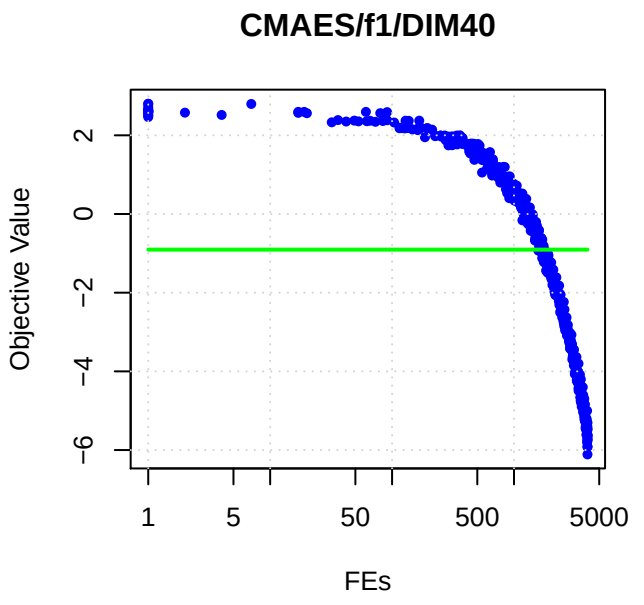
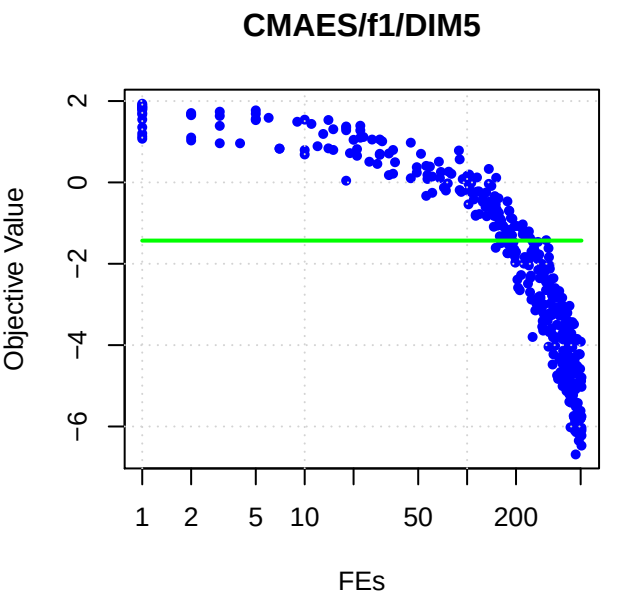
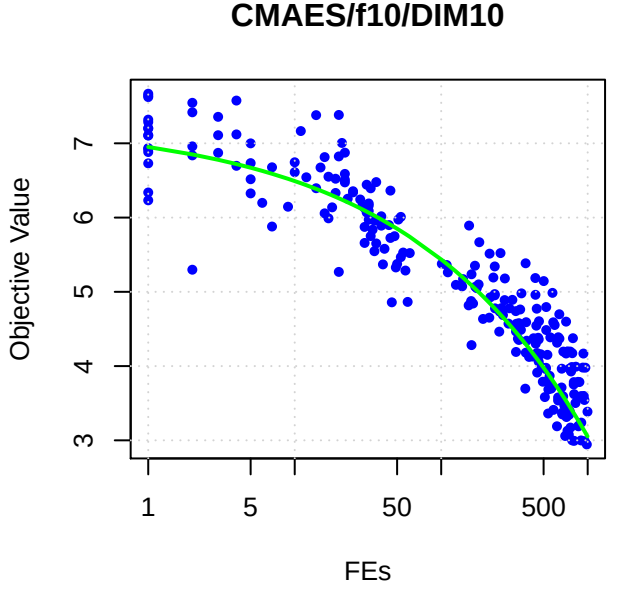
