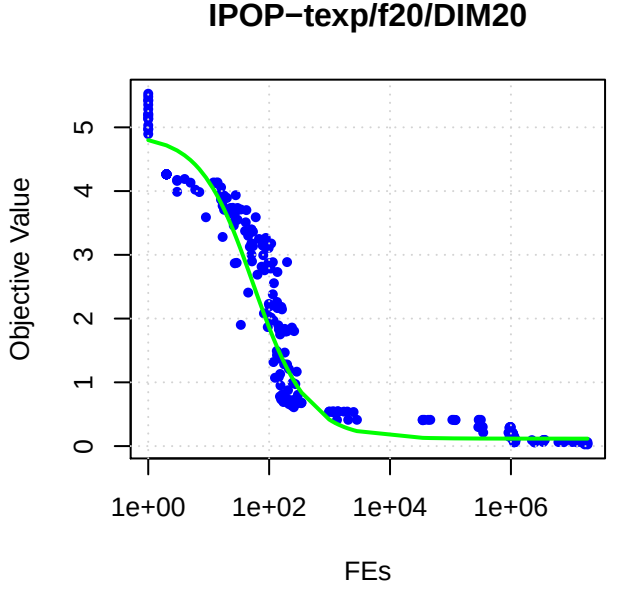
1000
10000
FEs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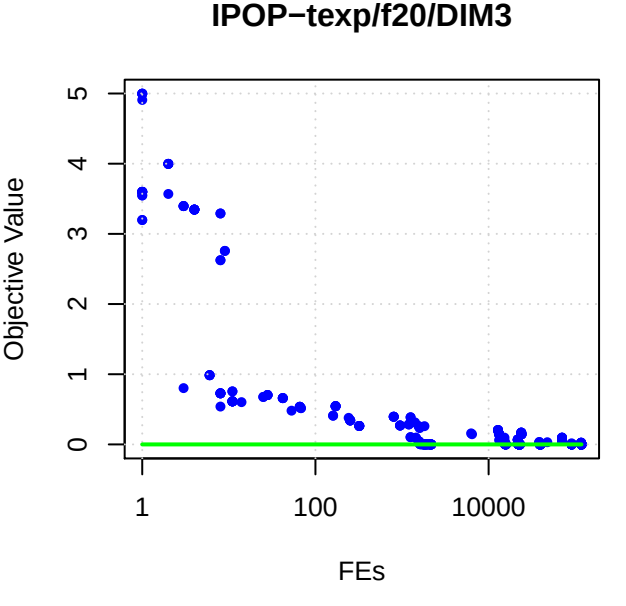
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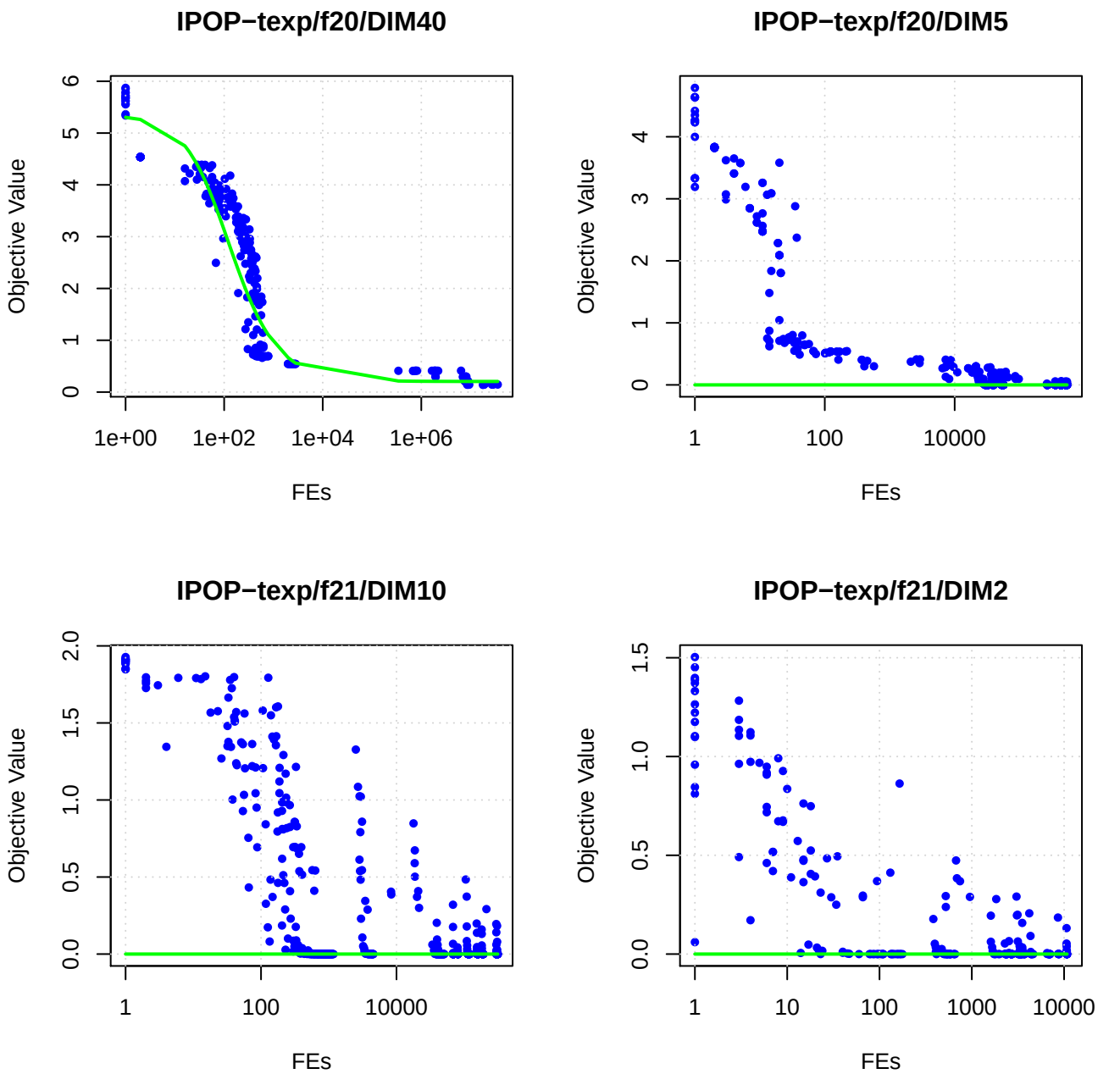
FEs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1e+04
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Objective Value
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2
3
4
1
100
10000
FEs
IPOP−texp/f21/DIM10
Objective Value
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1.0
1.5
2.0
1
100
10000
FEs
IPOP−texp/f21/DIM2
Objective Value
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0.5
1.0
1.5
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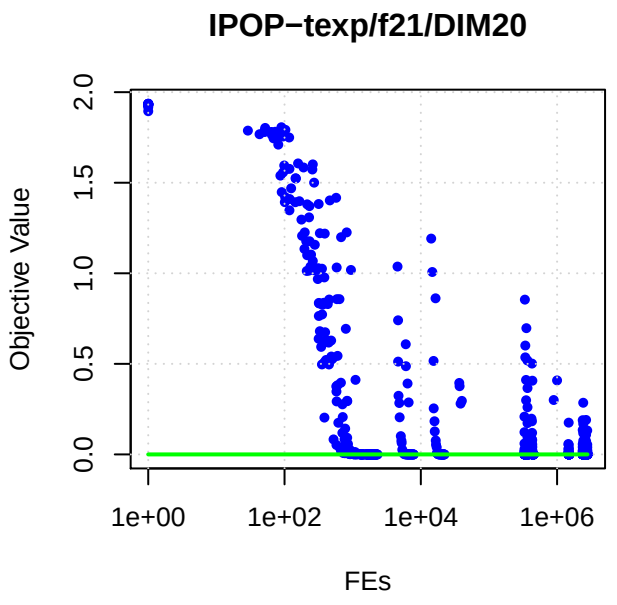
100
1000
10000
FEs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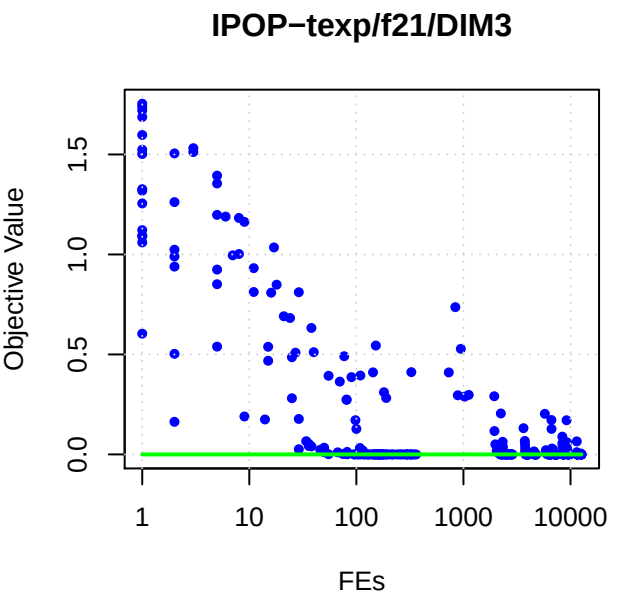
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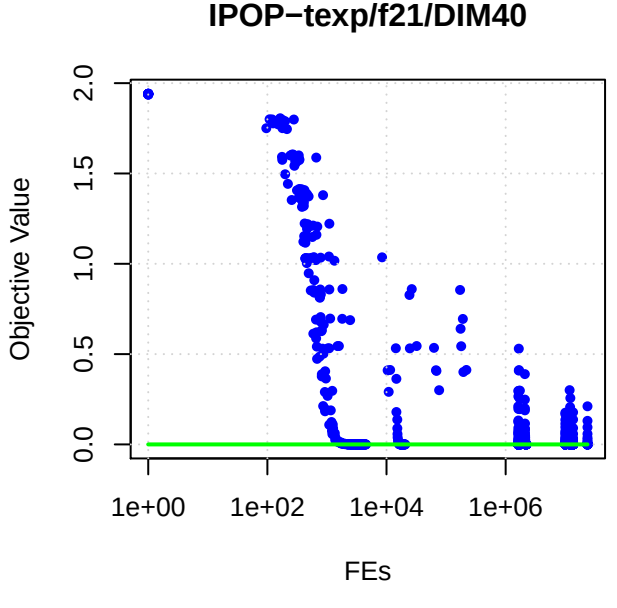
FEs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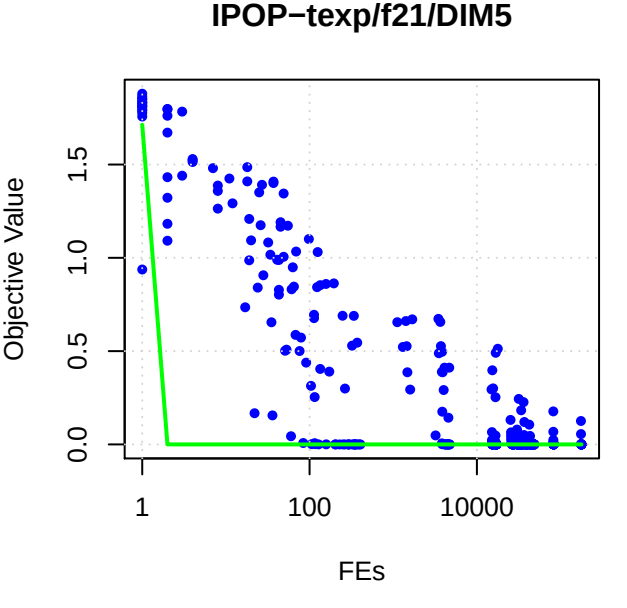
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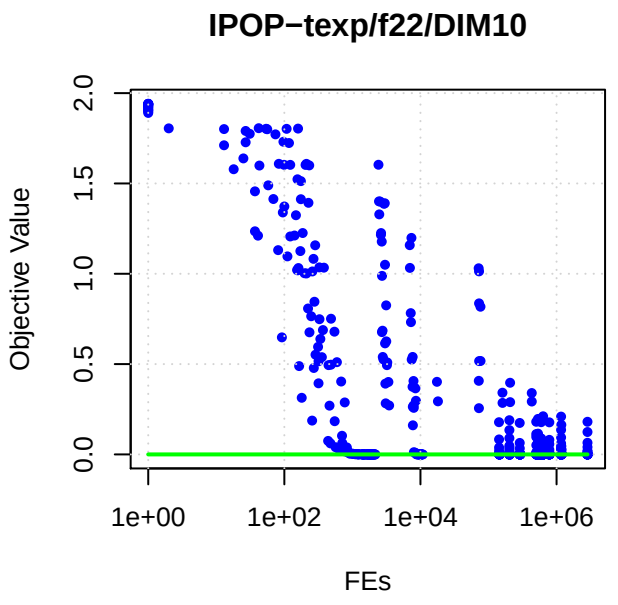
FEs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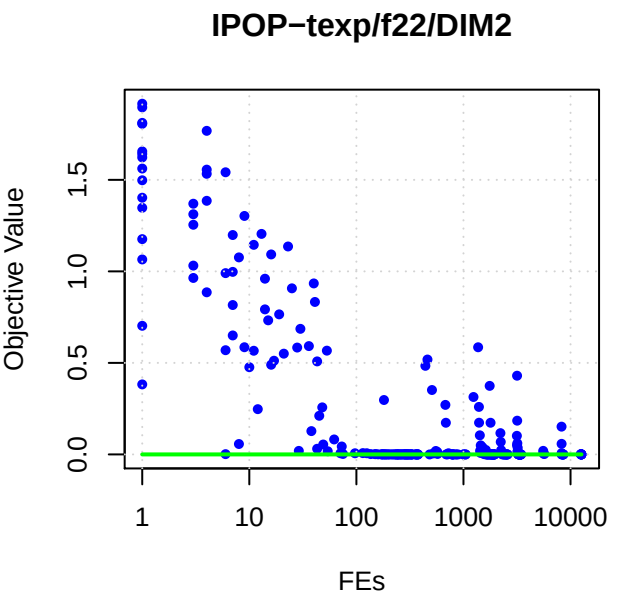
1e+06
FEs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Objective Value
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1000
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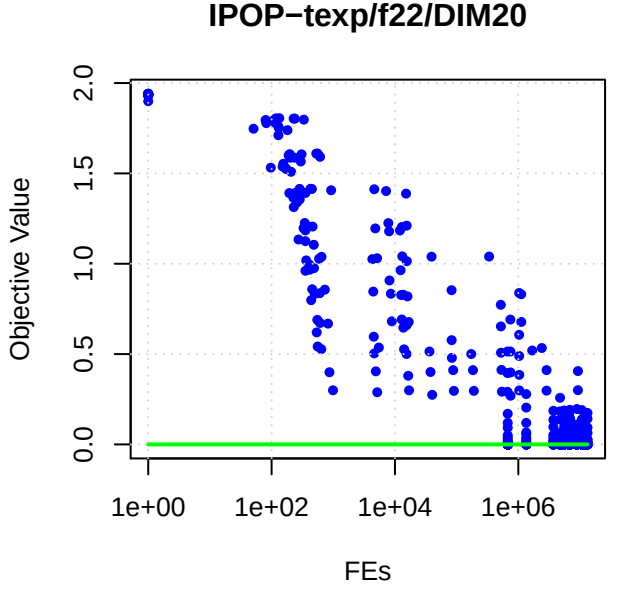
FEs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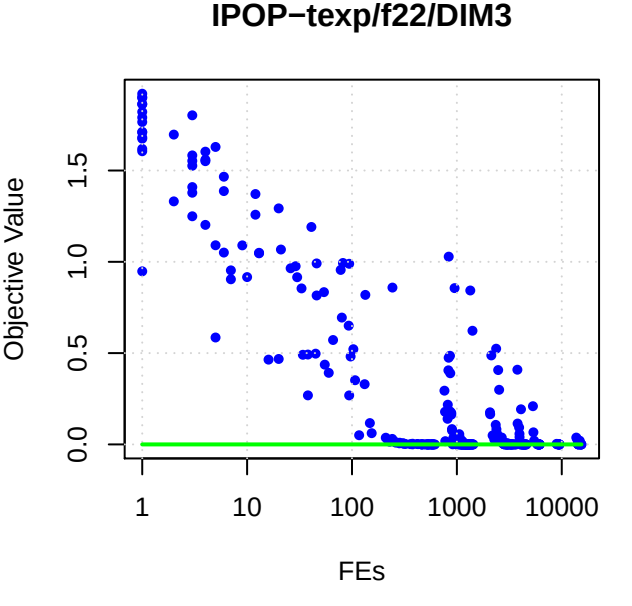
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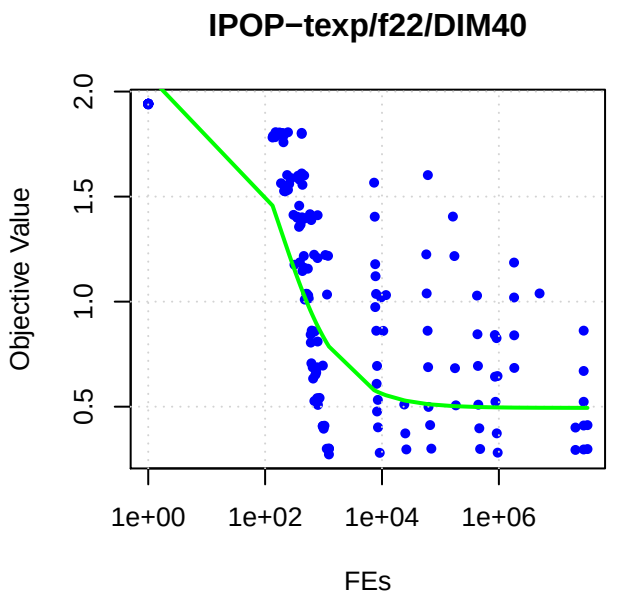
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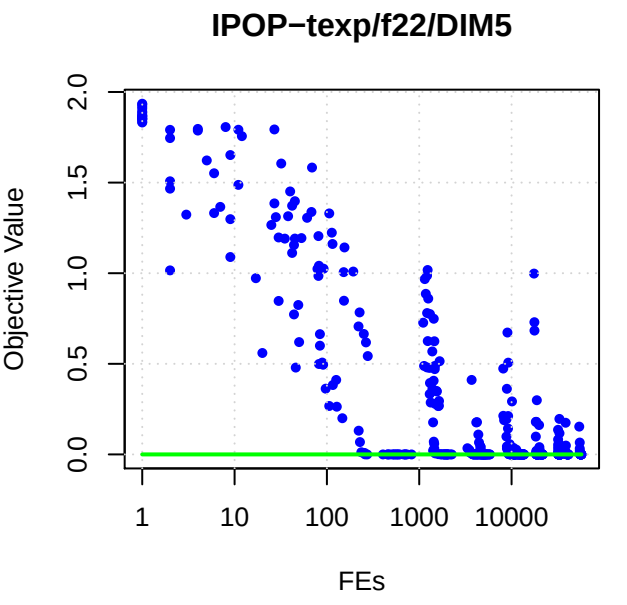
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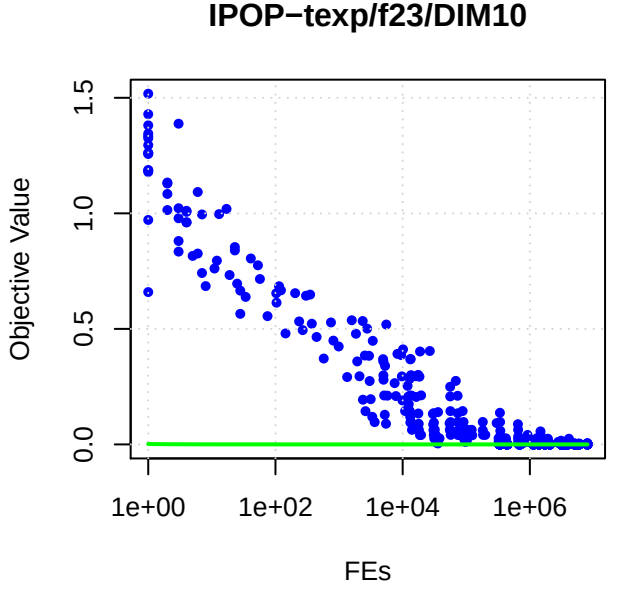
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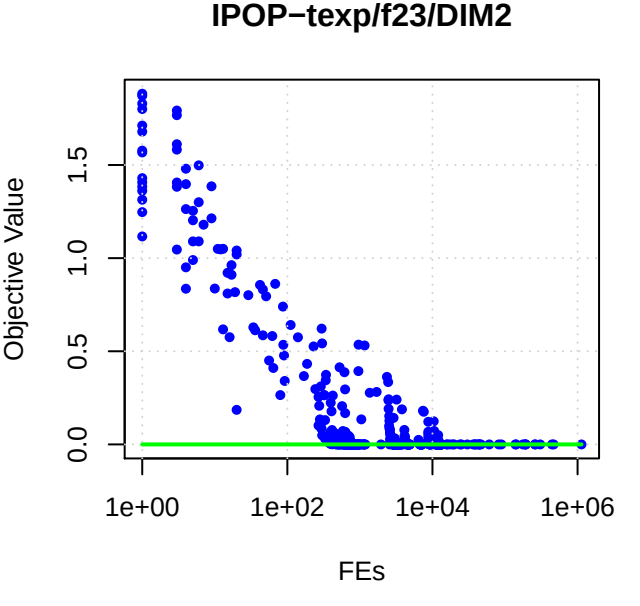
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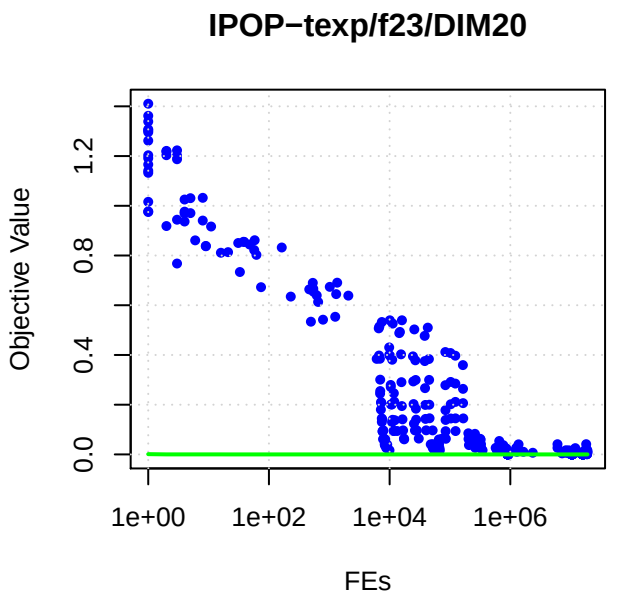
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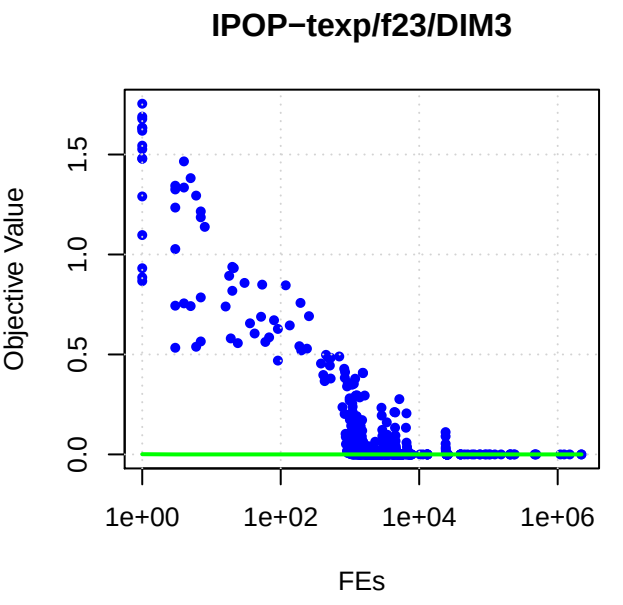
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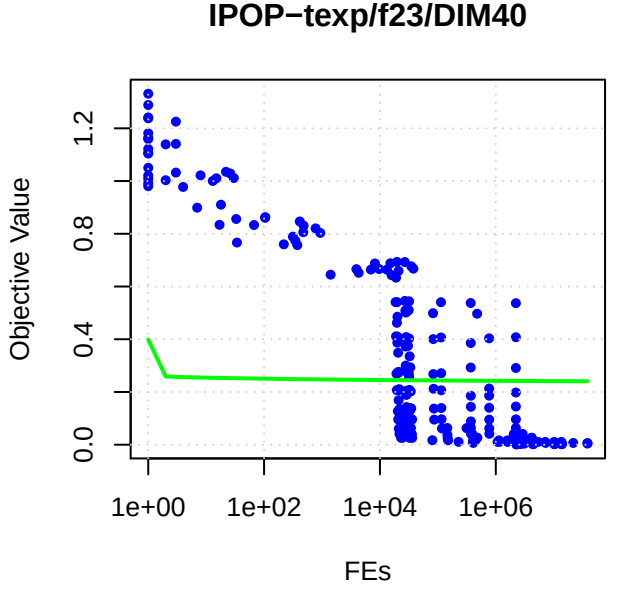
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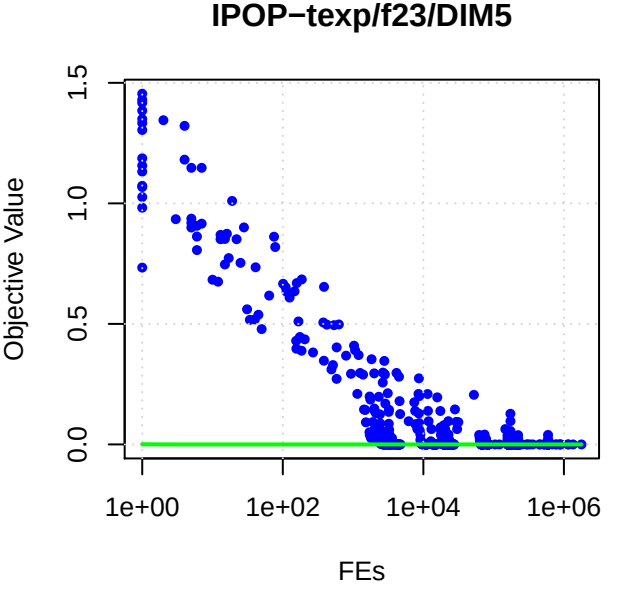
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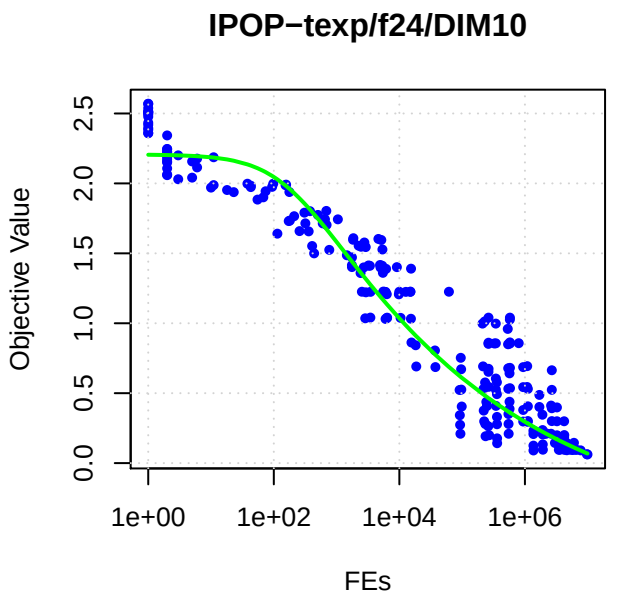
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Objective Value
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2.5
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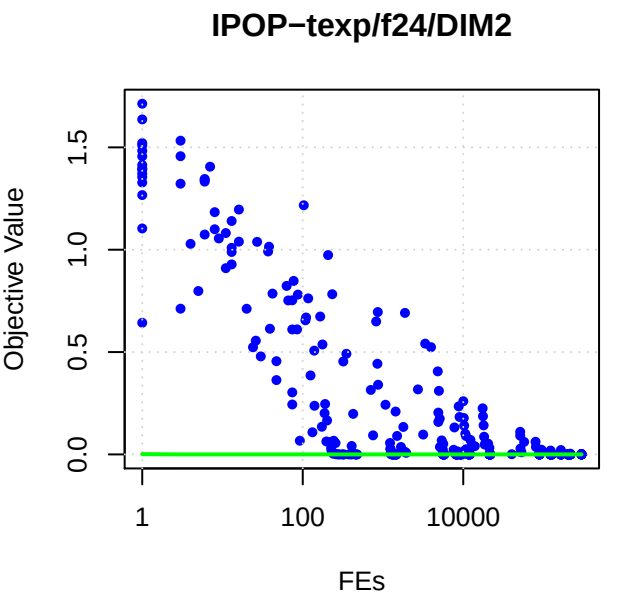
1e+06
FEs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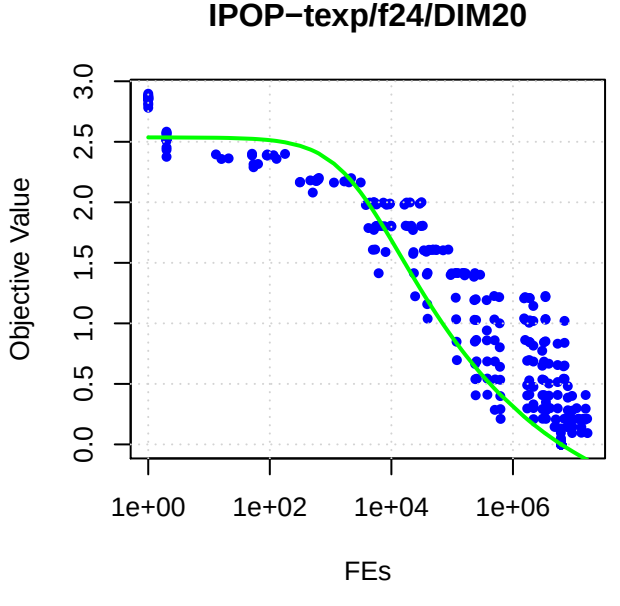
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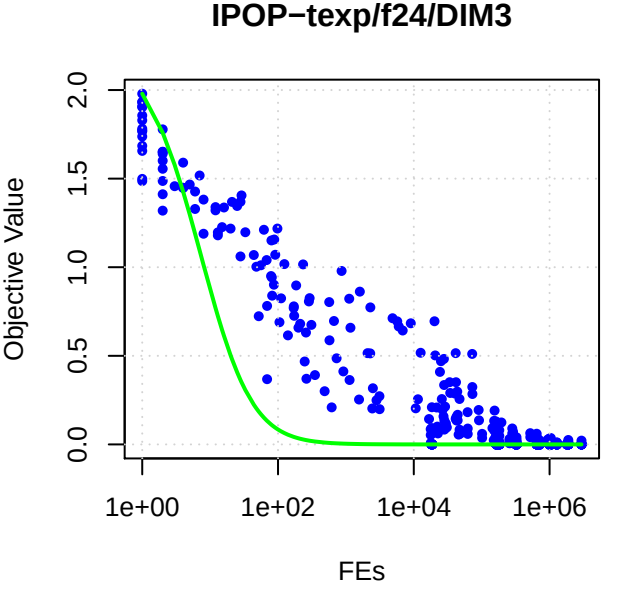
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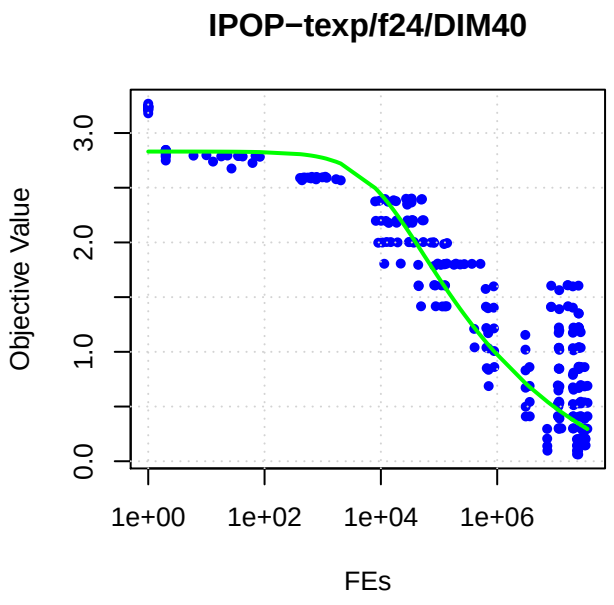
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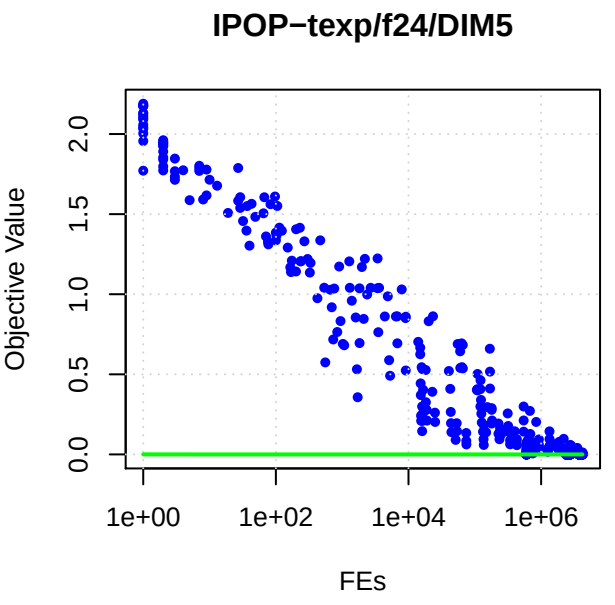
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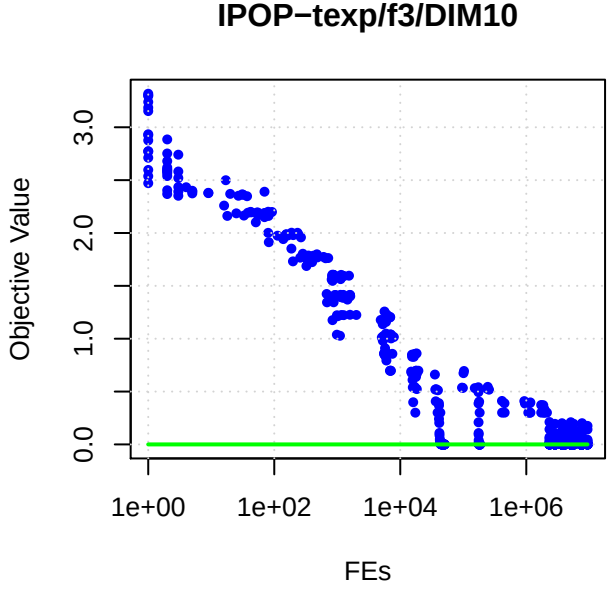
1e+06
FEs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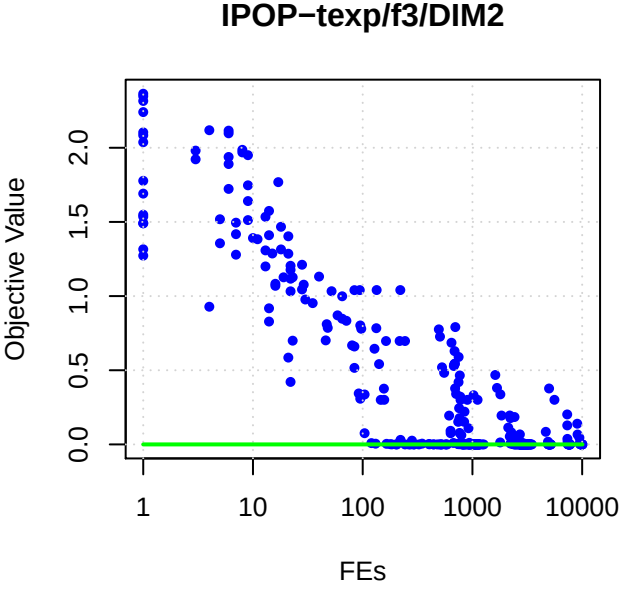
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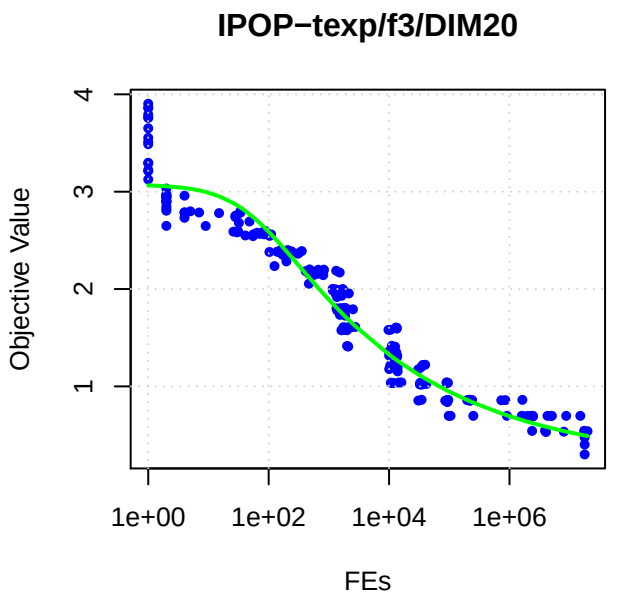
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1e+06
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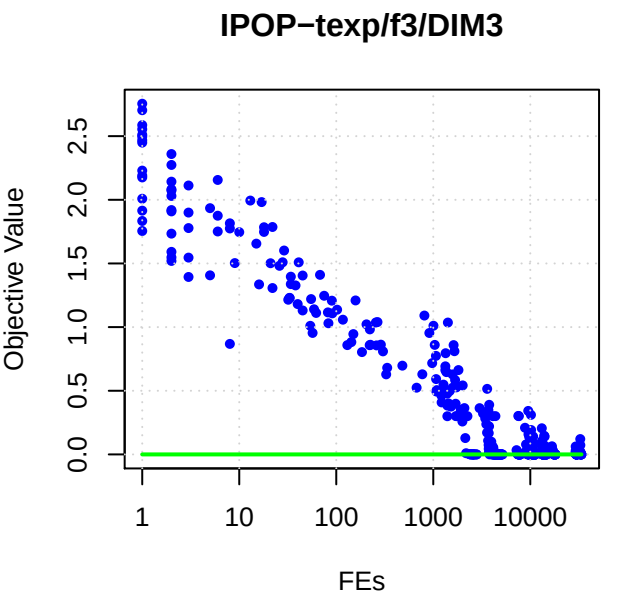
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Objective Value
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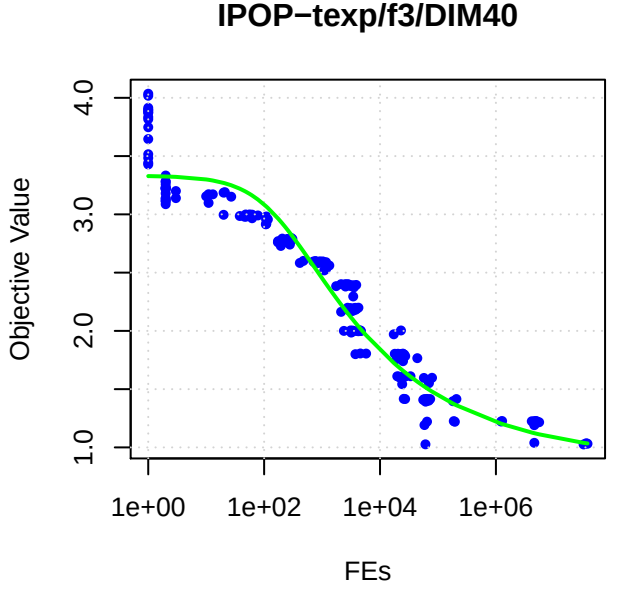
IPOP−texp/f3/DIM40
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3.0
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1e+02
1e+04
1e+06
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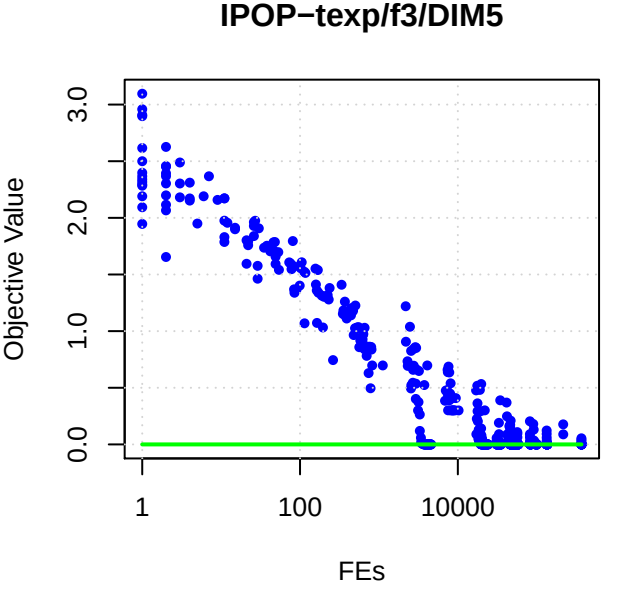
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Objective Value
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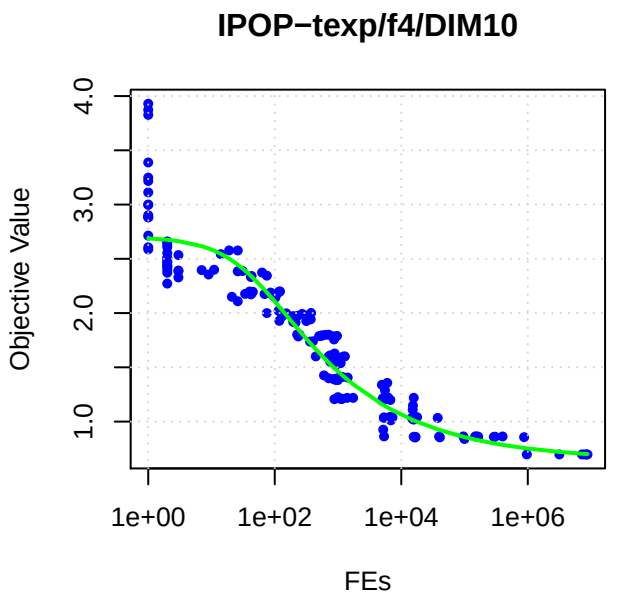
10000
FEs


IPOP−texp/f4/DIM10
Objective Value
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1.0
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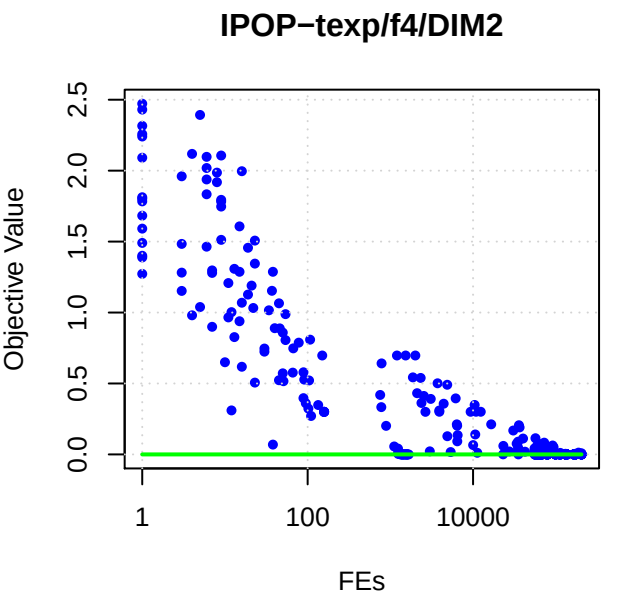
1e+02
1e+04
1e+06
FEs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Objective Value
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1.5
1.0
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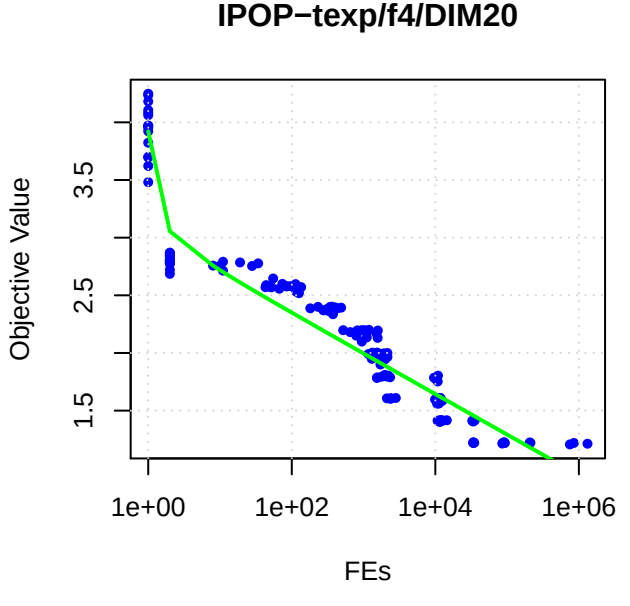
0.0
1
100
10000
FEs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Objective Value
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2.5
1.5
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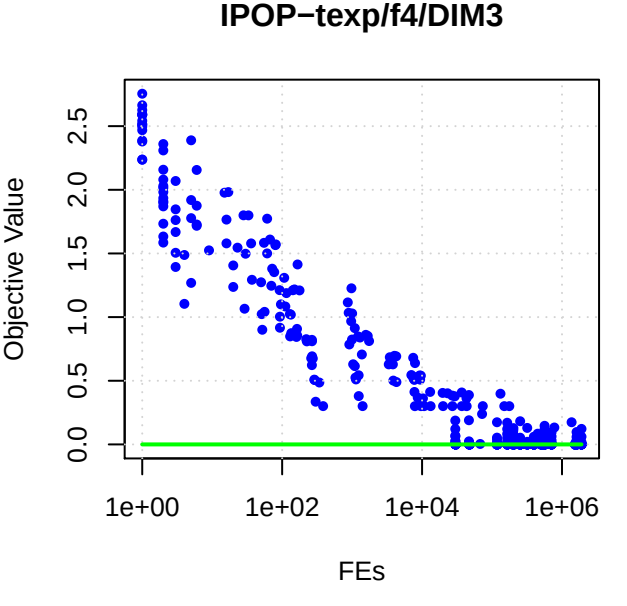
1e+04
1e+06
FEs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Objective Value
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1.5
1.0
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0.0
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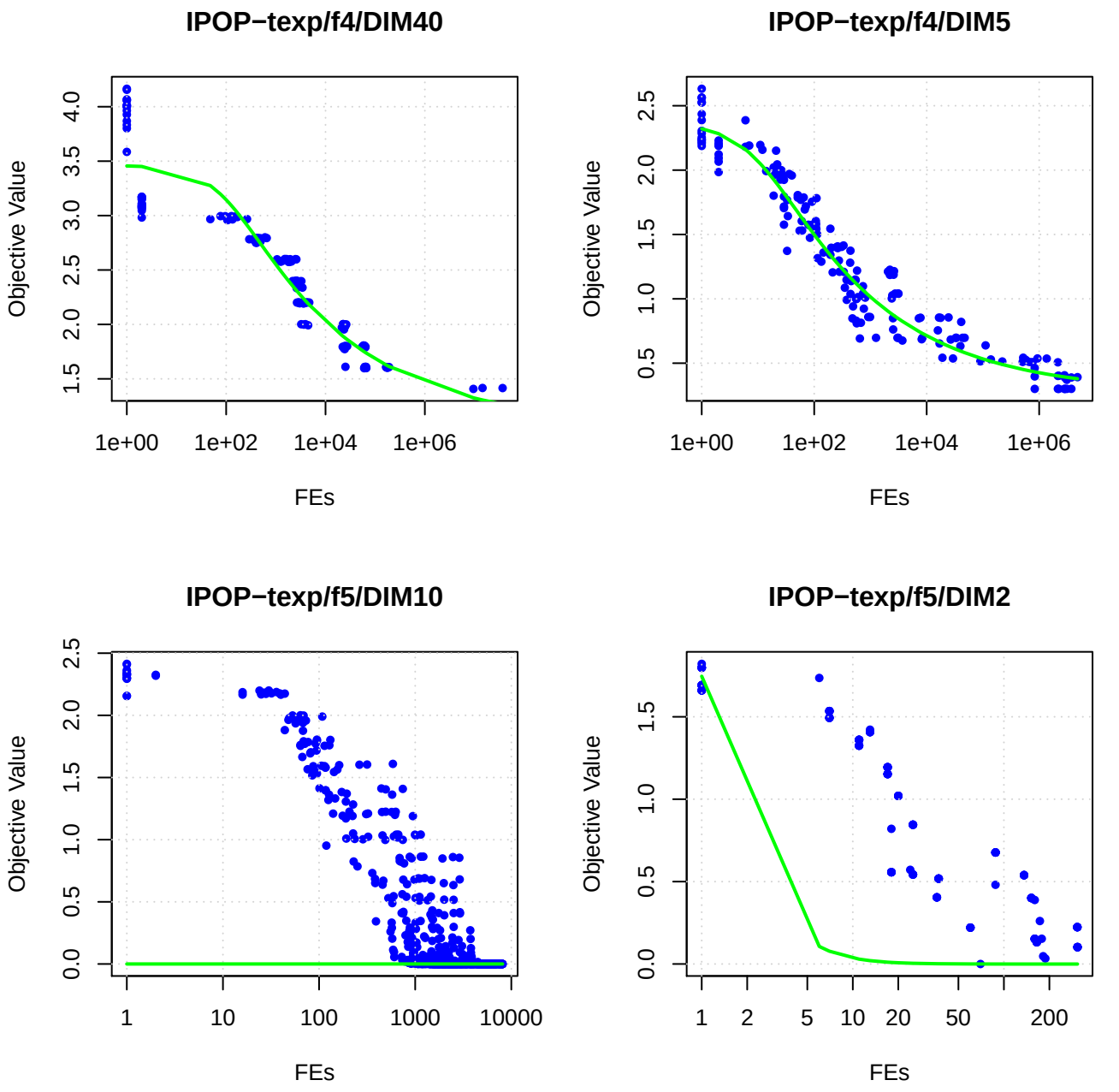
1e+02
1e+04
1e+06
FEs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Objective Value
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2.5
3.0
3.5
4.0
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−texp/f4/DIM5
Objective Value
0.5
1.0
1.5
2.0
2.5
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−texp/f5/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs
IPOP−texp/f5/DIM2
Objective Value
0.0
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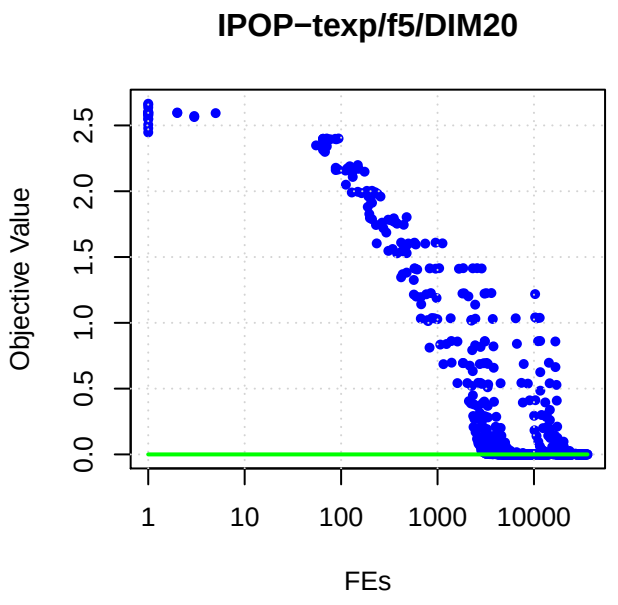
1.0
1.5
1
2
5
10
20
50
200
FEs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1.5
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2.5
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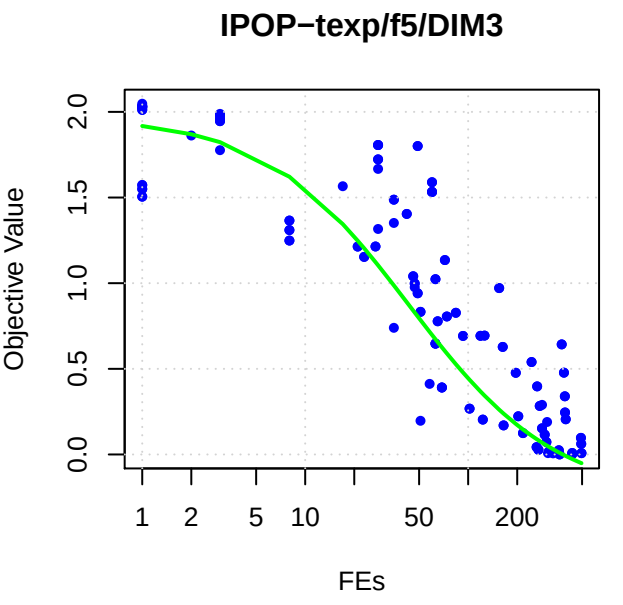
100
1000
10000
FEs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10
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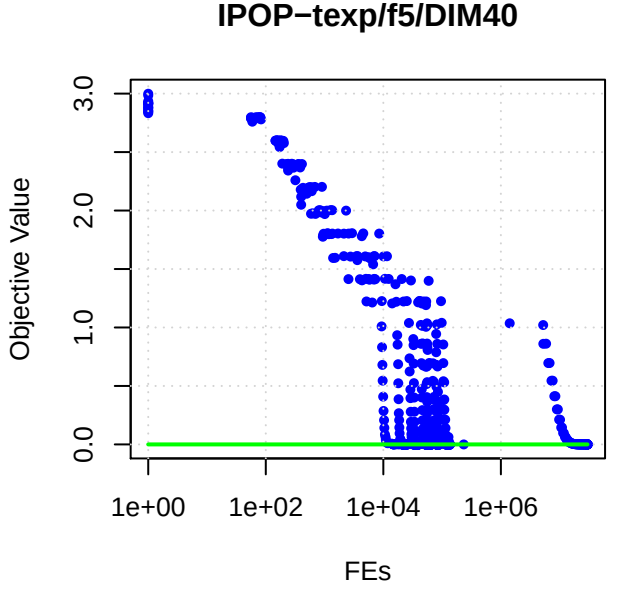
FEs