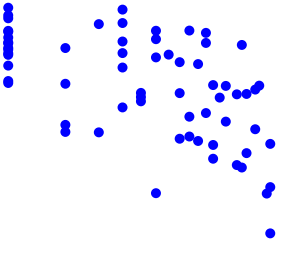
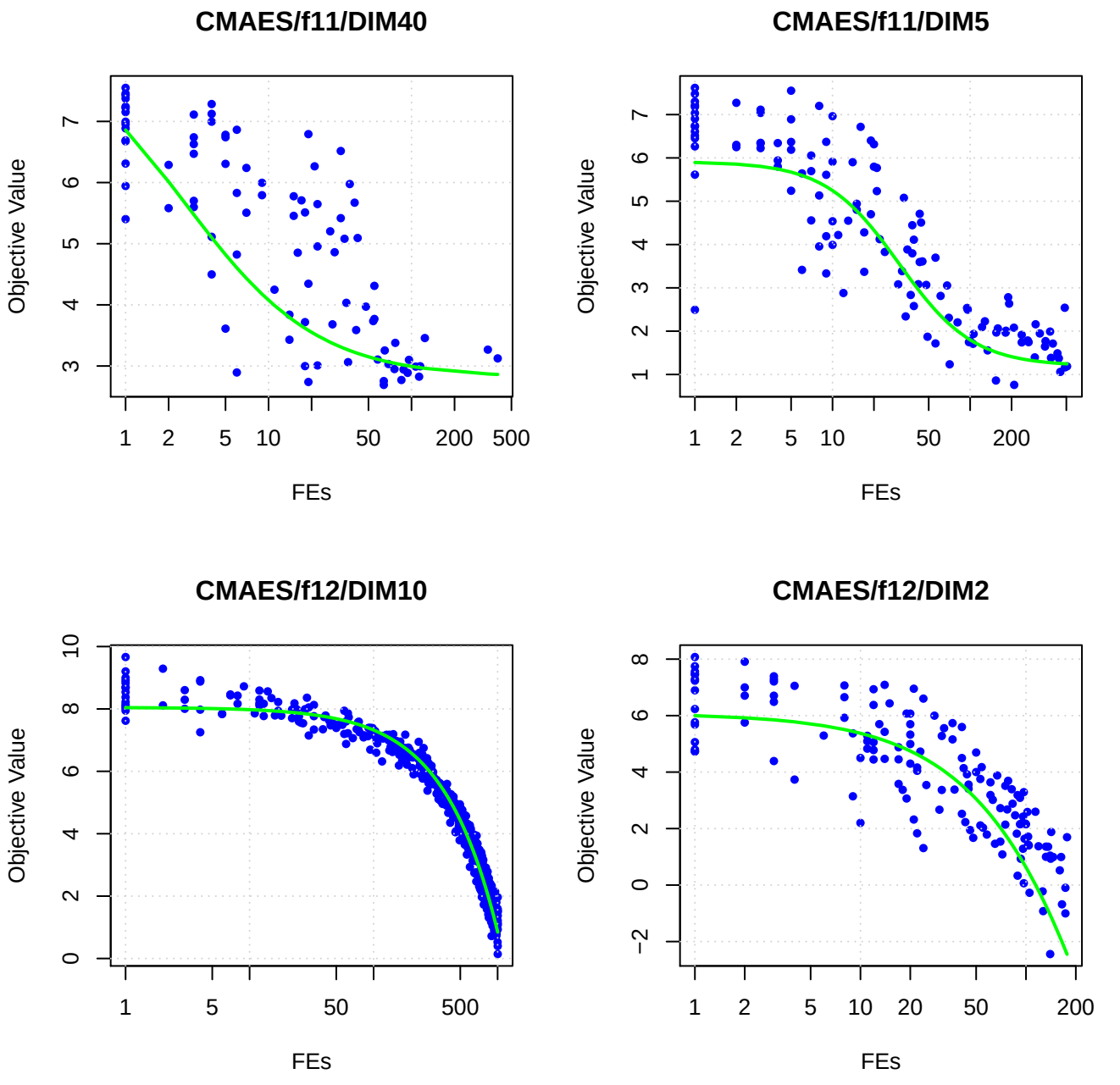
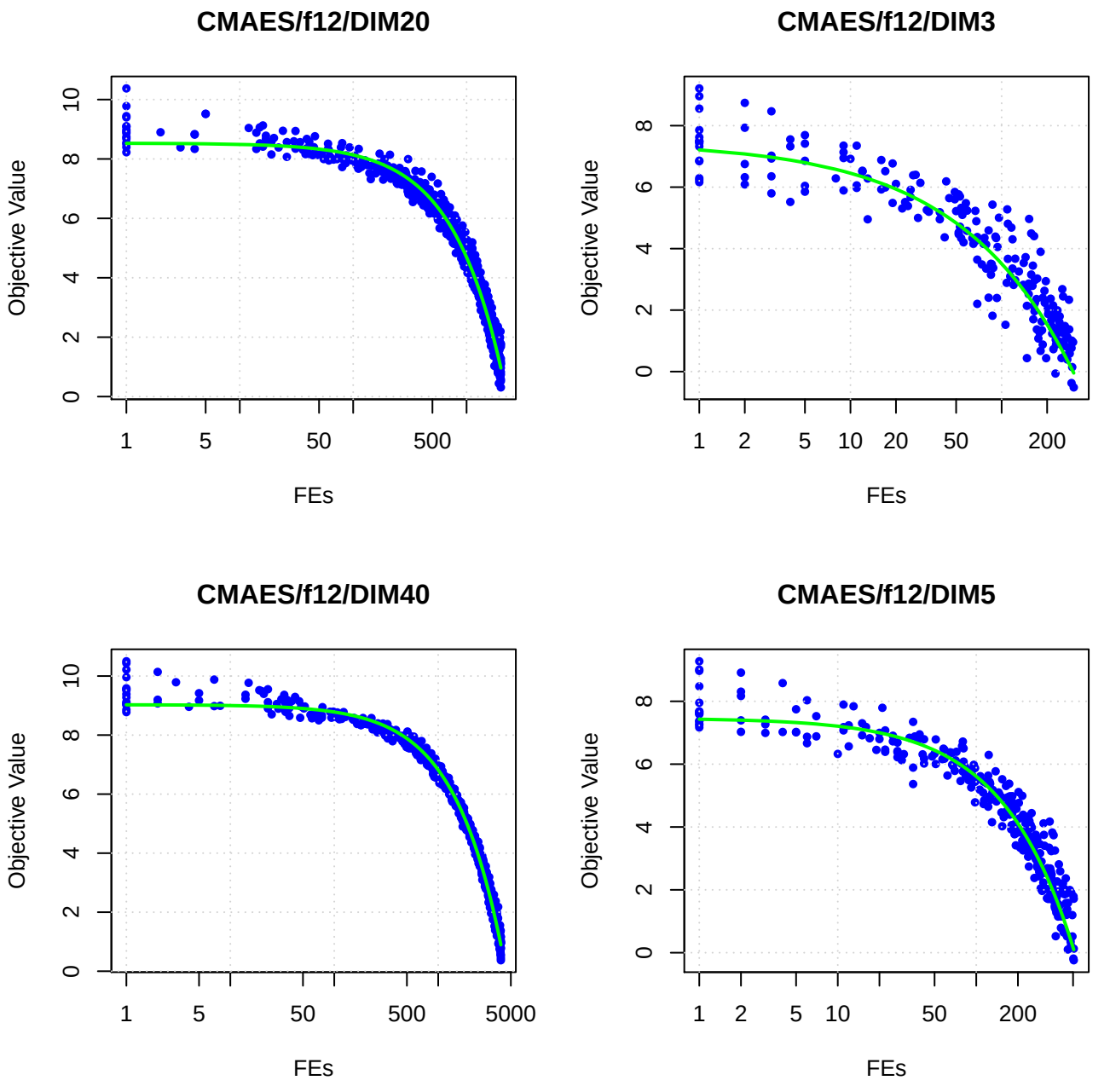