IPOP−texp/f5/DIM40
Objective Value
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1.0
2.0
3.0
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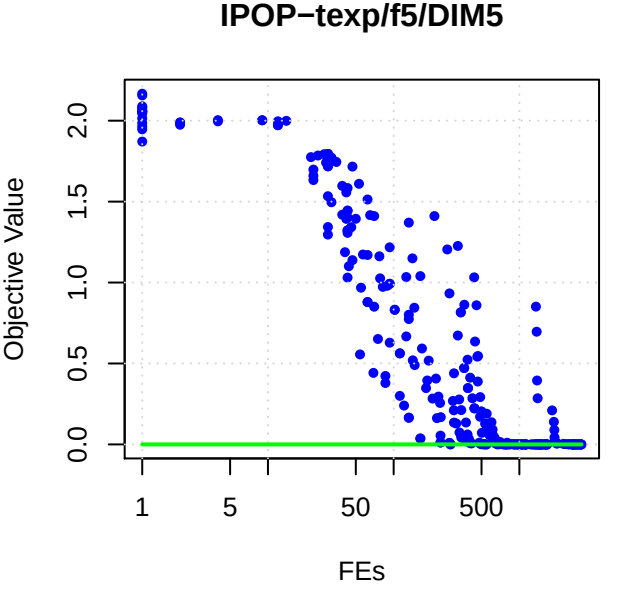
1e+02
1e+04
1e+06
FEs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Objective Value
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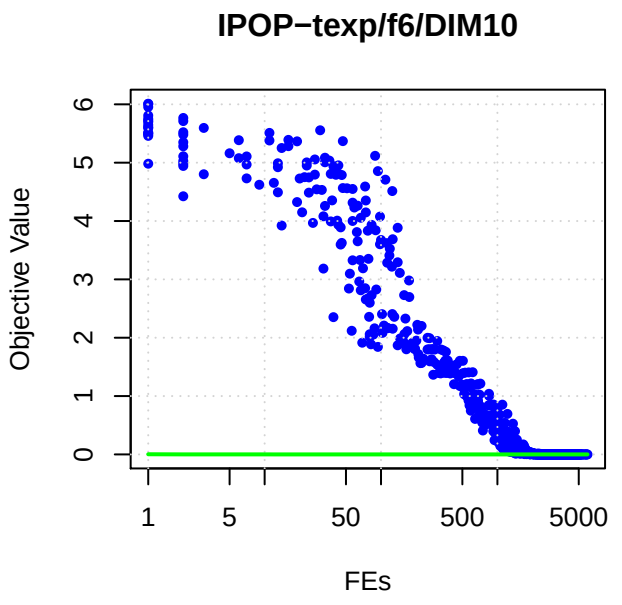
1
5
50
500
FEs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Objective Value
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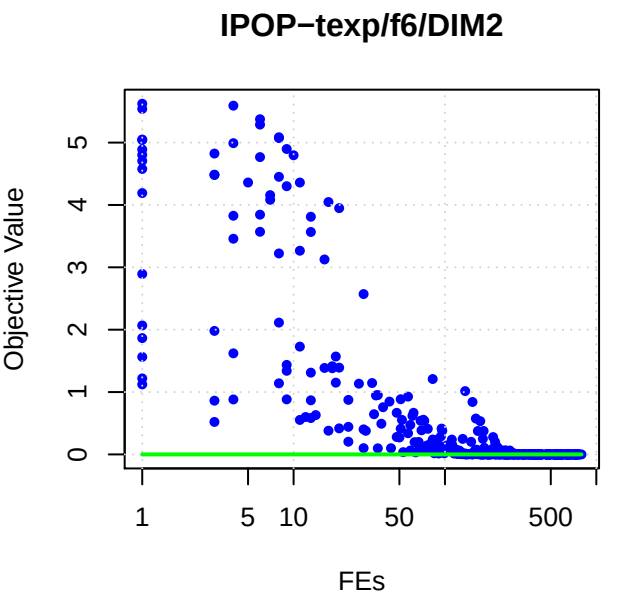
3
4
5
6
1
5
50
500
5000
FEs


IPOP−texp/f6/DIM2
Objective Value
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2
3
4
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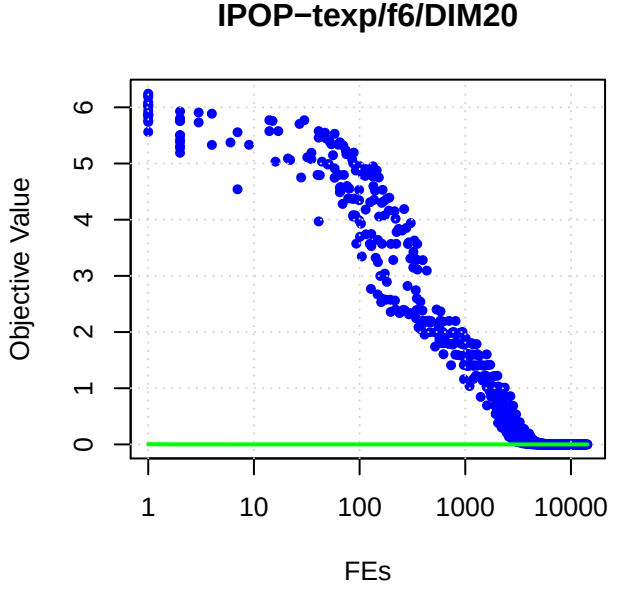
1
5
10
50
500
FEs


IPOP−texp/f6/DIM20
Objective Value
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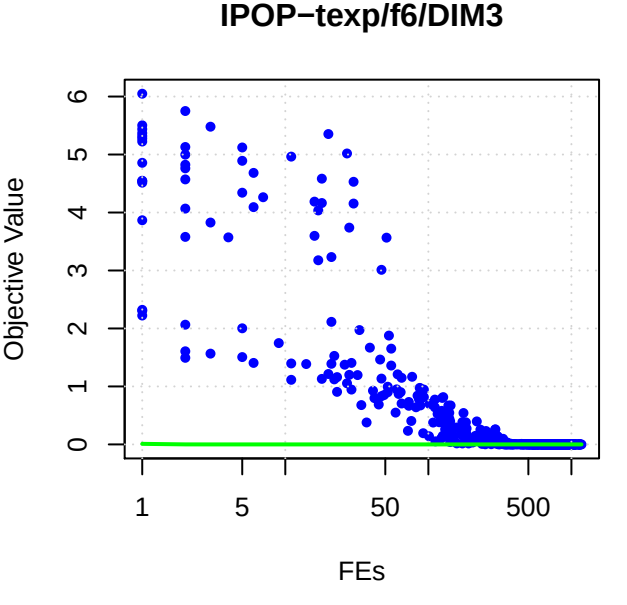
1000
10000
FEs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Objective Value
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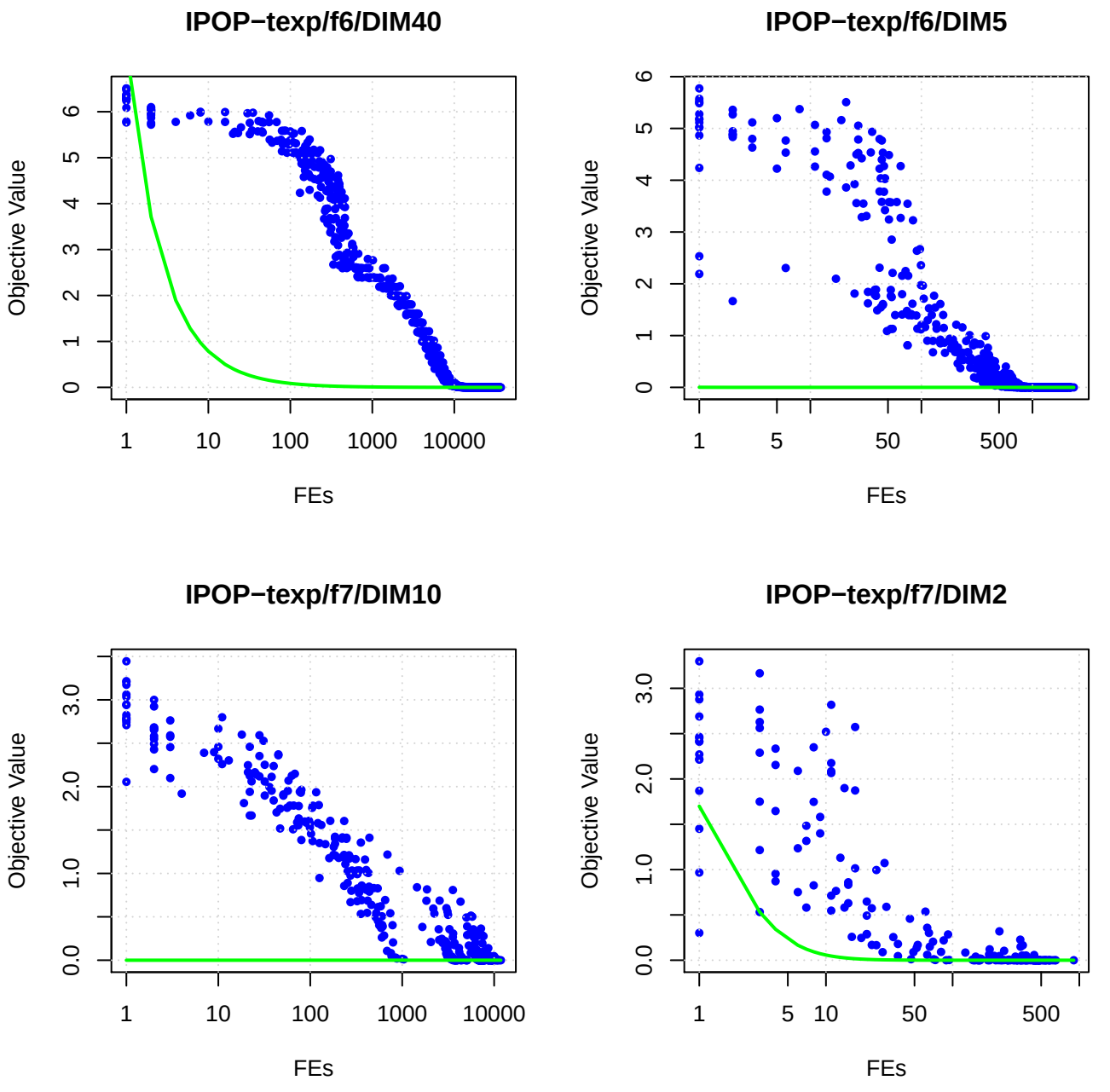
6
1
5
50
500
FEs


IPOP−texp/f6/DIM40
Objective Value
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1
2
3
4
5
6
1
10
100
1000
10000
FEs
IPOP−texp/f6/DIM5
Objective Value
0
1
2
3
4
5
6
1
5
50
500
FEs
IPOP−texp/f7/DIM10
Objective Value
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1.0
2.0
3.0
1
10
100
1000
10000
FEs
IPOP−texp/f7/DIM2
Objective Value
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3.0
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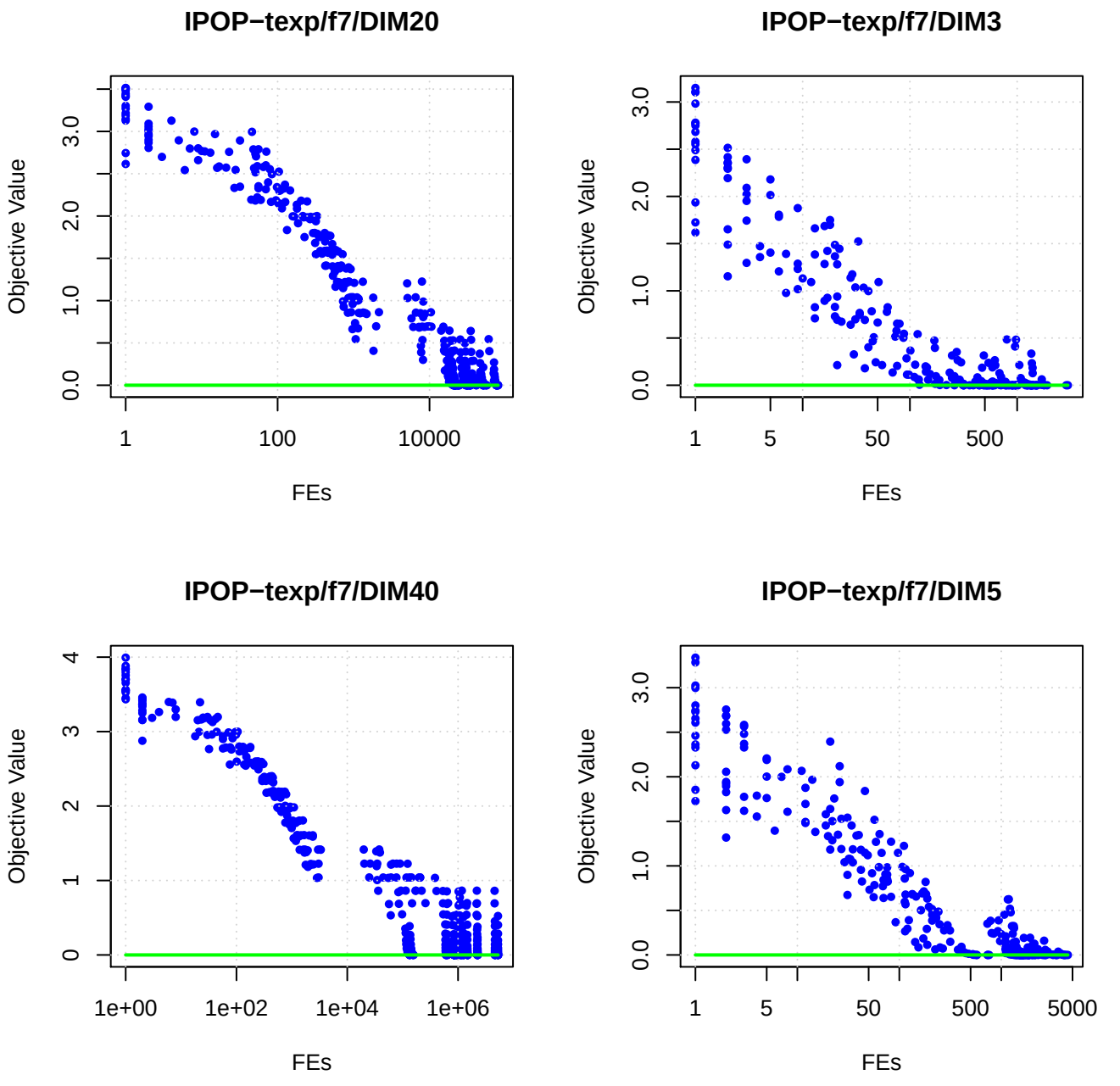
500
FEs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Objective Value
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2.0
3.0
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100
10000
FEs
IPOP−texp/f7/DIM3
Objective Value
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1.0
2.0
3.0
1
5
50
500
FEs
IPOP−texp/f7/DIM40
Objective Value
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1
2
3
4
1e+00
1e+02
1e+04
1e+06
FEs
IPOP−texp/f7/DIM5
Objective Value
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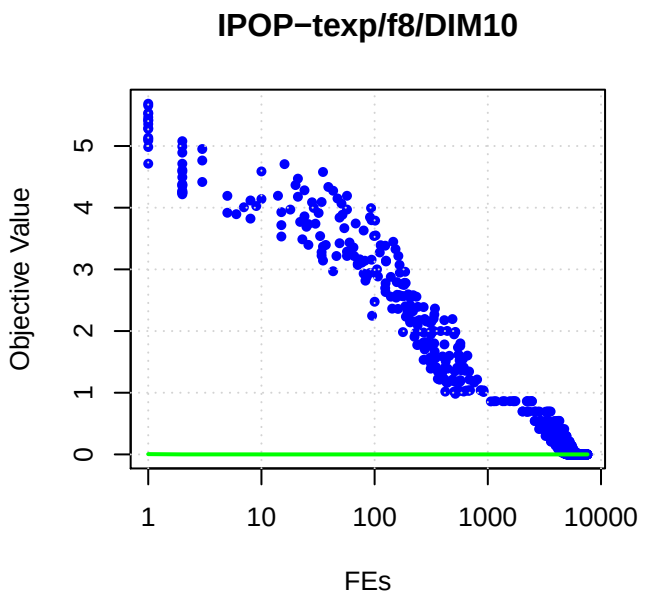
2.0
3.0
1
5
50
500
5000
FEs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Objective Value
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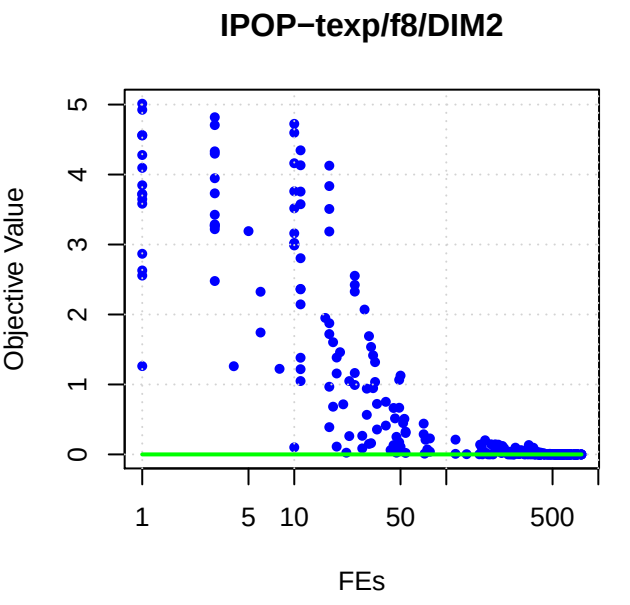
1000
10000
FEs


IPOP−texp/f8/DIM2
Objective Value
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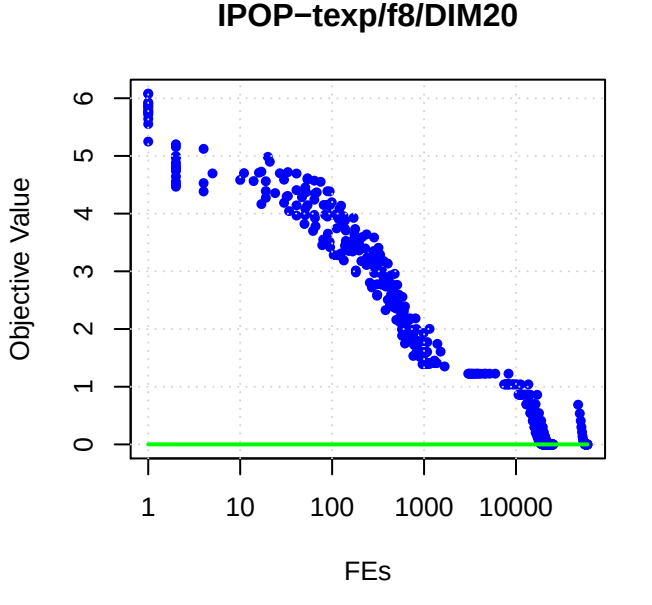
500
FEs


IPOP−texp/f8/DIM20
Objective Value
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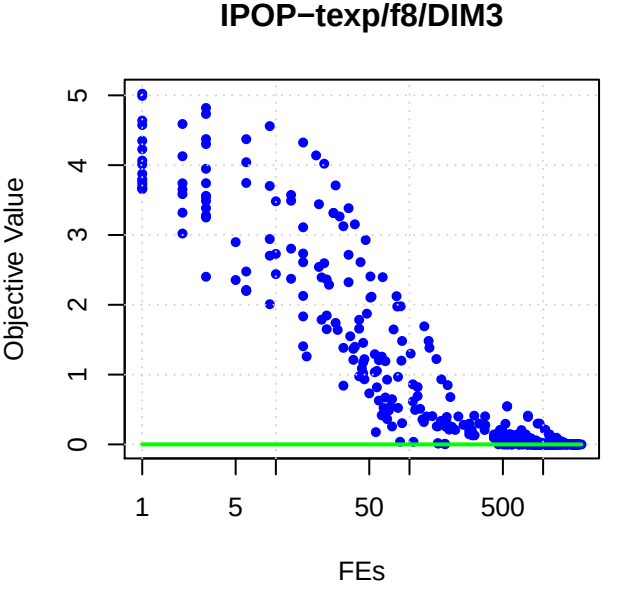
1000
10000
FEs


IPOP−texp/f8/DIM3
Objective Value
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500
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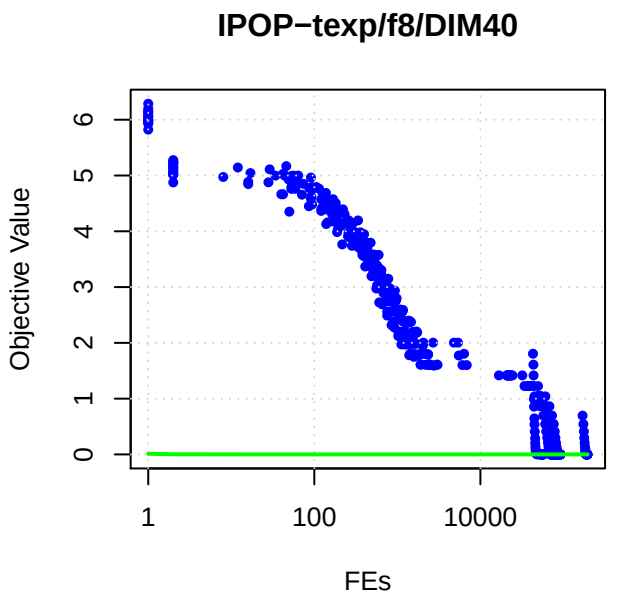
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Objective Value
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10000
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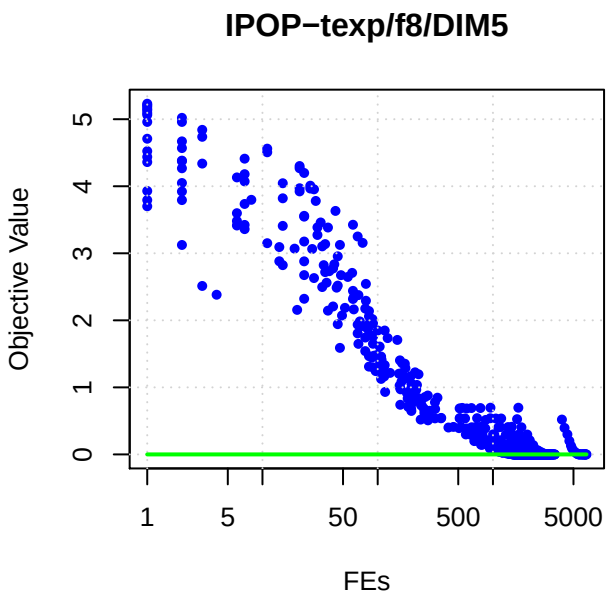
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Objective Value
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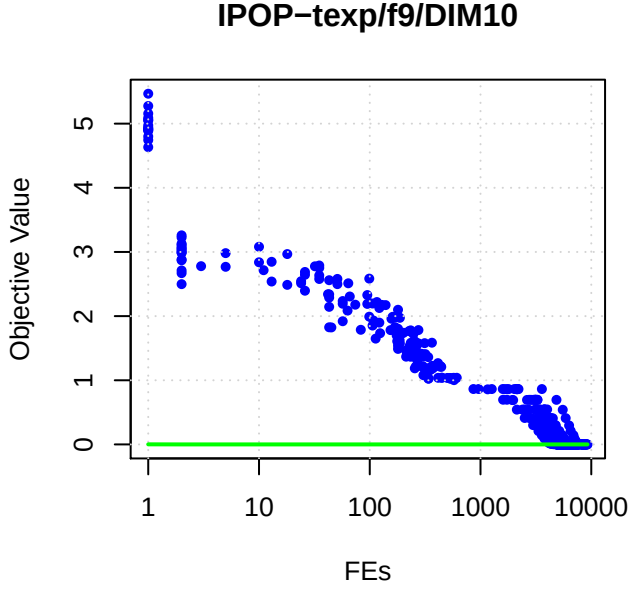
5000
FEs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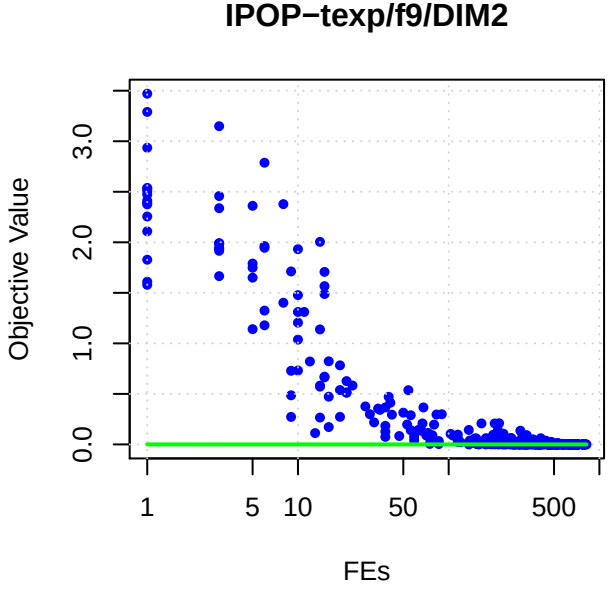
FEs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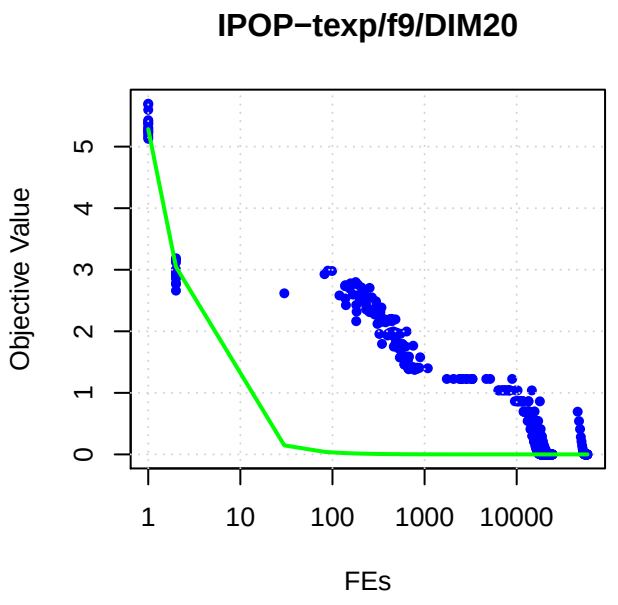
FEs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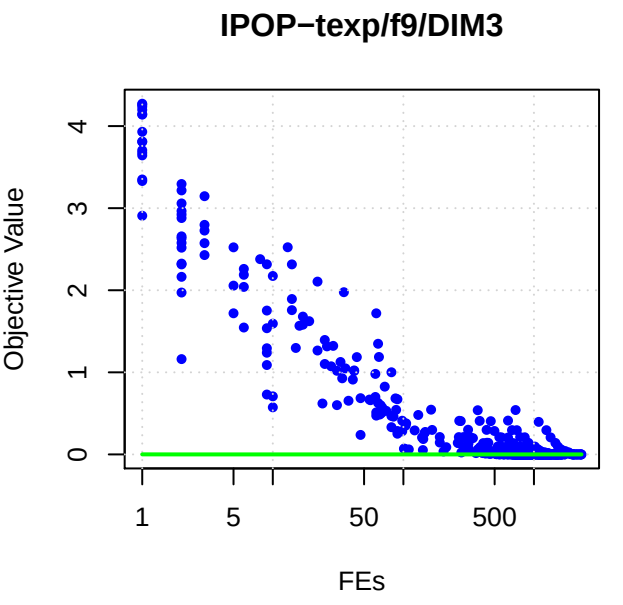
1000
10000
FEs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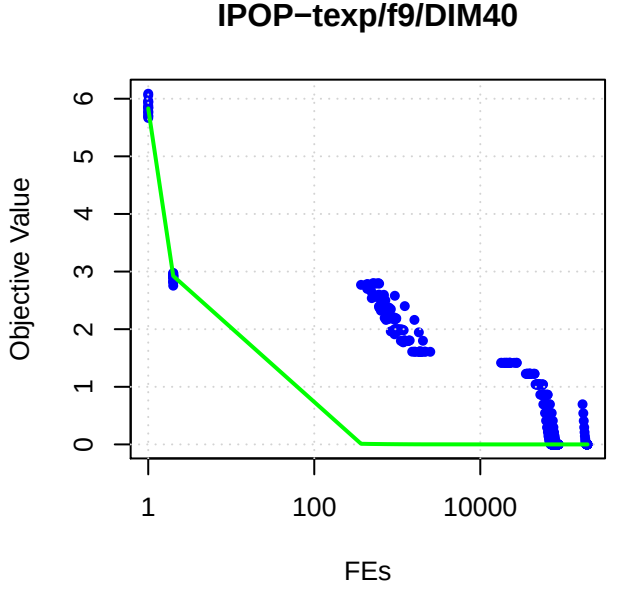
FEs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Objective Value
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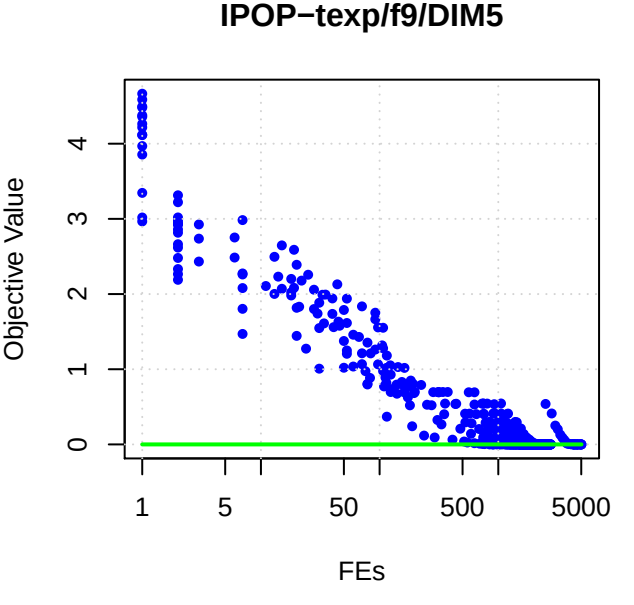
10000
FEs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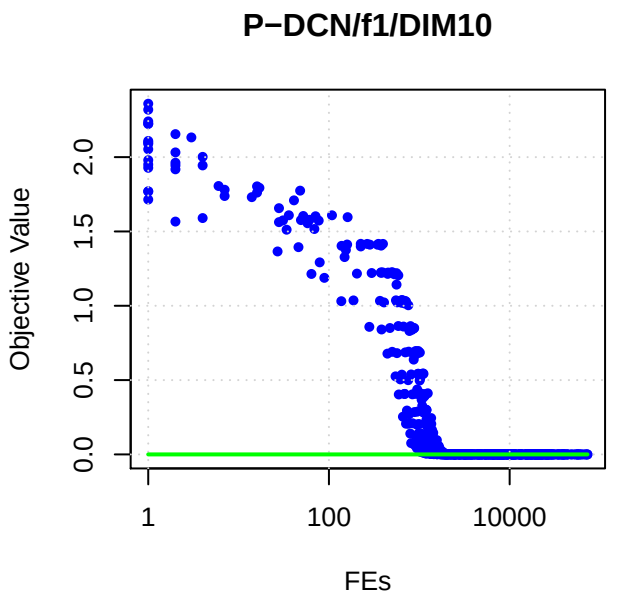
5000
FEs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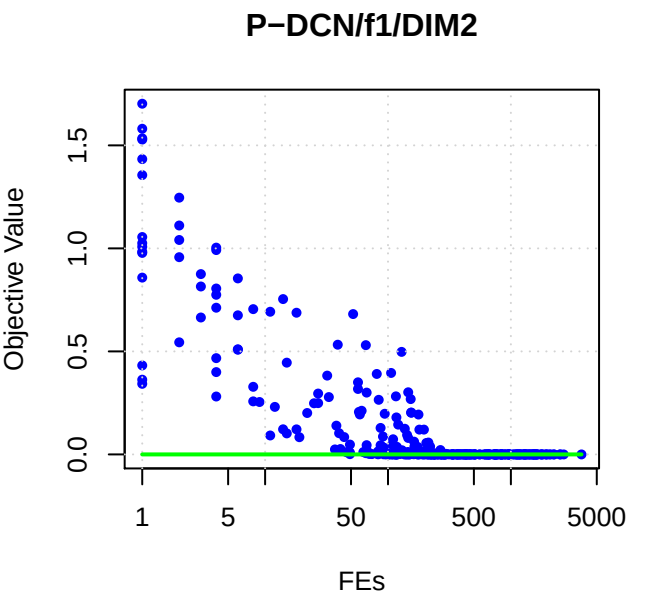
FEs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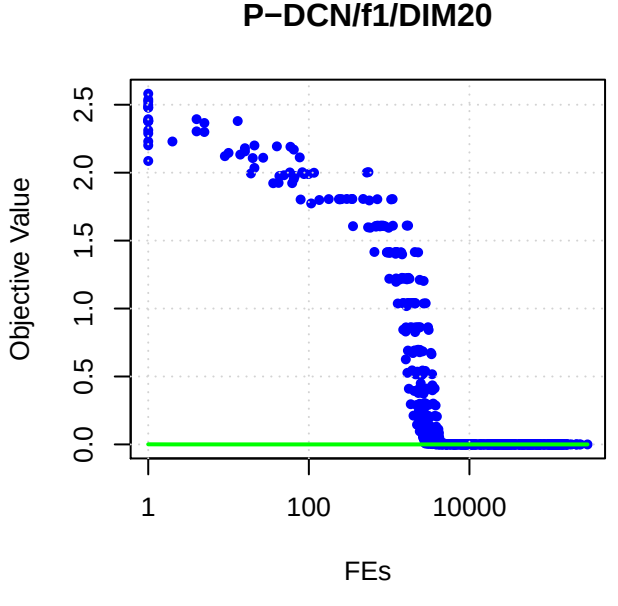
FEs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Objective Value
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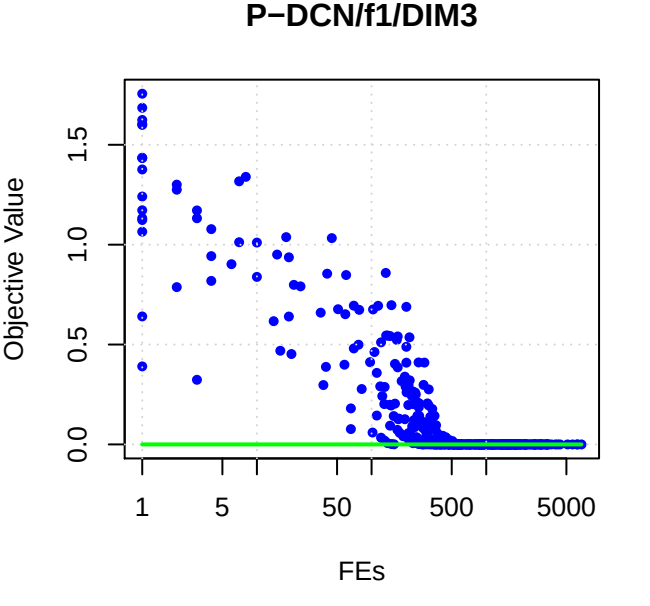
10000
FEs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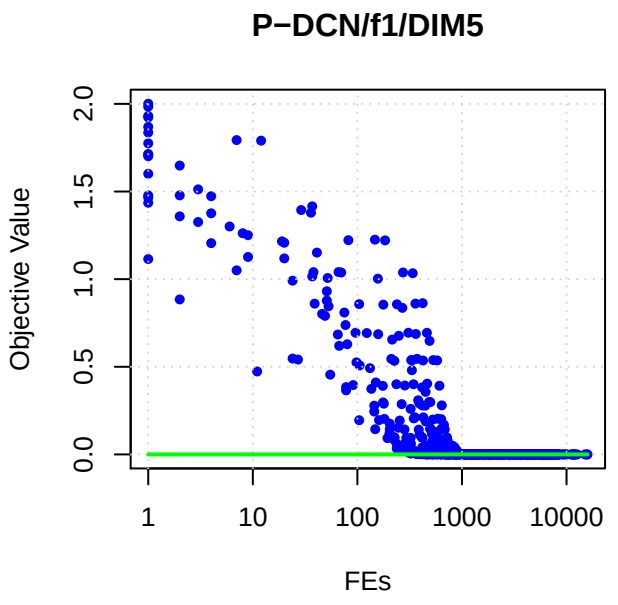
FEs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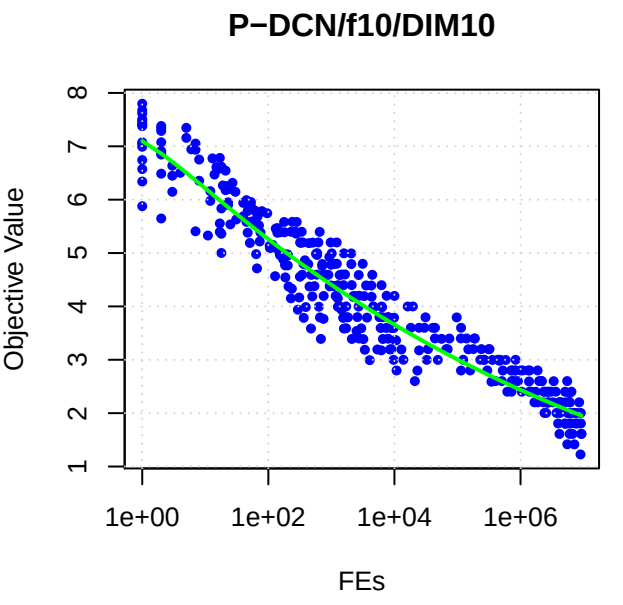
10000
FEs


P−DCN/f10/DIM10
Objective Value
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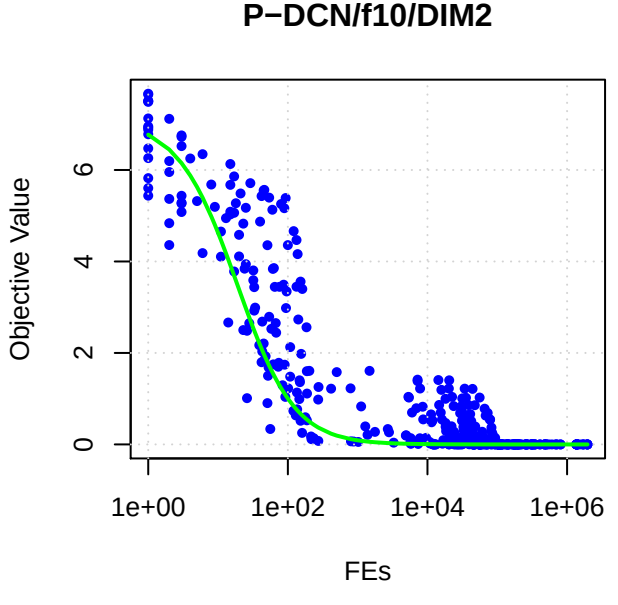
1e+02
1e+04
1e+06
FEs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Objective Value
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4
6
1e+00
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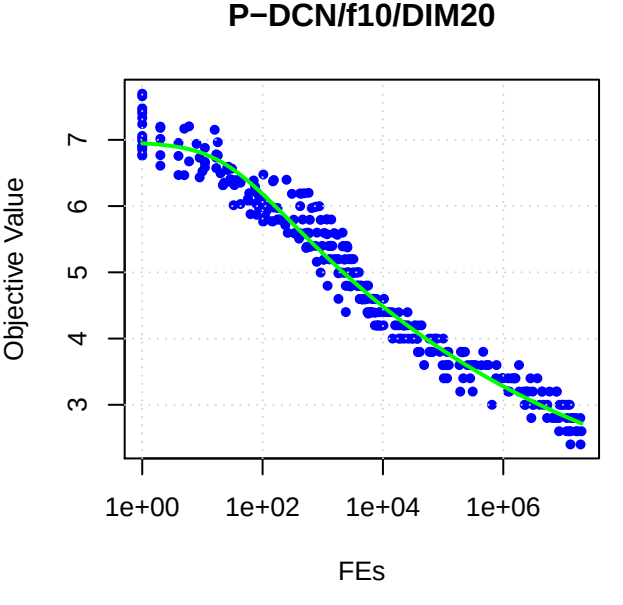
1e+06
FEs


P−DCN/f10/DIM20
Objective Value
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6
7
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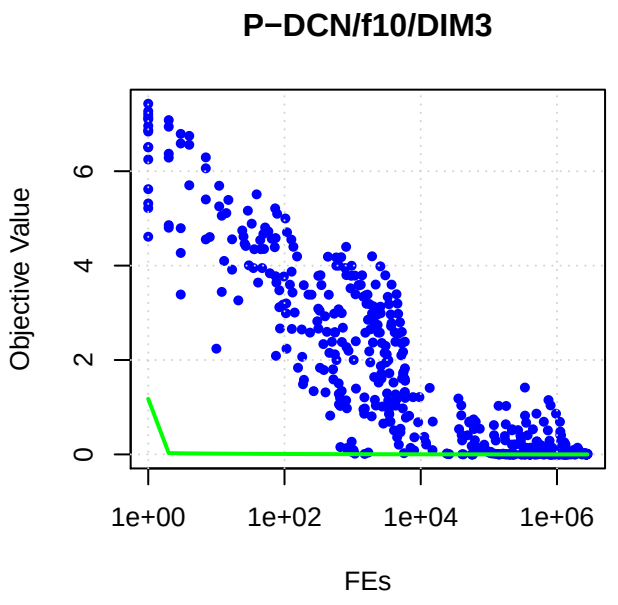
1e+02
1e+04
1e+06
FEs