CMAES/f1/DIM40
Objective Value
2
0
−2
−4
−6
1
5
50
500
5000
FEs

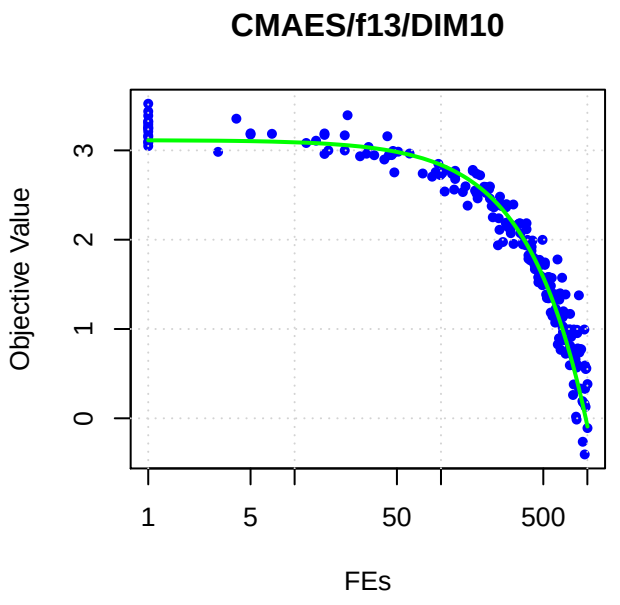

CMAES/f1/DIM5
Objective Value
2
0
−2
−4
−6
1
2
5
10
50
200
FEs


CMAES/f10/DIM10
Objective Value
7
6
5
4
3
1
5
50
500
FEs




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
0
2
4
6
8
10
1
5
50
500
FEs
CMAES/f12/DIM3
Objective Value
0
2
4
6
8
1
2
5
10
20
50
200
FEs
CMAES/f12/DIM40
Objective Value
0
2
4
6
8
10
1
5
50
500
5000
FEs
CMAES/f12/DIM5
Objective Value
0
2
4
6
8
1
2
5
10
50
200
FEs


CMAES/f13/DIM10
Objective Value
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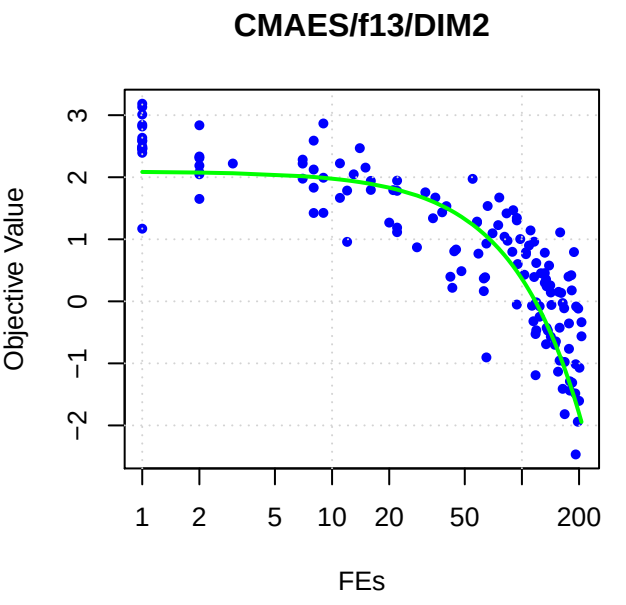
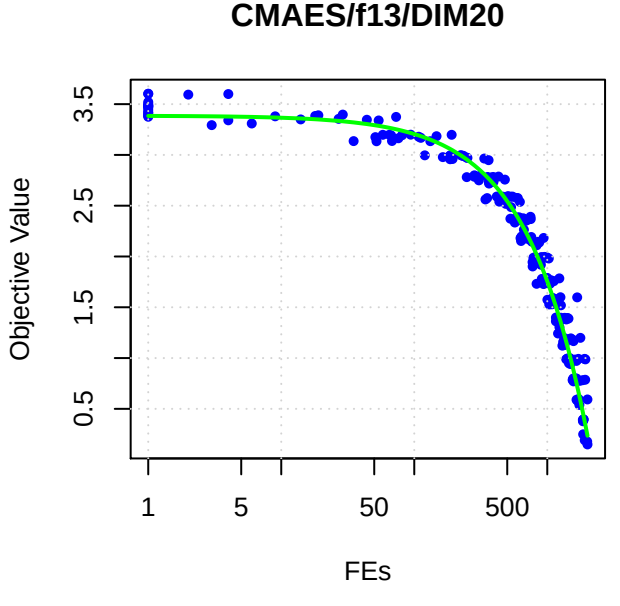
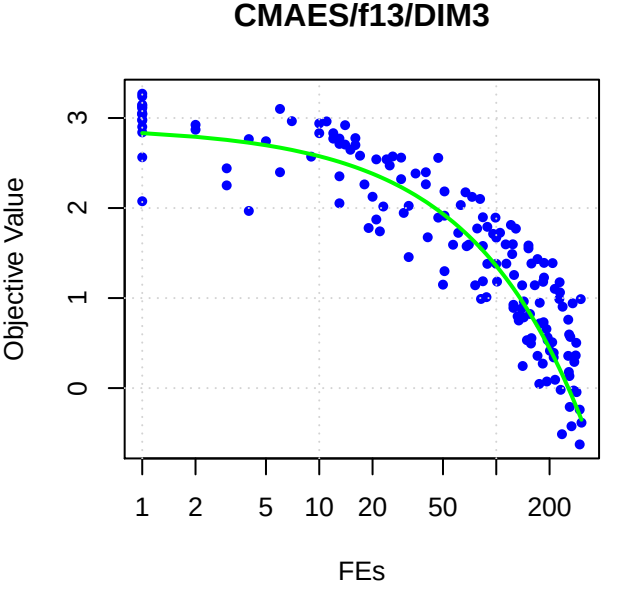
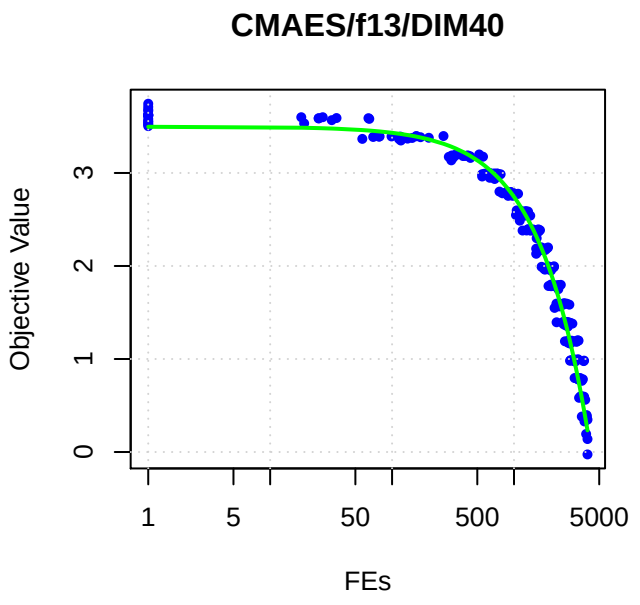
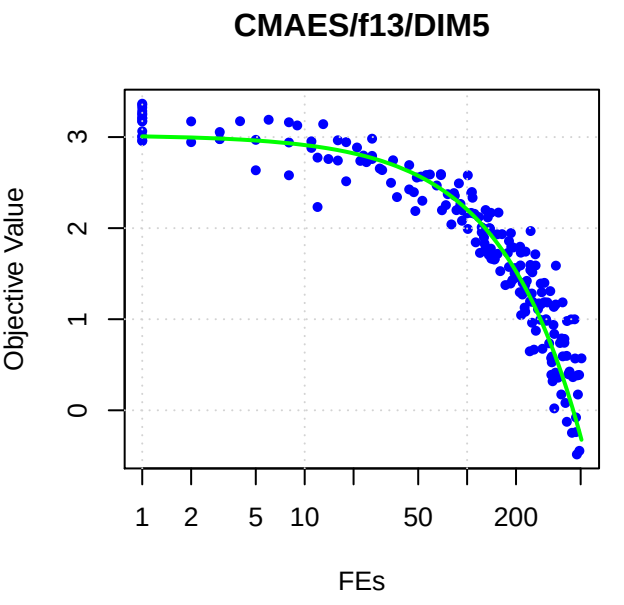
1
2
3
1
5
50
500
FEs