P−DCN/f10/DIM3
Objective Value
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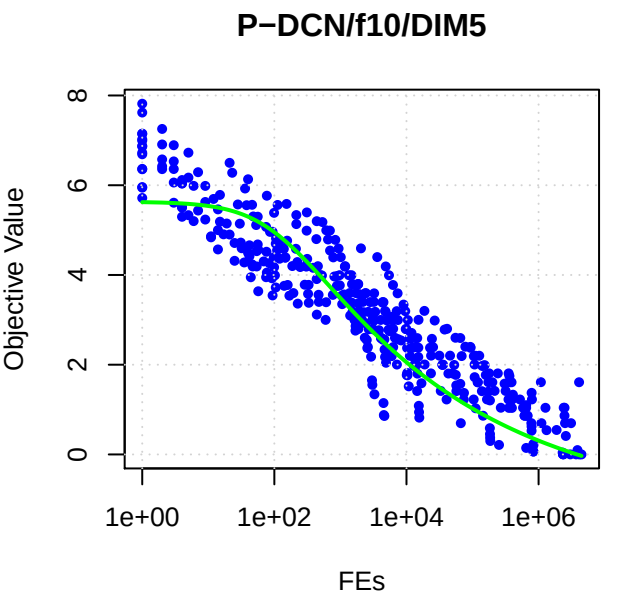
4
6
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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4
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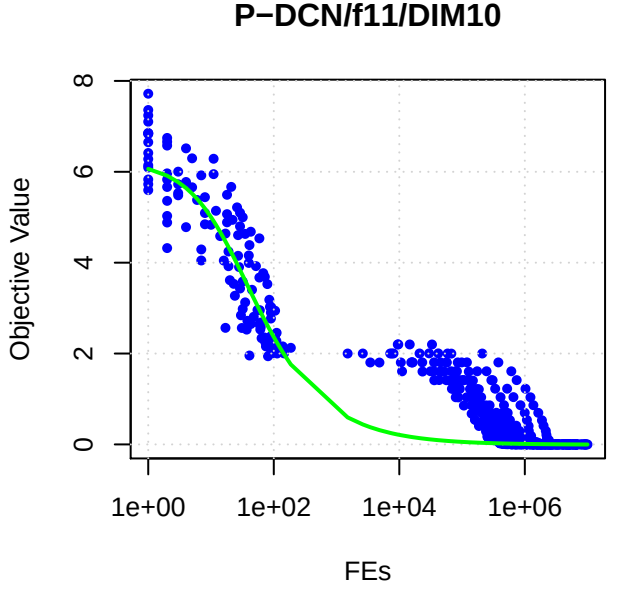
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Objective Value
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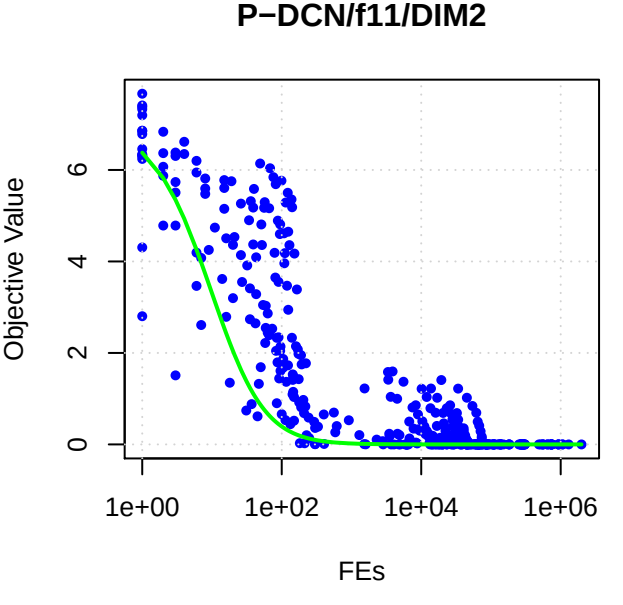
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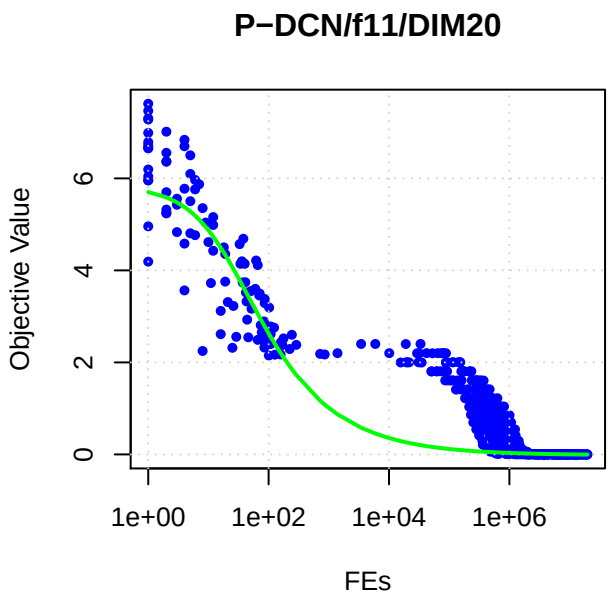
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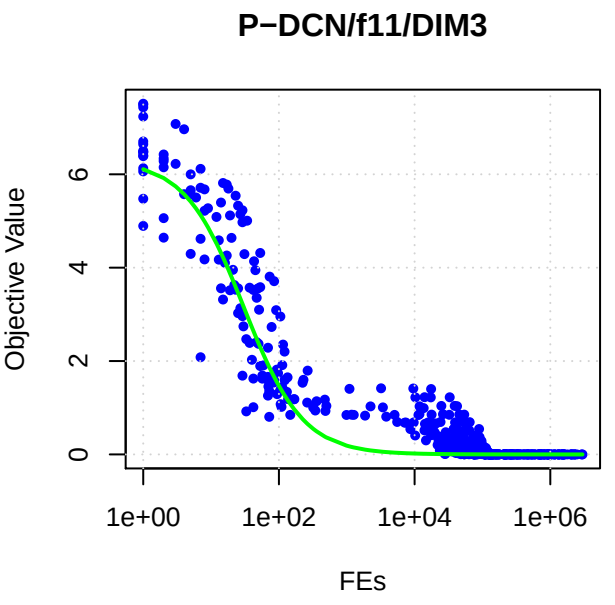
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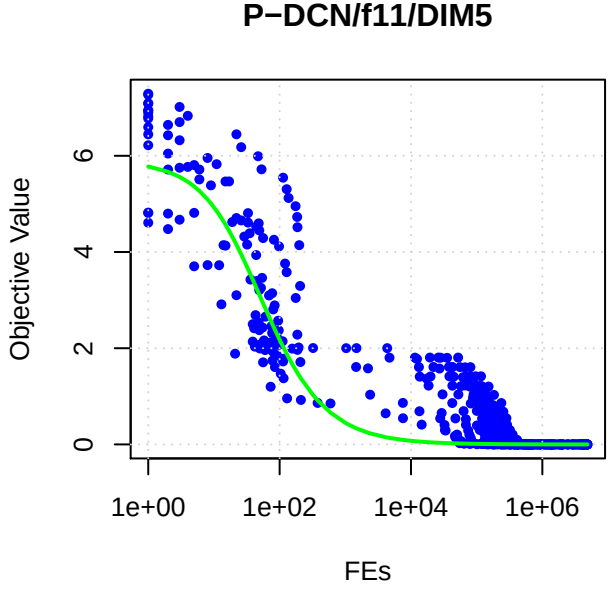
FEs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Objective Value
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4
6
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1e+02
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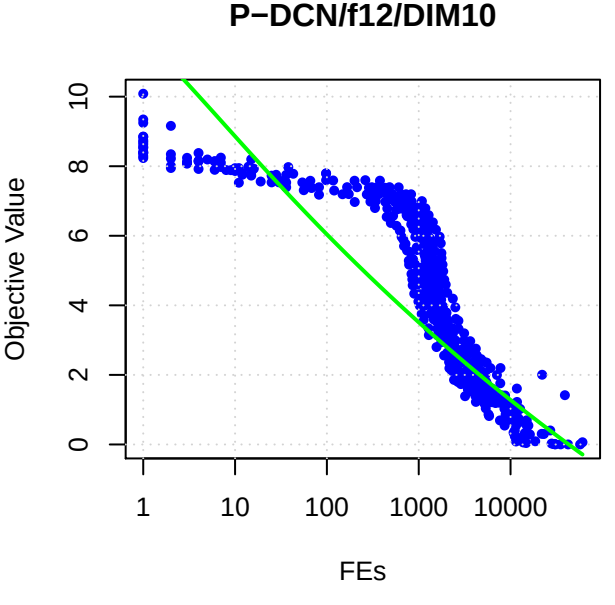
1e+06
FEs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Objective Value
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8
10
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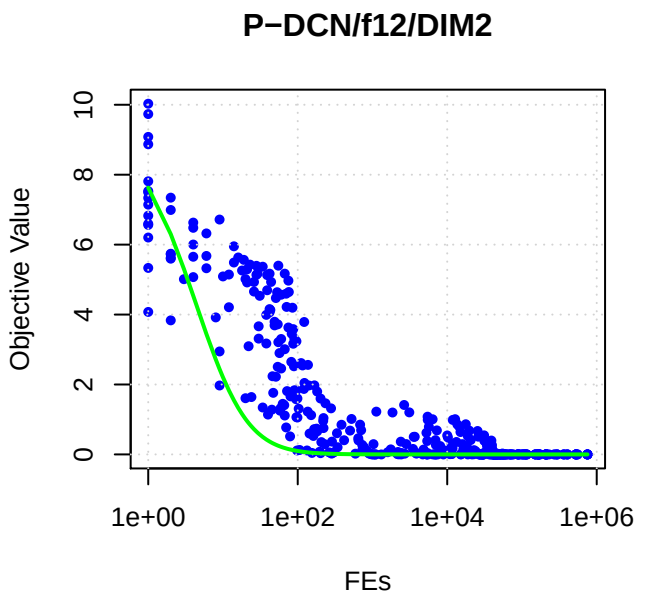
10
100
1000
10000
FEs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Objective Value
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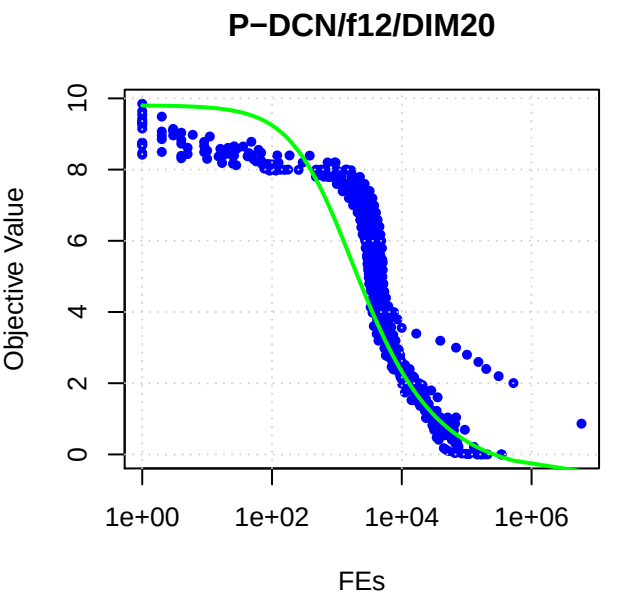
1e+06
FEs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Objective Value
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8
10
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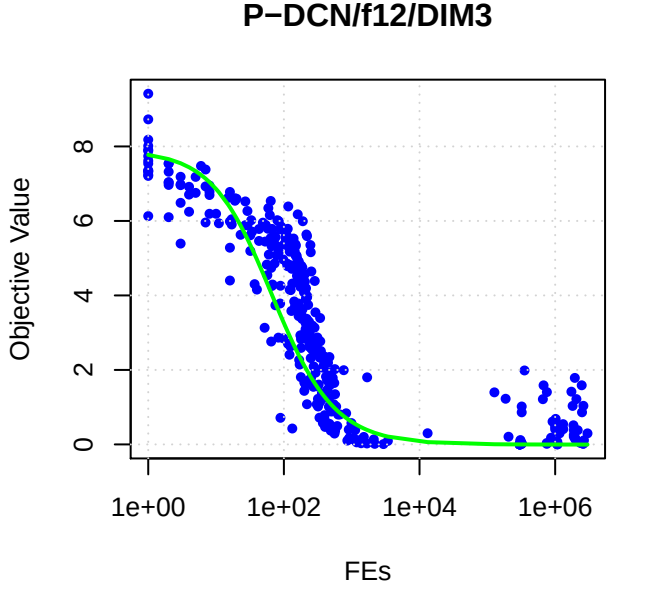
1e+06
FEs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Objective Value
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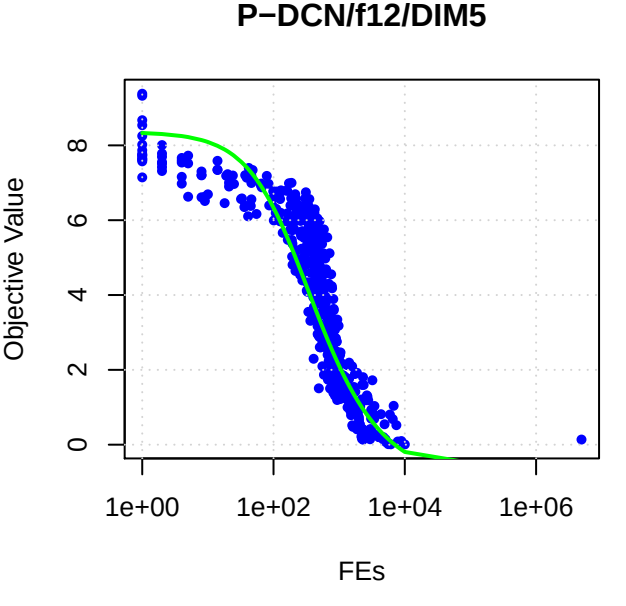
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Objective Value
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6
8
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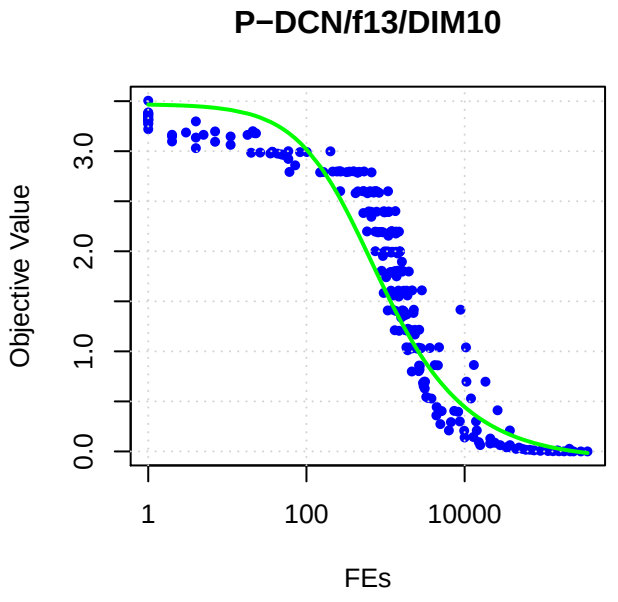
1e+02
1e+04
1e+06
FEs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Objective Value
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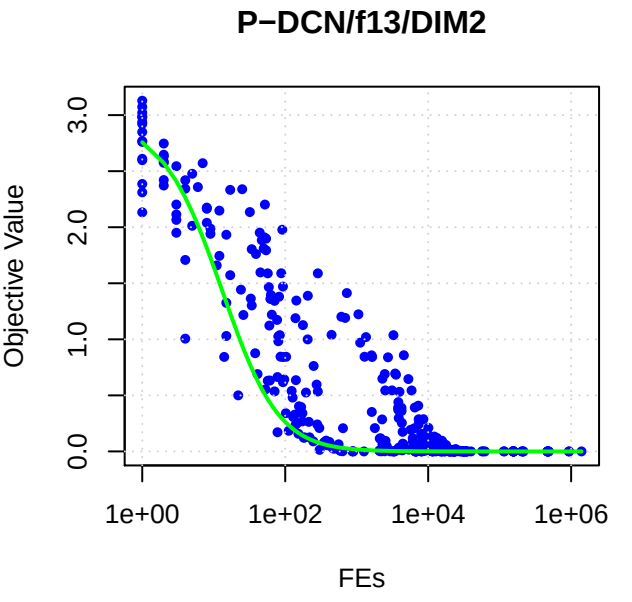
3.0
1
100
10000
FEs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3.0
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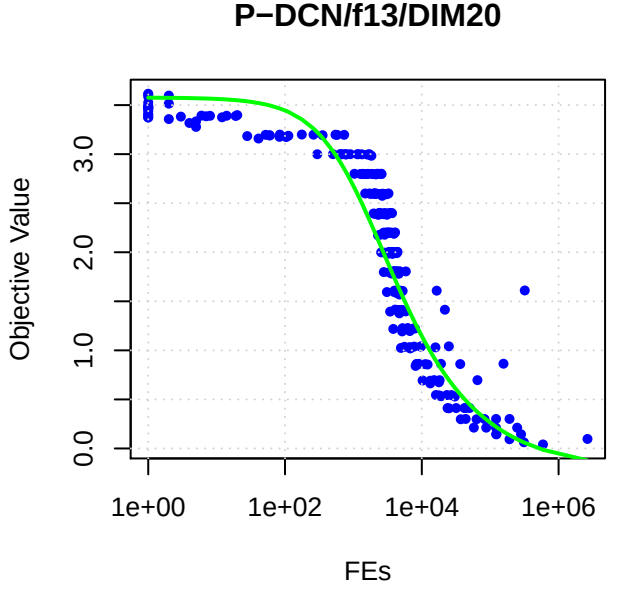
1e+04
1e+06
FEs


P−DCN/f13/DIM20
Objective Value
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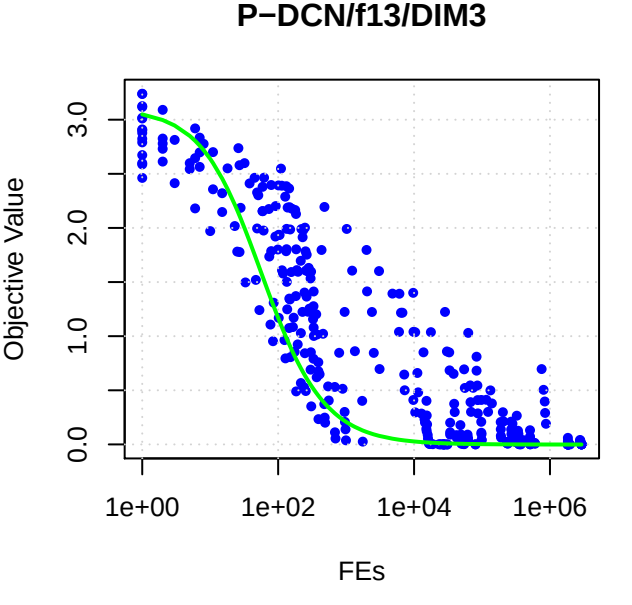
1e+06
FEs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Objective Value
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3.0
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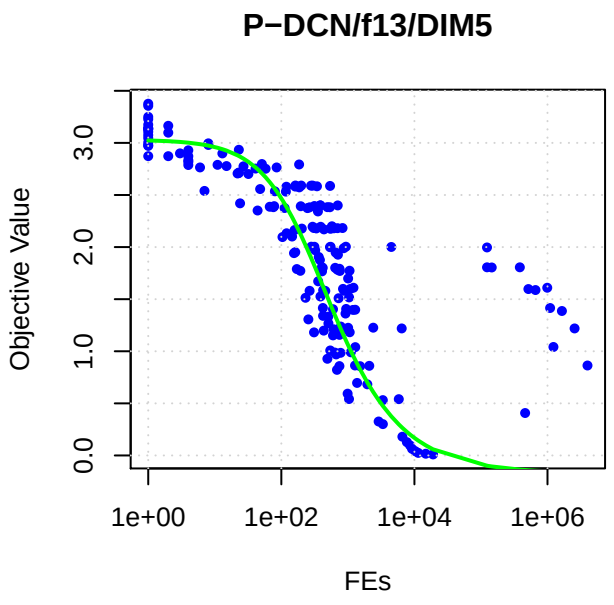
1e+04
1e+06
FEs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Objective Value
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3.0
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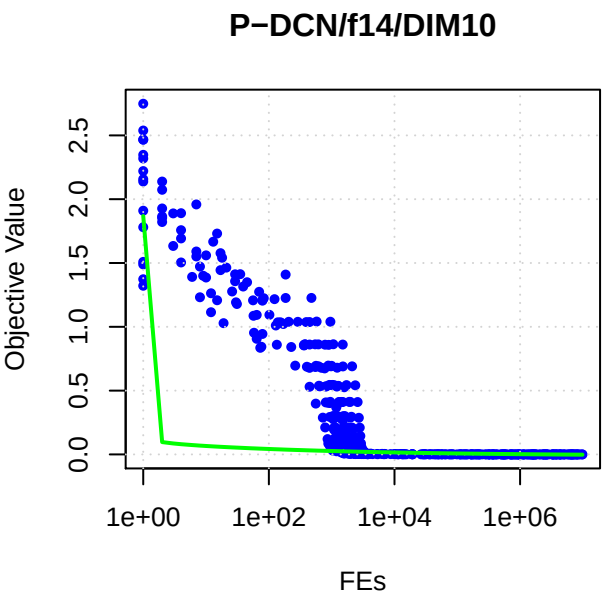
1e+06
FEs


P−DCN/f14/DIM10
Objective Value
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1.5
2.0
2.5
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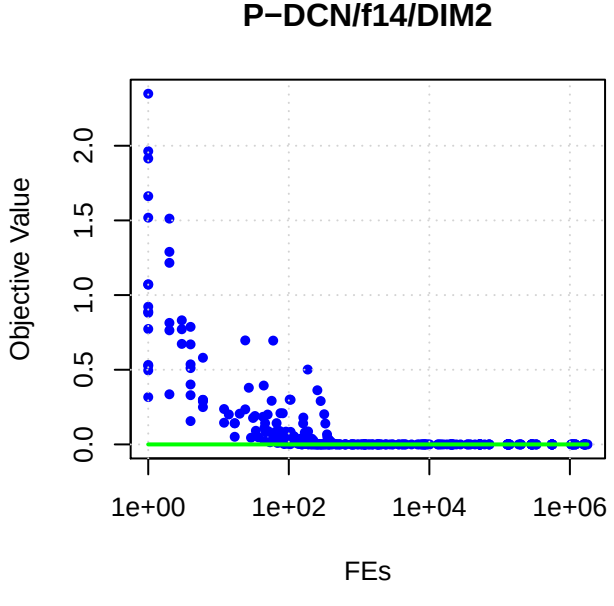
1e+06
FEs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Objective Value
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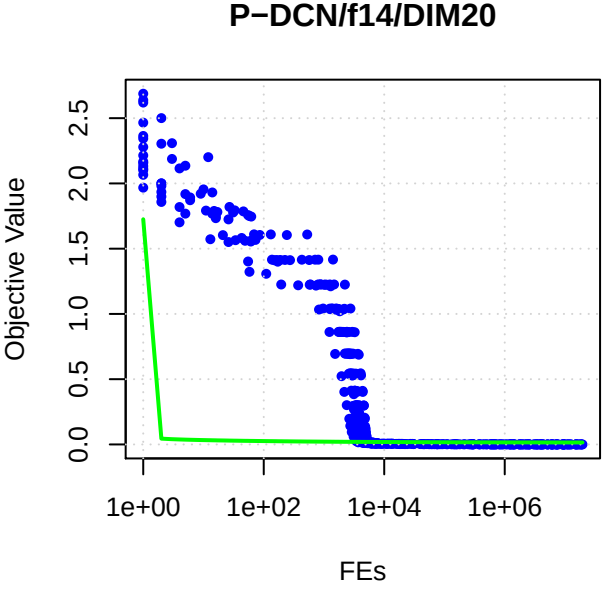
1e+04
1e+06
FEs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Objective Value
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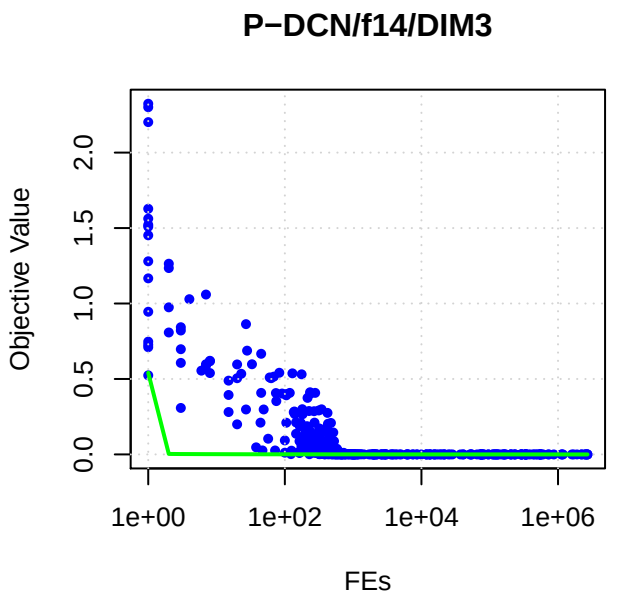
2.5
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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1.5
2.0
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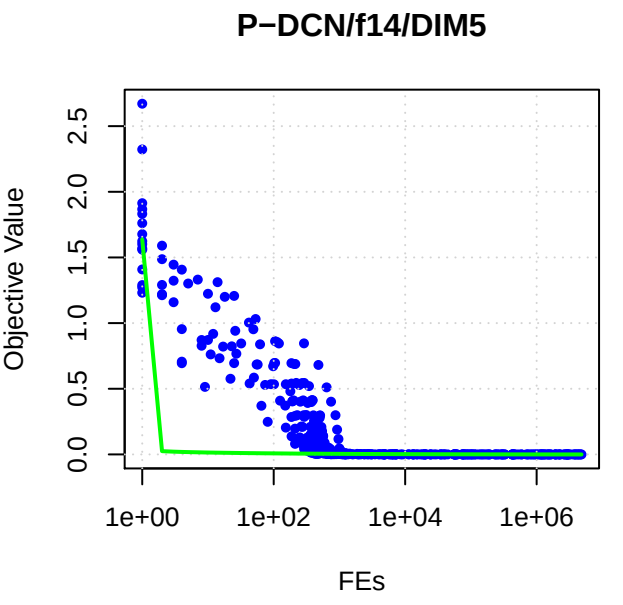
1e+02
1e+04
1e+06
FEs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Objective Value
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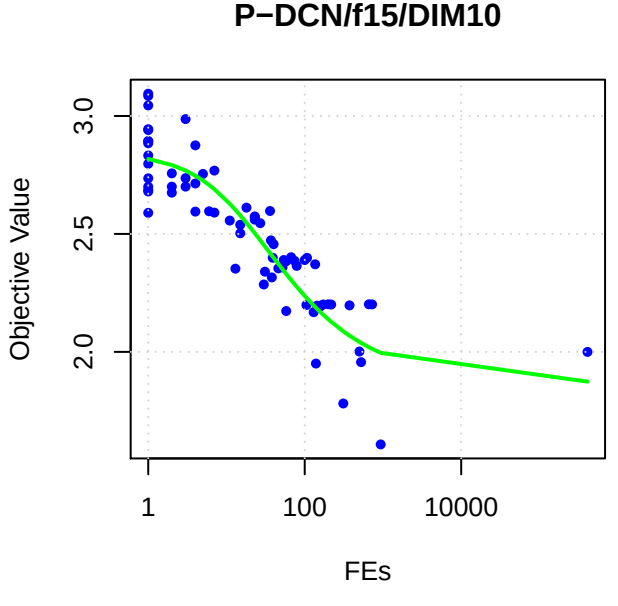
1.5
2.0
2.5
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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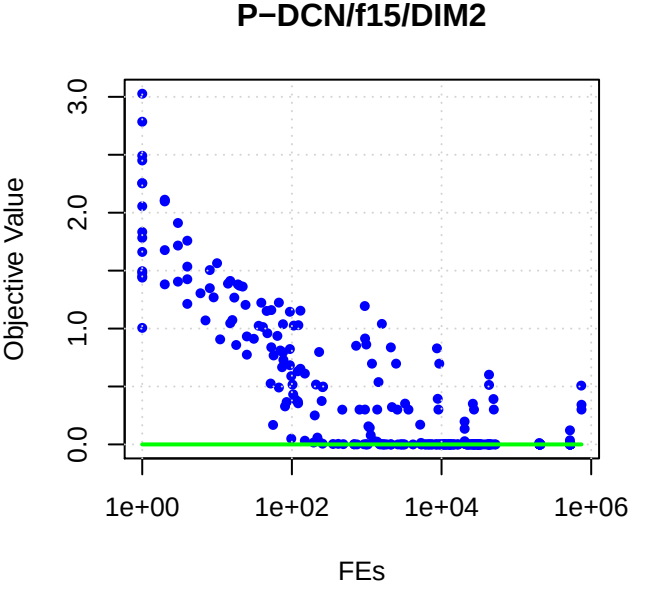
3.0
1
100
10000
FEs


P−DCN/f15/DIM2
Objective Value
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1.0
2.0
3.0
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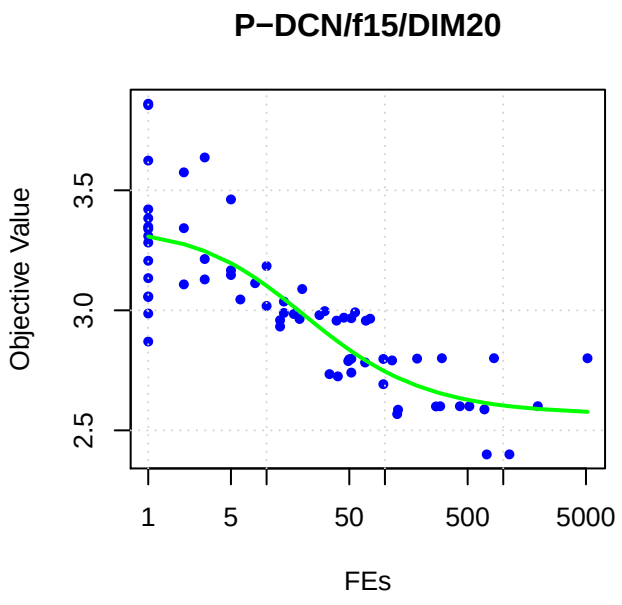
1e+02
1e+04
1e+06
FEs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Objective Value
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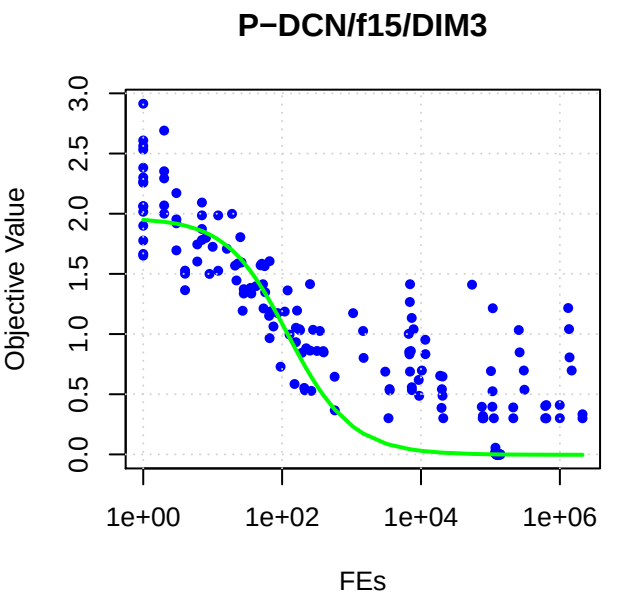
500
5000
FEs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Objective Value
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2.5
3.0
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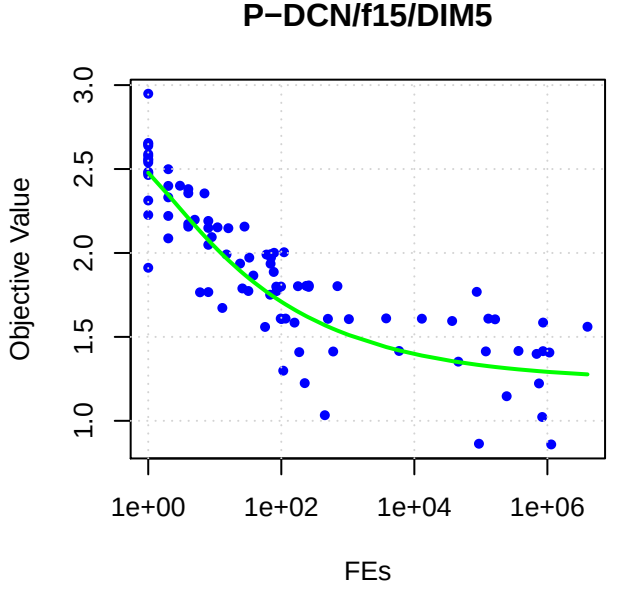
1e+06
FEs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Objective Value
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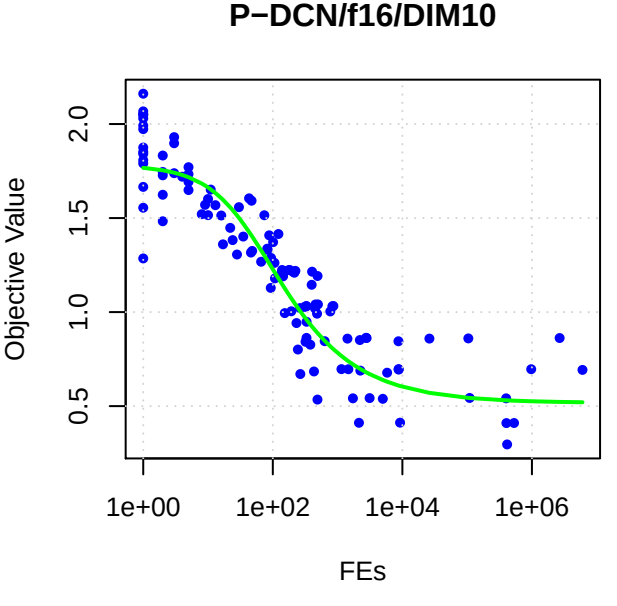
1e+02
1e+04
1e+06
FEs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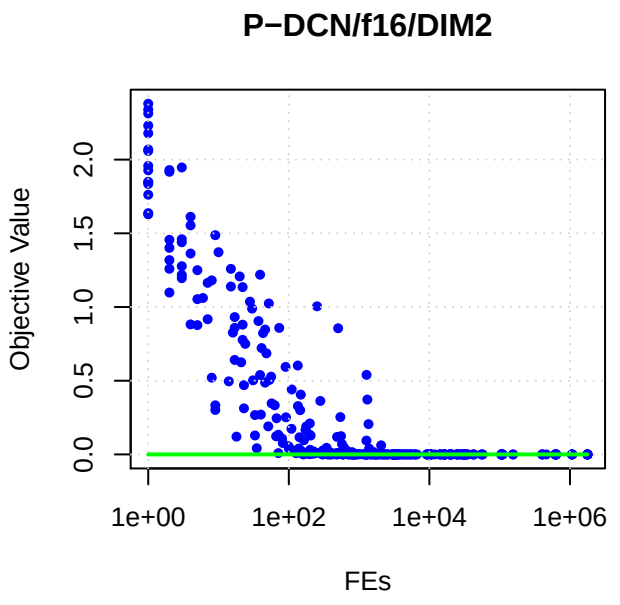
1e+02
1e+04
1e+06
FEs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Objective Value
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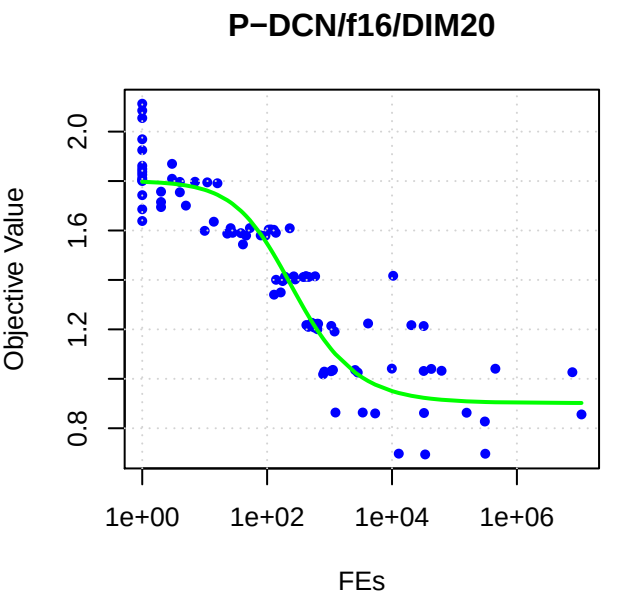
1e+02
1e+04
1e+06
FEs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Objective Value
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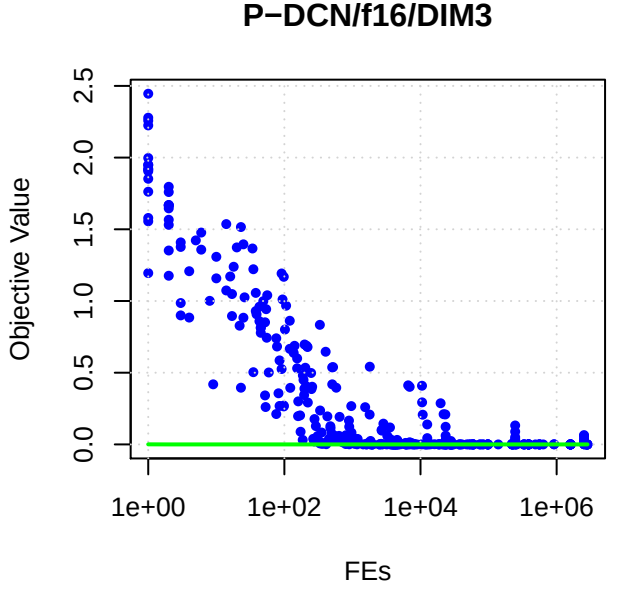
1e+02
1e+04
1e+06
FEs


P−DCN/f16/DIM3
Objective Value
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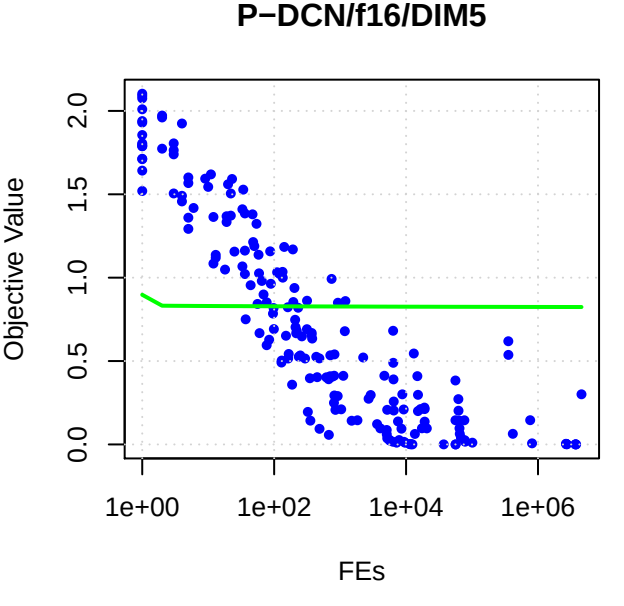
1.5
2.0
2.5
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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1.5
2.0
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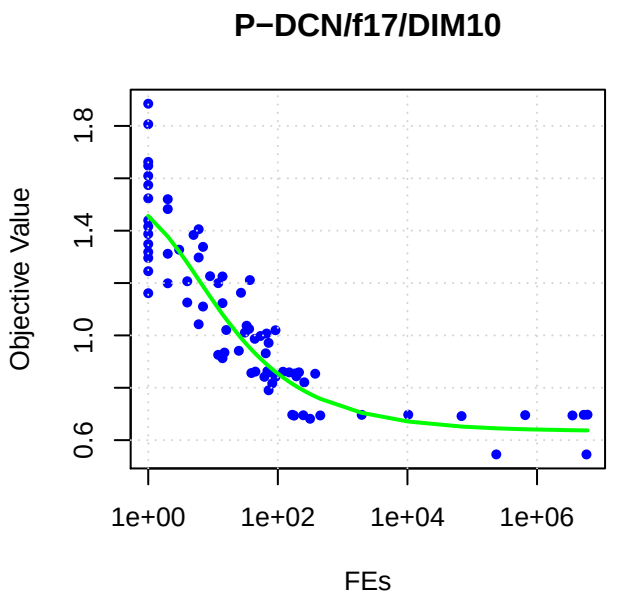
1e+06
FEs


P−DCN/f17/DIM10
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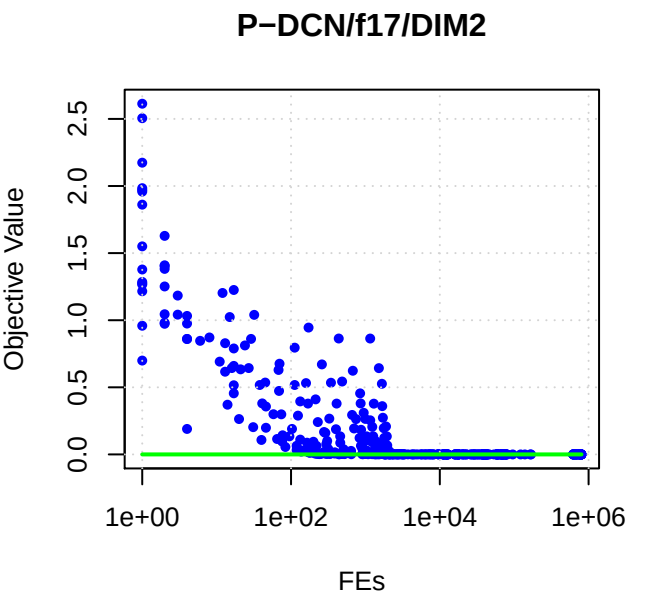
1e+06
FEs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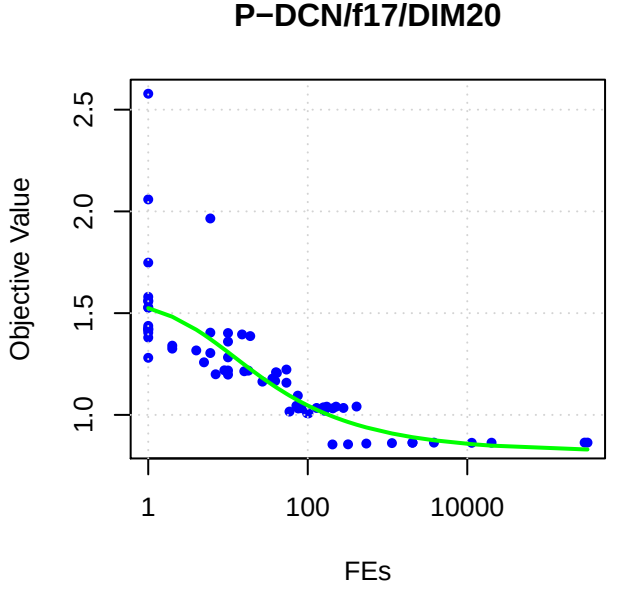
1e+06
FEs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Objective Value
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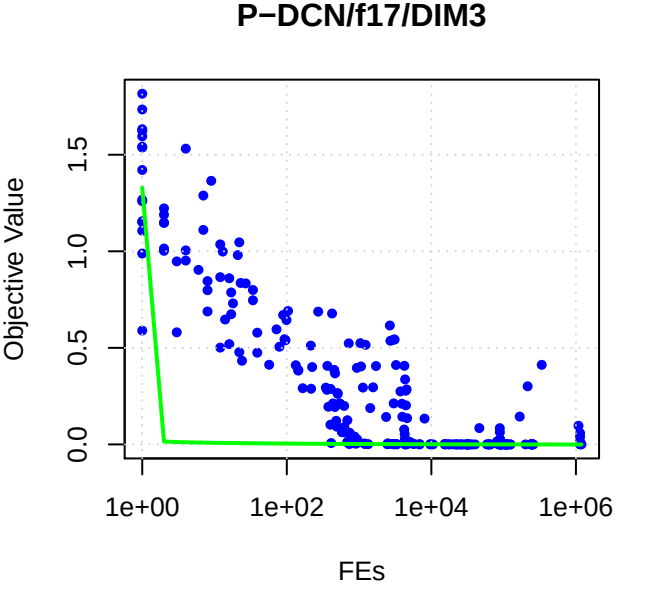
100
10000
FEs


P−DCN/f17/DIM3
Objective Value
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1.0
1.5
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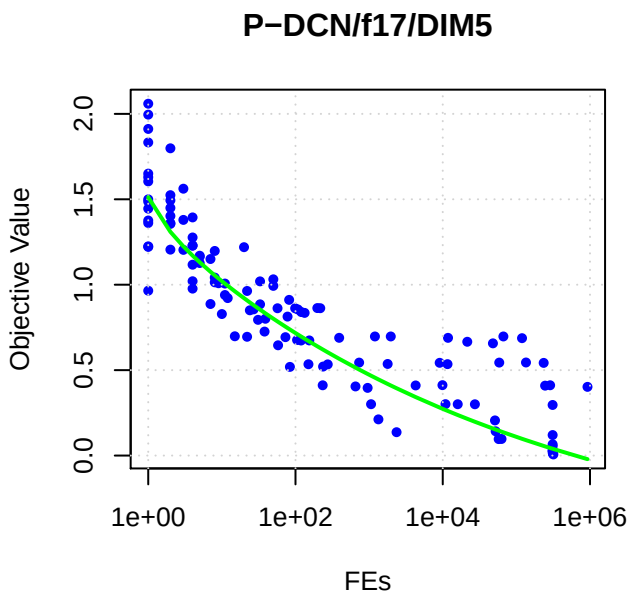
1e+02
1e+04
1e+06
FEs


P−DCN/f17/DIM5
Objective Value
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1.5
2.0
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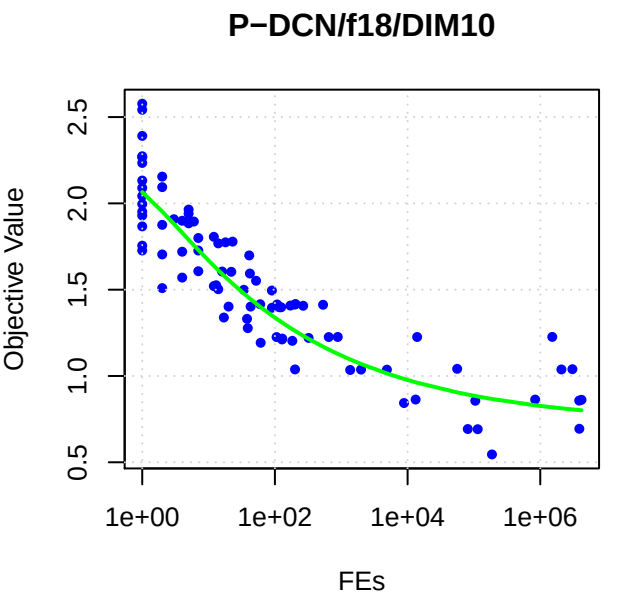
1e+02
1e+04
1e+06
FEs


P−DCN/f18/DIM10
Objective Value
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2.5
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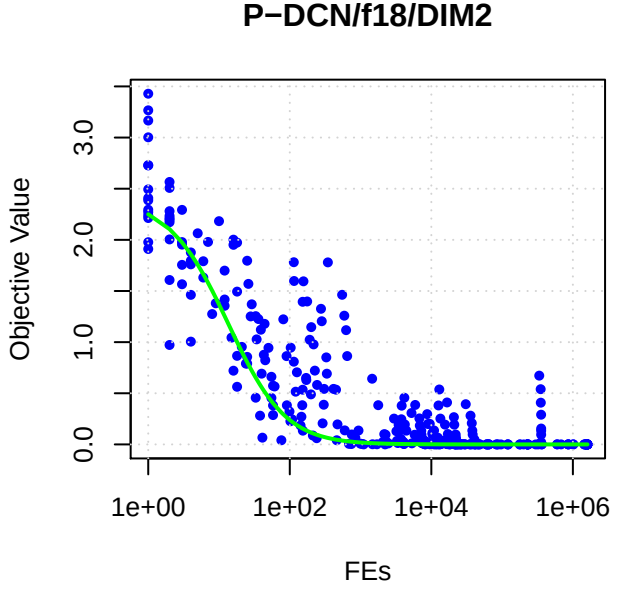
1e+04
1e+06
FEs


P−DCN/f18/DIM2
Objective Value
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1e+02
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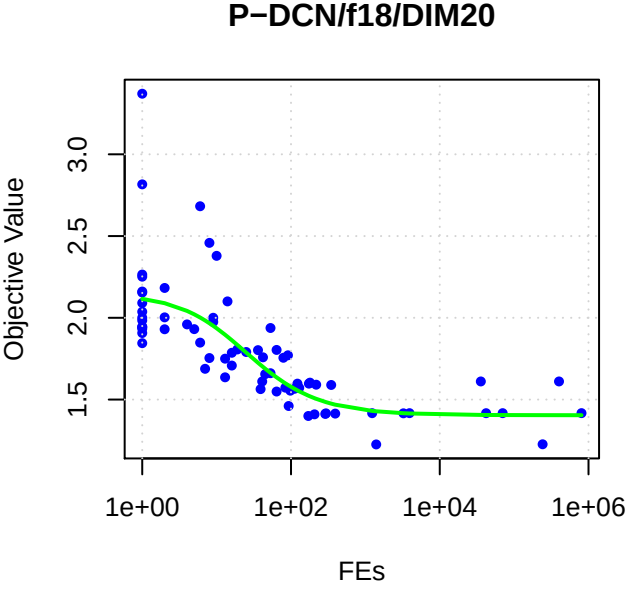
1e+06
FEs


P−DCN/f18/DIM20
Objective Value
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2.5
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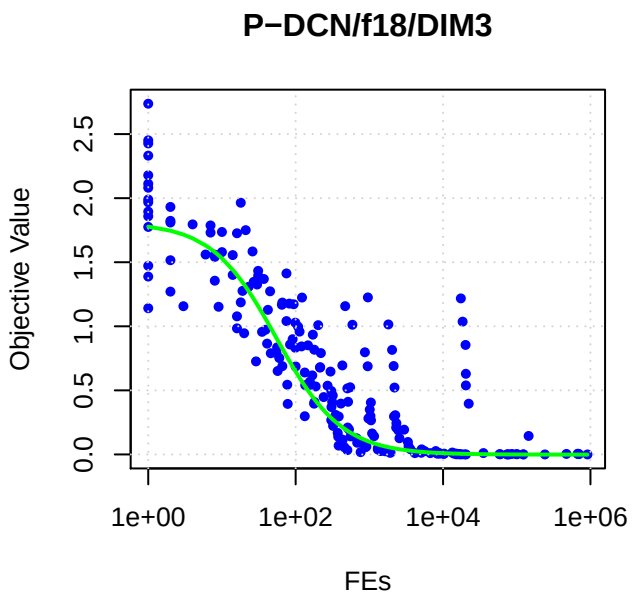
1e+02
1e+04
1e+06
FEs