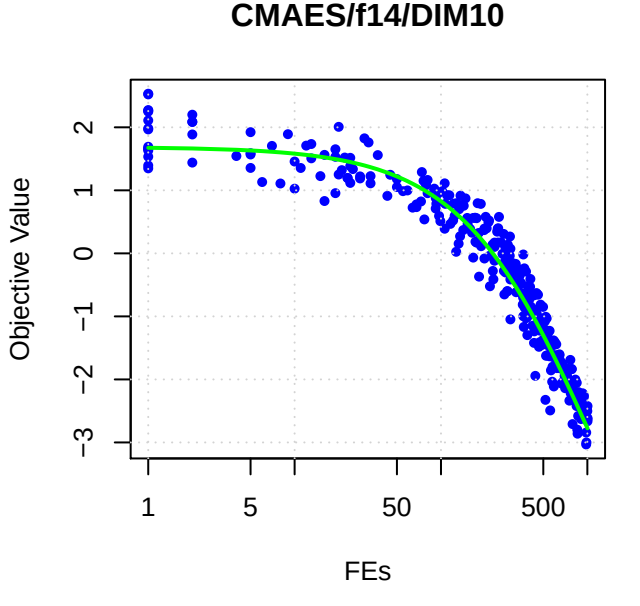

CMAES/f13/DIM2
Objective Value
−2
−1
0
1
2
3
1
2
5
10
20
50
200
FEs

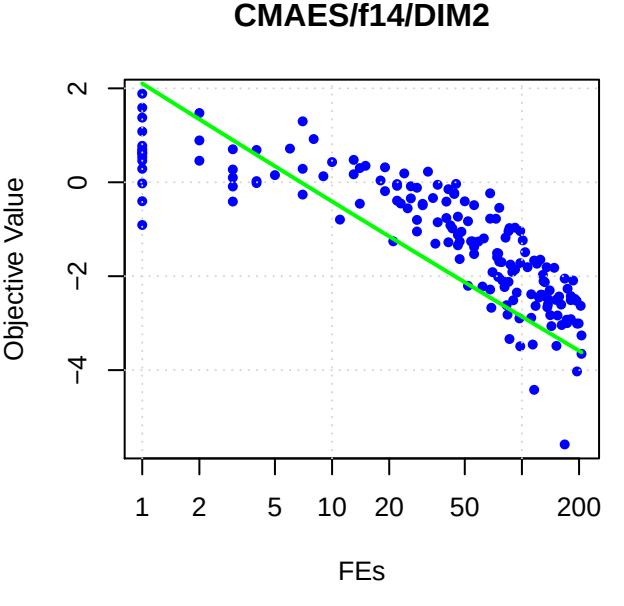

CMAES/f13/DIM20
Objective Value
0.5
1.5
2.5
3.5
1
5
50
500
FEs

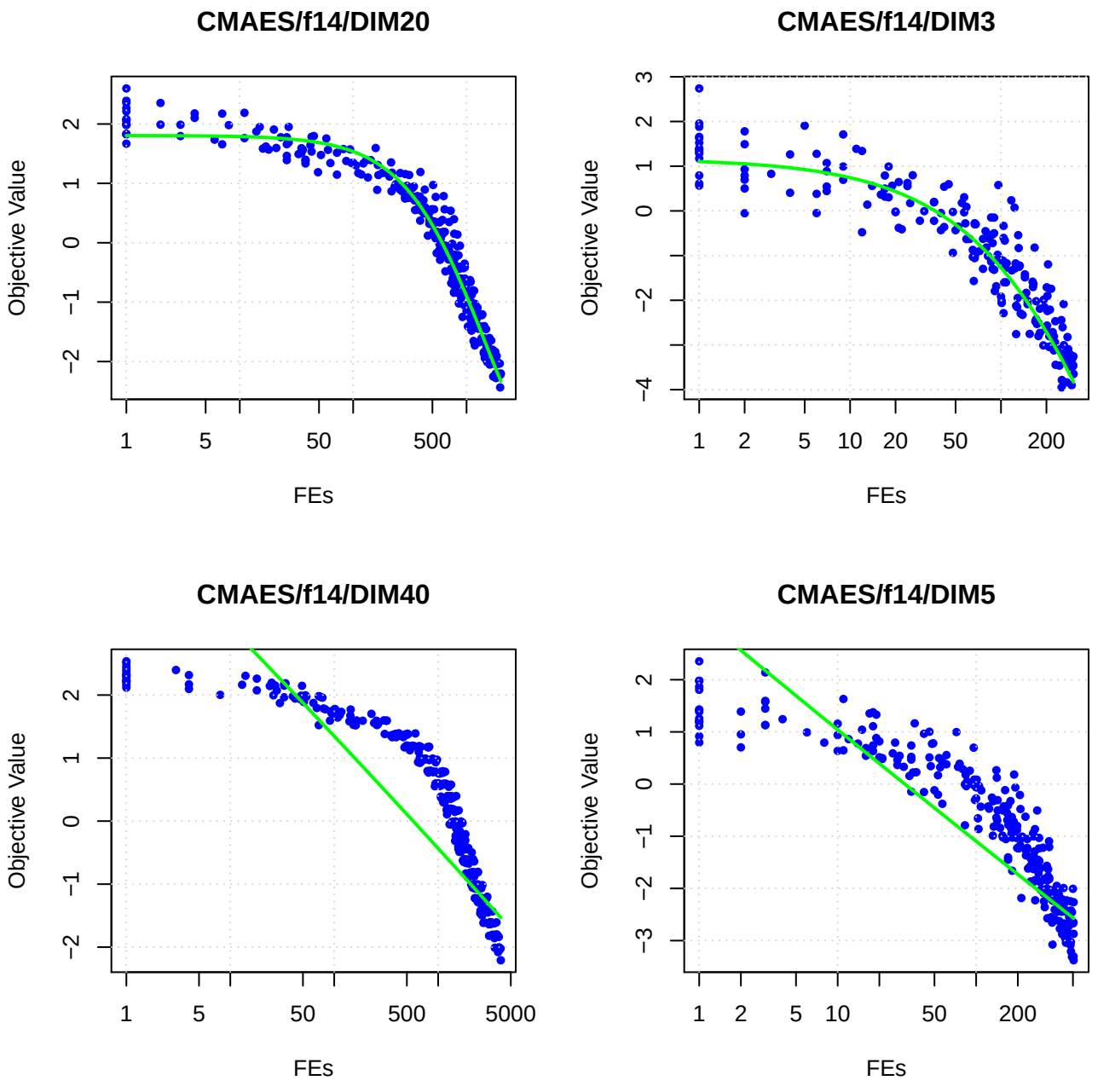

CMAES/f13/DIM3
Objective Value
0
1
2
3
1
2
5
10
20
50
200
FEs

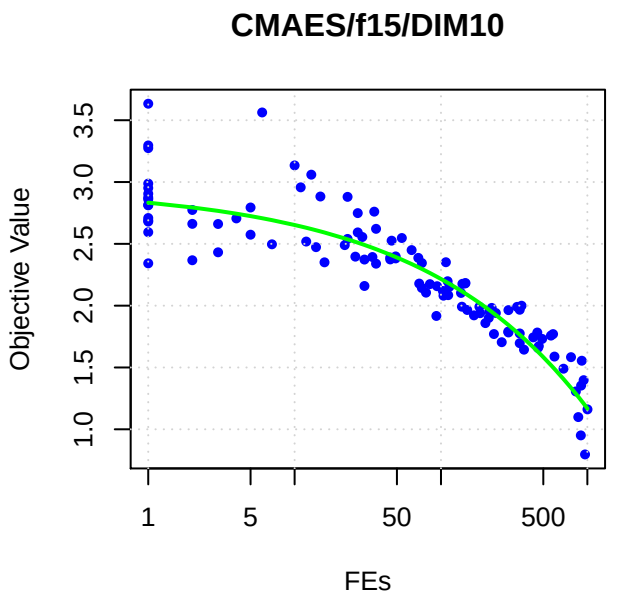

CMAES/f13/DIM40
Objective Value
0
1
2
3
1
5
50
500
5000
FEs

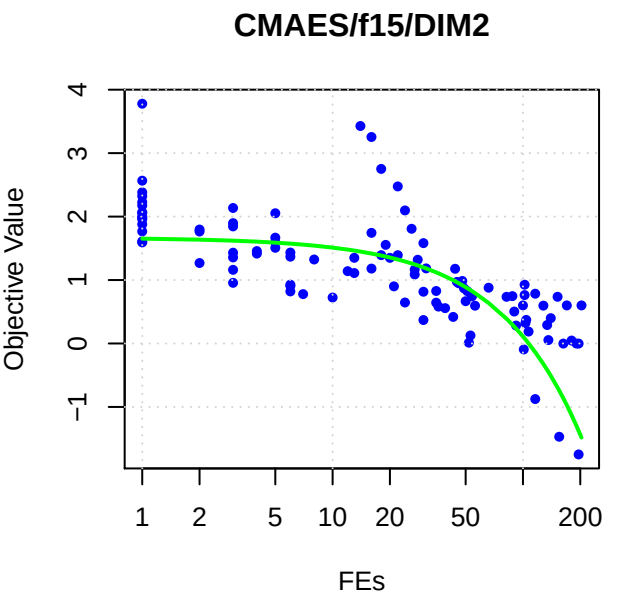