P−DCN/f18/DIM3
Objective Value
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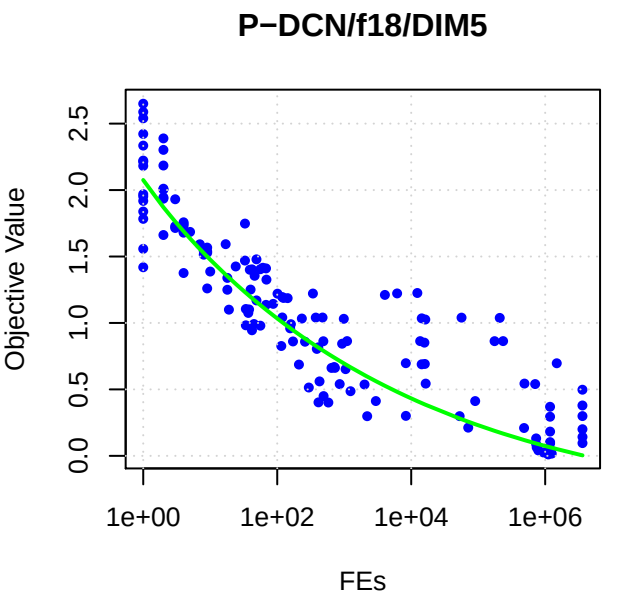
1.0
1.5
2.0
2.5
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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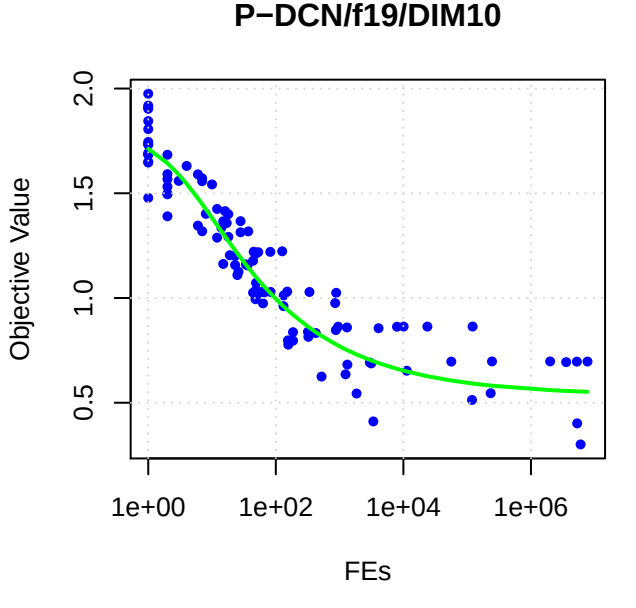
1.0
1.5
2.0
2.5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f19/DIM10
Objective Value
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1.0
1.5
2.0
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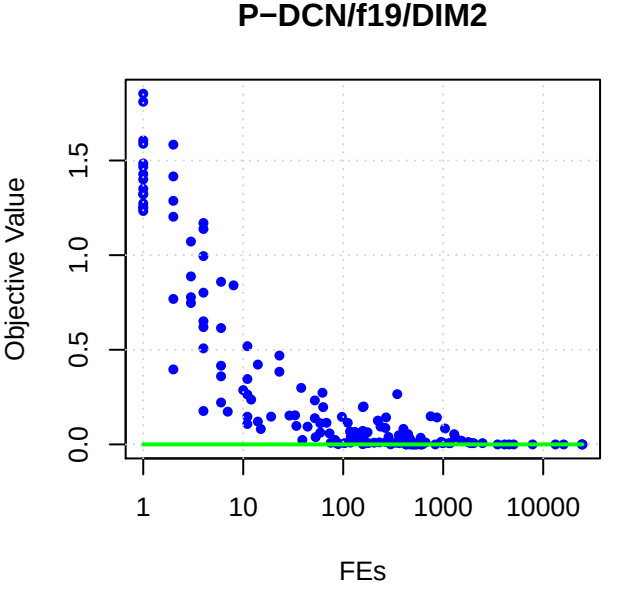
1e+02
1e+04
1e+06
FEs


P−DCN/f19/DIM2
Objective Value
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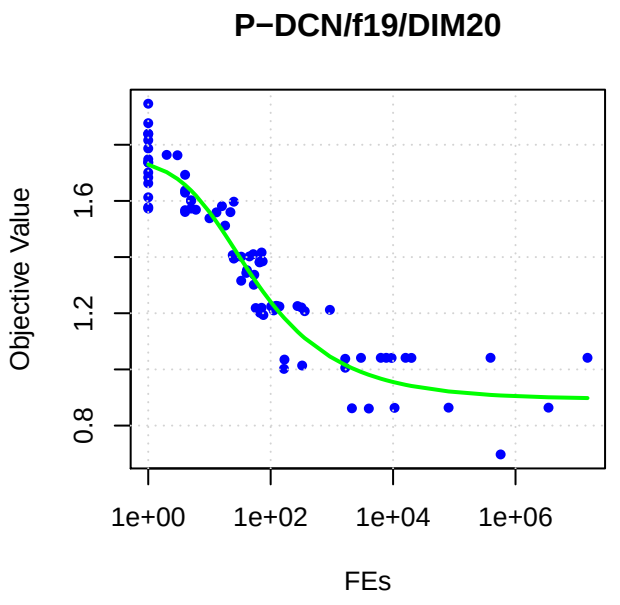
0.5
1.0
1.5
1
10
100
1000
10000
FEs


P−DCN/f19/DIM20
Objective Value
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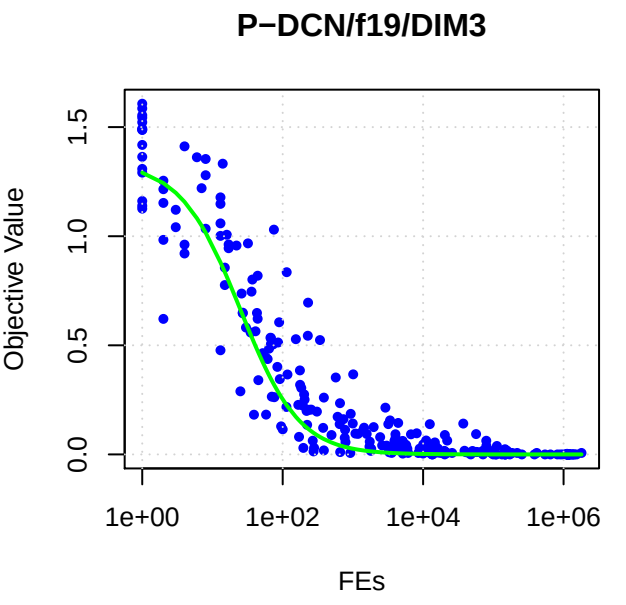
1.2
1.6
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f19/DIM3
Objective Value
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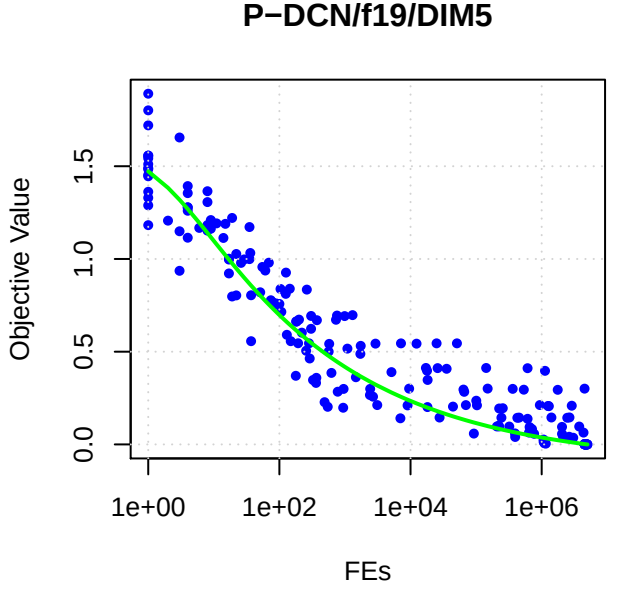
0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f19/DIM5
Objective Value
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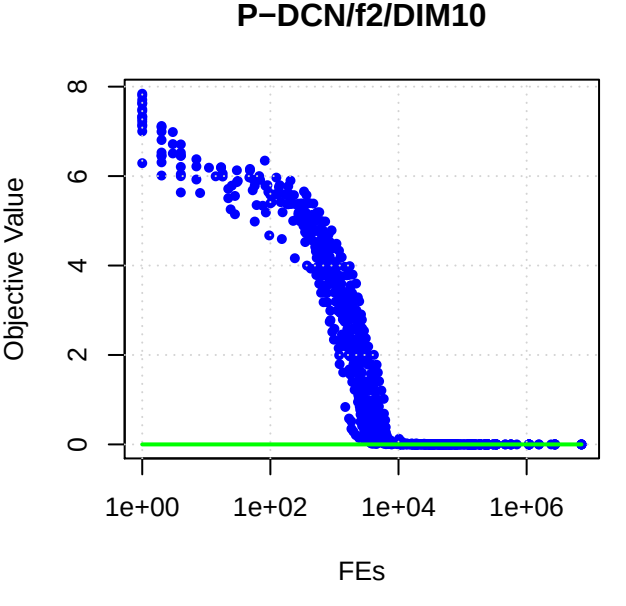
0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f2/DIM10
Objective Value
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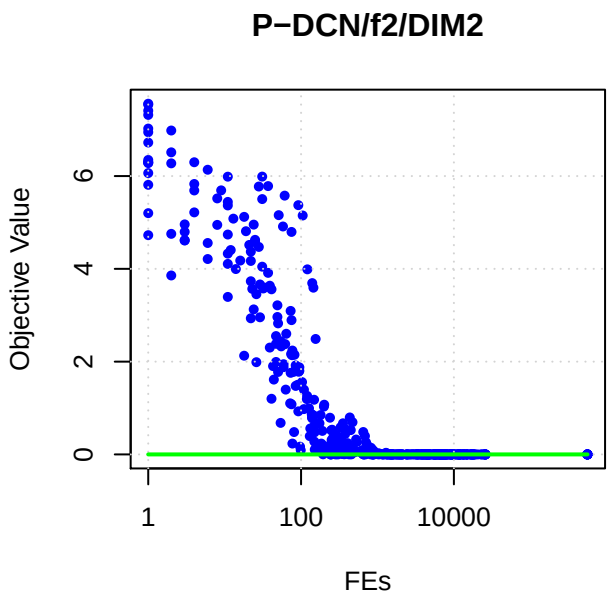
2
4
6
8
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f2/DIM2
Objective Value
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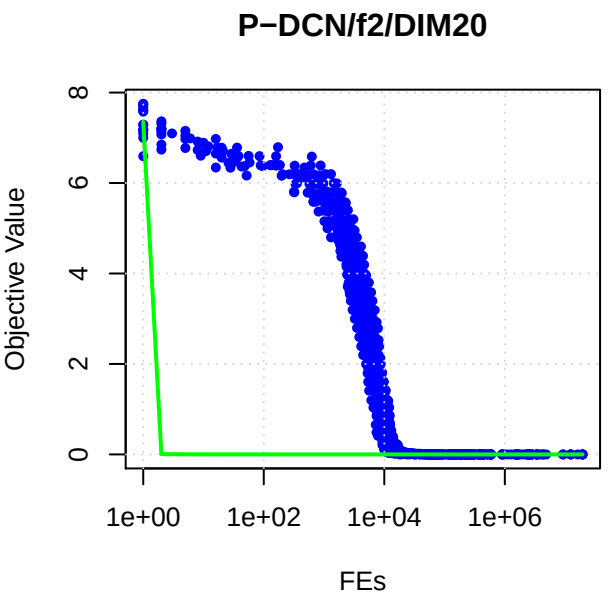
4
6
1
100
10000
FEs


P−DCN/f2/DIM20
Objective Value
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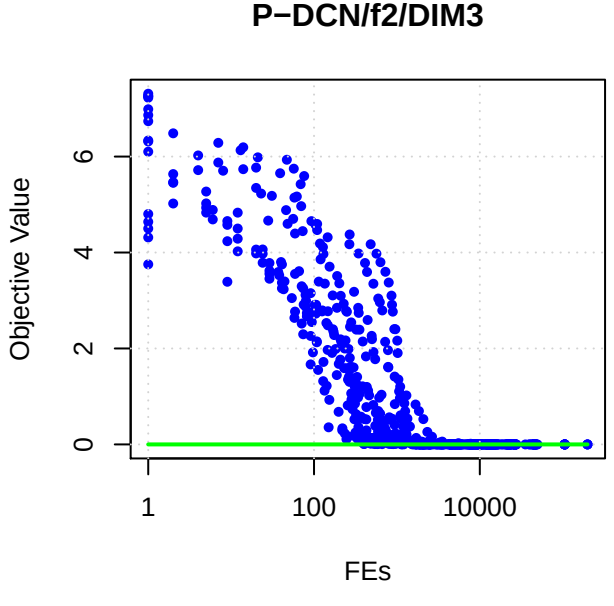
4
6
8
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f2/DIM3
Objective Value
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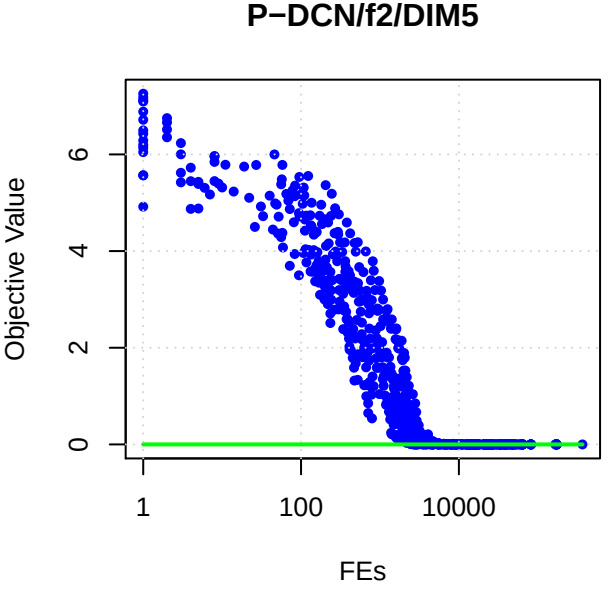
4
6
1
100
10000
FEs


P−DCN/f2/DIM5
Objective Value
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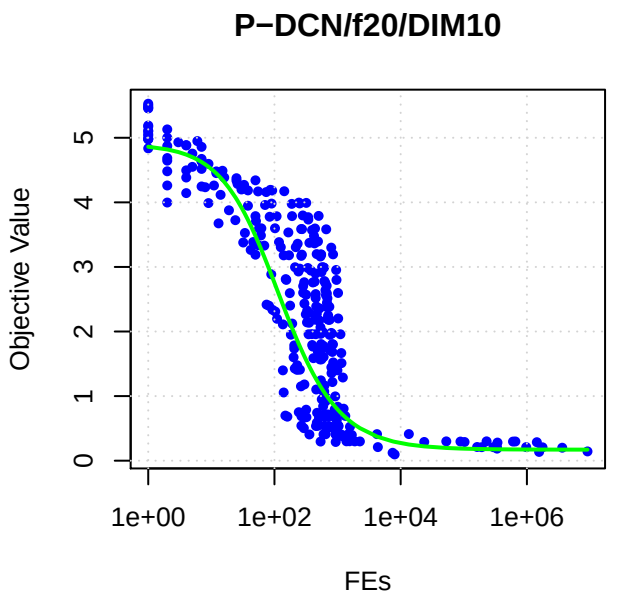
2
4
6
1
100
10000
FEs


P−DCN/f20/DIM10
Objective Value
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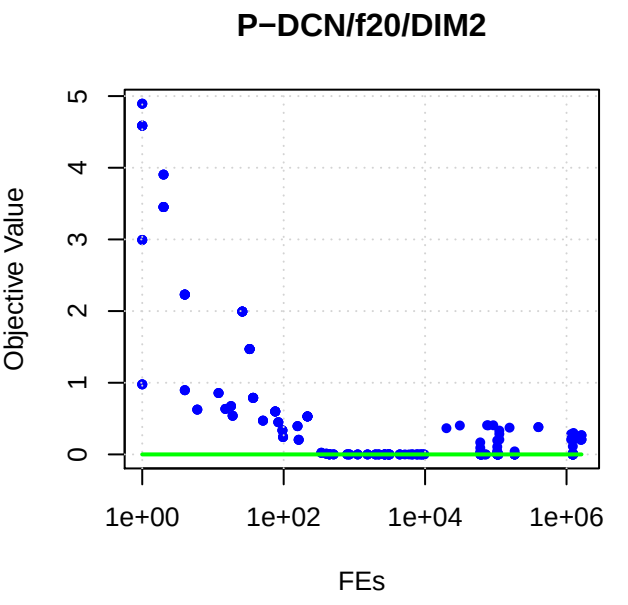
1
2
3
4
5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f20/DIM2
Objective Value
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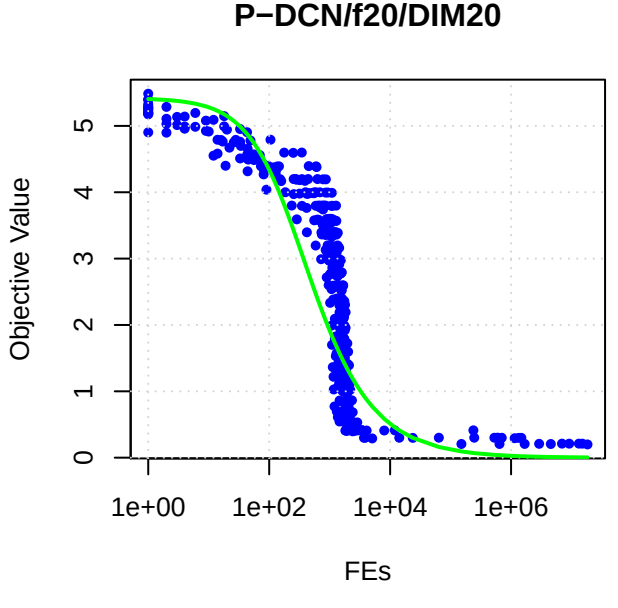
1
2
3
4
5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f20/DIM20
Objective Value
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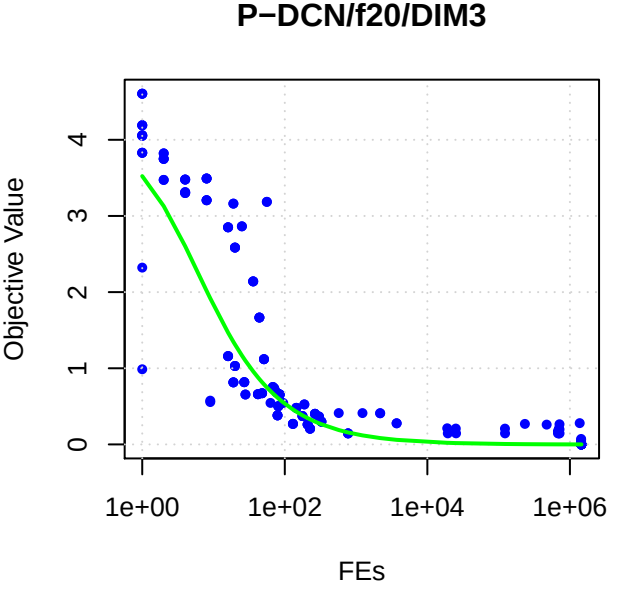
2
3
4
5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f20/DIM3
Objective Value
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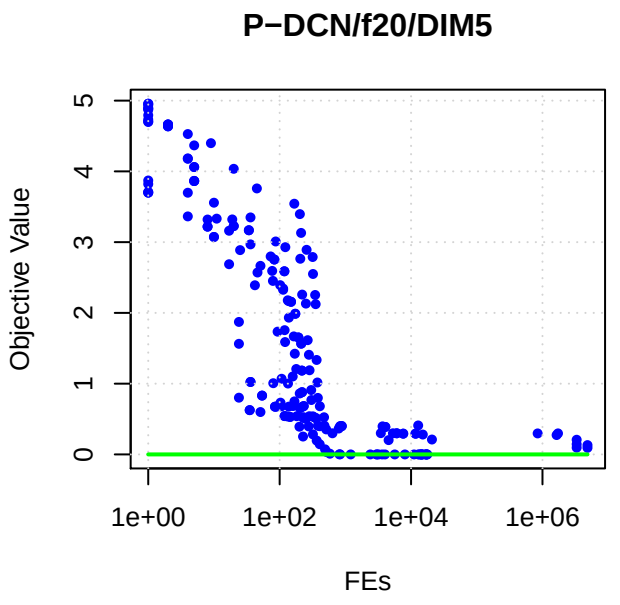
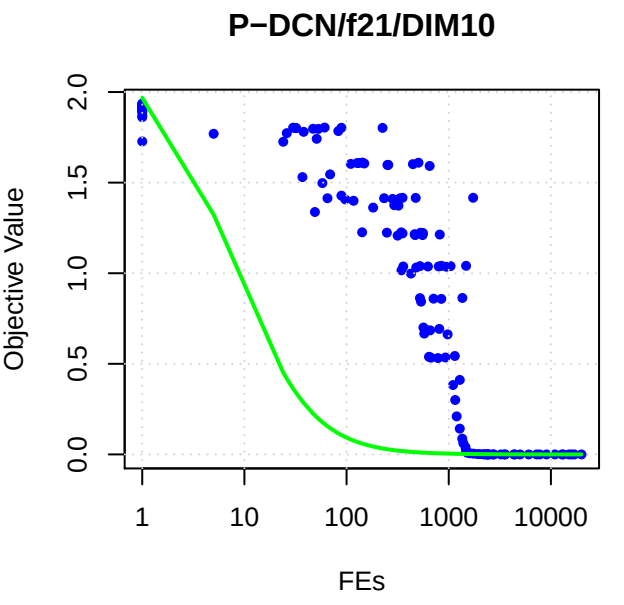
1
2
3
4
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f20/DIM5
Objective Value
0
1
2
3
4
5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f21/DIM10
Objective Value
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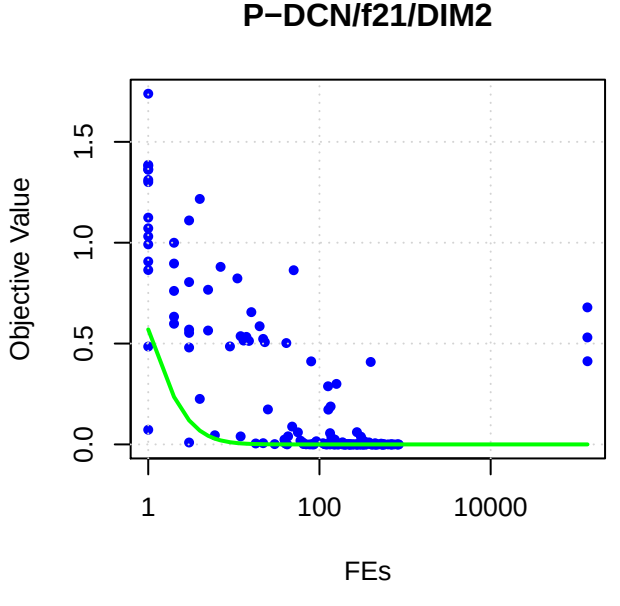
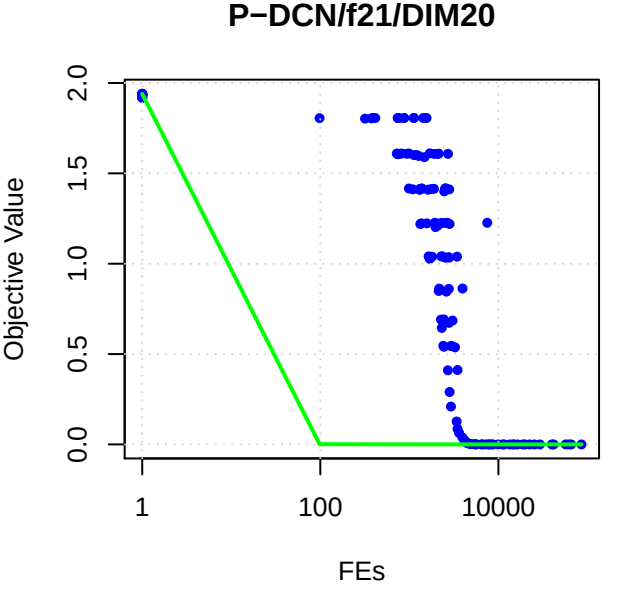
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs


P−DCN/f21/DIM2
Objective Value
0.0
0.5
1.0
1.5
1
100
10000
FEs


P−DCN/f21/DIM20
Objective Value
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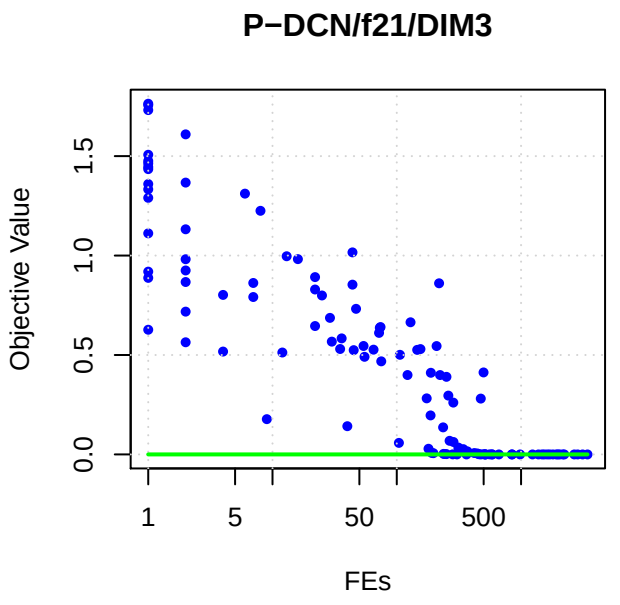
1.0
1.5
2.0
1
100
10000
FEs


P−DCN/f21/DIM3
Objective Value
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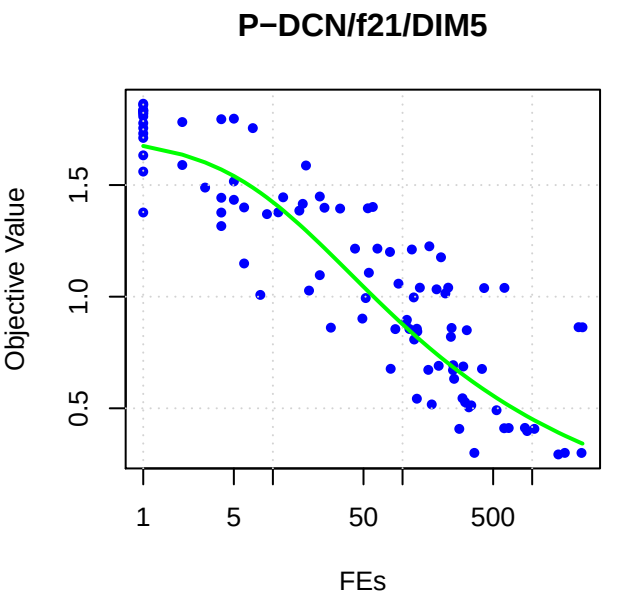
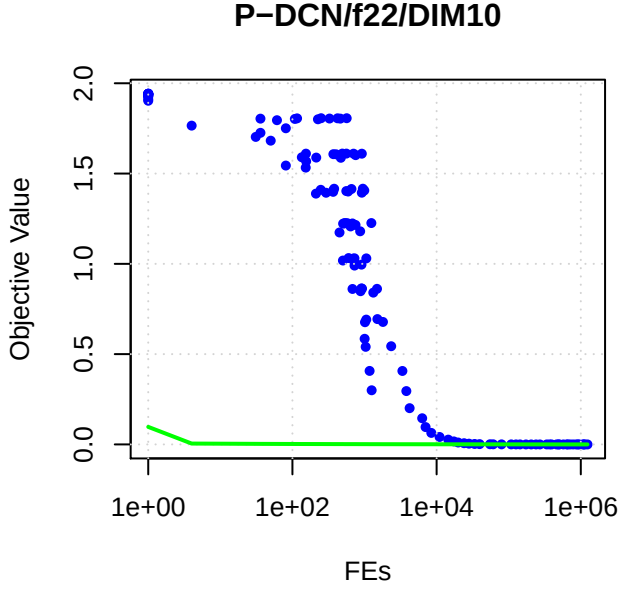
0.5
1.0
1.5
1
5
50
500
FEs


P−DCN/f21/DIM5
Objective Value
0.5
1.0
1.5
1
5
50
500
FEs


P−DCN/f22/DIM10
Objective Value
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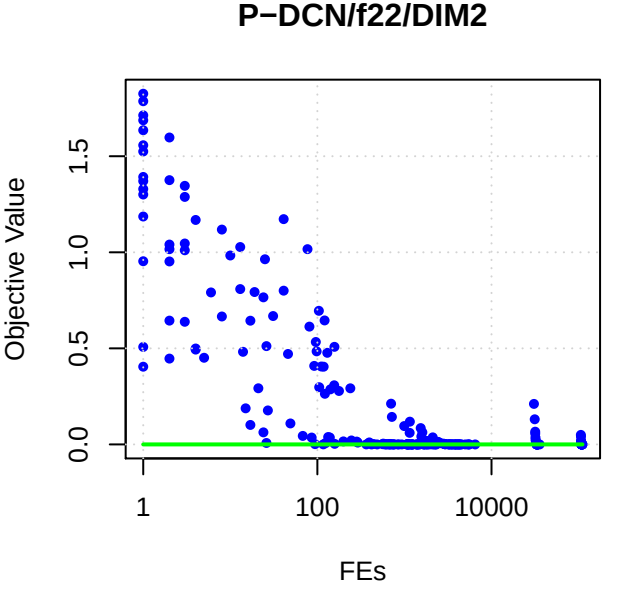
0.5
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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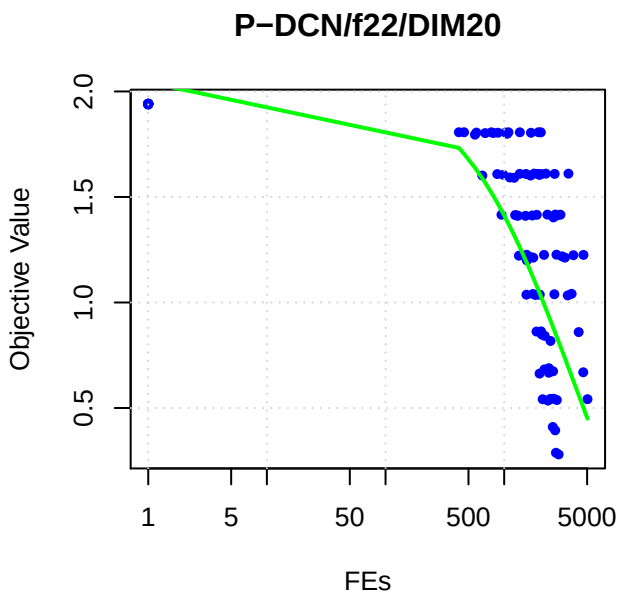
1.0
1.5
1
100
10000
FEs


P−DCN/f22/DIM20
Objective Value
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1.5
1.0
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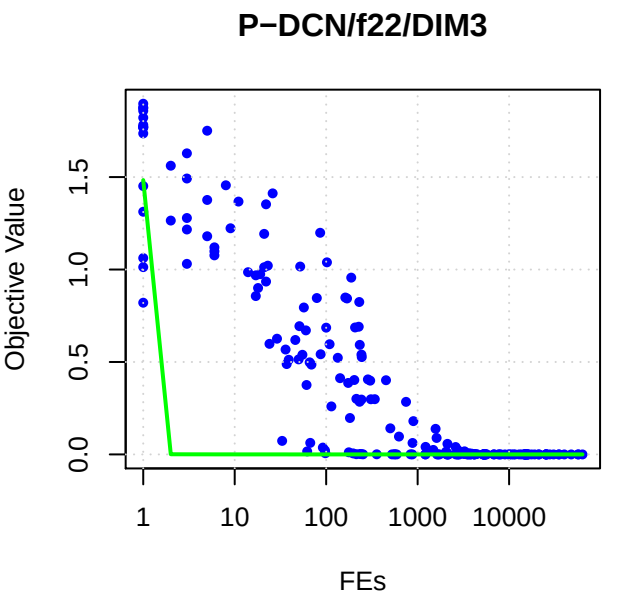
1
5
50
500
5000
FEs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Objective Value
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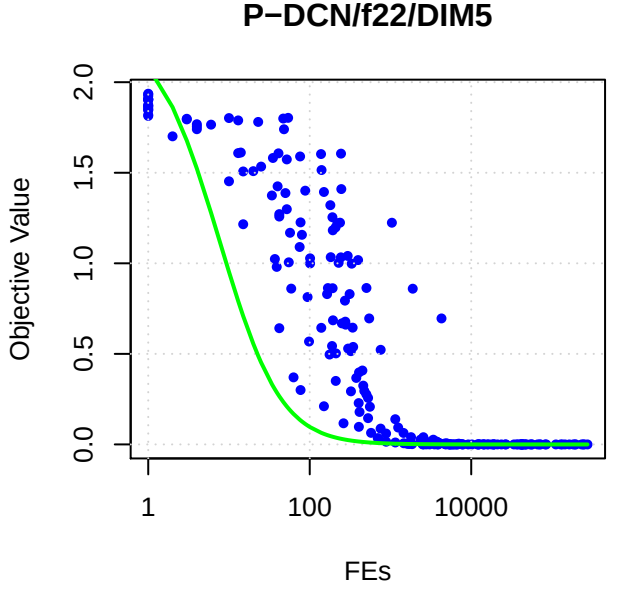
0.0
1
10
100
1000
10000
FEs


P−DCN/f22/DIM5
Objective Value
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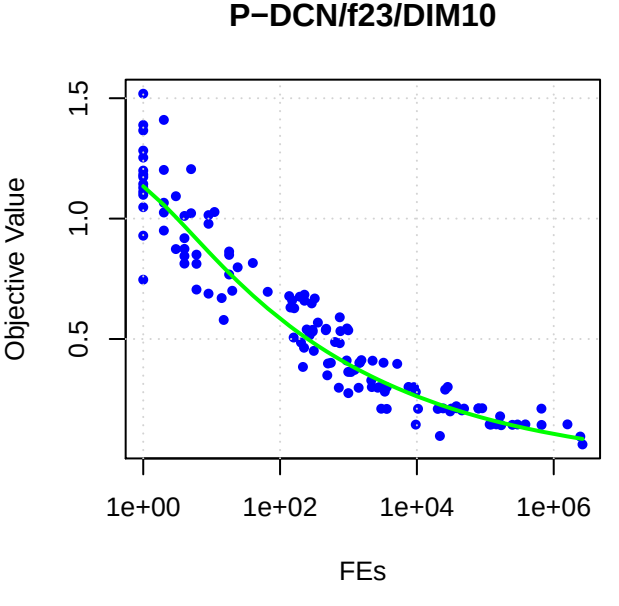
1.5
1.0
0.5
0.0
1
100
10000
FEs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Objective Value
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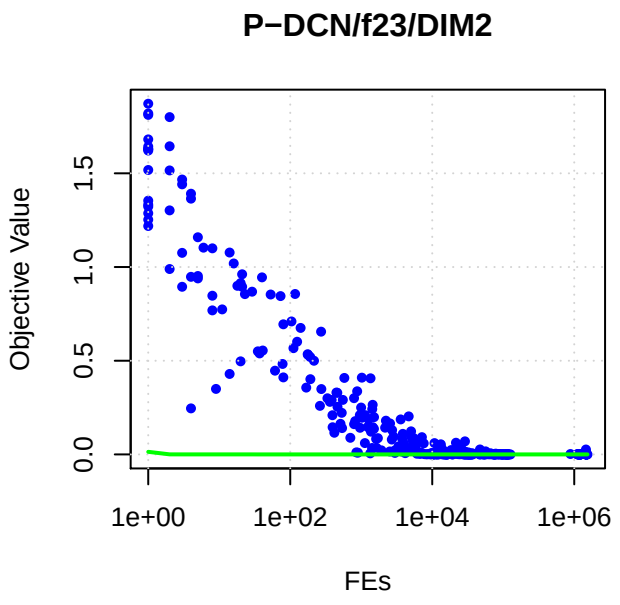
1e+02
1e+04
1e+06
FEs


P−DCN/f23/DIM2
Objective Value
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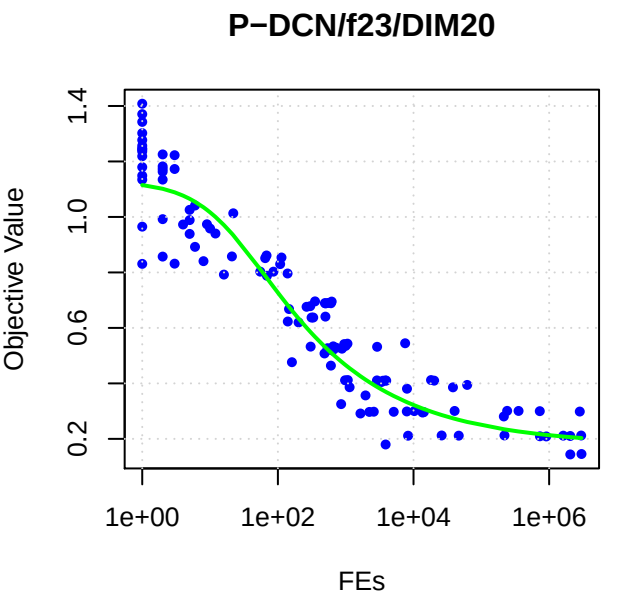
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f23/DIM20
Objective Value
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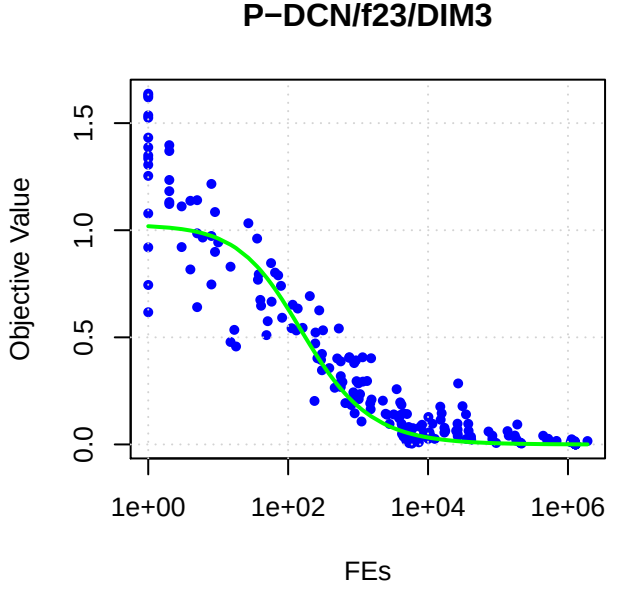
0.6
1.0
1.4
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f23/DIM3
Objective Value
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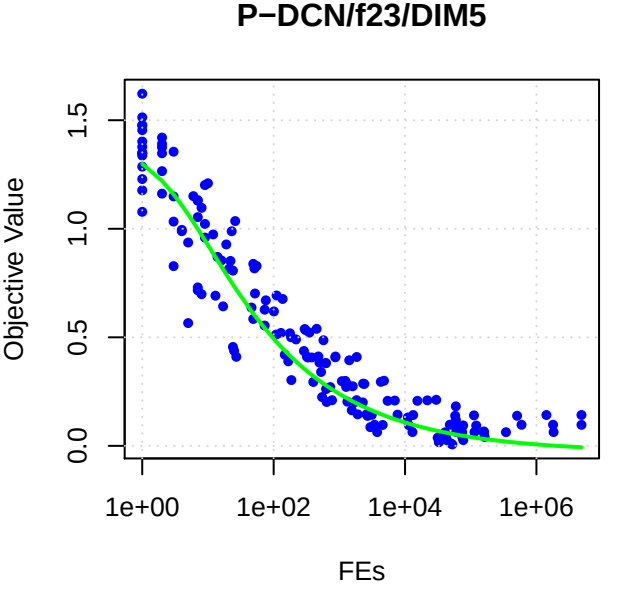
0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f23/DIM5
Objective Value
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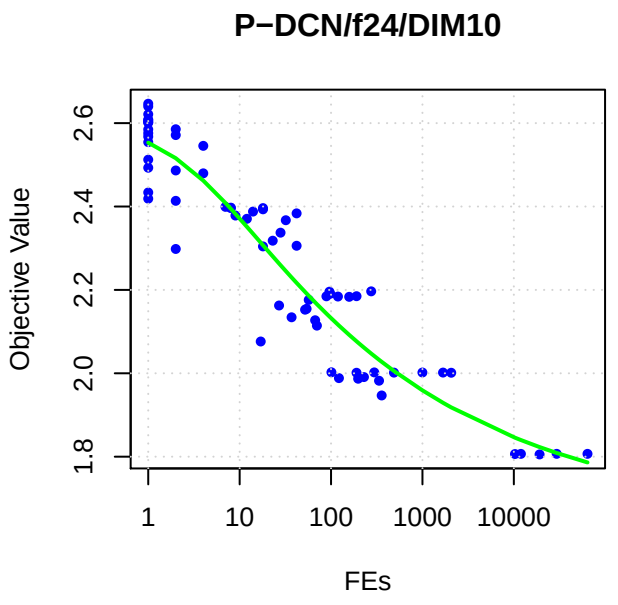
0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f24/DIM10
Objective Value
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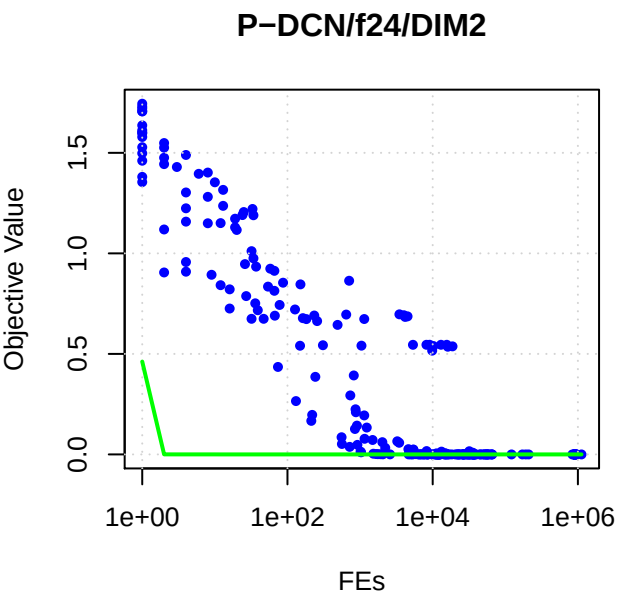
2.4
2.2
2.0
1.8
1
10
100
1000
10000
FEs


P−DCN/f24/DIM2
Objective Value
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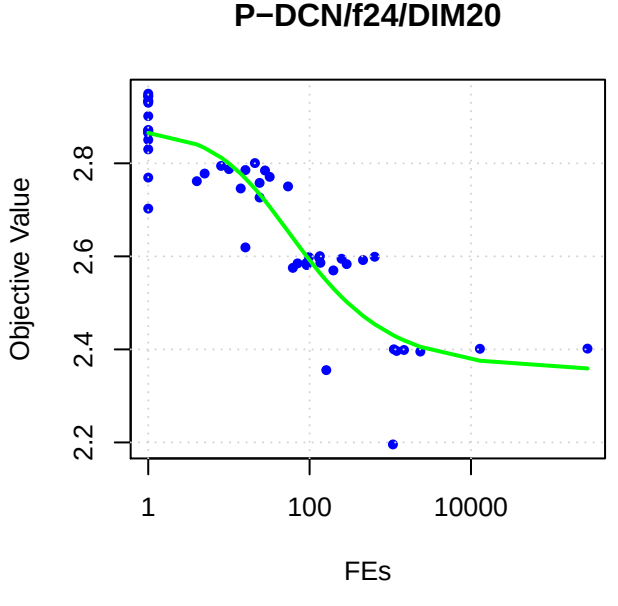
1.0
0.5
0.0
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f24/DIM20
Objective Value
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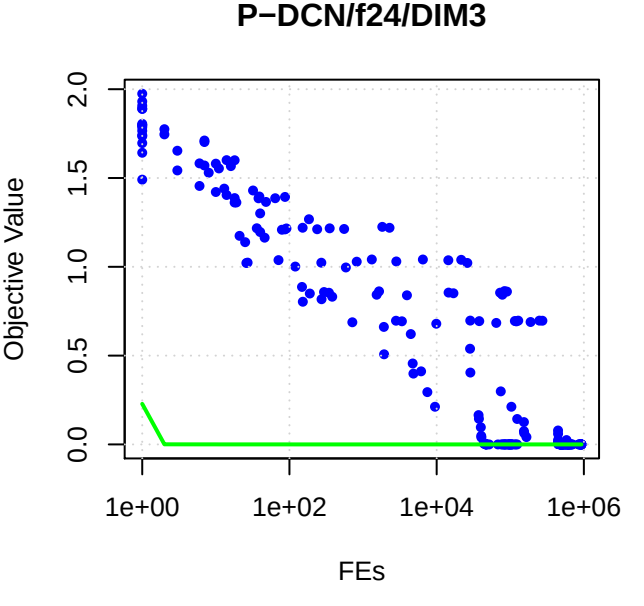
2.6
2.4
2.2
1
100
10000
FEs


P−DCN/f24/DIM3
Objective Value
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1.0
0.5
0.0
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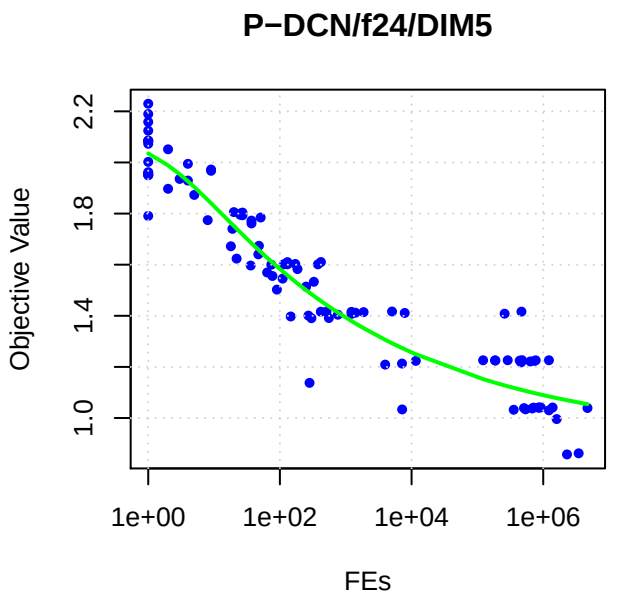
1e+02
1e+04
1e+06
FEs


P−DCN/f24/DIM5
Objective Value
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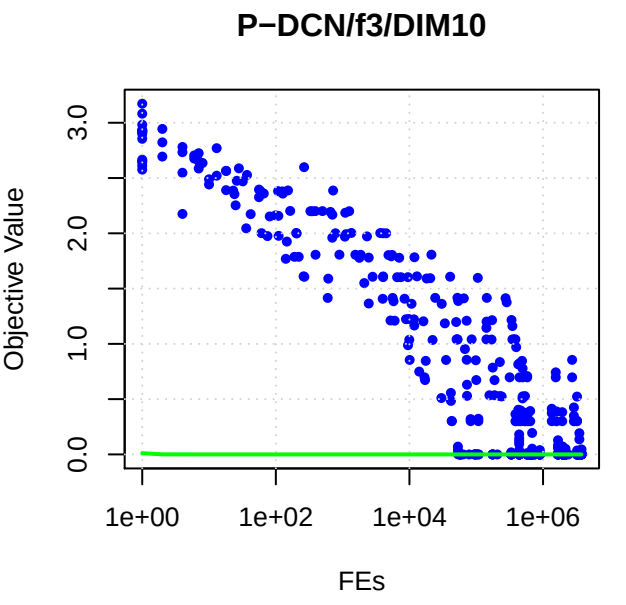
1.4
1.8
2.2
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f3/DIM10
Objective Value
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1.0
2.0
3.0
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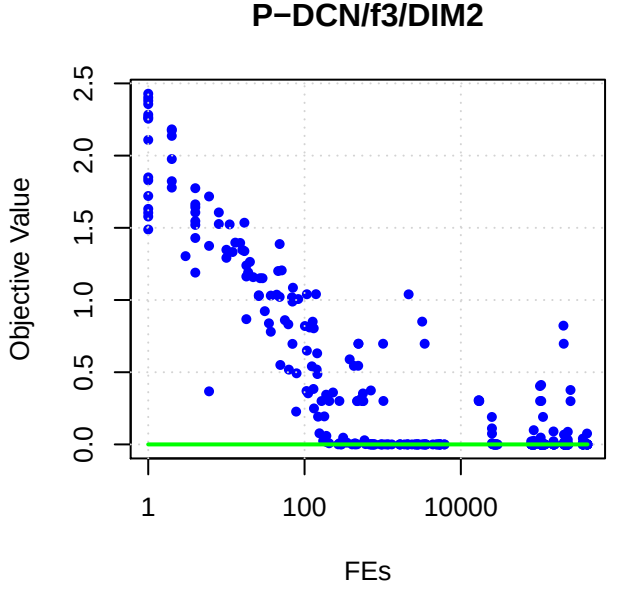
1e+02
1e+04
1e+06
FEs