CMAES/f13/DIM5
Objective Value
0
1
2
3
1
2
5
10
50
200
FEs

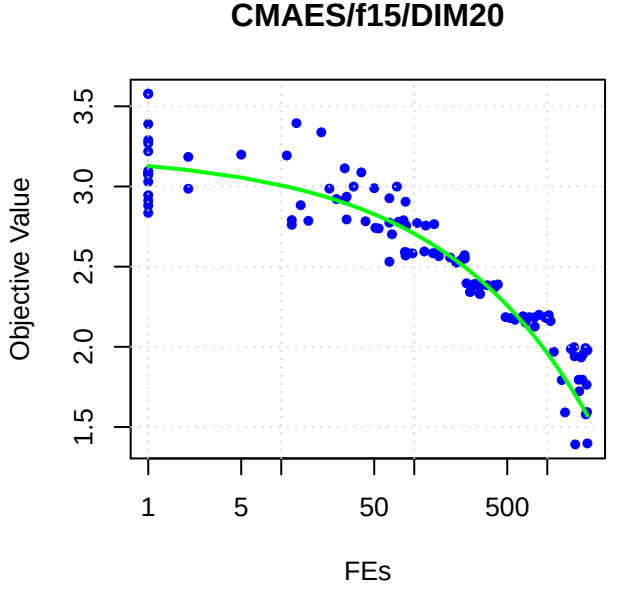

CMAES/f14/DIM10
Objective Value
−3
−2
−1
0
1
2
1
5
50
500
FEs

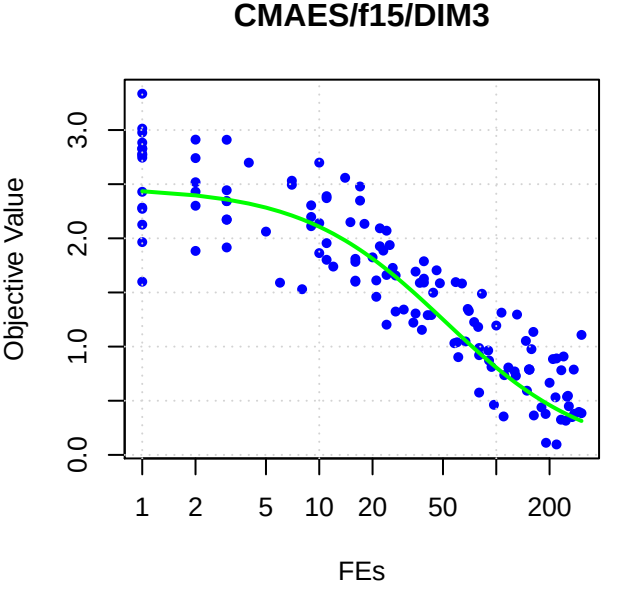

CMAES/f14/DIM2
Objective Value
−4
−2
0
2
1
2
5
10
20
50
200
FEs

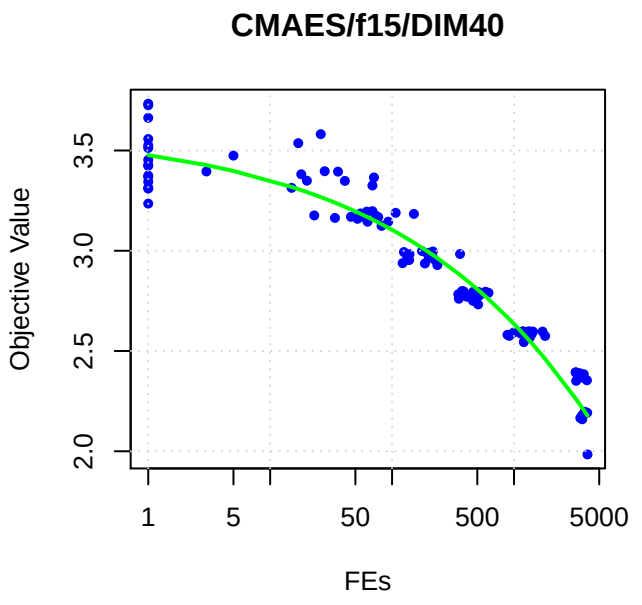

CMAES/f14/DIM20
Objective Value
FEs
CMAES/f14/DIM3
Objective Value
FEs
CMAES/f14/DIM40
Objective Value
FEs
CMAES/f14/DIM5
Objective Value
FEs