P−DCN/f3/DIM2
Objective Value
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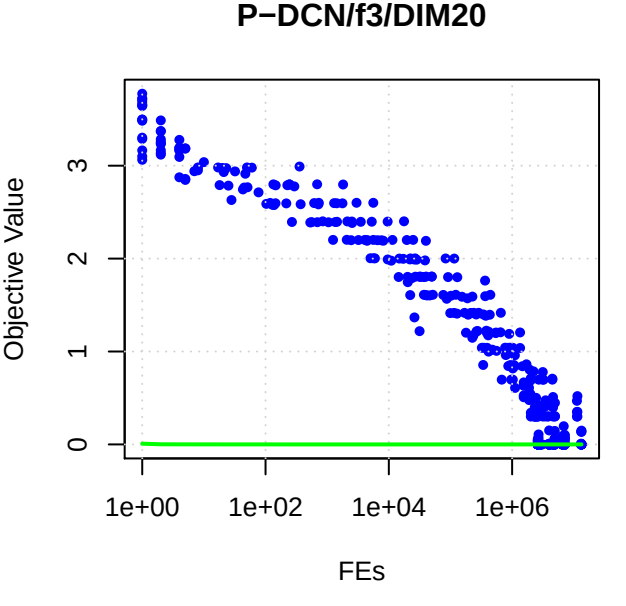
1.0
1.5
2.0
2.5
1
100
10000
FEs


P−DCN/f3/DIM20
Objective Value
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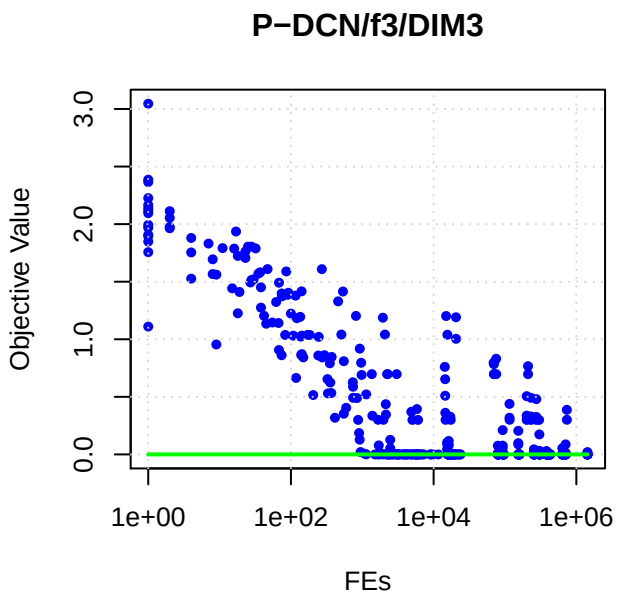
1
2
3
1e+00
1e+02
1e+04
1e+06
FEs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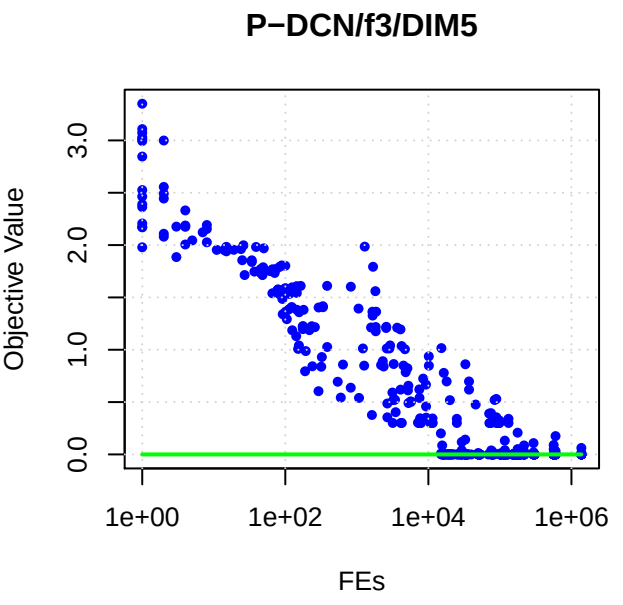
1e+02
1e+04
1e+06
FEs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1e+02
1e+04
1e+06
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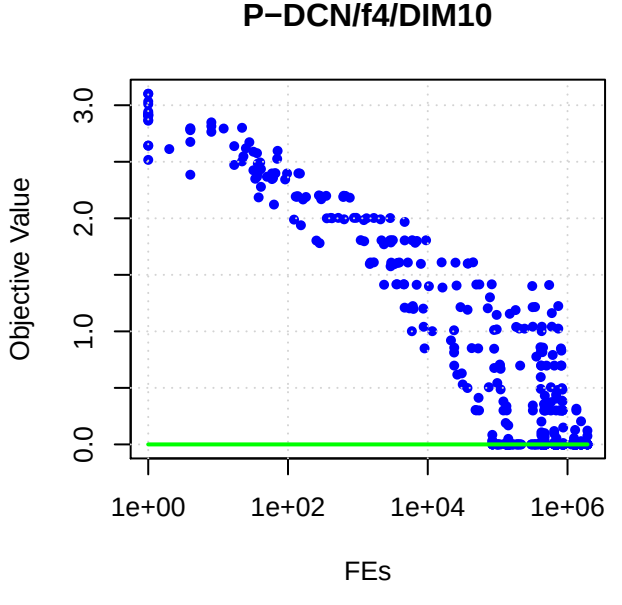
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1e+02
1e+04
1e+06
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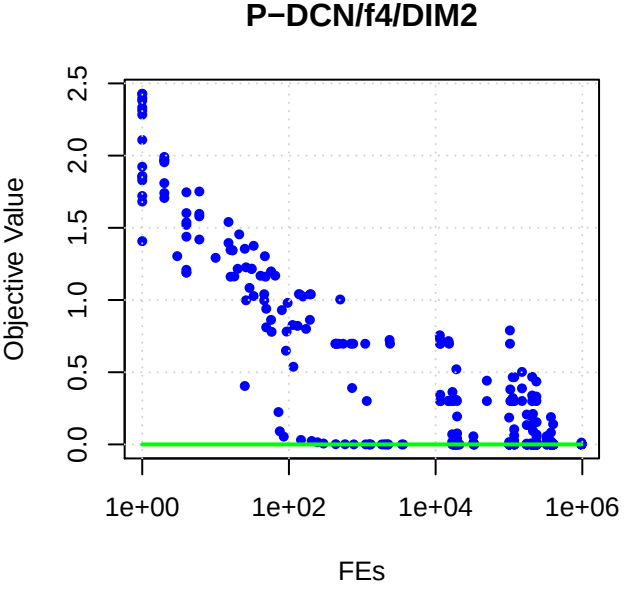
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Objective Value
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2.0
2.5
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1e+02
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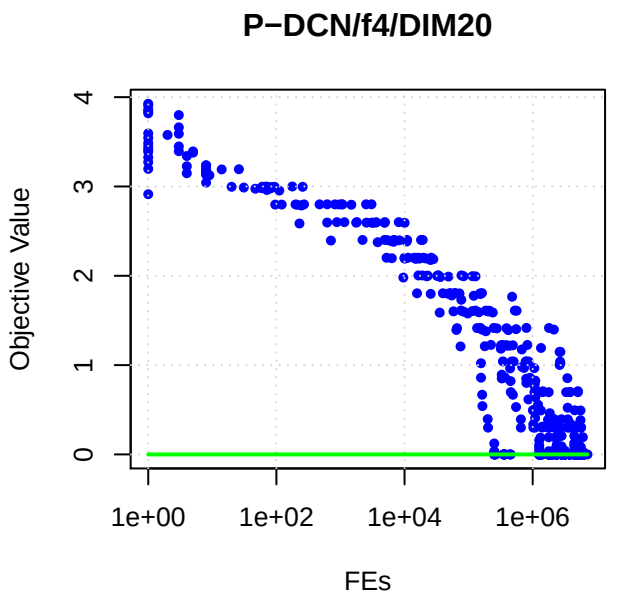
1e+06
FEs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Objective Value
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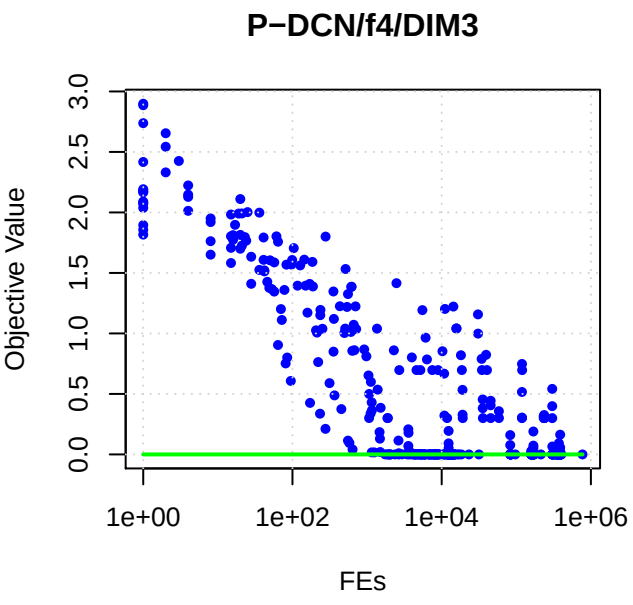
2
3
4
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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1.5
2.0
2.5
3.0
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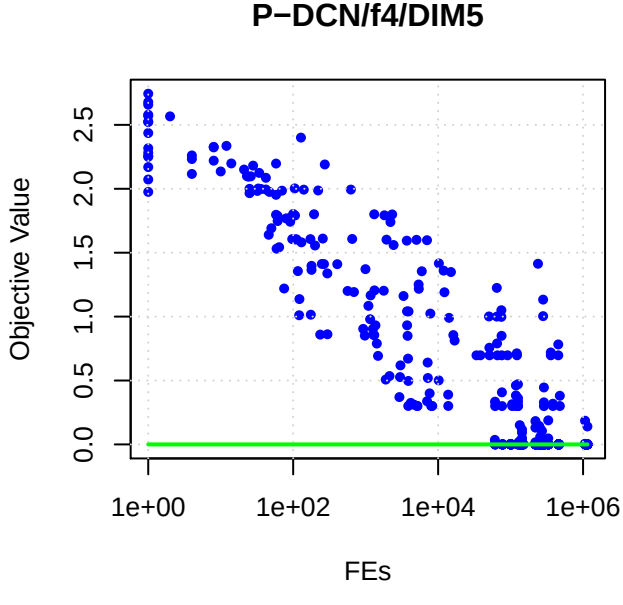
1e+02
1e+04
1e+06
FEs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Objective Value
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1.5
2.0
2.5
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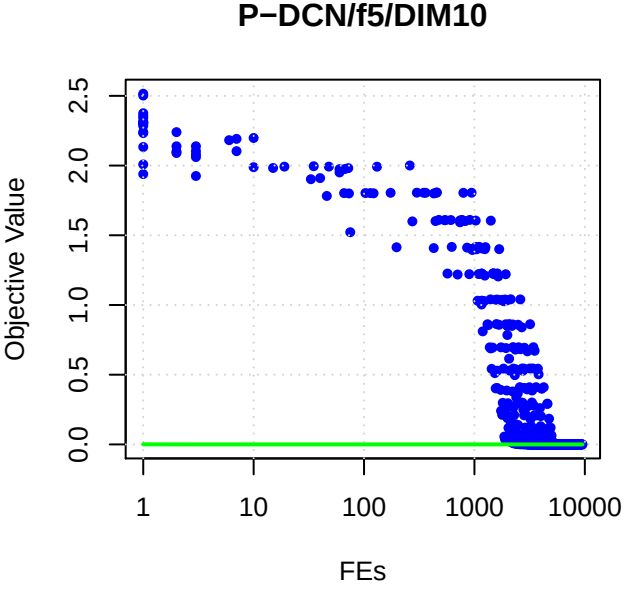
1e+02
1e+04
1e+06
FEs


P−DCN/f5/DIM10
Objective Value
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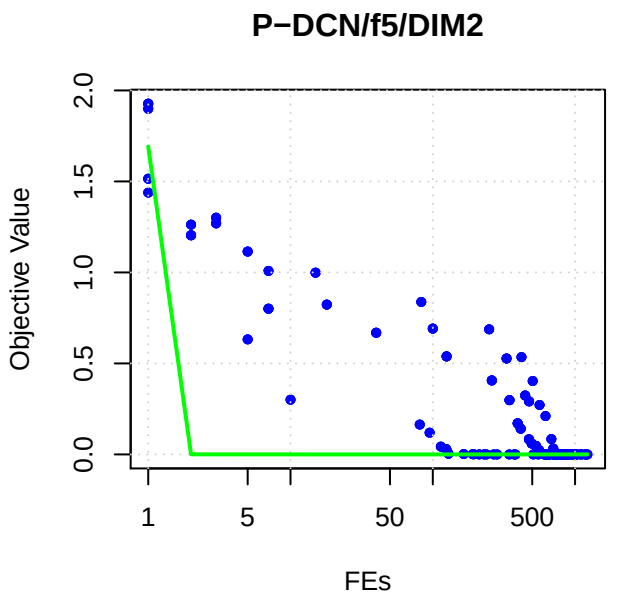
1.5
2.0
2.5
1
10
100
1000
10000
FEs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Objective Value
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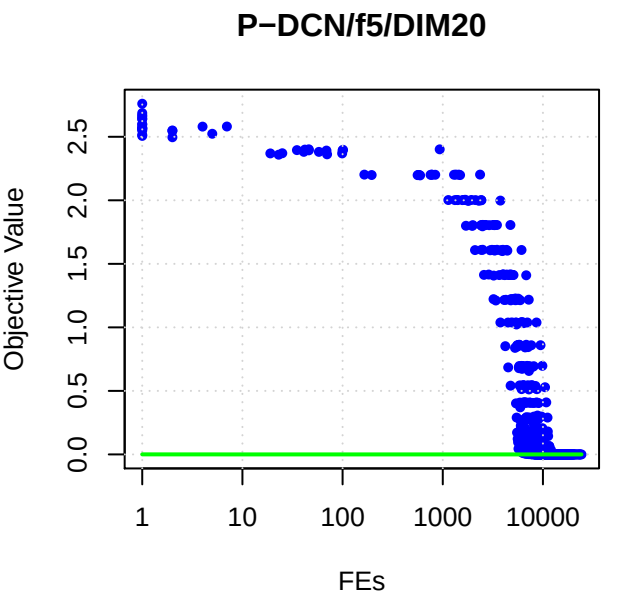
1.5
2.0
1
5
50
500
FEs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Objective Value
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1.5
2.0
2.5
1
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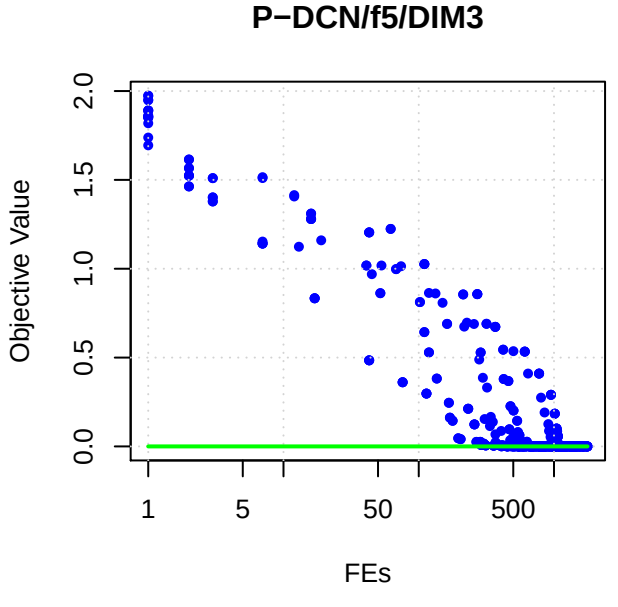
100
1000
10000
FEs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Objective Value
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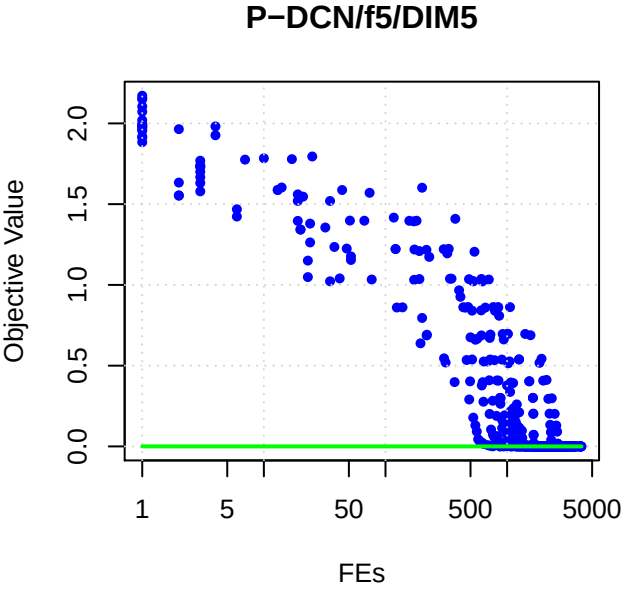
1.0
1.5
2.0
1
5
50
500
FEs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Objective Value
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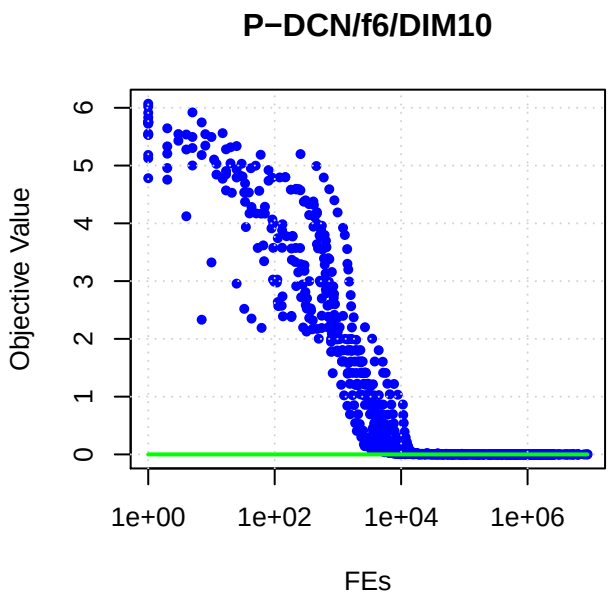
500
5000
FEs


P−DCN/f6/DIM10
Objective Value
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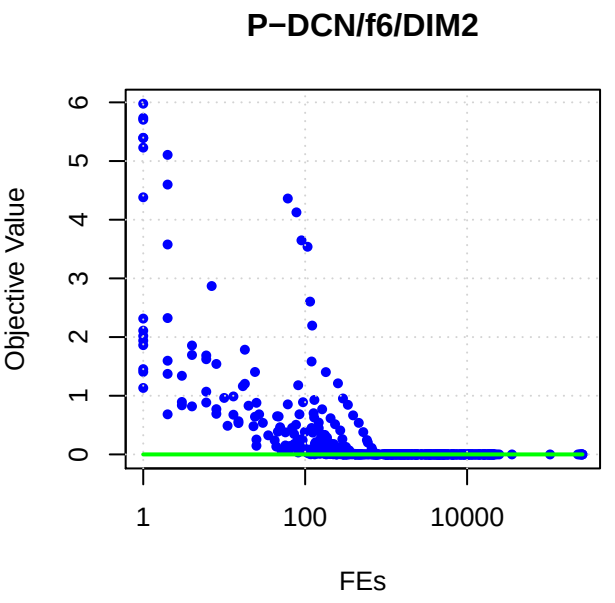
2
3
4
5
6
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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6
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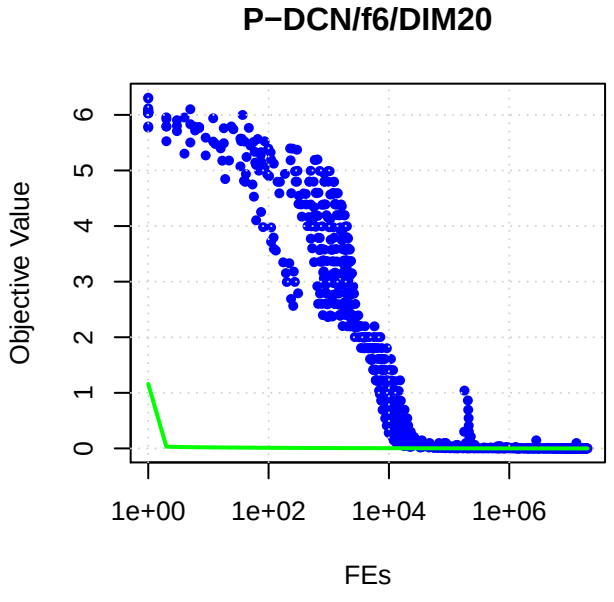
100
10000
FEs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Objective Value
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6
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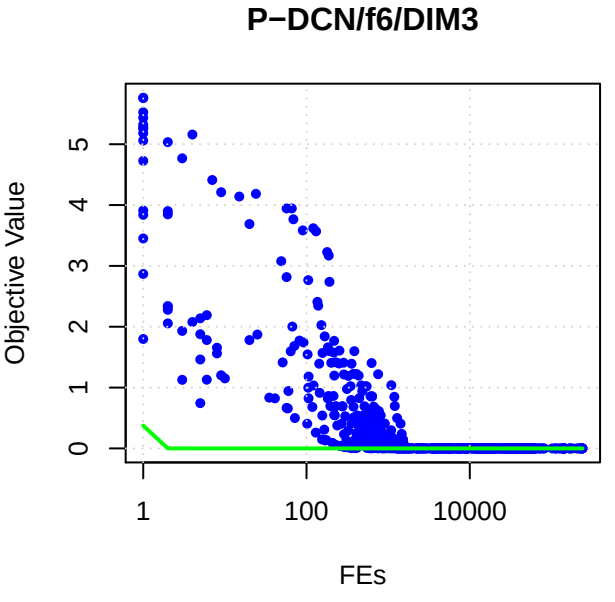
1e+02
1e+04
1e+06
FEs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Objective Value
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2
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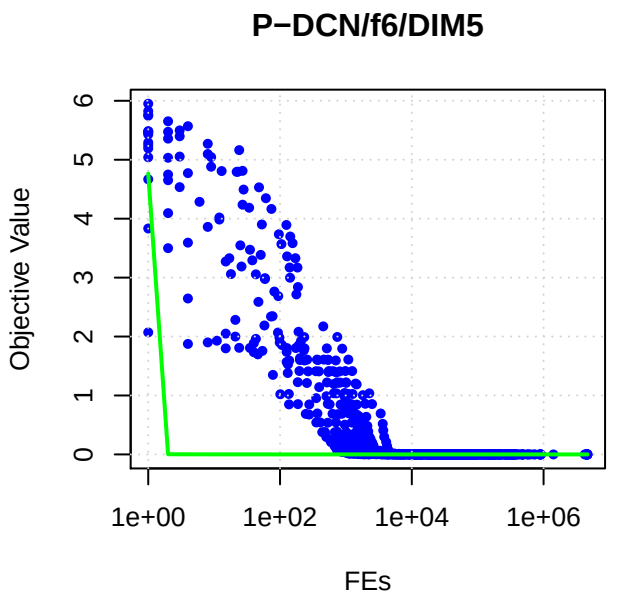
4
5
1
100
10000
FEs


P−DCN/f6/DIM5
Objective Value
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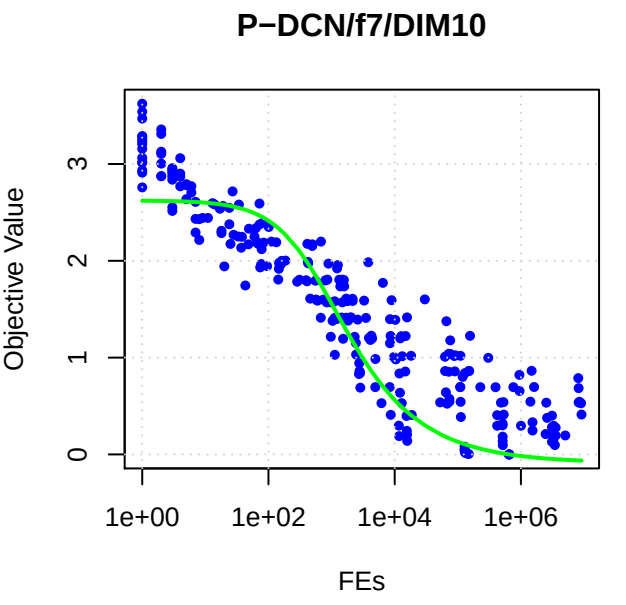
2
3
4
5
6
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
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2
3
1e+00
1e+02
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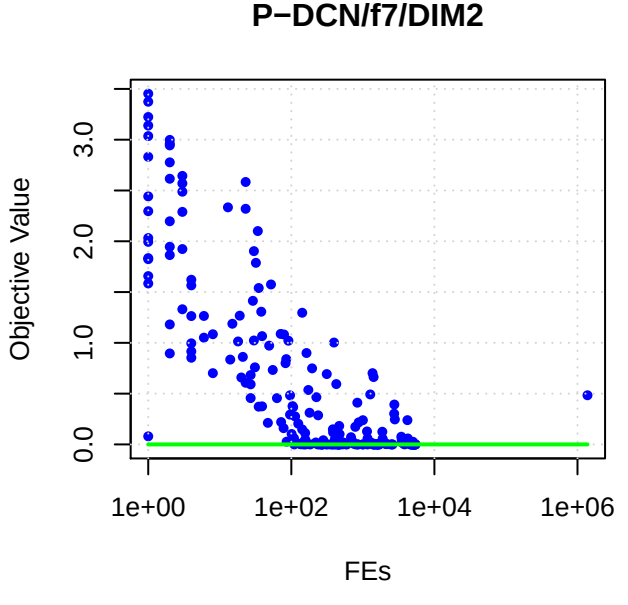
1e+06
FEs


P−DCN/f7/DIM2
Objective Value
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1.0
2.0
3.0
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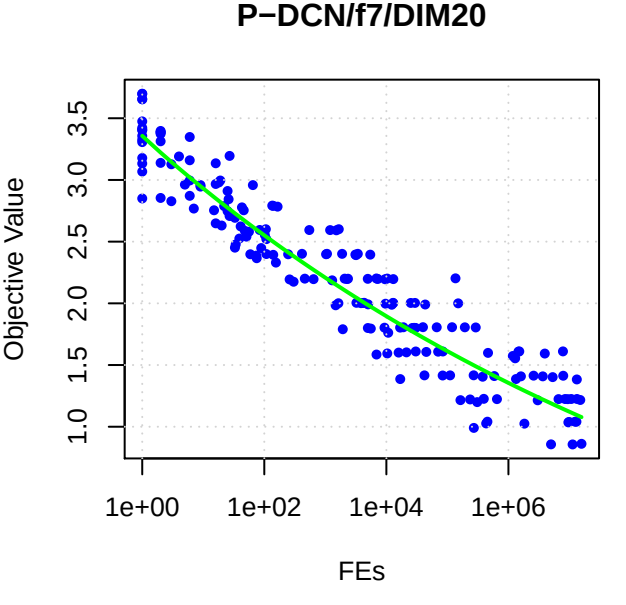
1e+02
1e+04
1e+06
FEs


P−DCN/f7/DIM20
Objective Value
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1e+06
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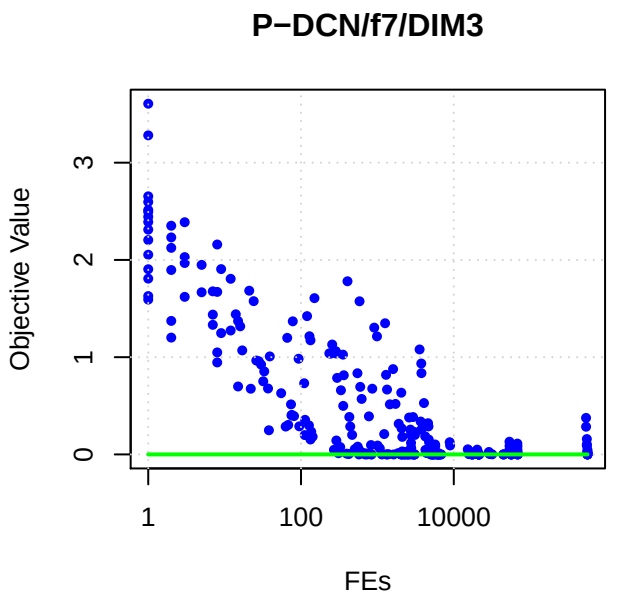
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Objective Value
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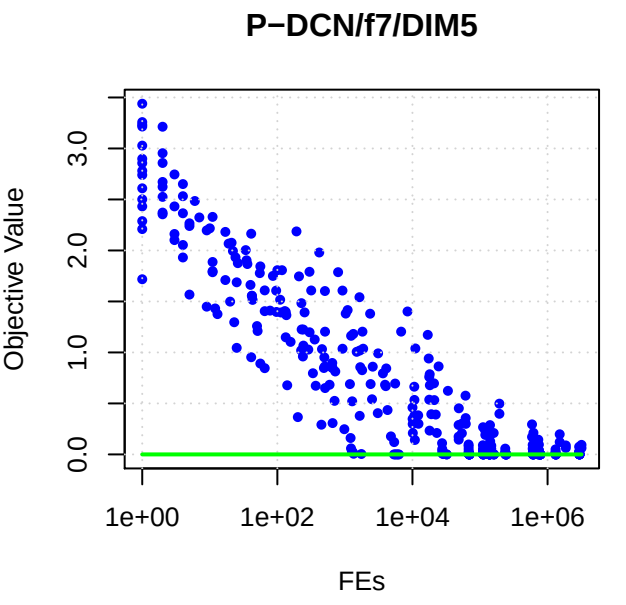
2
3
1
100
10000
FEs


P−DCN/f7/DIM5
Objective Value
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1e+06
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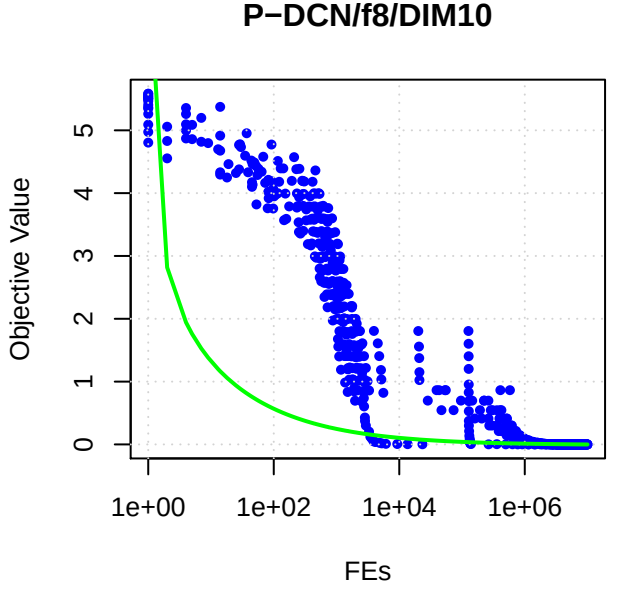
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Objective Value
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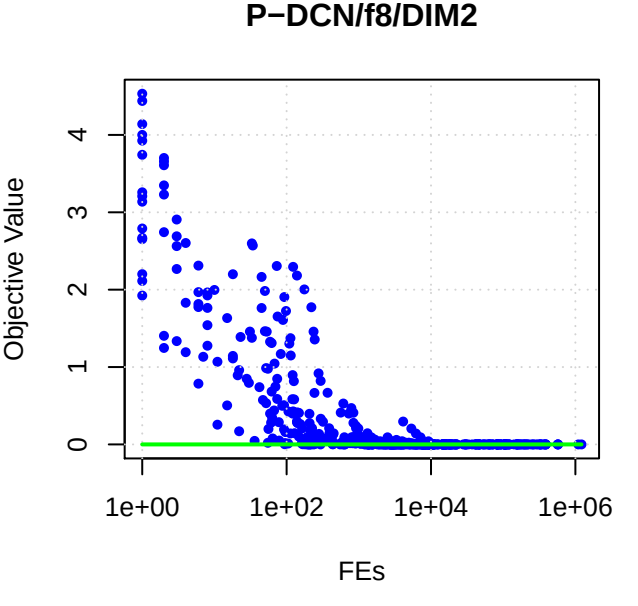
1e+02
1e+04
1e+06
FEs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Objective Value
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4
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1e+02
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1e+06
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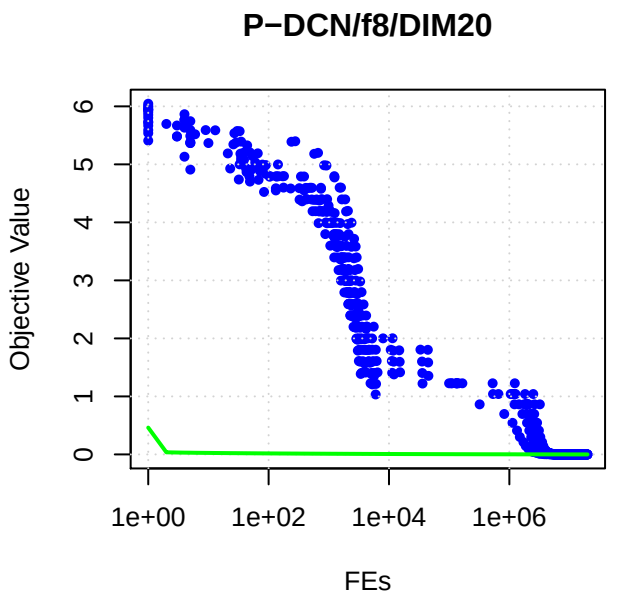
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Objective Value
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4
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1e+02
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1e+06
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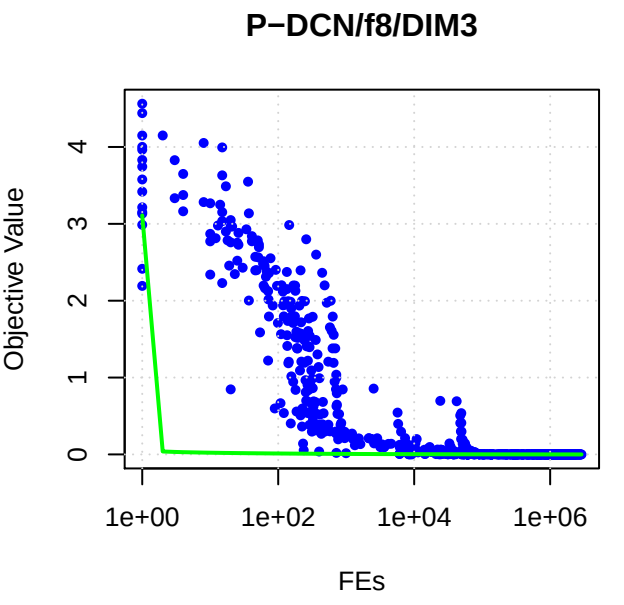
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1e+06
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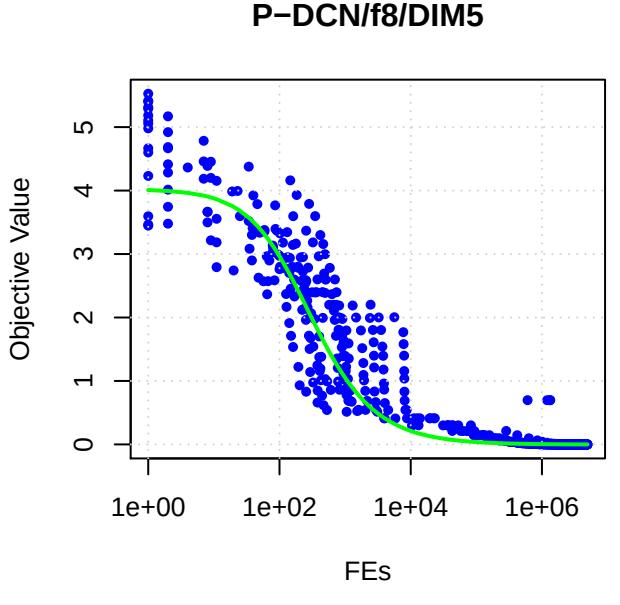
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1e+02
1e+04
1e+06
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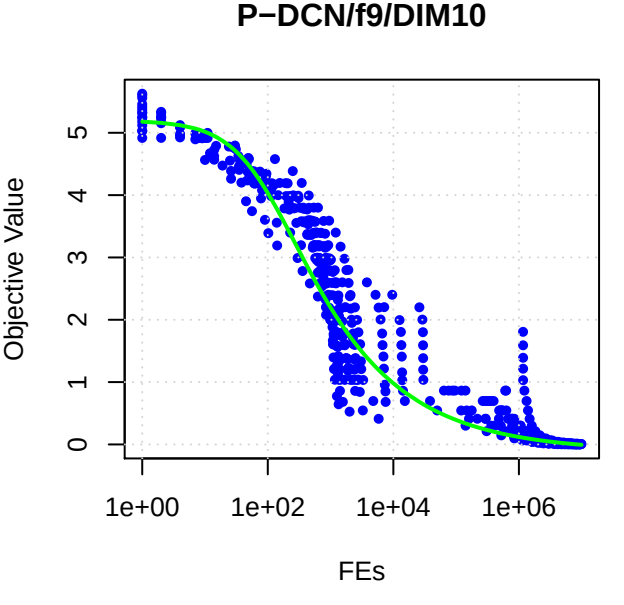
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1e+06
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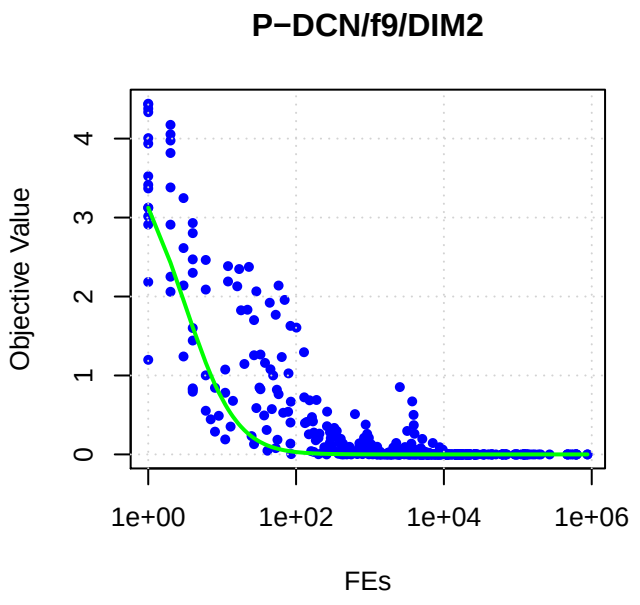
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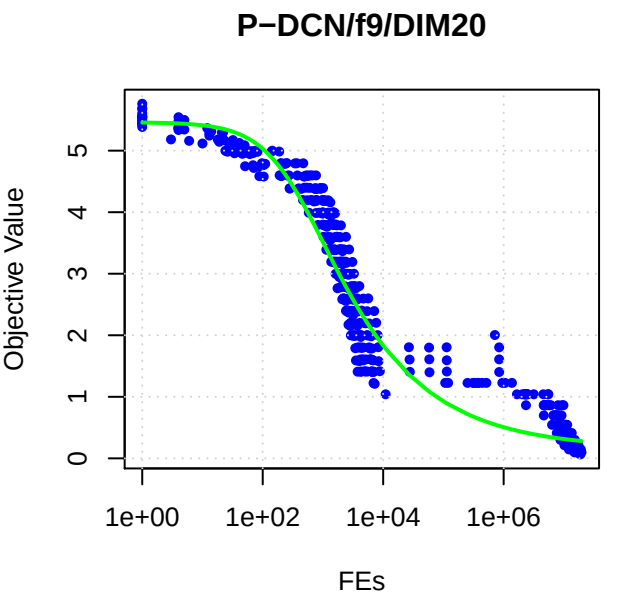
1e+04
1e+06
FEs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Objective Value
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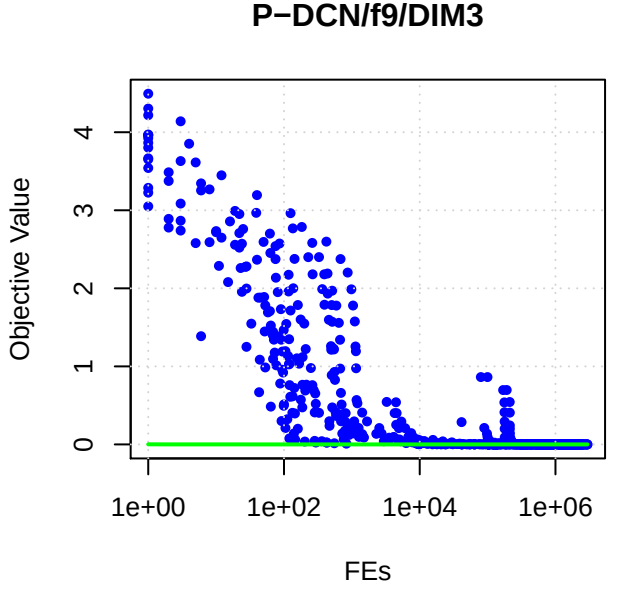
1e+06
FEs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Objective Value
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3
4
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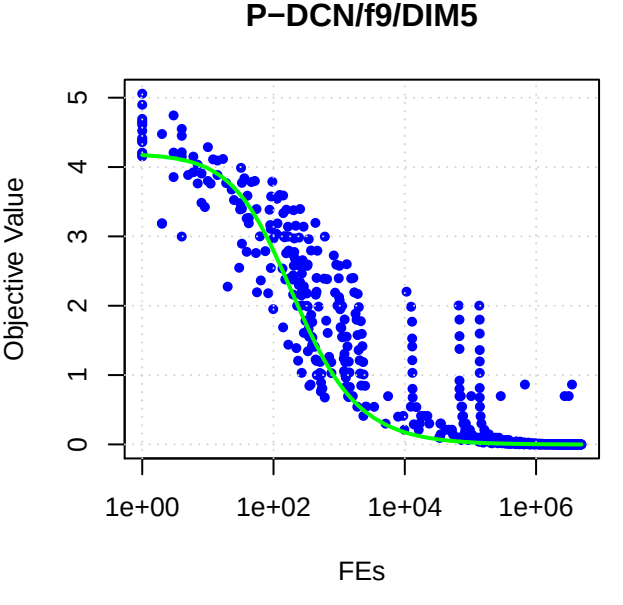
1e+02
1e+04
1e+06
FEs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Objective Value
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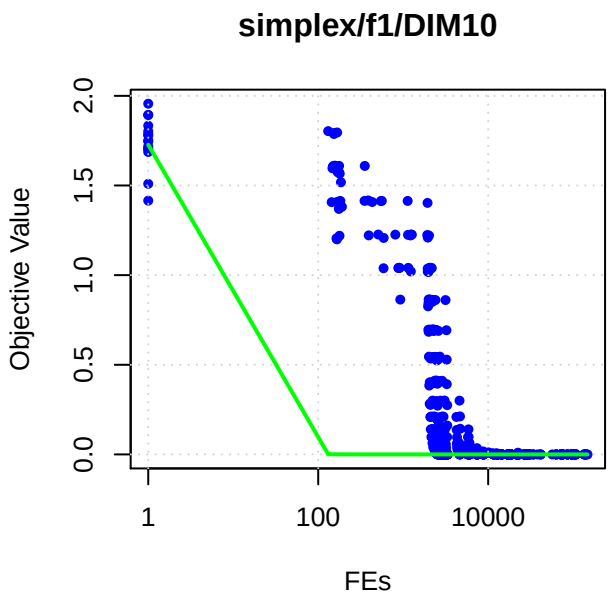
1e+02
1e+04
1e+06
FEs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Objective Value
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1.5
2.0
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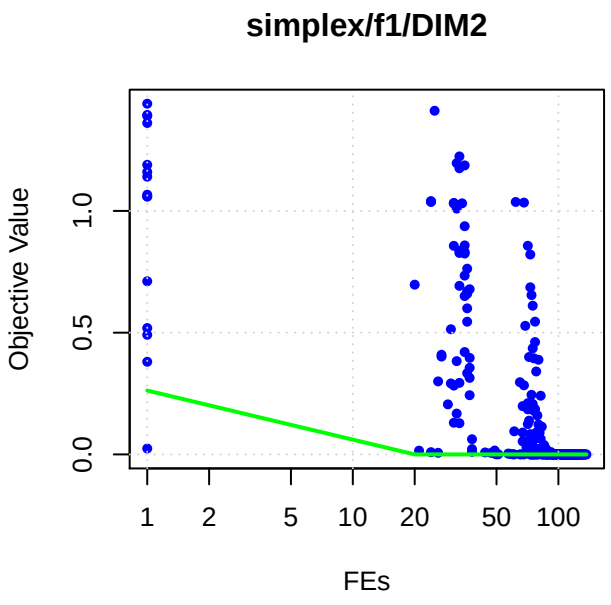
100
10000
FEs


simplex/f1/DIM2
Objective Value
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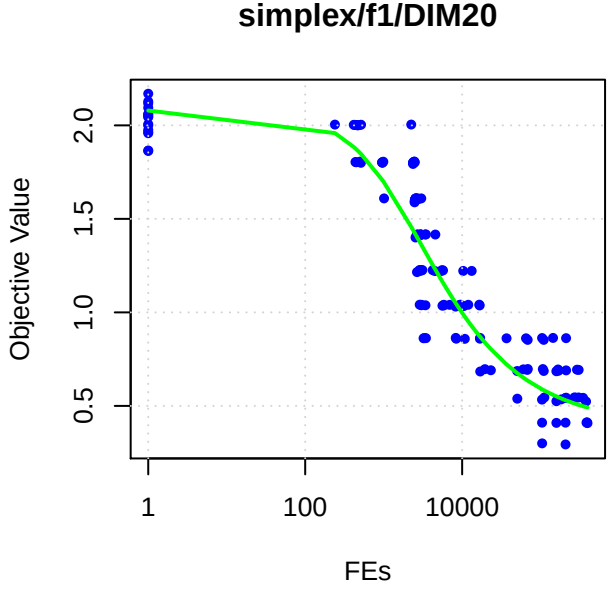
1.0
1
2
5
10
20
50
100
FEs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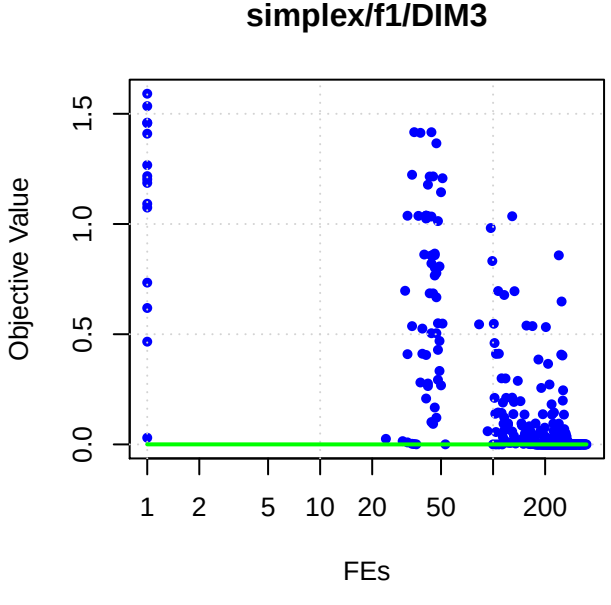
FEs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Objective Value
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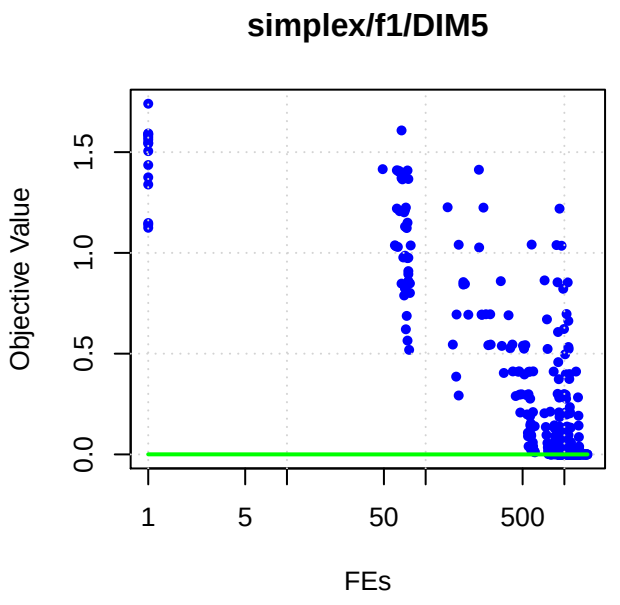
1.0
1.5
1
2
5
10
20
50
200
FEs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Objective Value
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1.5
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5
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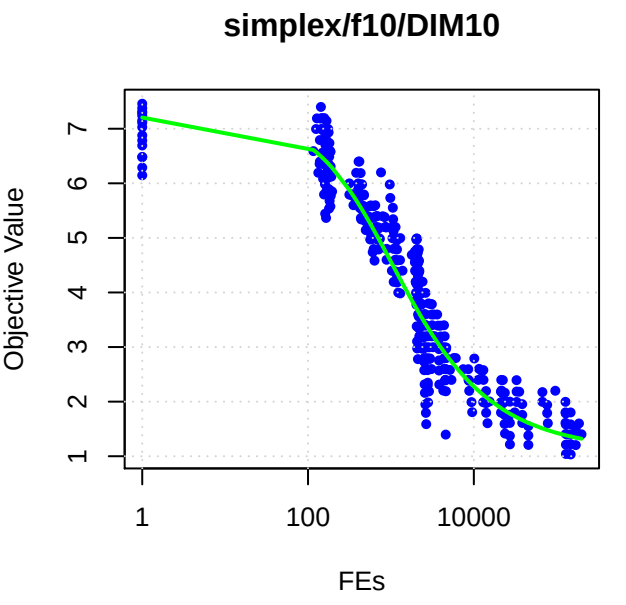
500
FEs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Objective Value
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6
7
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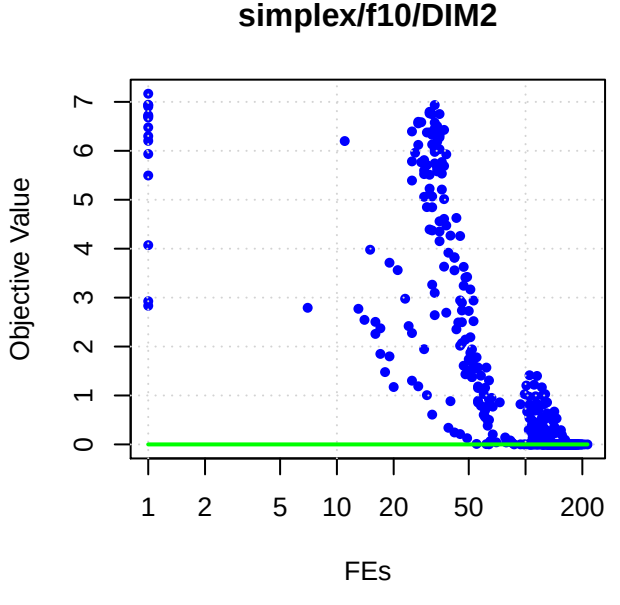
10000
FEs


simplex/f10/DIM2
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4
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6
7
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2
5
10
20
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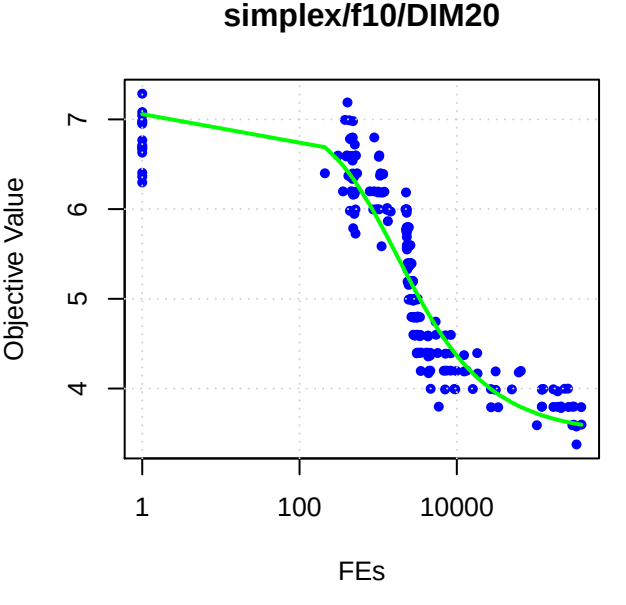
200
FEs


simplex/f10/DIM20
Objective Value
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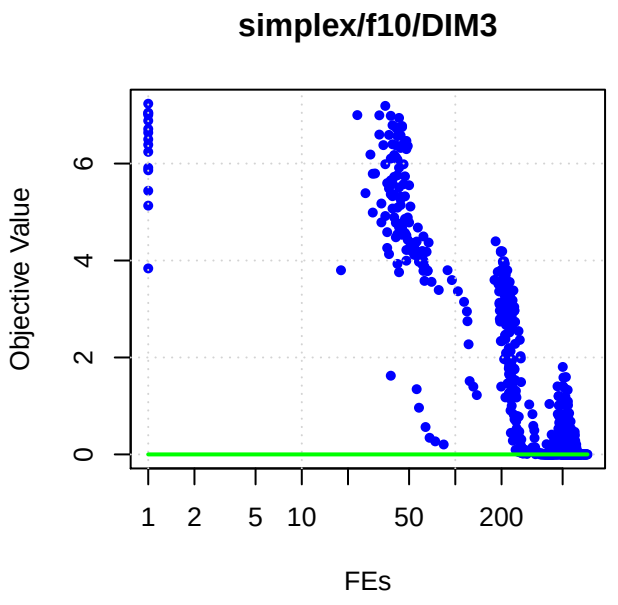
5
6
7
1
100
10000
FEs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Objective Value
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6
1
2
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10
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200
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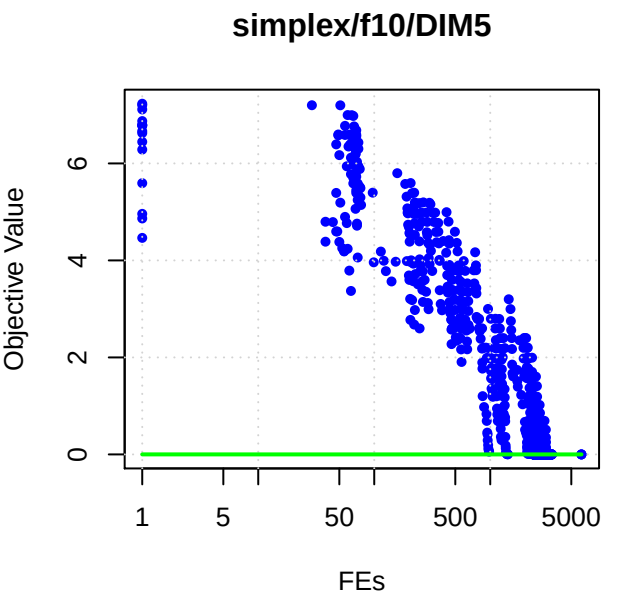
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Objective Value
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6
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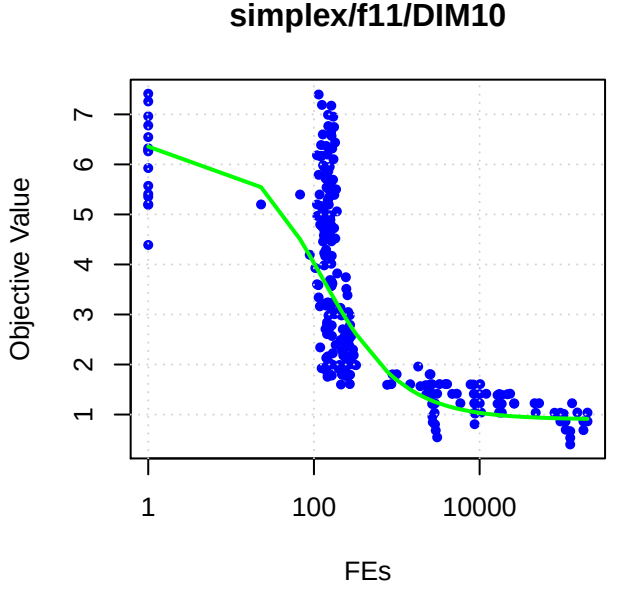
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Objective Value
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6
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10000
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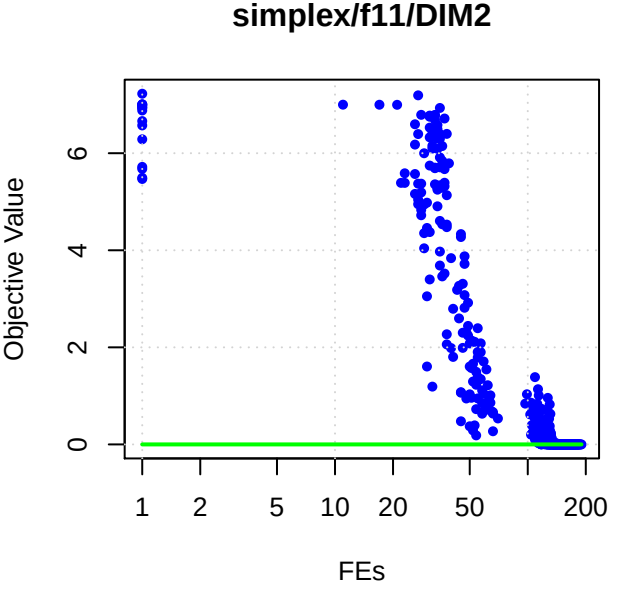
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Objective Value
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2
5
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20
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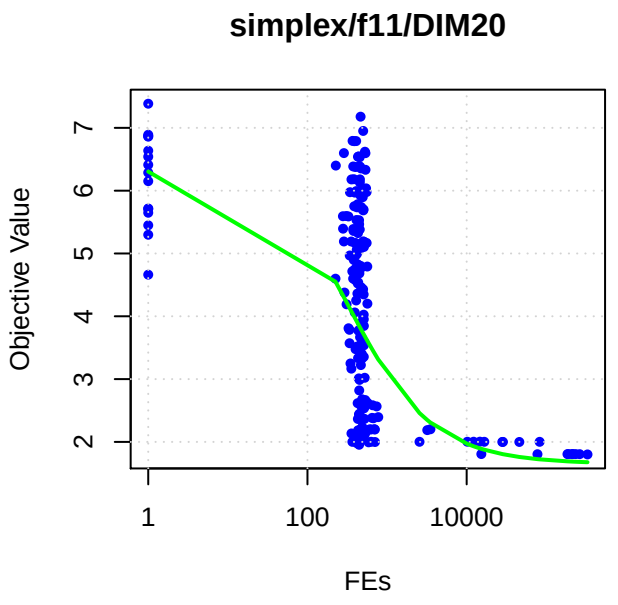
200
FEs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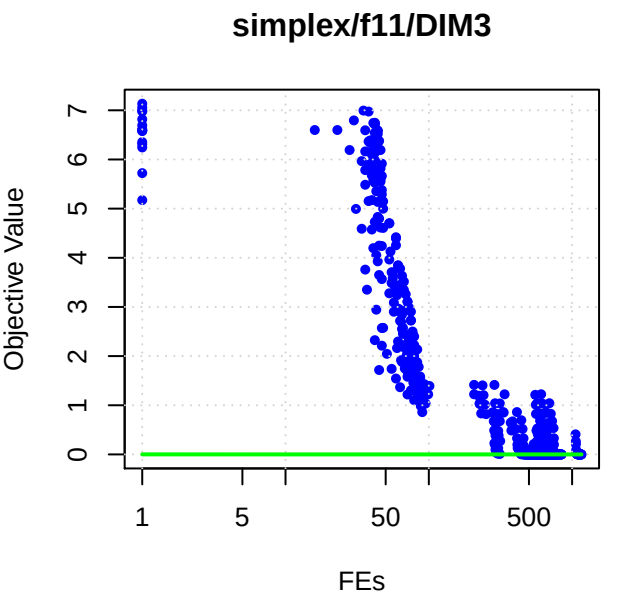
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Objective Value
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3
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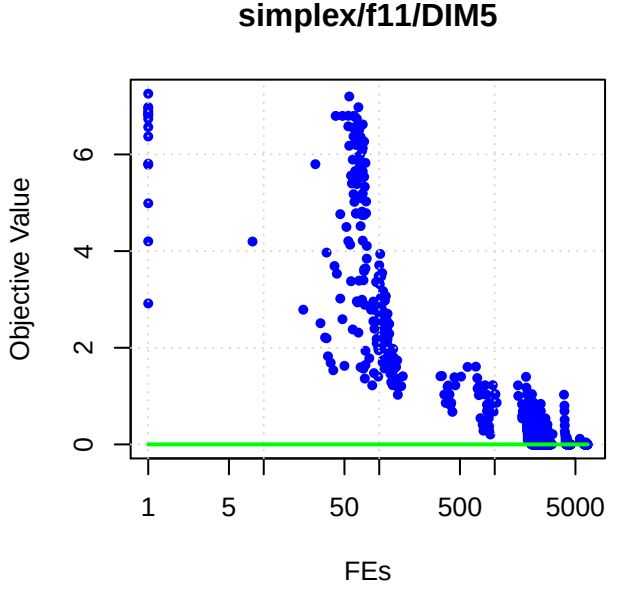
7
1
5
50
500
FEs


simplex/f11/DIM5
Objective Value
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50
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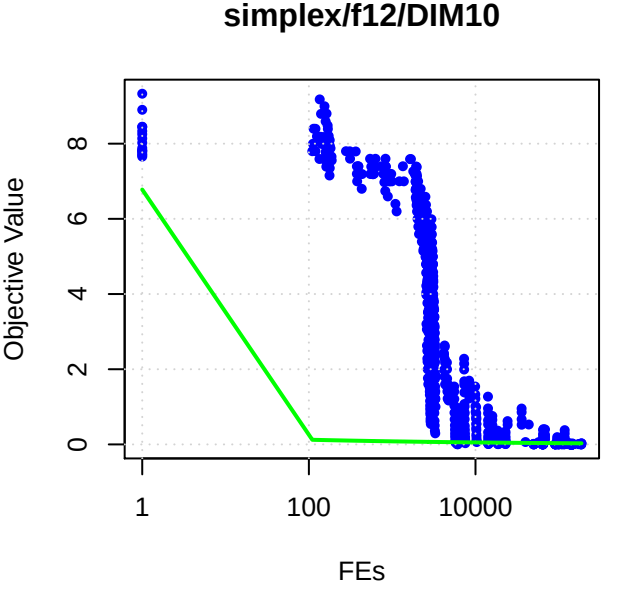
FEs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Objective Value
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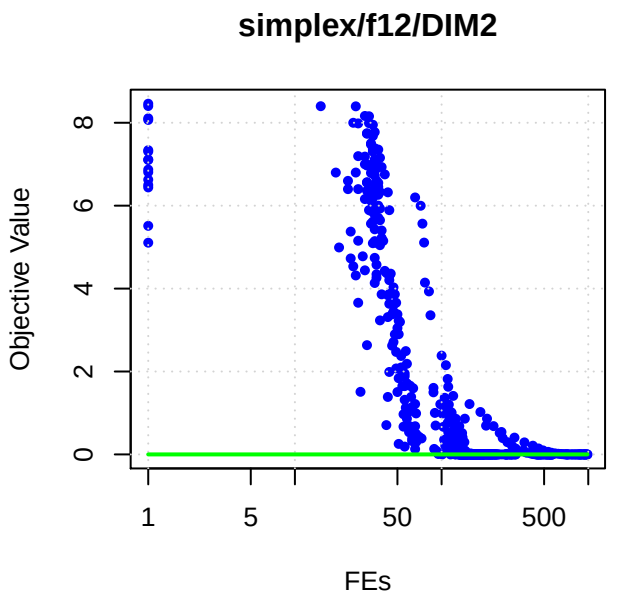
8
1
100
10000
FEs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Objective Value
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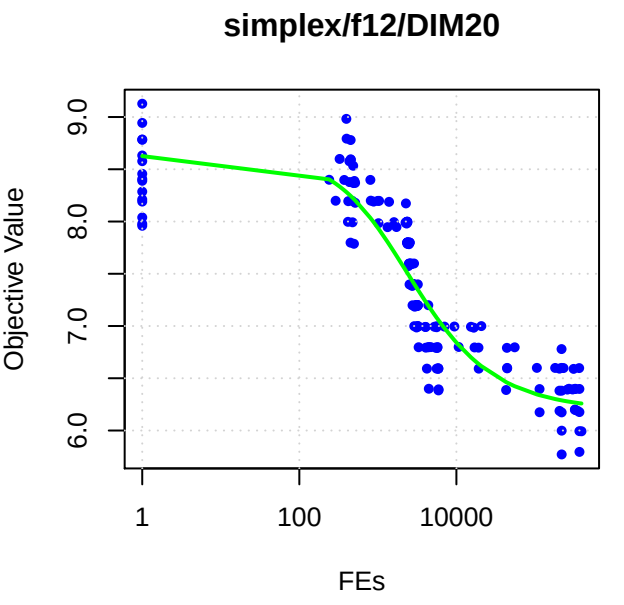
6
8
1
5
50
500
FEs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8.0
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1
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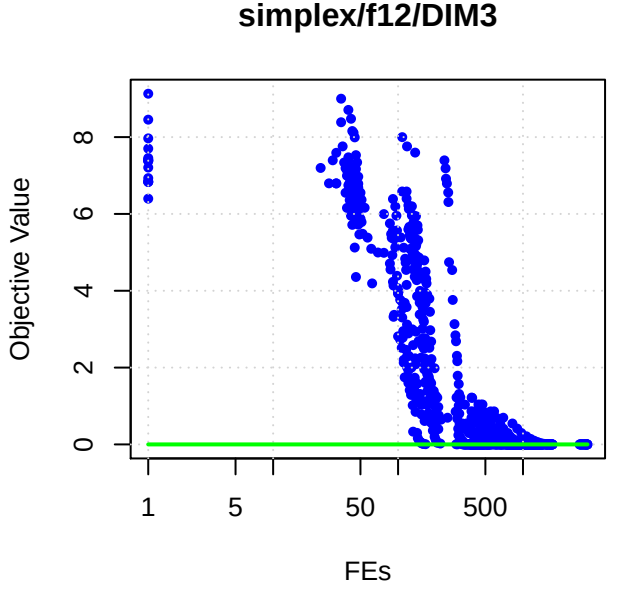
10000
FEs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Objective Value
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1
5
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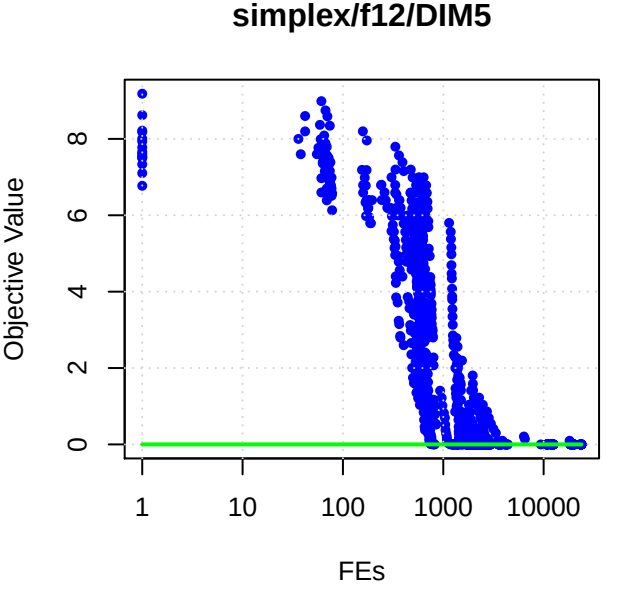
FEs


simplex/f12/DIM5
Objective Value
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2
4
6
8
1
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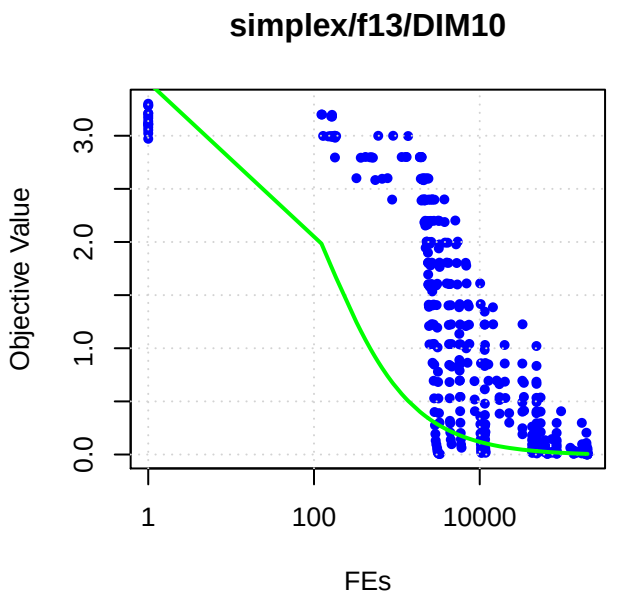
100
1000
10000
FEs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Objective Value
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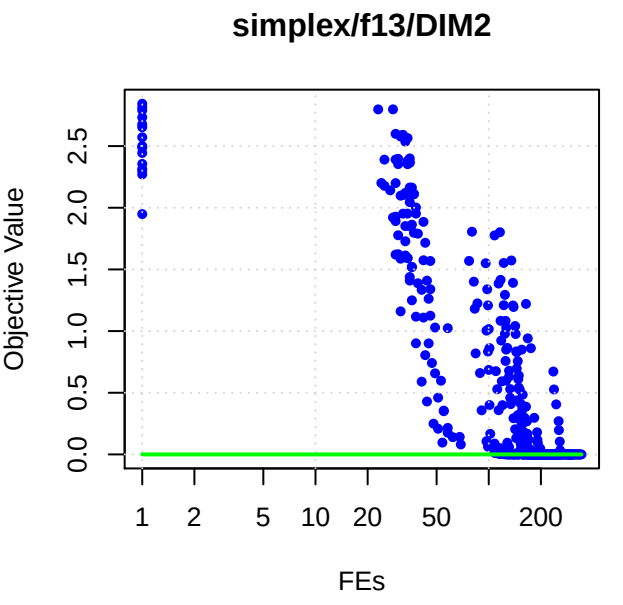
10000
FEs


simplex/f13/DIM2
Objective Value
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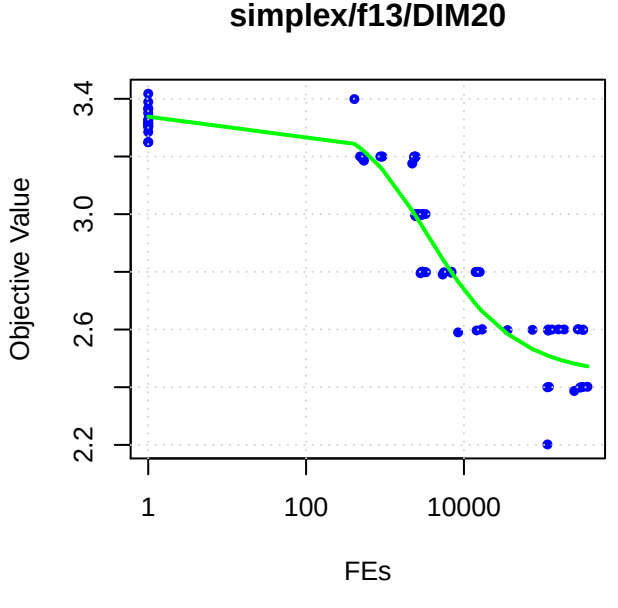
1.5
2.0
2.5
1
2
5
10
20
50
200
FEs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Objective Value
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2.6
3.0
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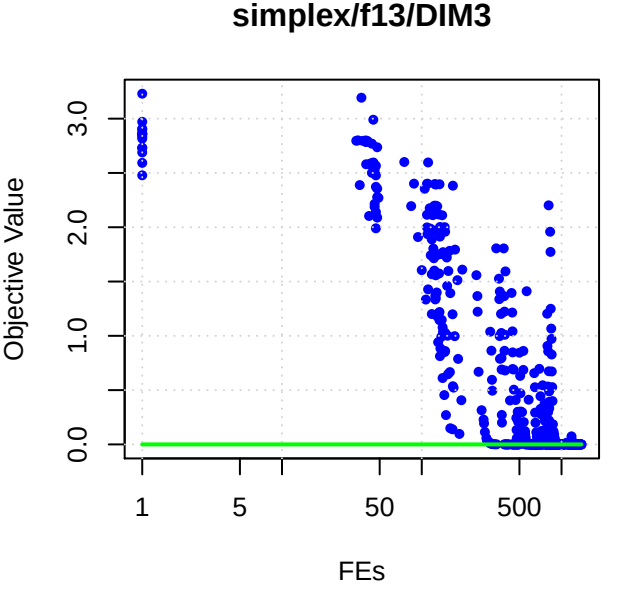
FEs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Objective Value
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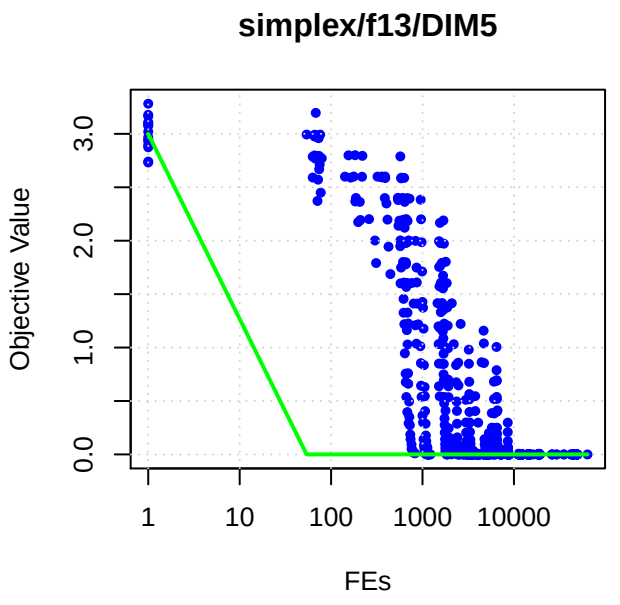
2.0
3.0
1
5
50
500
FEs


simplex/f13/DIM5
Objective Value
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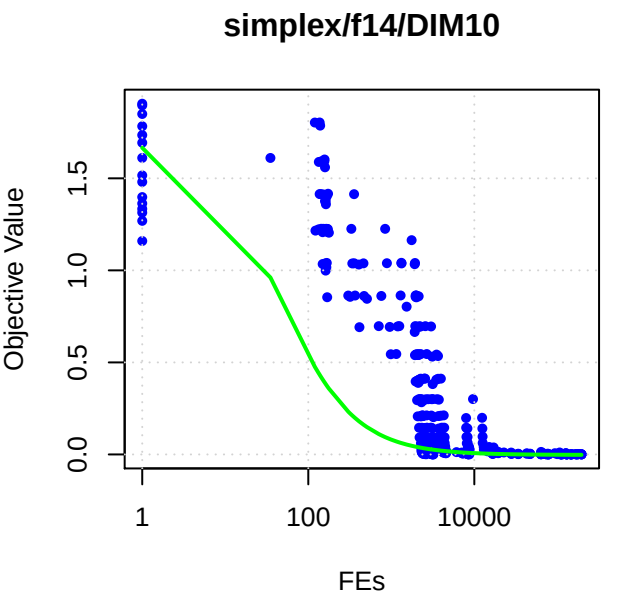
2.0
3.0
1
10
100
1000
10000
FEs


simplex/f14/DIM10
Objective Value
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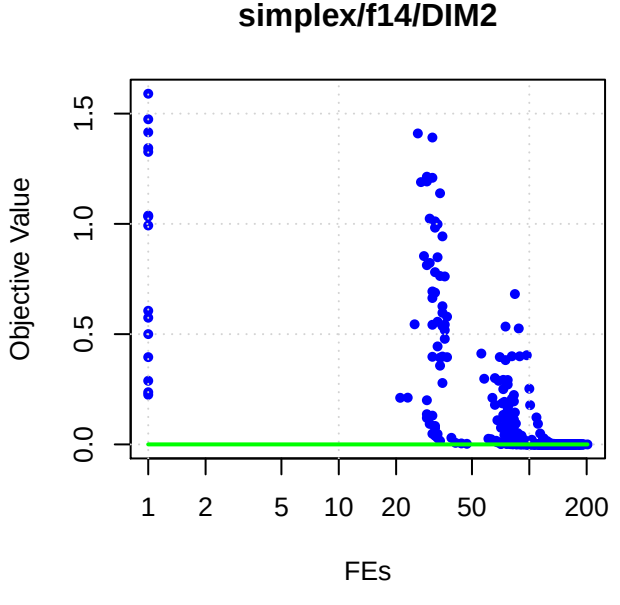
1.0
1.5
1
100
10000
FEs


simplex/f14/DIM2
Objective Value
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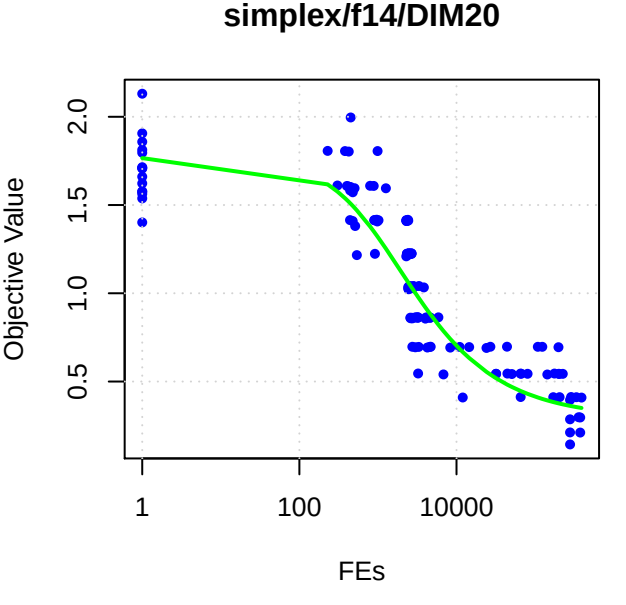
0.5
1.0
1.5
1
2
5
10
20
50
200
FEs


simplex/f14/DIM20
Objective Value
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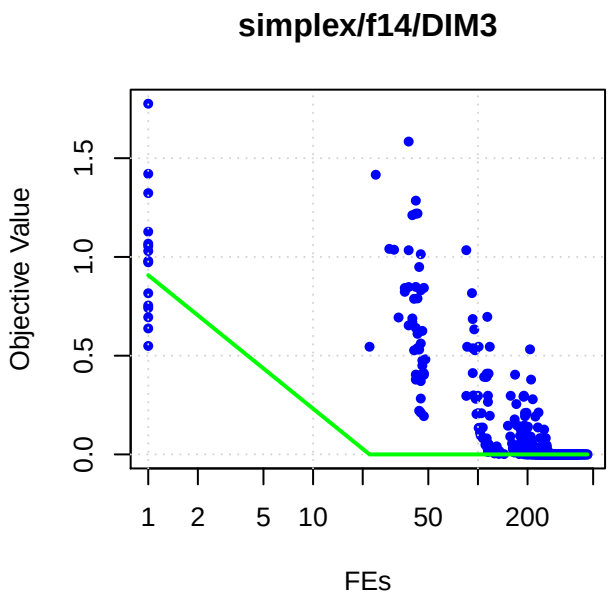
1.5
2.0
1
100
10000
FEs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Objective Value
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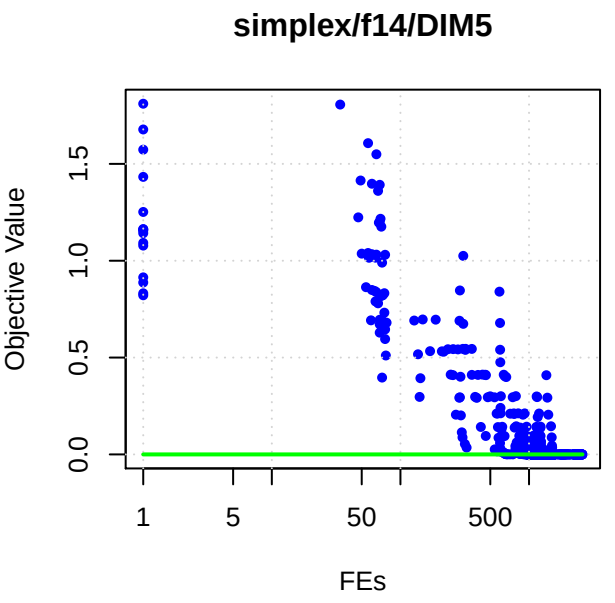
1.0
1.5
1
2
5
10
50
200
FEs


simplex/f14/DIM5
Objective Value
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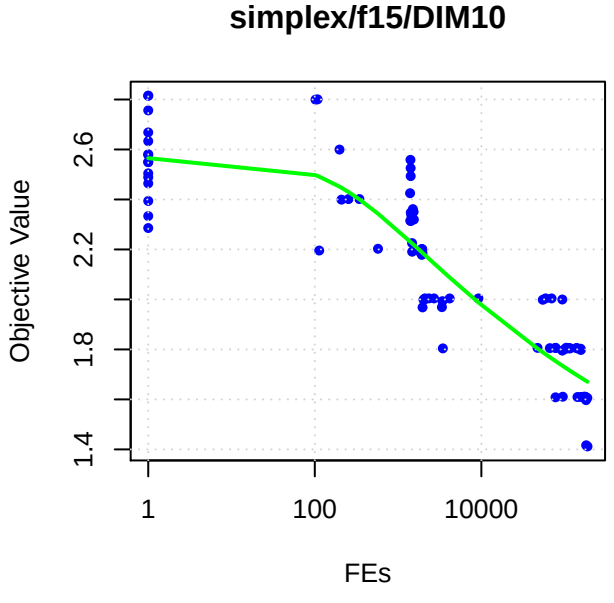
0.5
1.0
1.5
1
5
50
500
FEs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Objective Value
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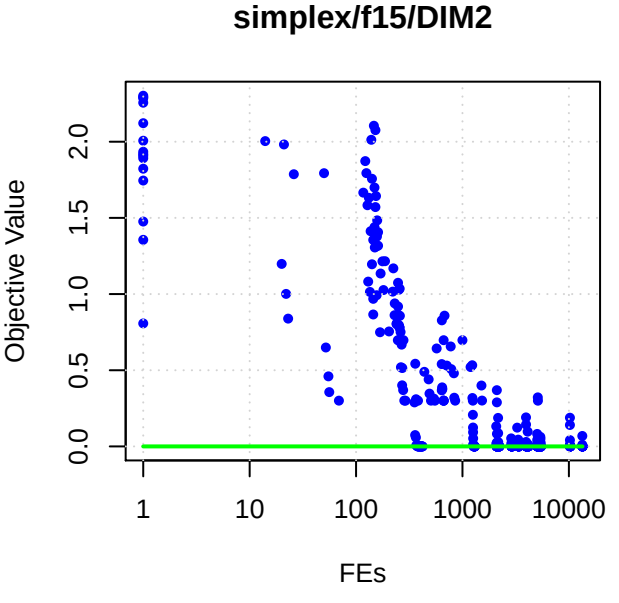
1.8
2.2
2.6
1
100
10000
FEs


simplex/f15/DIM2
Objective Value
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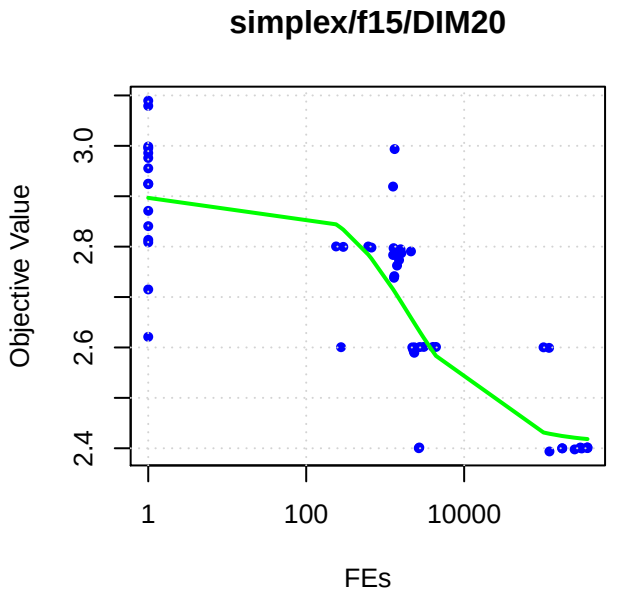
1.0
1.5
2.0
1
10
100
1000
10000
FEs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Objective Value
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2.6
2.8
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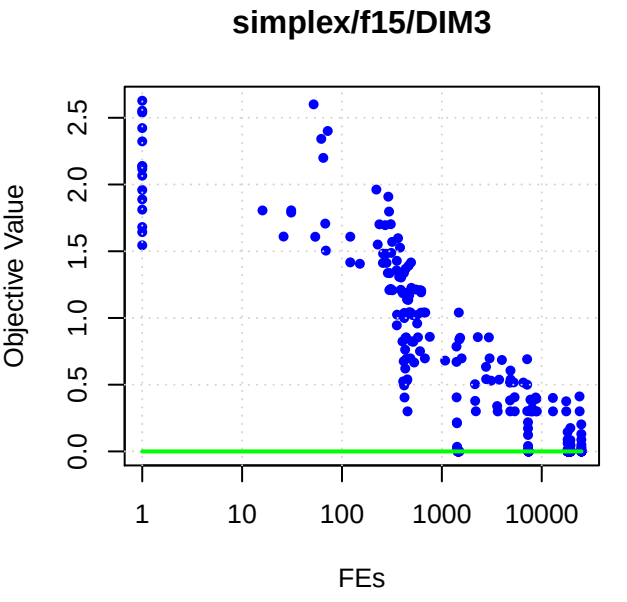
10000
FEs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1.5
2.0
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1
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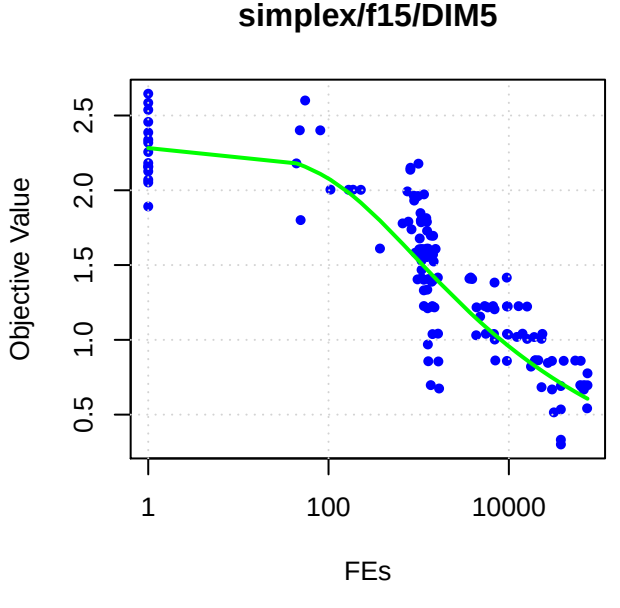
100
1000
10000
FEs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Objective Value
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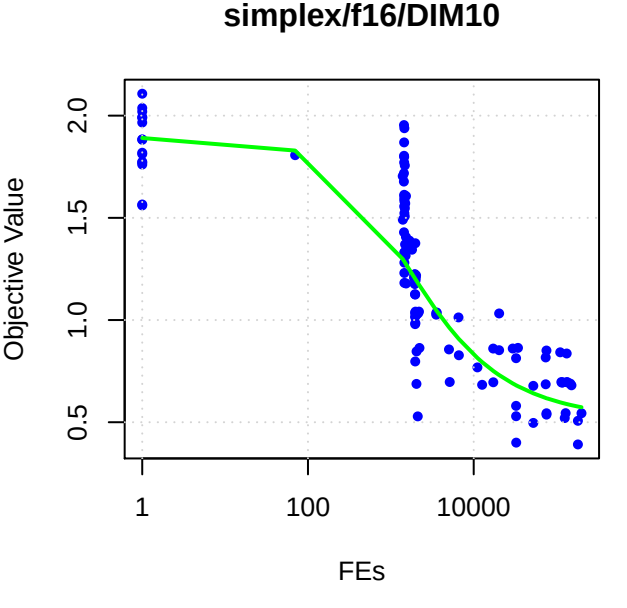
2.0
2.5
1
100
10000
FEs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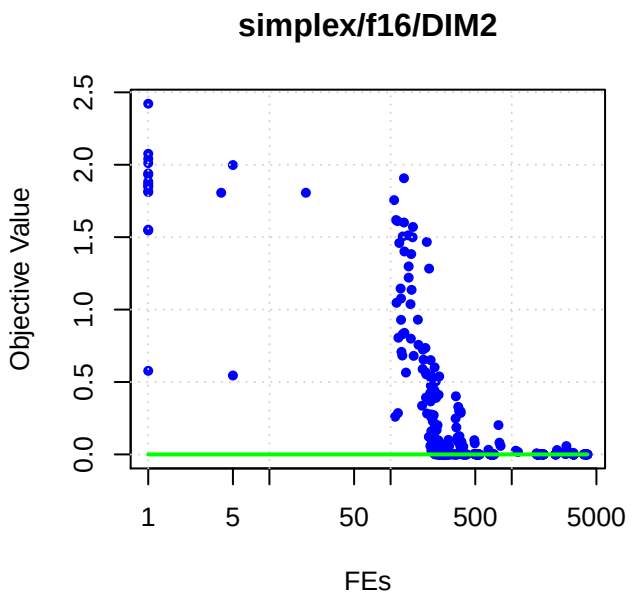
10000
FEs


simplex/f16/DIM2
Objective Value
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1.5
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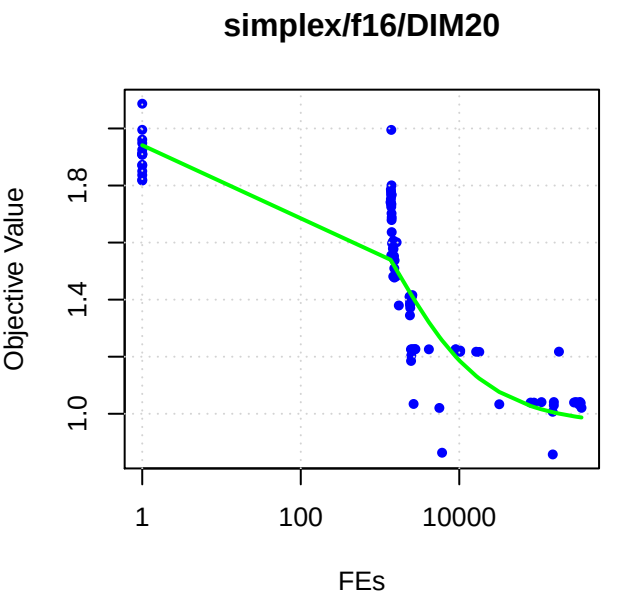
2.5
1
5
50
500
5000
FEs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Objective Value
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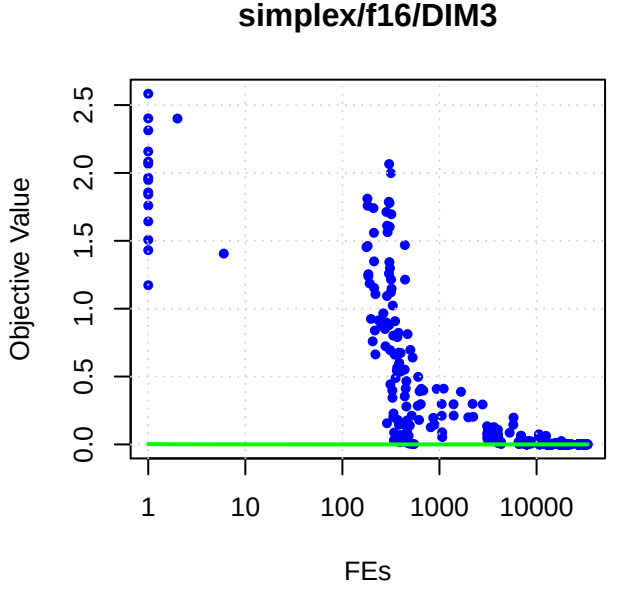
100
10000
FEs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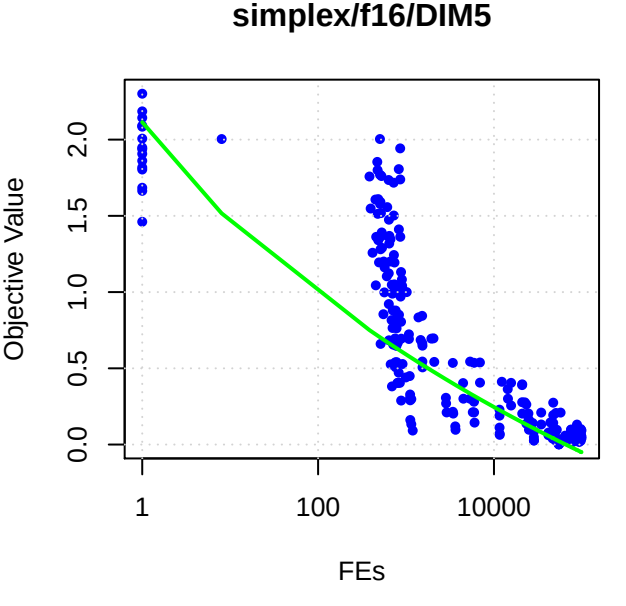
10
100
1000
10000
FEs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Objective Value
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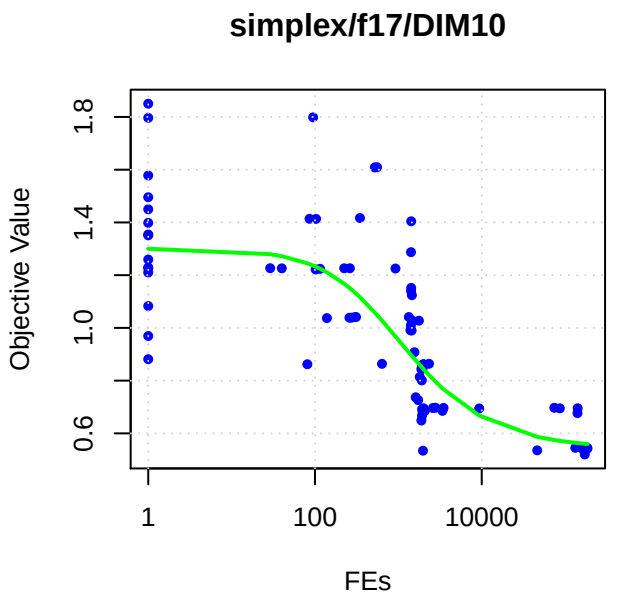
10000
FEs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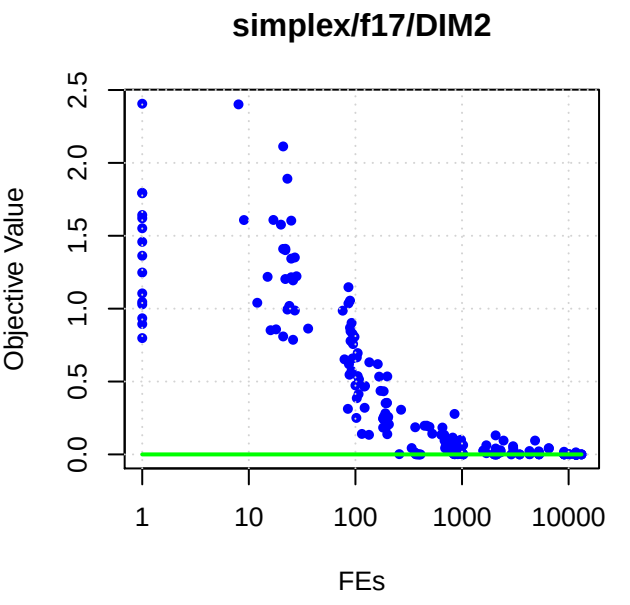
FEs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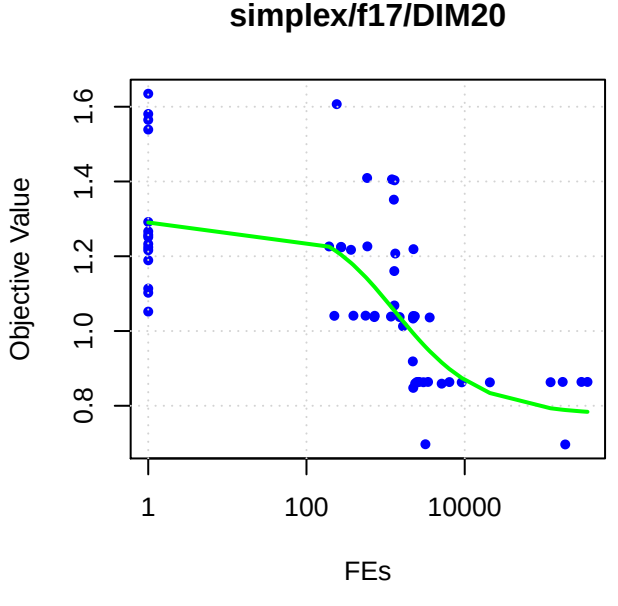
FEs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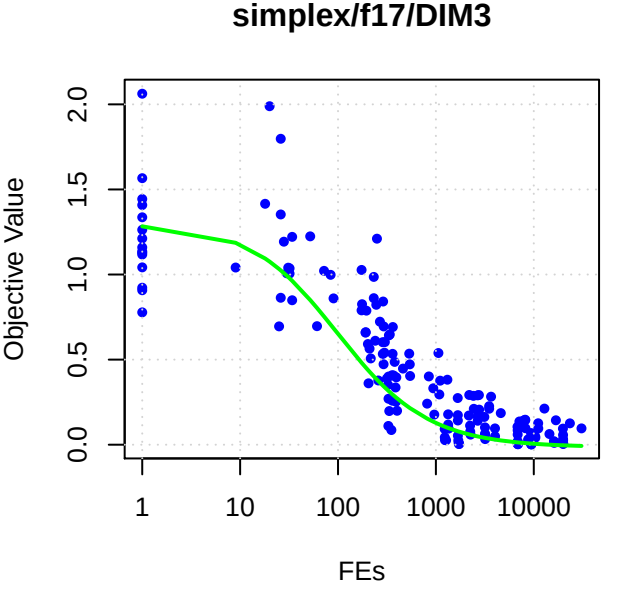
10000
FEs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1.5
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10
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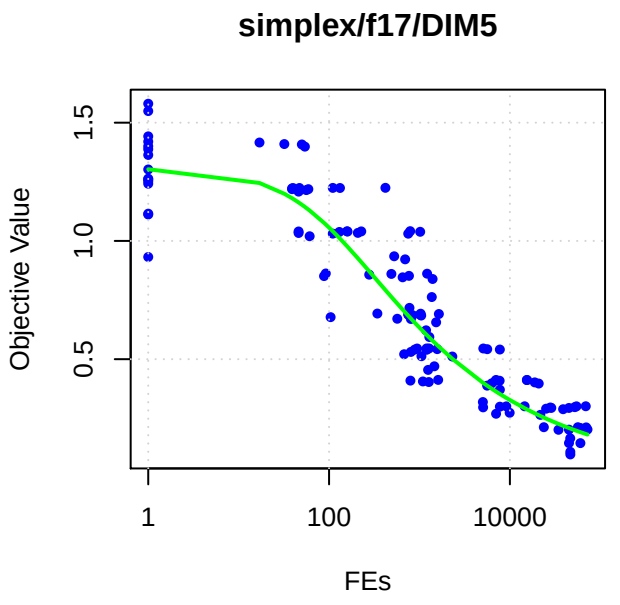
1000
10000
FEs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Objective Value
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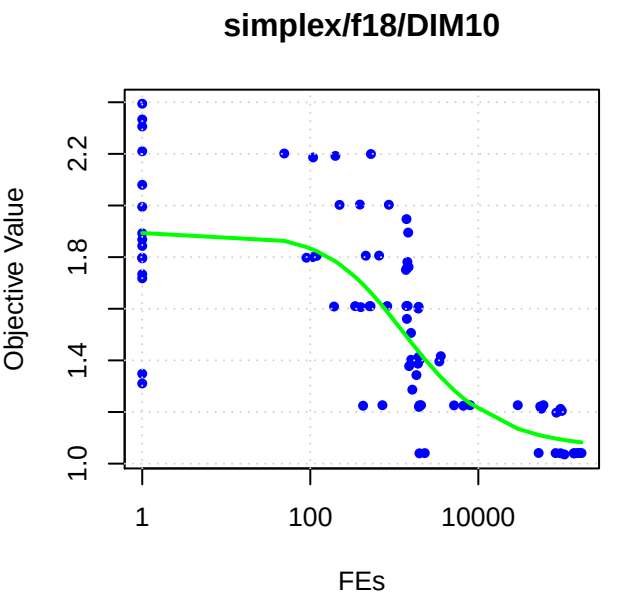
1
100
10000
FEs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Objective Value
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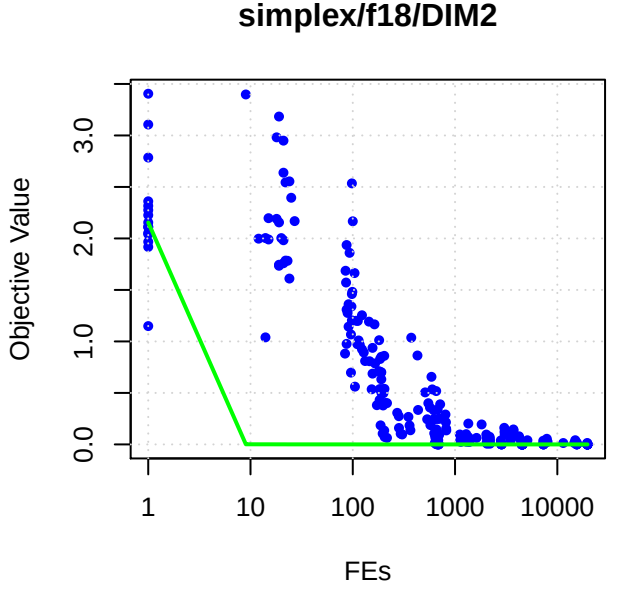
1.4
1.8
2.2
1
100
10000
FEs