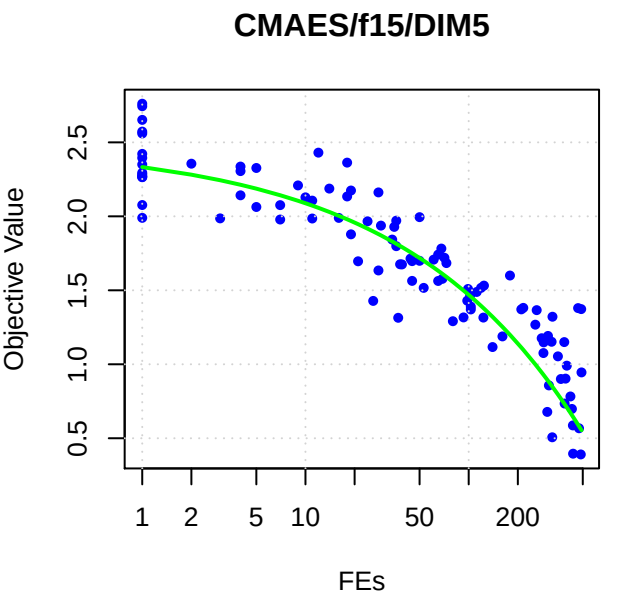

CMAES/f15/DIM10
Objective Value
1.0
1.5
2.0
2.5
3.0
3.5
1
5
50
500
FEs

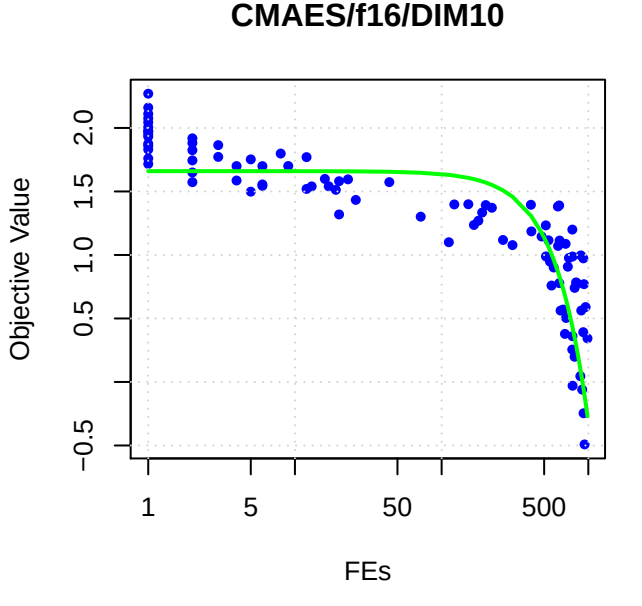

CMAES/f15/DIM2
Objective Value
−1
0
1
2
3
4
1
2
5
10
20
50
200
FEs

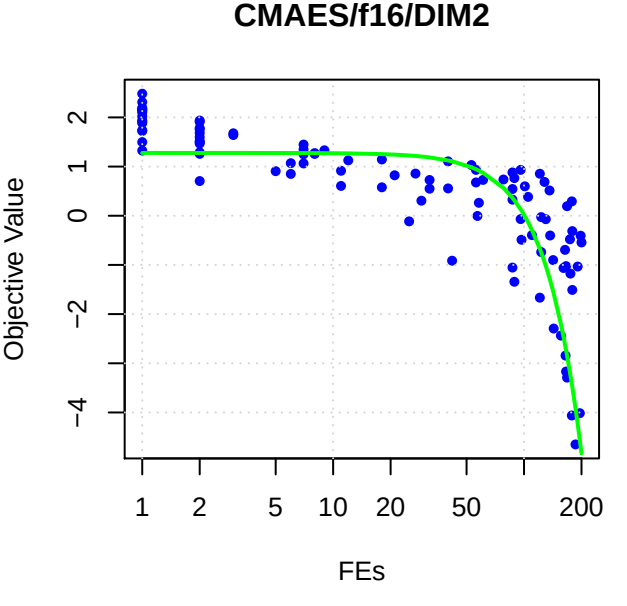

CMAES/f15/DIM20
Objective Value
1.5
2.0
2.5
3.0
3.5
1
5
50
500
FEs

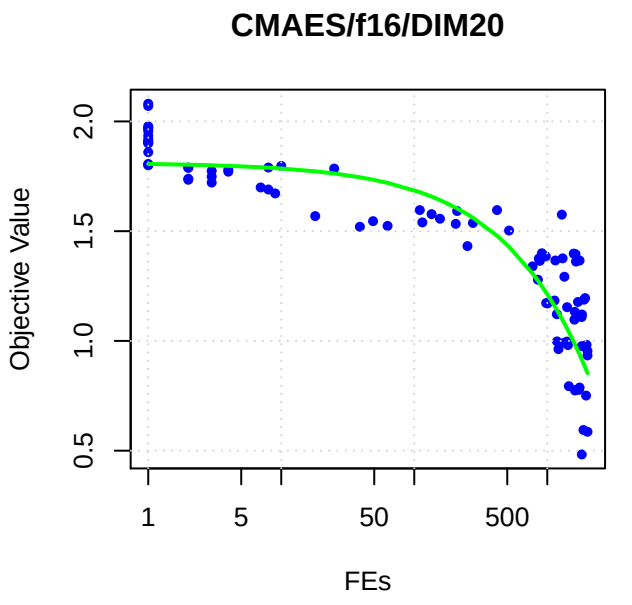

CMAES/f15/DIM3
Objective Value
0.0
1.0
2.0
3.0
1
2
5
10
20
50
200
FEs


CMAES/f15/DIM40
Objective Value
3.5
3.0
2.5
2.0
1
5
50
500
5000
FEs


CMAES/f15/DIM5
Objective Value
2.5
2.0
1.5
1.0