simplex/f18/DIM2
Objective Value
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2.0
3.0
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1000
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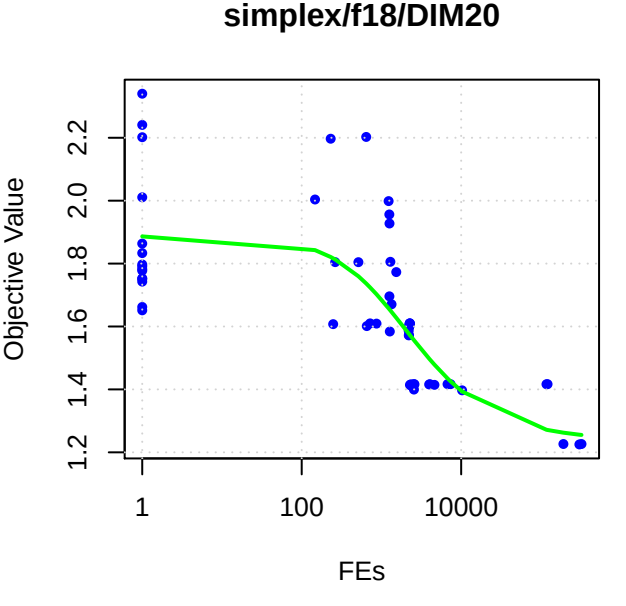
FEs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Objective Value
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1.4
1.6
1.8
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2.2
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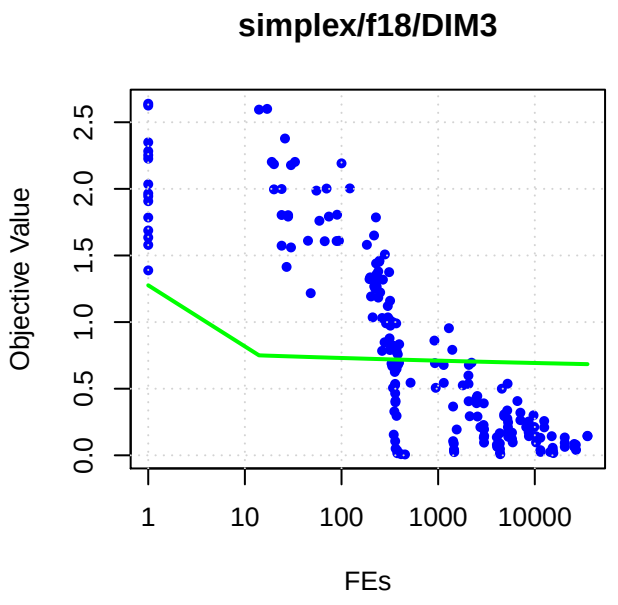
100
10000
FEs


simplex/f18/DIM3
Objective Value
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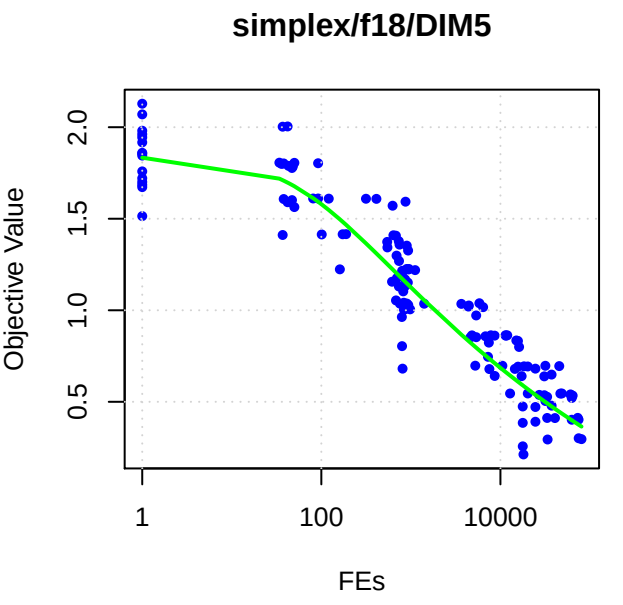
1.5
2.0
2.5
1
10
100
1000
10000
FEs


simplex/f18/DIM5
Objective Value
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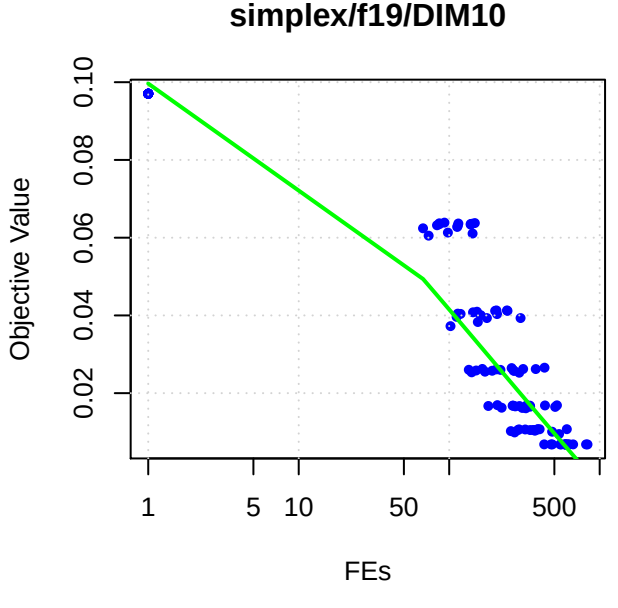
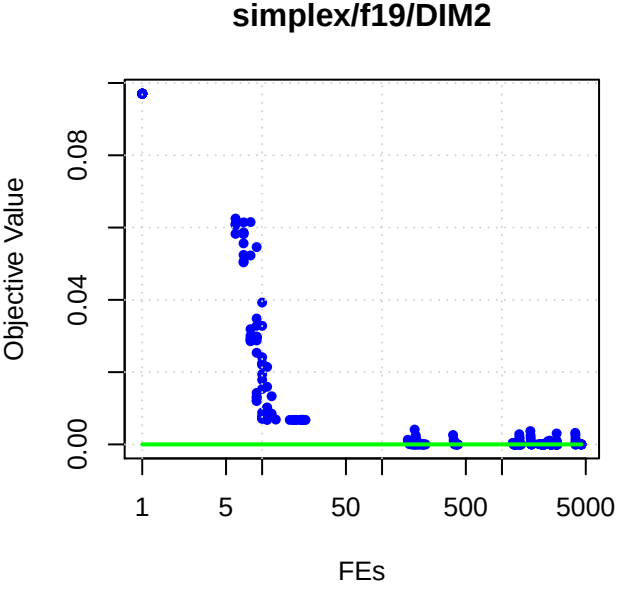
2.0
1
100
10000
FEs


simplex/f19/DIM10
Objective Value
0.02
0.04
0.06
0.08
0.10
1
5
10
50
500
FEs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Objective Value
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0.04
0.08
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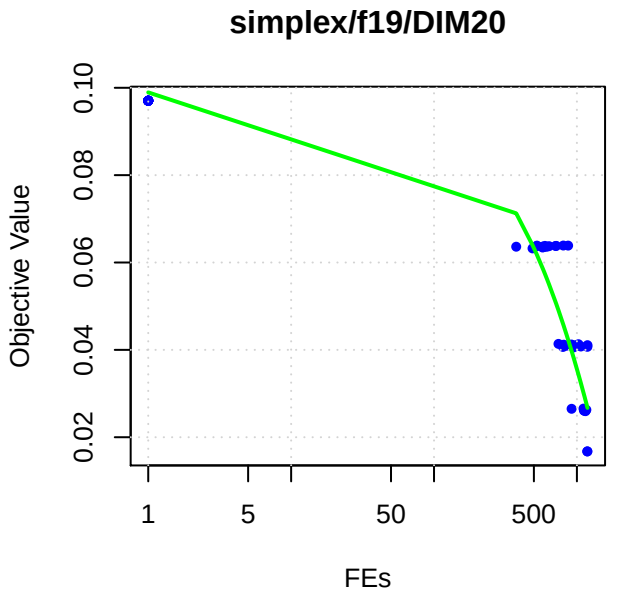
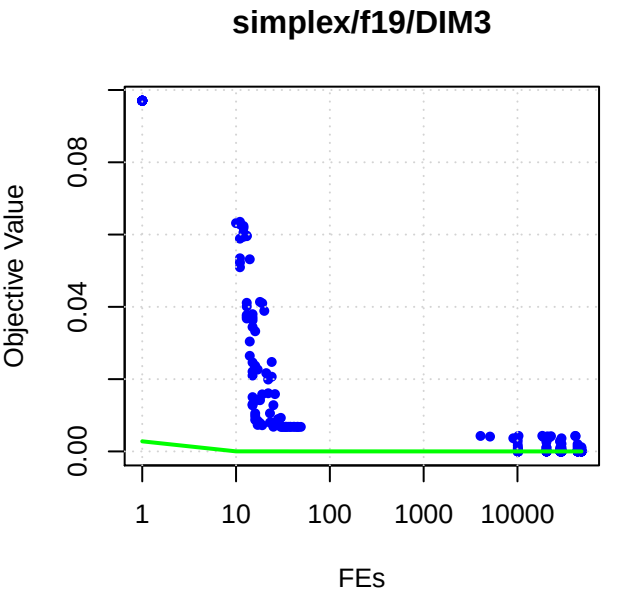
5
50
500
5000
FEs


simplex/f19/DIM20
Objective Value
0.02
0.04
0.06
0.08
0.10
1
5
50
500
FEs


simplex/f19/DIM3
Objective Value
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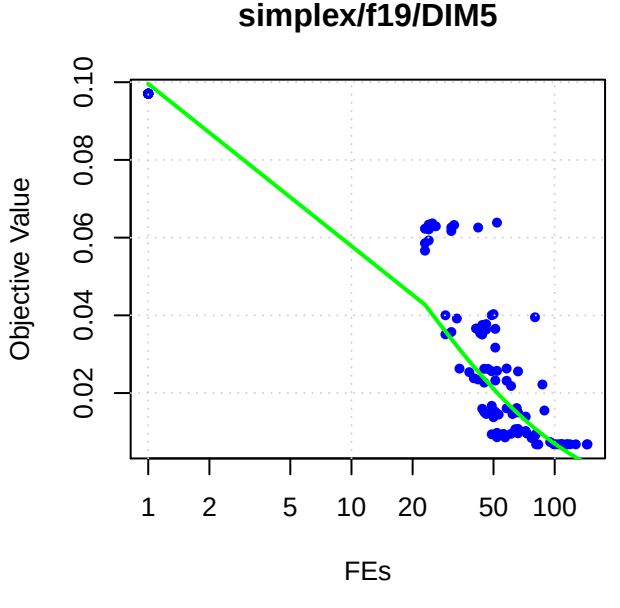
0.04
0.08
1
10
100
1000
10000
FEs


simplex/f19/DIM5
Objective Value
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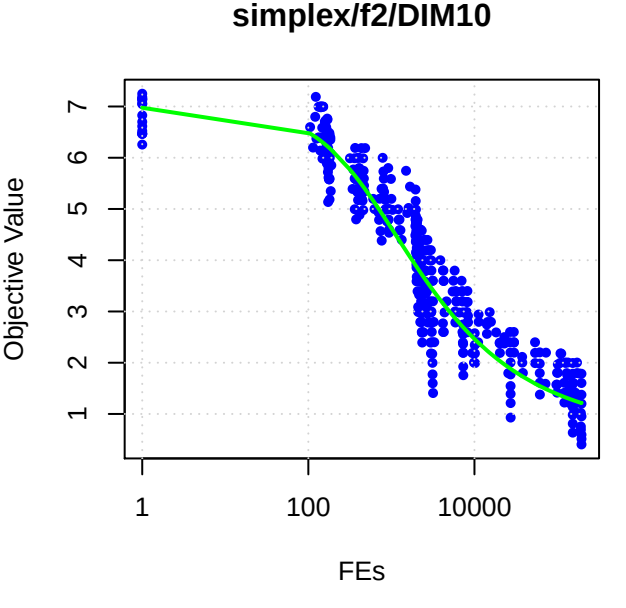
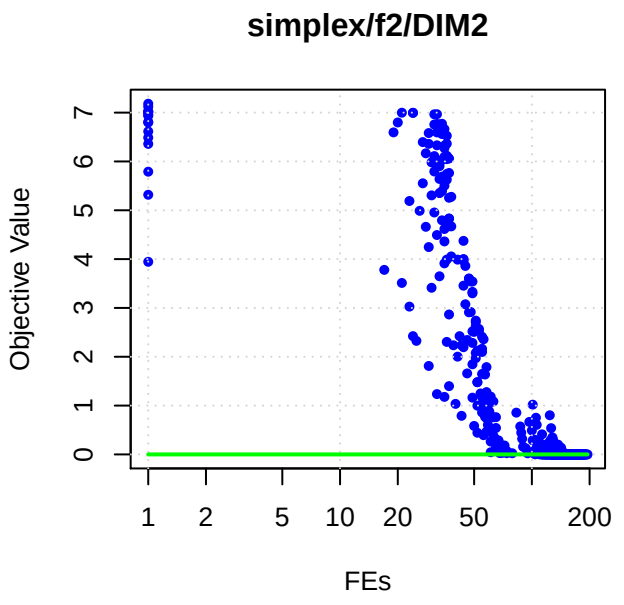
0.04
0.06
0.08
0.10
1
2
5
10
20
50
100
FEs


simplex/f2/DIM10
Objective Value
1
2
3
4
5
6
7
1
100
10000
FEs


simplex/f2/DIM2
Objective Value
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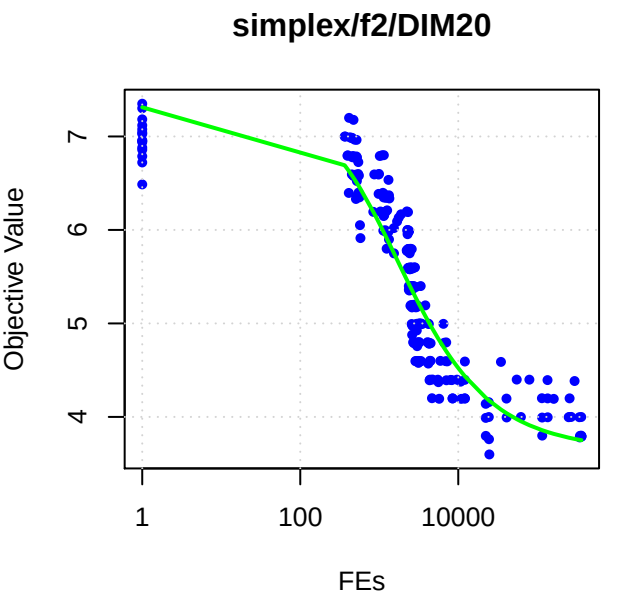
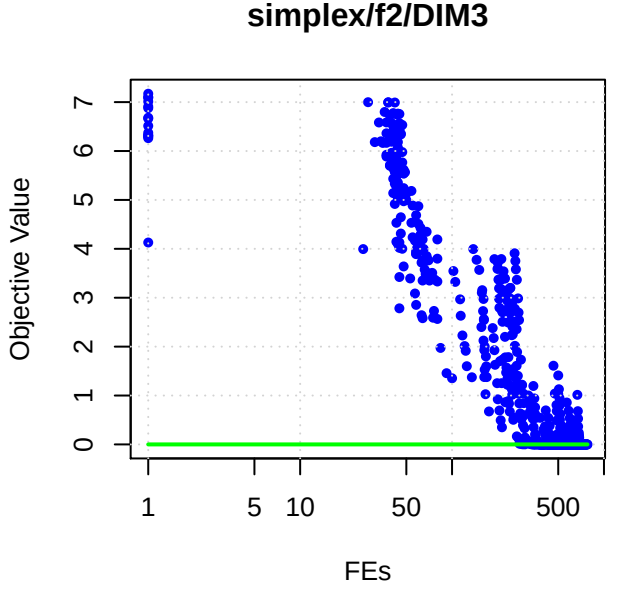
1
2
3
4
5
6
7
1
2
5
10
20
50
200
FEs


simplex/f2/DIM20
Objective Value
4
5
6
7
1
100
10000
FEs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Objective Value
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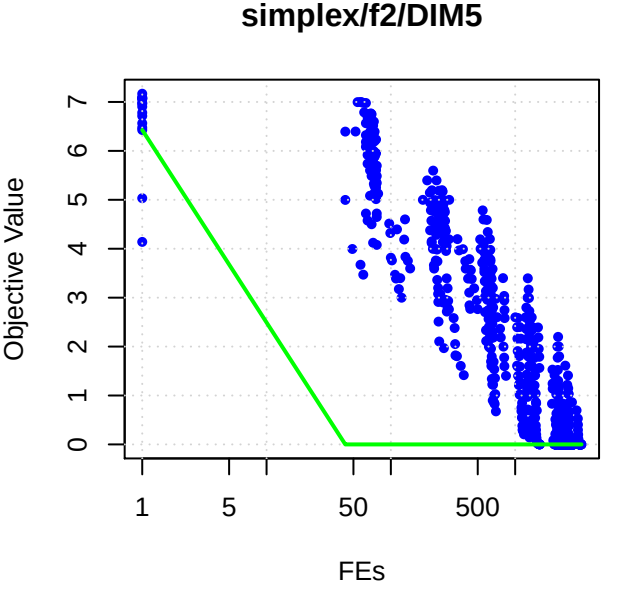
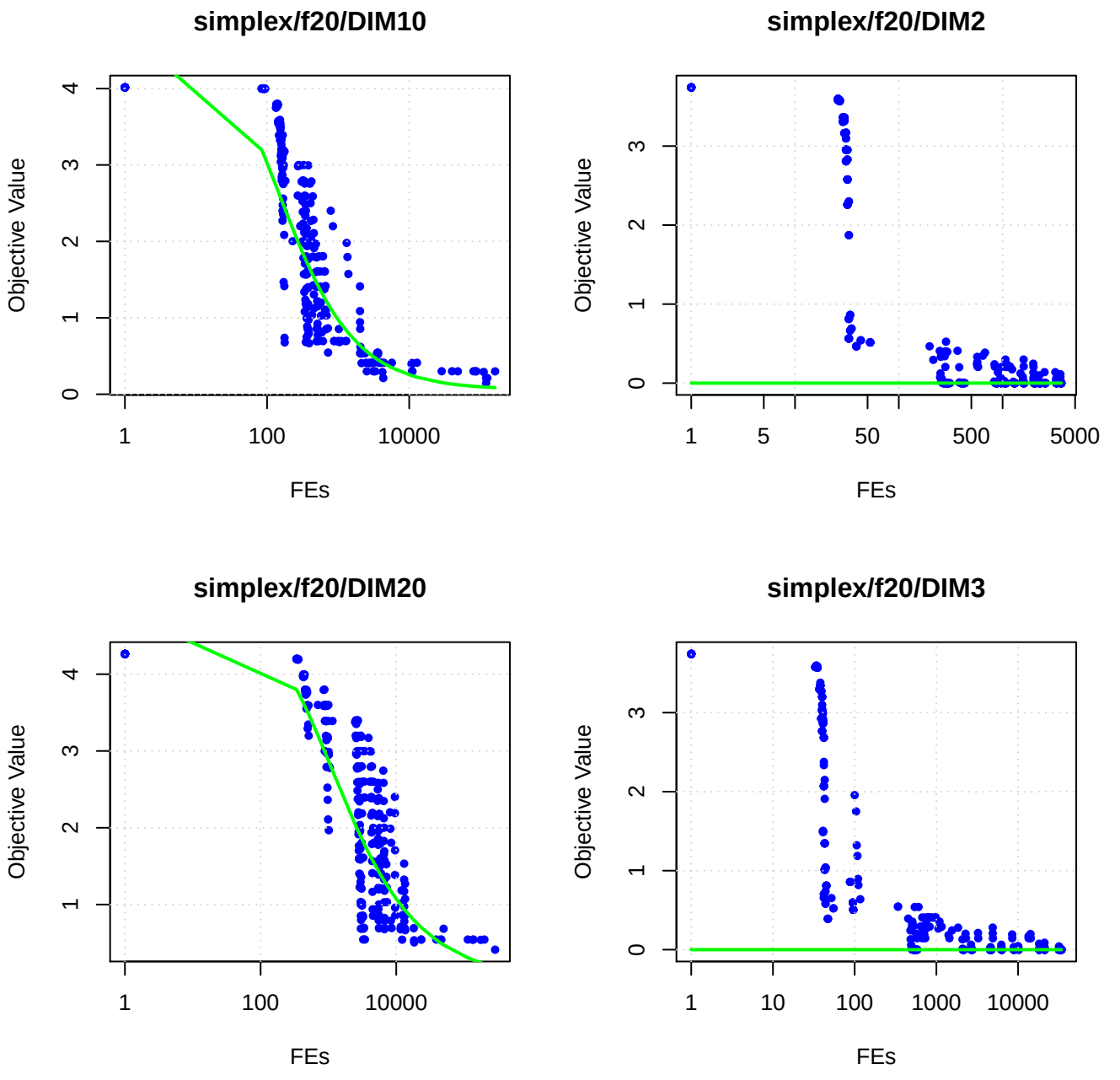
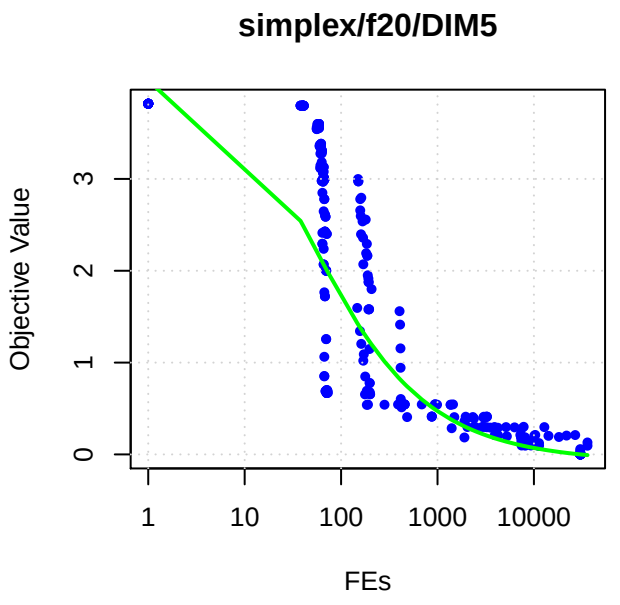
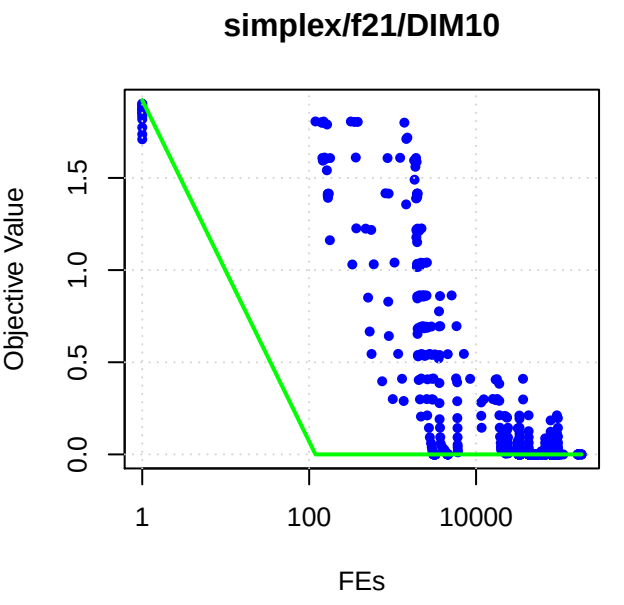
1
2
3
4
5
6
7
1
5
10
50
500
FEs


simplex/f2/DIM5
Objective Value
0
1
2
3
4
5
6
7
1
5
50
500
FEs


simplex/f20/DIM10
Objective Value
FEs
simplex/f20/DIM2
Objective Value
FEs
simplex/f20/DIM20
Objective Value
FEs
simplex/f20/DIM3
Objective Value
FEs


simplex/f20/DIM5
Objective Value
0
1
2
3
1
10
100
1000
10000
FEs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Objective Value
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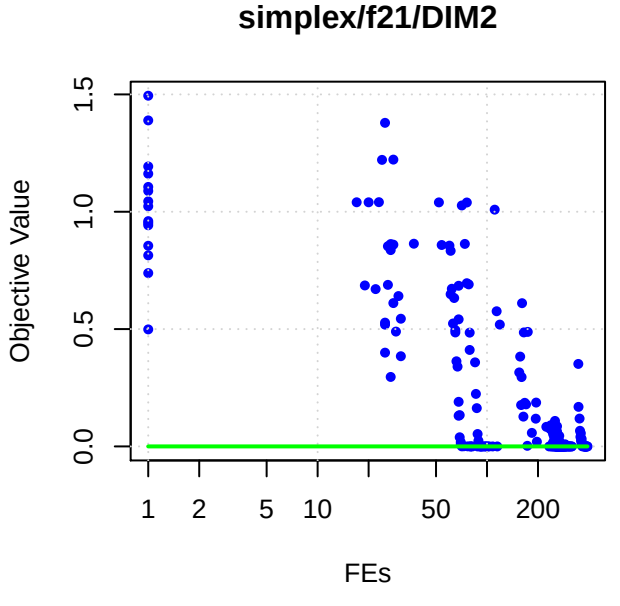
1.0
1.5
1
100
10000
FEs


simplex/f21/DIM2
Objective Value
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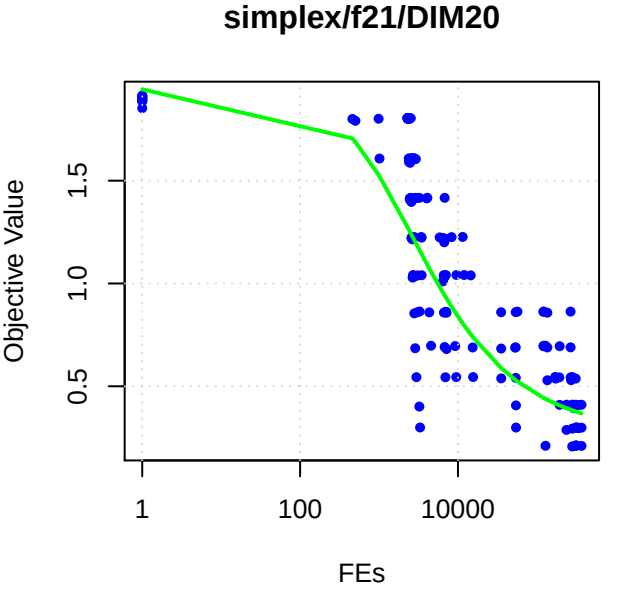
0.5
1.0
1.5
1
2
5
10
50
200
FEs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Objective Value
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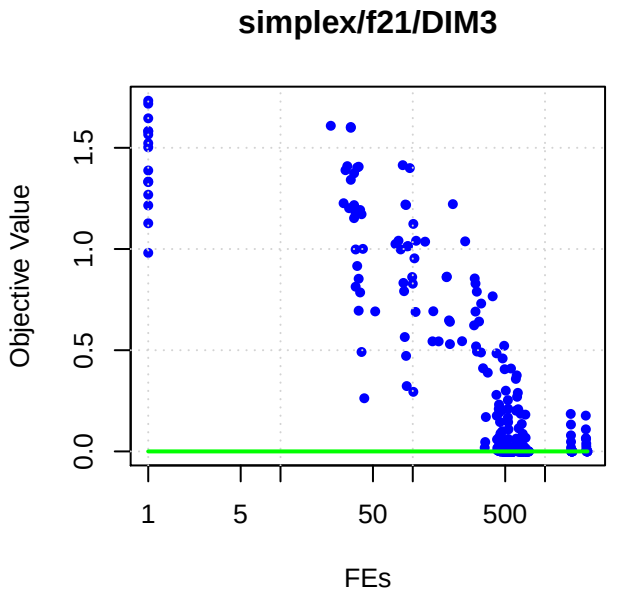
1.0
1.5
1
100
10000
FEs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Objective Value
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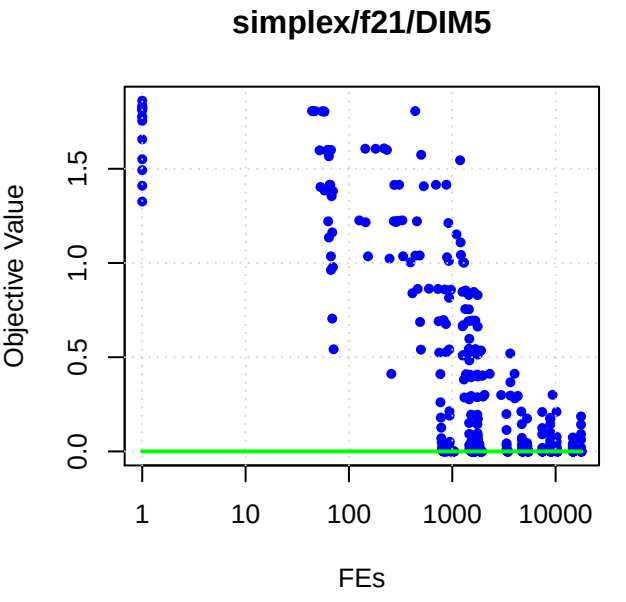
0.5
1.0
1.5
1
5
50
500
FEs


simplex/f21/DIM5
Objective Value
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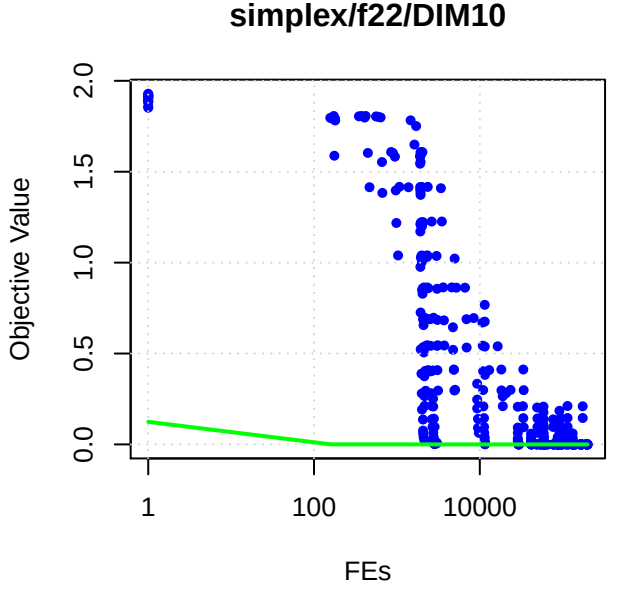
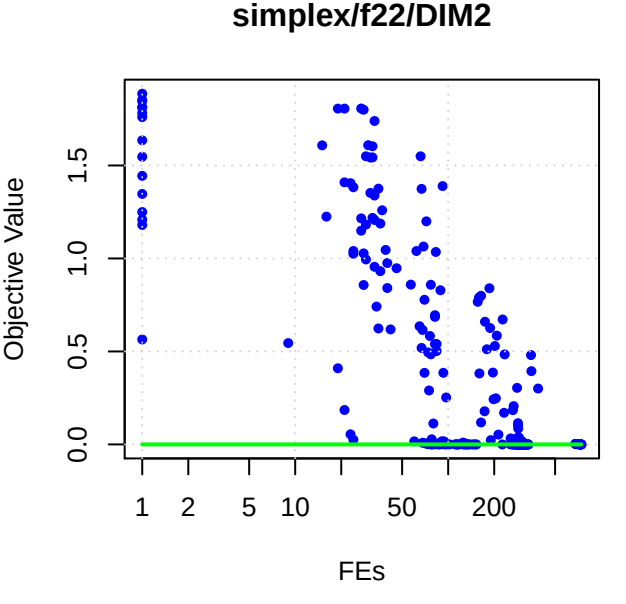
0.5
1.0
1.5
1
10
100
1000
10000
FEs


simplex/f22/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
1
100
10000
FEs


simplex/f22/DIM2
Objective Value
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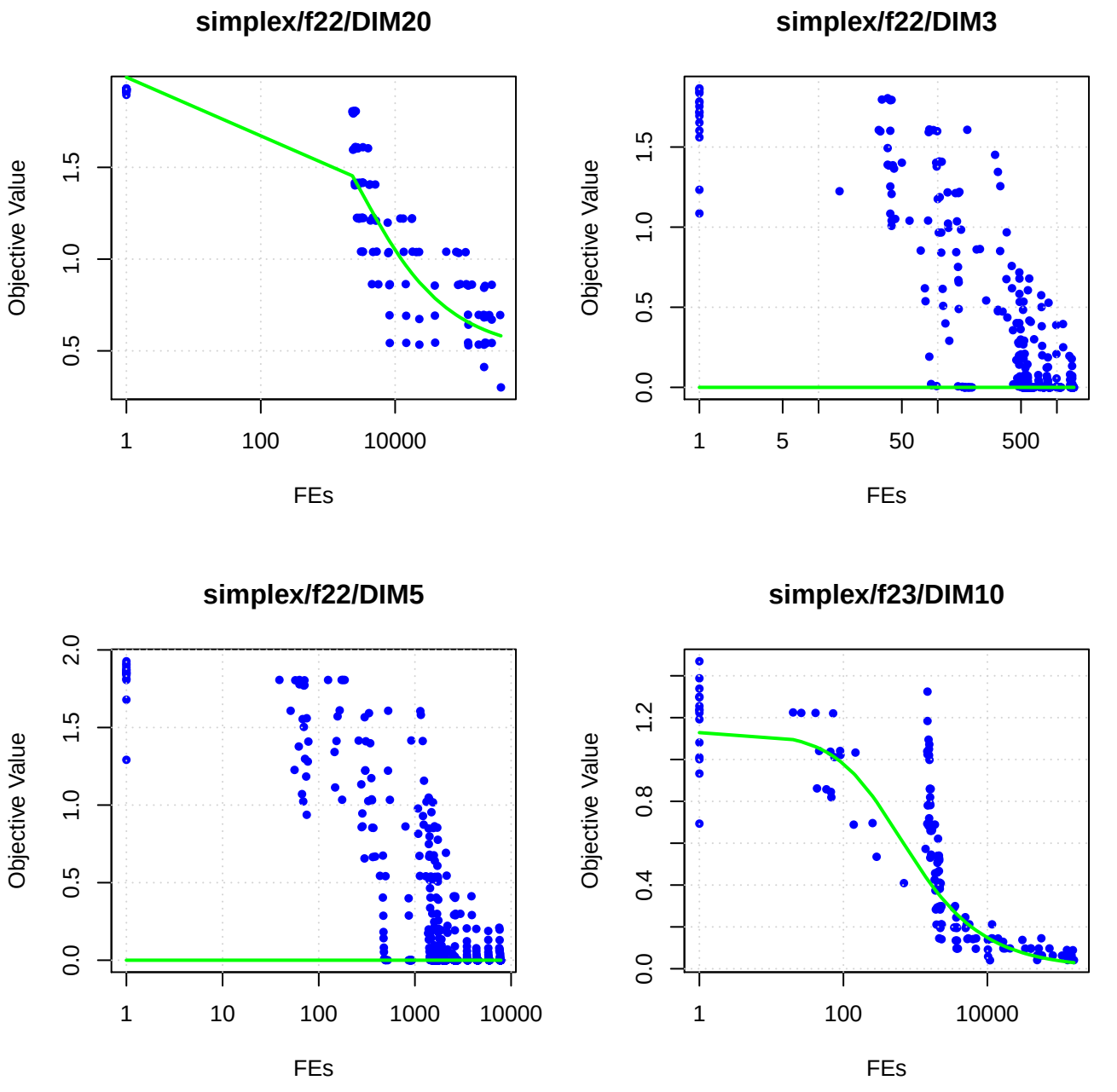
0.5
1.0
1.5
1
2
5
10
50
200
FEs


simplex/f22/DIM20
Objective Value
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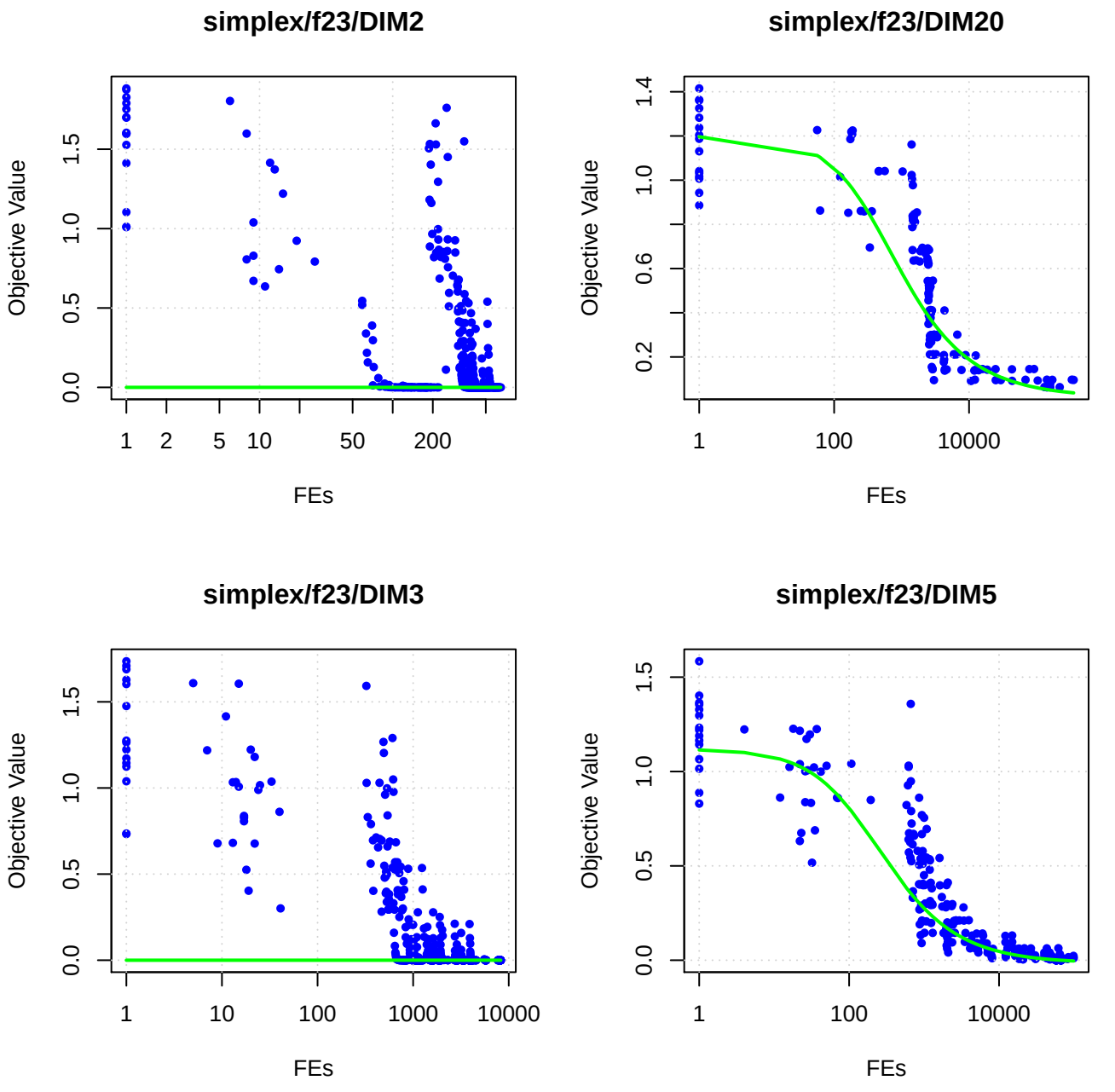
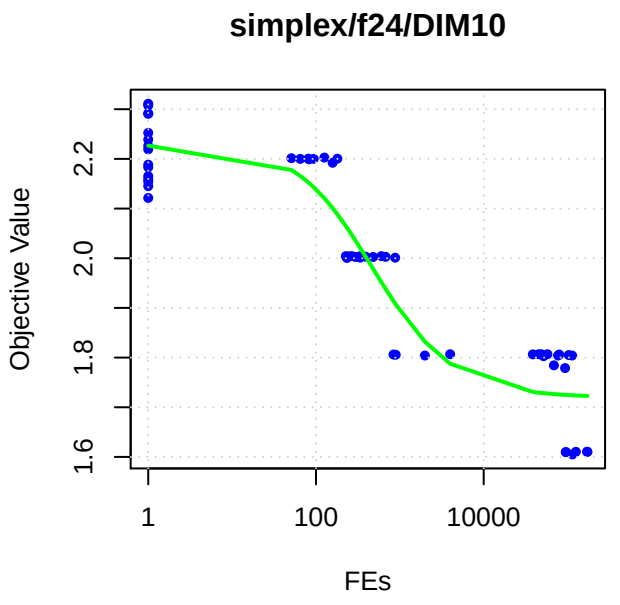
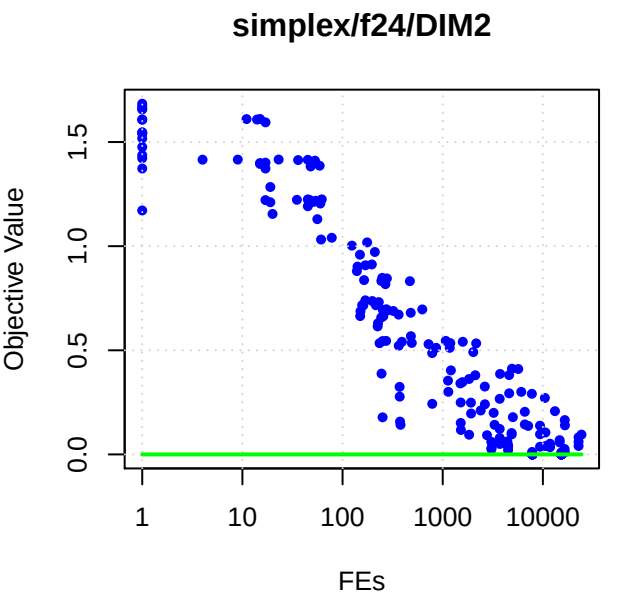
1.0
1.5
1
100
10000
FEs
simplex/f22/DIM3
Objective Value
0.0
0.5
1.0
1.5
1
5
50
500
FEs
simplex/f22/DIM5
Objective Value
0.0
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs
simplex/f23/DIM10
Objective Value
0.0
0.4
0.8
1.2
1
100
10000
FEs


simplex/f23/DIM2
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
50
200
FEs
simplex/f23/DIM20
Objective Value
0.2
0.6
1.0
1.4
1
100
10000
FEs
simplex/f23/DIM3
Objective Value
0.0
0.5
1.0
1.5
1
10
100
1000
10000
FEs
simplex/f23/DIM5
Objective Value
0.0
0.5
1.0
1.5
1
100
10000
FEs


simplex/f24/DIM10
Objective Value
2.2
2.0
1.8
1.6
1
100
10000
FEs


simplex/f24/DIM2
Objective Value
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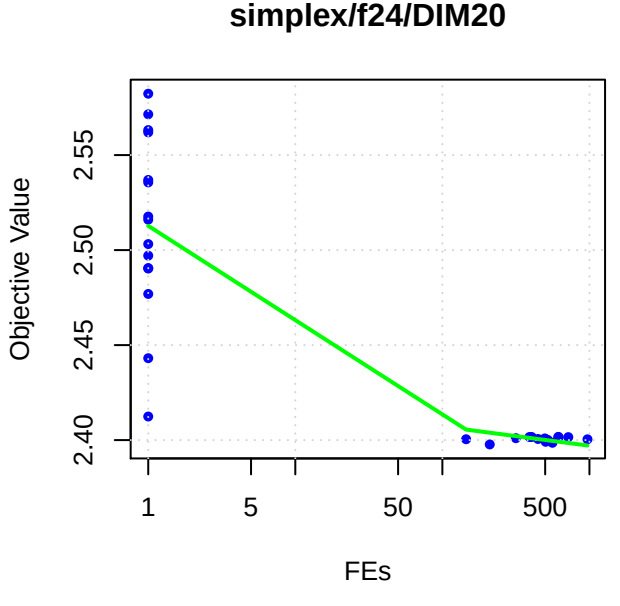
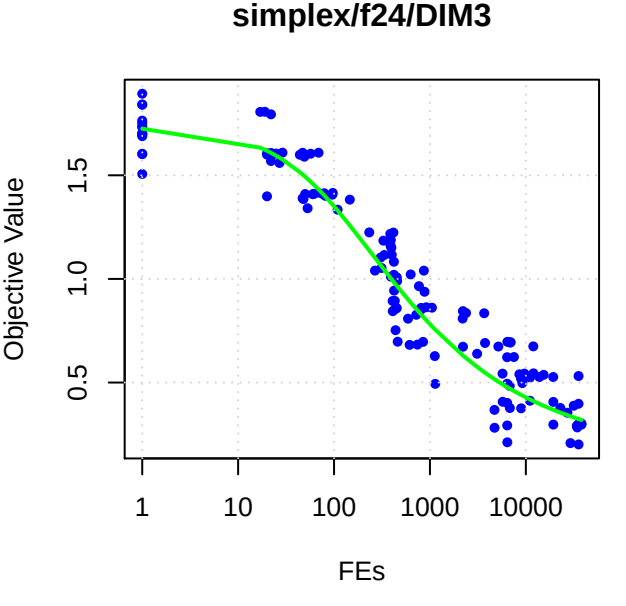
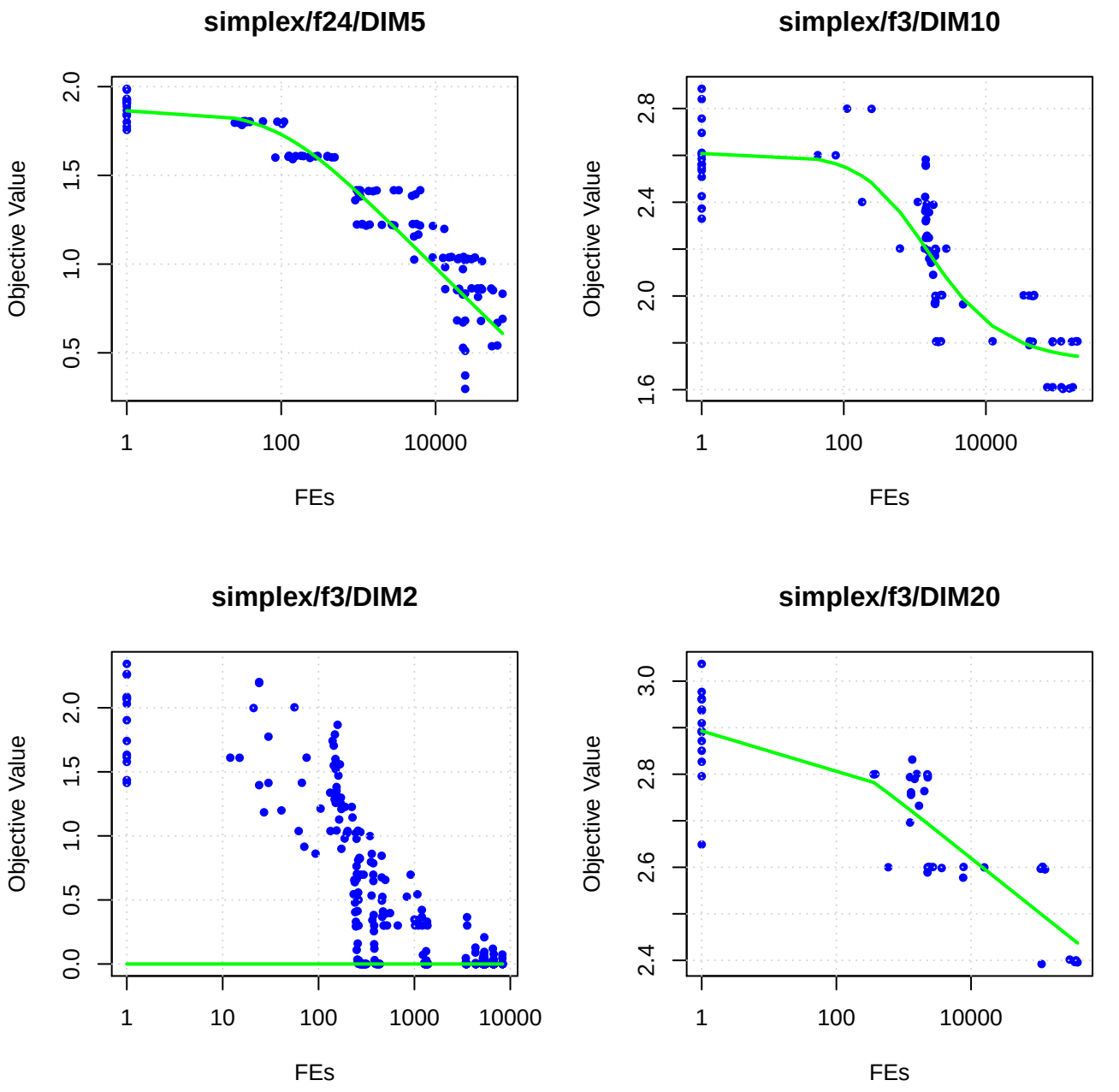
1.0
0.5
0.0
1
10
100
1000
10000
FEs


simplex/f24/DIM20
Objective Value
2.55
2.50
2.45
2.40
1
5
50
500
FEs


simplex/f24/DIM3
Objective Value
1.5
1.0
0.5
1
10
100
1000
10000
FEs


simplex/f24/DIM5
Objective Value
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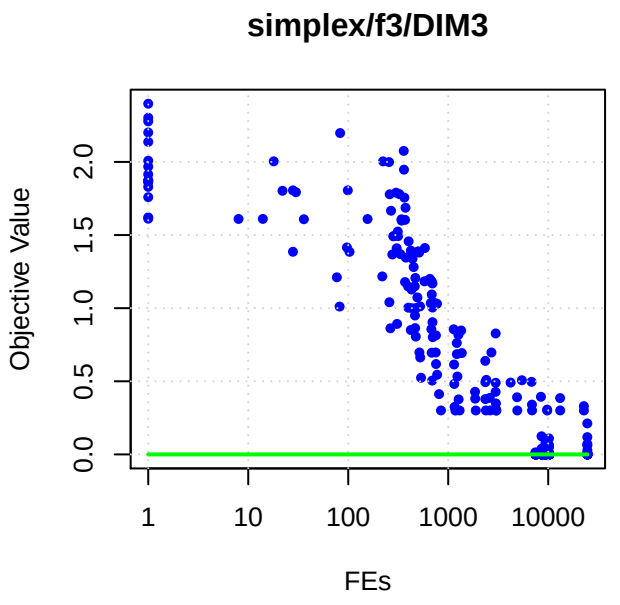
1.0
1.5
2.0
1
100
10000
FEs
simplex/f3/DIM10
Objective Value
1.6
2.0
2.4
2.8
1
100
10000
FEs
simplex/f3/DIM2
Objective Value
0.0
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs
simplex/f3/DIM20
Objective Value
2.4
2.6
2.8
3.0
1
100
10000
FEs


simplex/f3/DIM3
Objective Value
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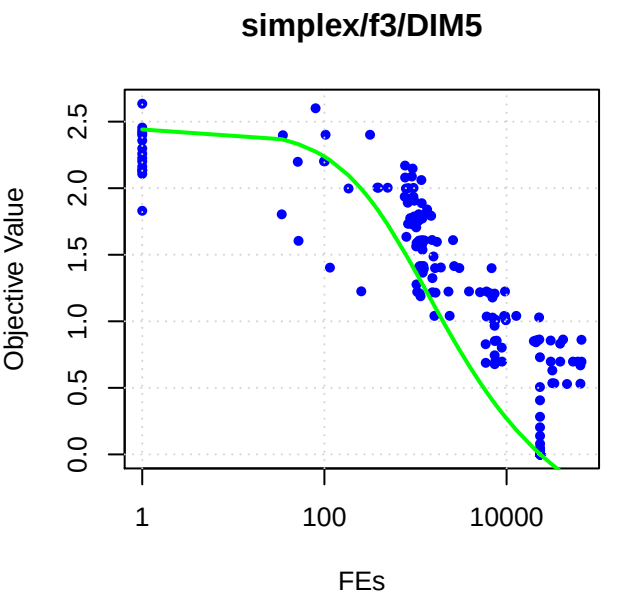
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs


simplex/f3/DIM5
Objective Value
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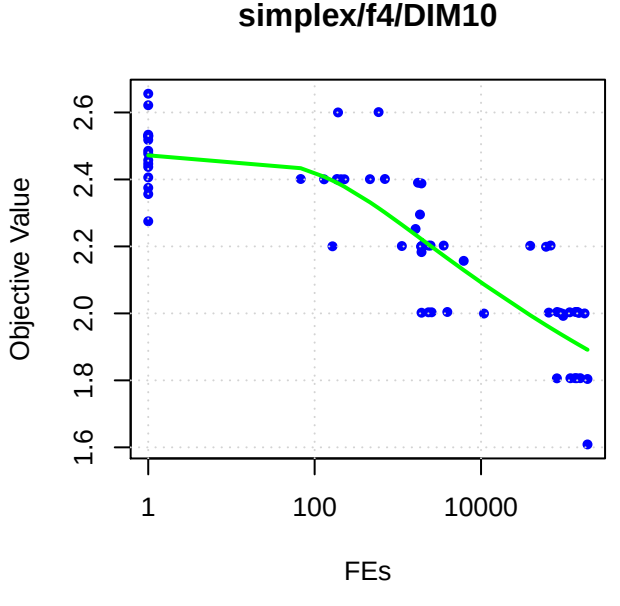
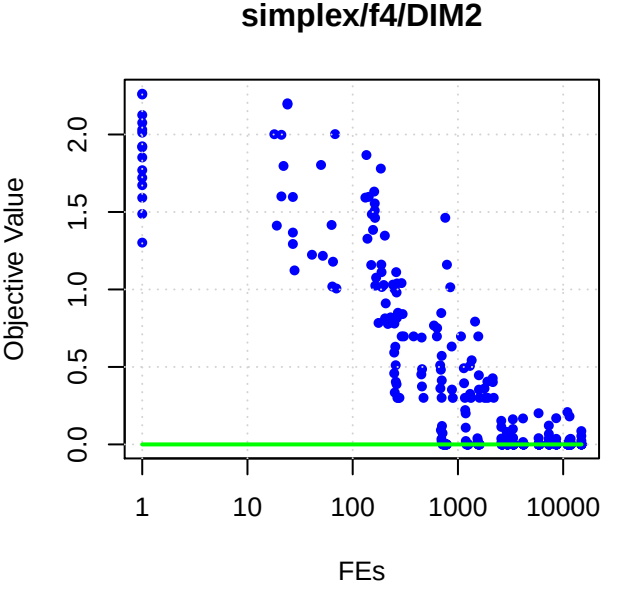
1.0
1.5
2.0
2.5
1
100
10000
FEs


simplex/f4/DIM10
Objective Value
1.6
1.8
2.0
2.2
2.4
2.6
1
100
10000
FEs


simplex/f4/DIM2
Objective Value
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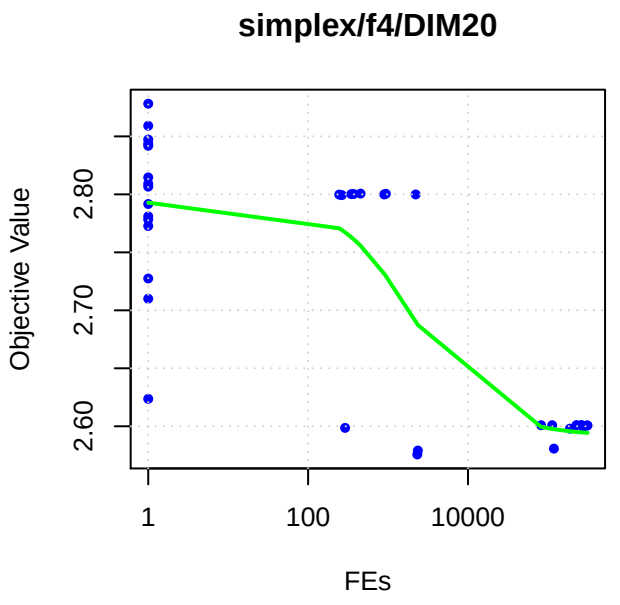
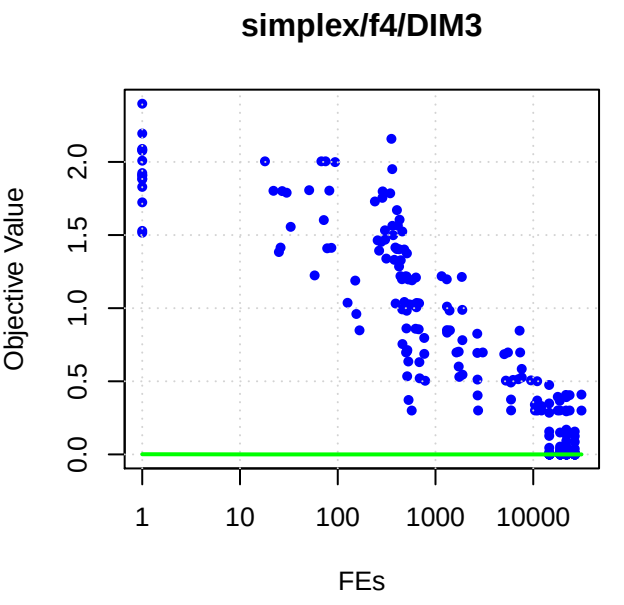
0.5
1.0
1.5
2.0
1
10
100
1000
10000
FEs


simplex/f4/DIM20
Objective Value
2.60
2.70
2.80
1
100
10000
FEs


simplex/f4/DIM3
Objective Value
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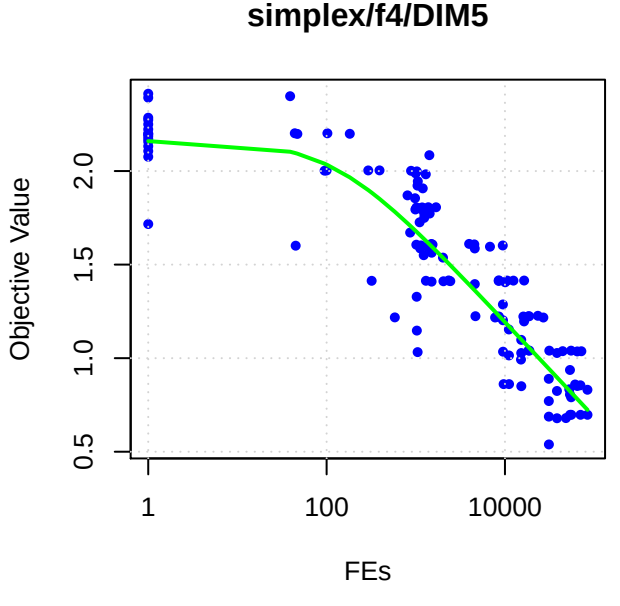
1.0
1.5
2.0
1
10
100
1000
10000
FEs


simplex/f4/DIM5
Objective Value
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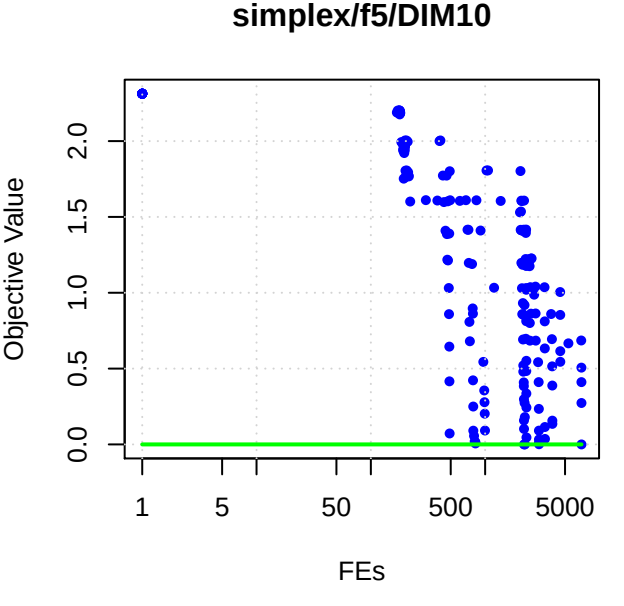
1.0
1.5
2.0
1
100
10000
FEs


simplex/f5/DIM10
Objective Value
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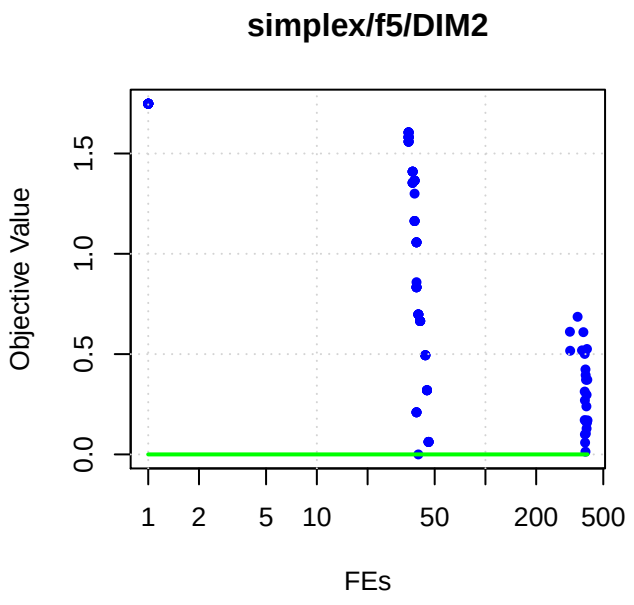
0.5
1.0
1.5
2.0
1
5
50
500
5000
FEs


simplex/f5/DIM2
Objective Value
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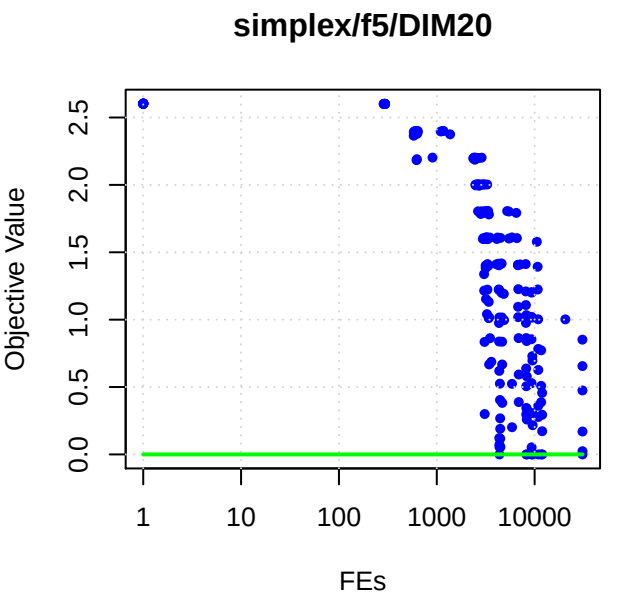
0.5
1.0
1.5
1
2
5
10
50
200
500
FEs


simplex/f5/DIM20
Objective Value
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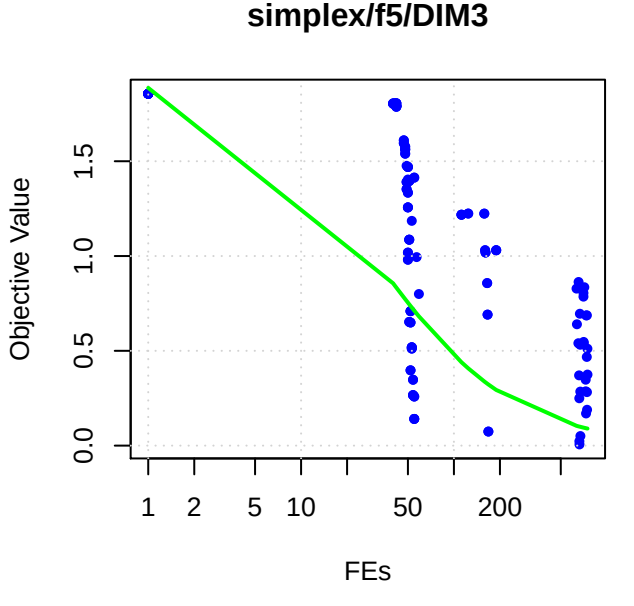
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs


simplex/f5/DIM3
Objective Value
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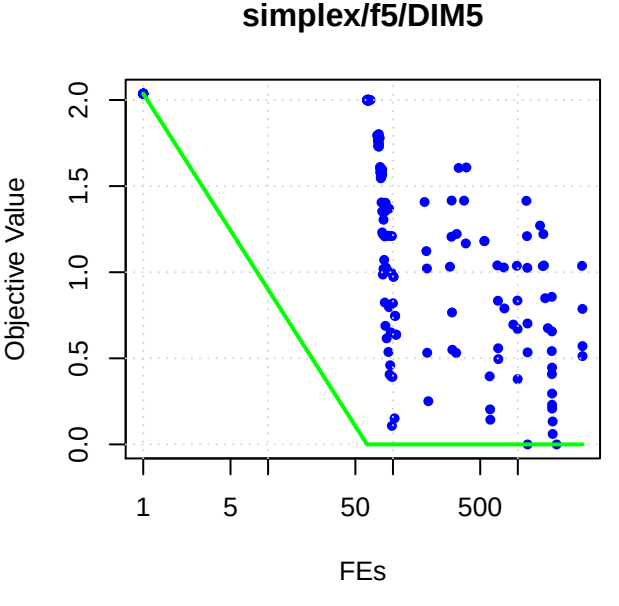
1.0
1.5
1
2
5
10
50
200
FEs


simplex/f5/DIM5
Objective Value
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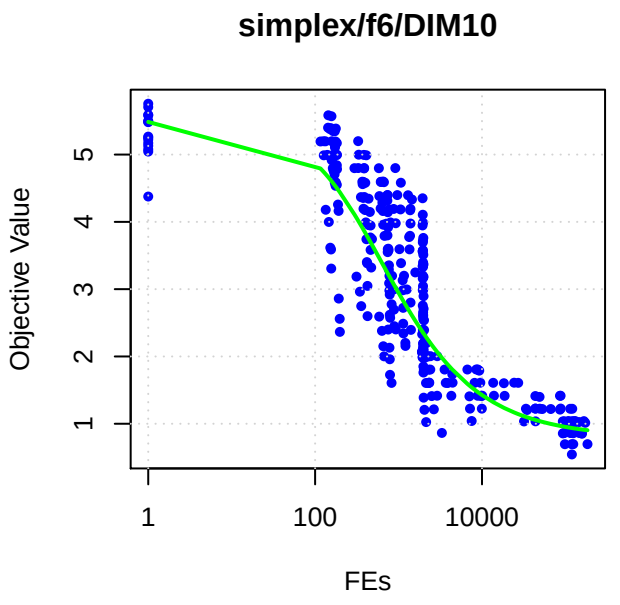
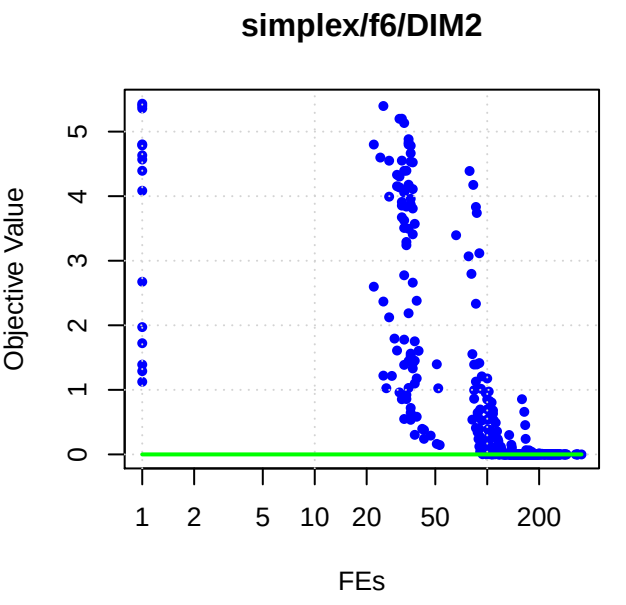
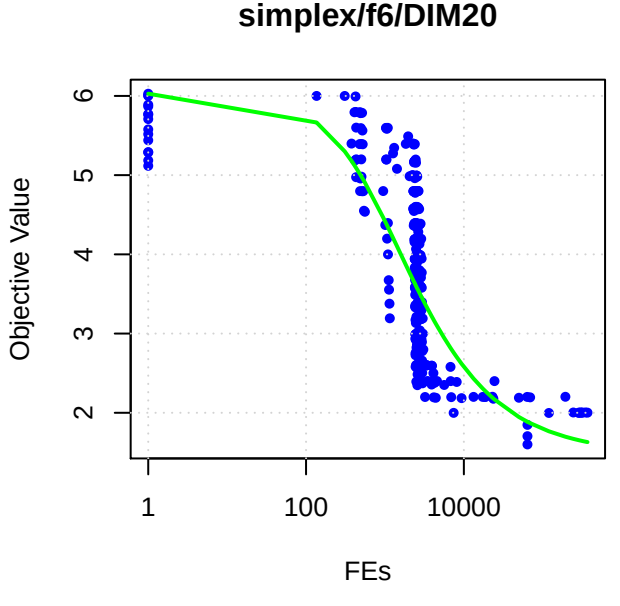
0.5
1.0
1.5
2.0
1
5
50
500
FEs


simplex/f6/DIM10
Objective Value
FEs
1
100
10000
1
2
3
4
5


simplex/f6/DIM2
Objective Value
FEs
1
2
5
10
20
50
200
0
1
2
3
4
5


simplex/f6/DIM20
Objective Value
FEs
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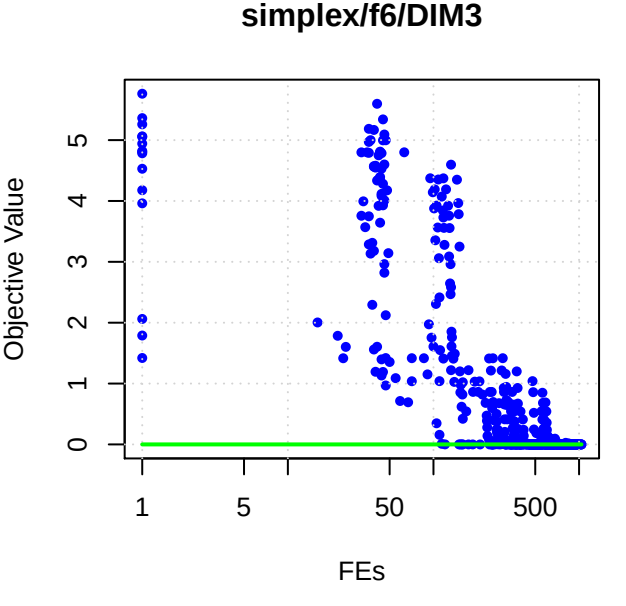
100
10000
2
3
4
5
6


simplex/f6/DIM3
Objective Value
FEs
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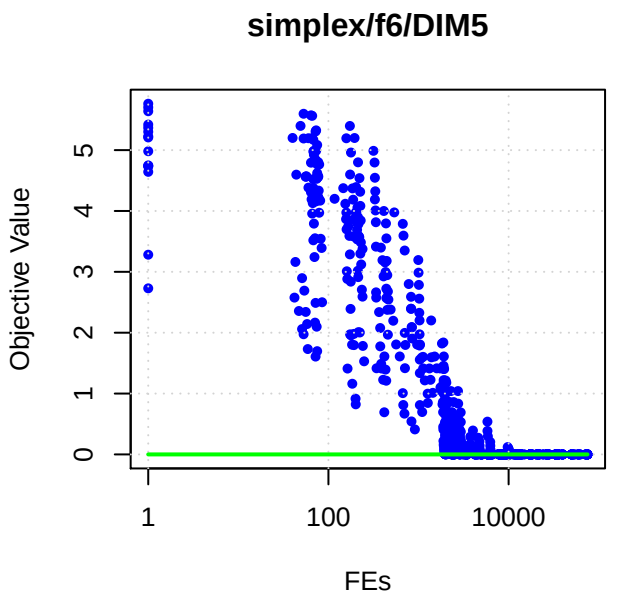
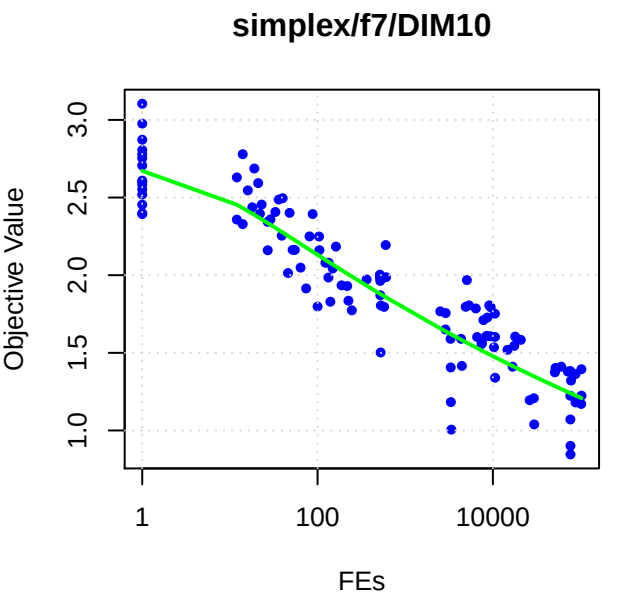
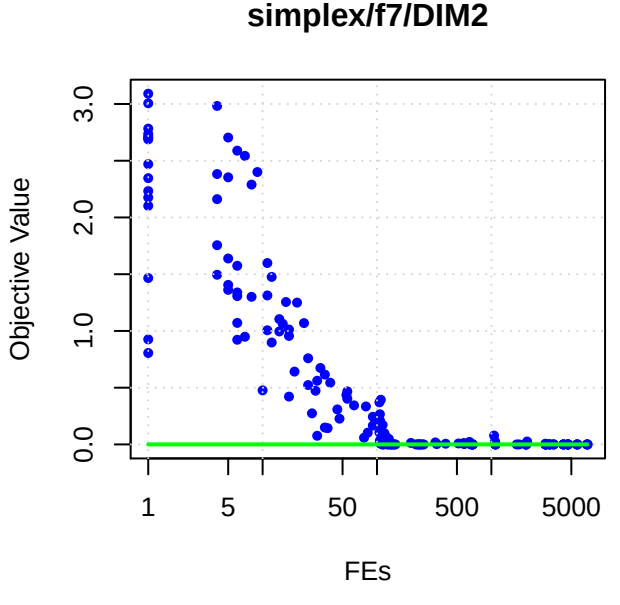
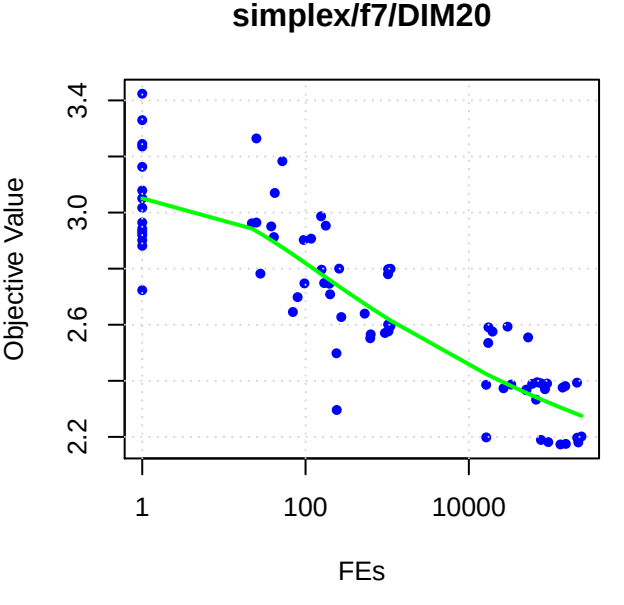
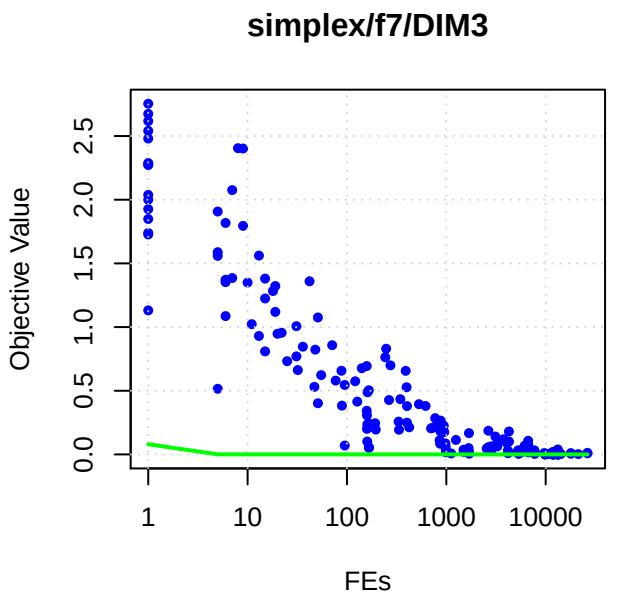
5
50
500
0
1
2
3
4
5

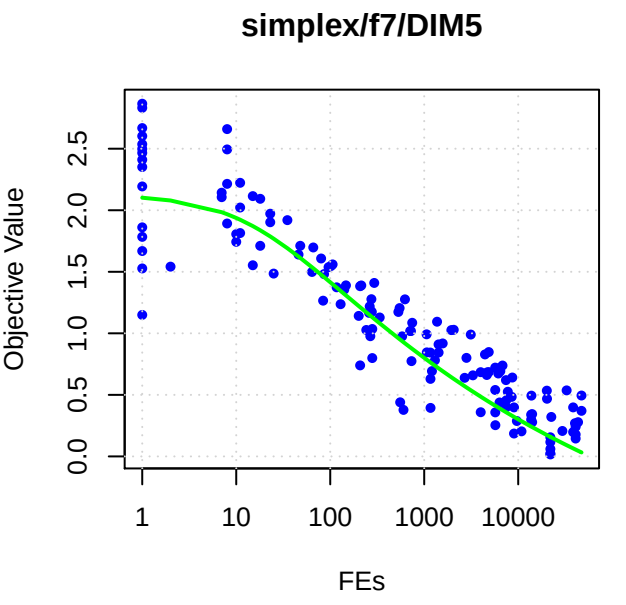

simplex/f6/DIM5
Objective Value
0
1
2
3
4
5
1
100
10000
FEs

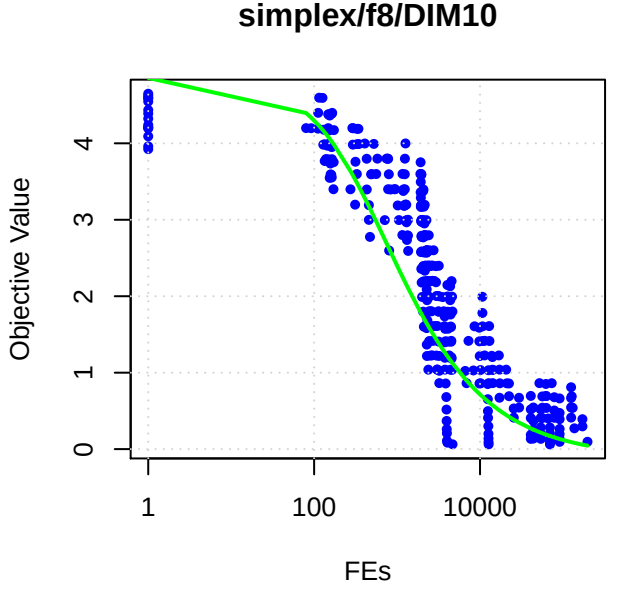

simplex/f7/DIM10
Objective Value
1.0
1.5
2.0
2.5
3.0
1
100
10000
FEs

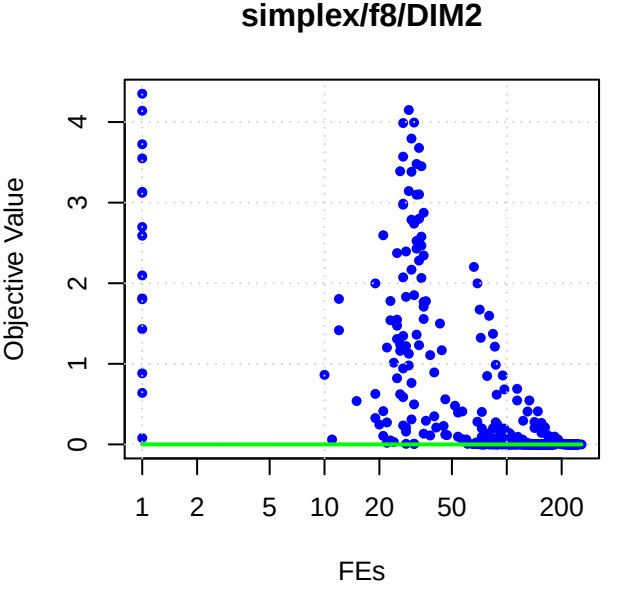

simplex/f7/DIM2
Objective Value
0.0
1.0
2.0
3.0
1
5
50
500
5000
FEs

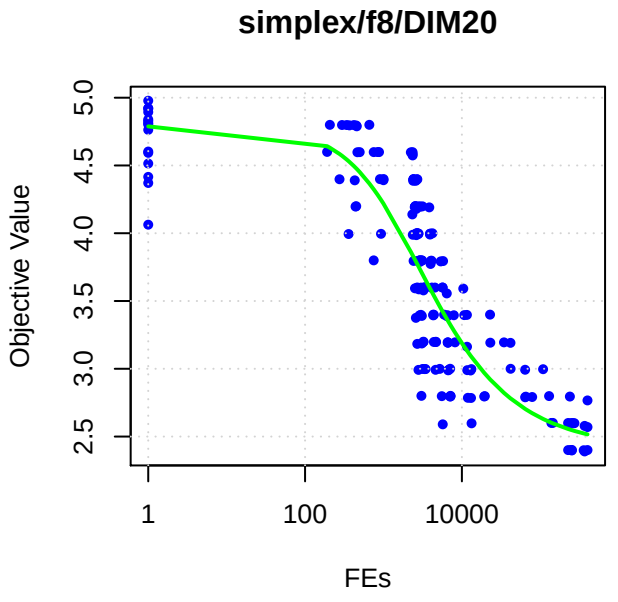

simplex/f7/DIM20
Objective Value
2.2
2.6
3.0
3.4
1
100
10000
FEs

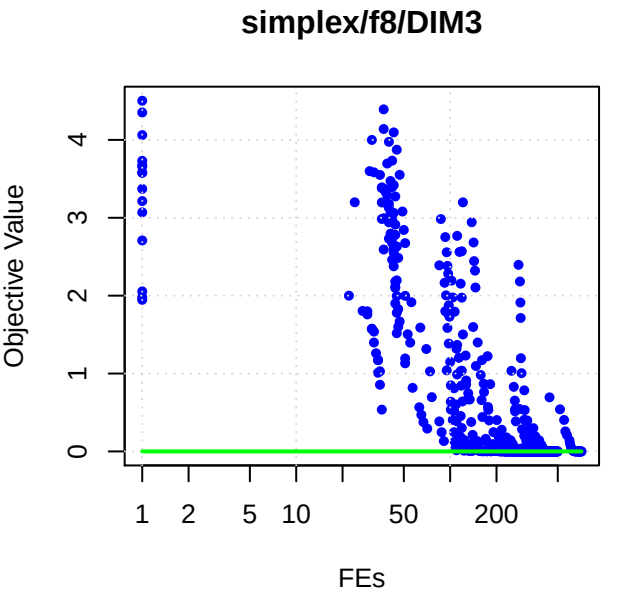

simplex/f7/DIM3
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs

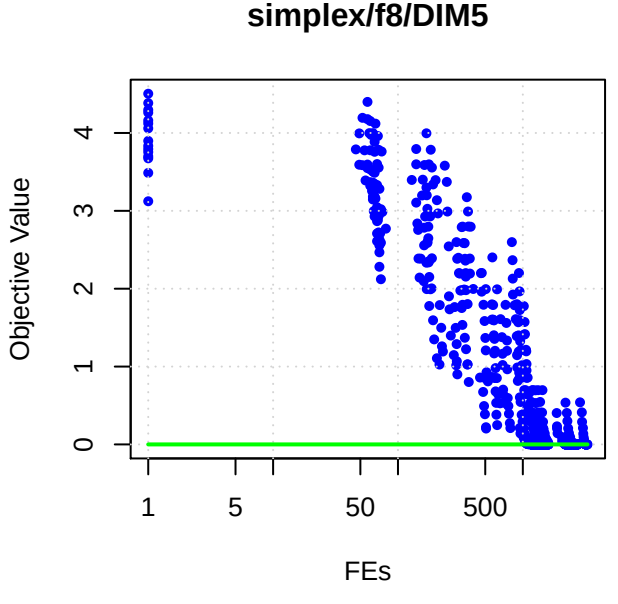

simplex/f7/DIM5
Objective Value
0.0
0.5
1.0
1.5
2.0
2.5
1
10
100
1000
10000
FEs

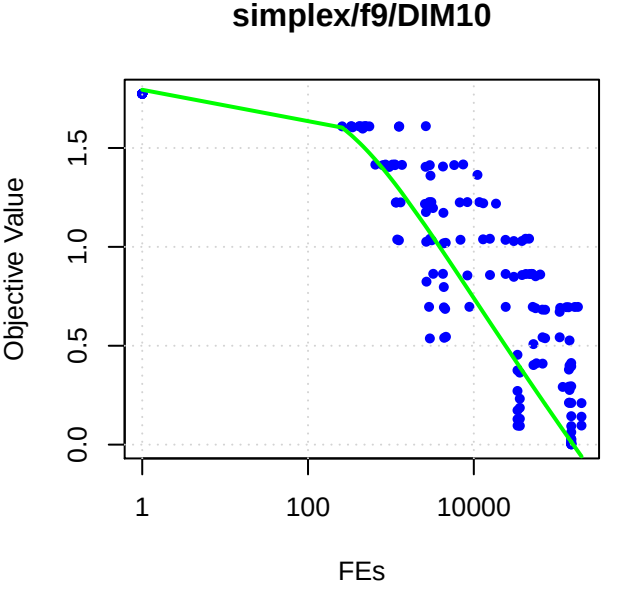

simplex/f8/DIM10
Objective Value
0
1
2
3
4
1
100
10000
FEs

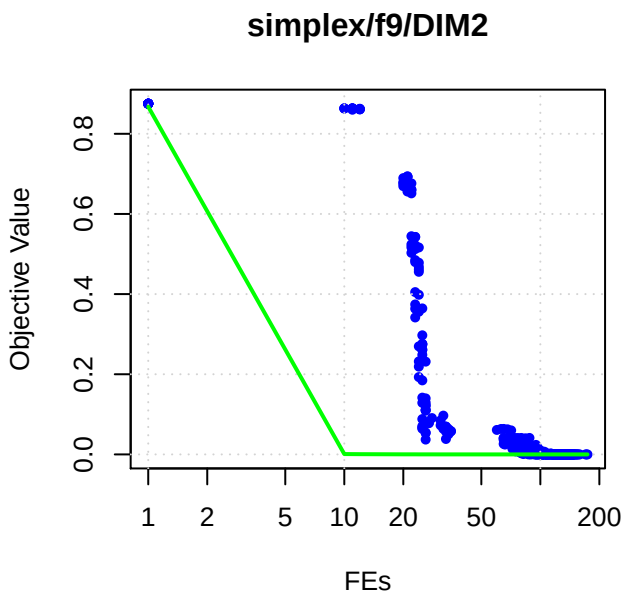

simplex/f8/DIM2
Objective Value
0
1
2
3
4
1
2
5
10
20
50
200
FEs


simplex/f8/DIM20
Objective Value
5.0
4.5
4.0
3.5
3.0
2.5
1
100
10000
FEs


simplex/f8/DIM3
Objective Value
4
3
2
1
0
1
2
5
10
50
200
FEs


simplex/f8/DIM5
Objective Value
4
3
2
1
0
1
5
50
500
FEs


simplex/f9/DIM10
Objective Value
1.5
1.0
0.5
0.0
1
100
10000
FEs


simplex/f9/DIM2
Objective Value
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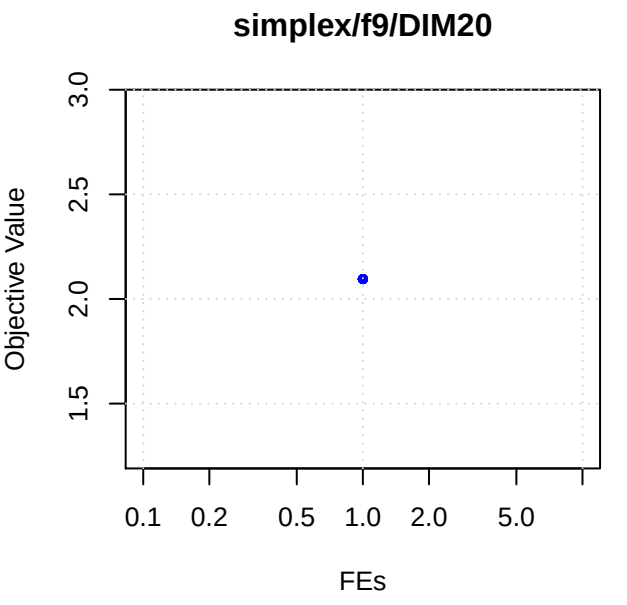
0.2
0.4
0.6
0.8
1
2
5
10
20
50
200
FEs


simplex/f9/DIM20
Objective Value
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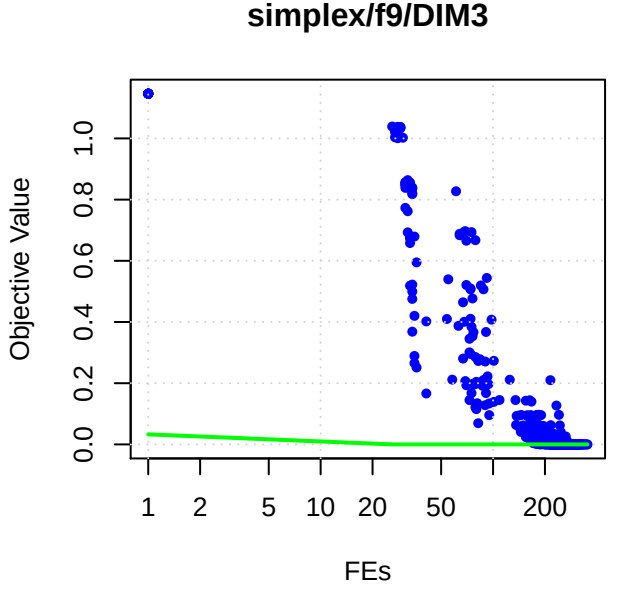
2.0
2.5
3.0
0.1
0.2
0.5
1.0
2.0
5.0
FEs


simplex/f9/DIM3
Objective Value
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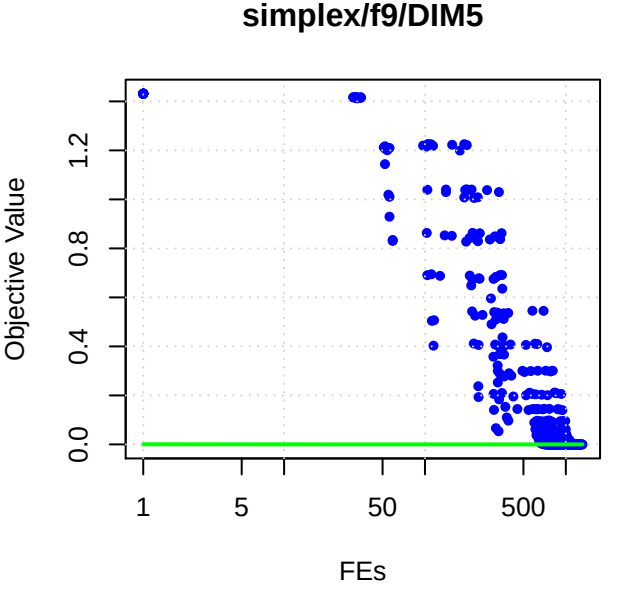
0.2
0.4
0.6
0.8
1.0
1
2
5
10
20
50
200
FEs


simplex/f9/DIM5
Objective Value
0.0
0.4
0.8
1.2
1
5
50
500
FEs