0.5
1
2
5
10
50
200
FEs


CMAES/f16/DIM10
Objective Value
2.0
1.5
1.0
0.5
−0.5
1
5
50
500
FEs


CMAES/f16/DIM2
Objective Value
2
1
0
−2
−4
1
2
5
10
20
50
200
FEs


CMAES/f16/DIM20
Objective Value
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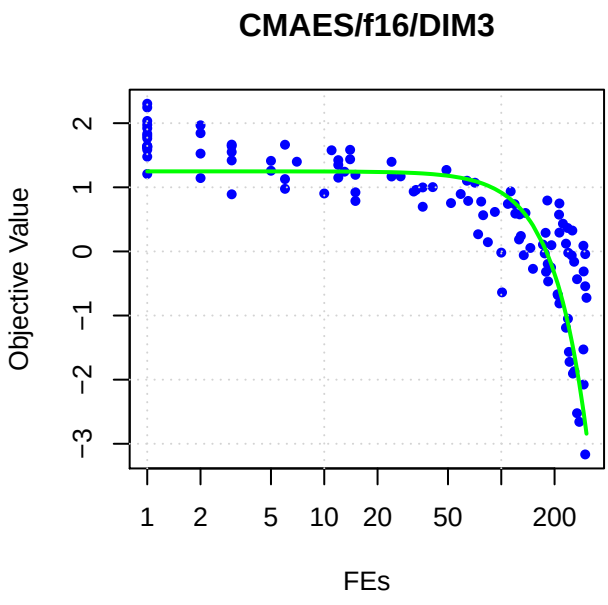
1.0
1.5
2.0
1
5
50
500
FEs


CMAES/f16/DIM3
Objective Value
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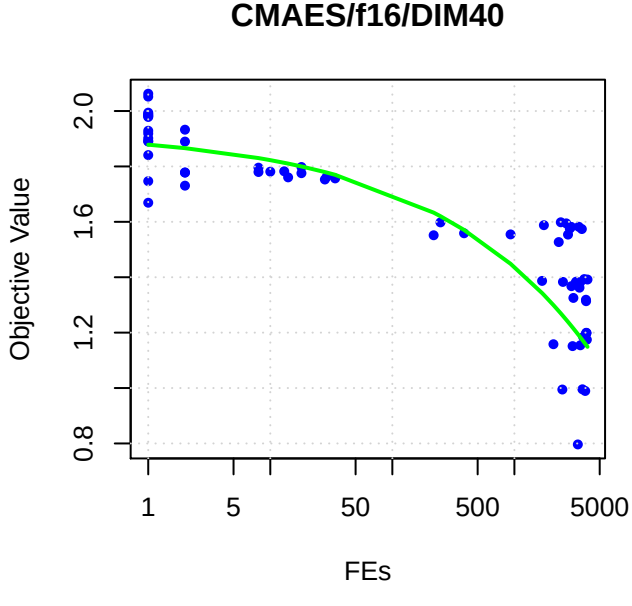
−2
−1
0
1
2
1
2
5
10
20
50
200
FEs


CMAES/f16/DIM40
Objective Value
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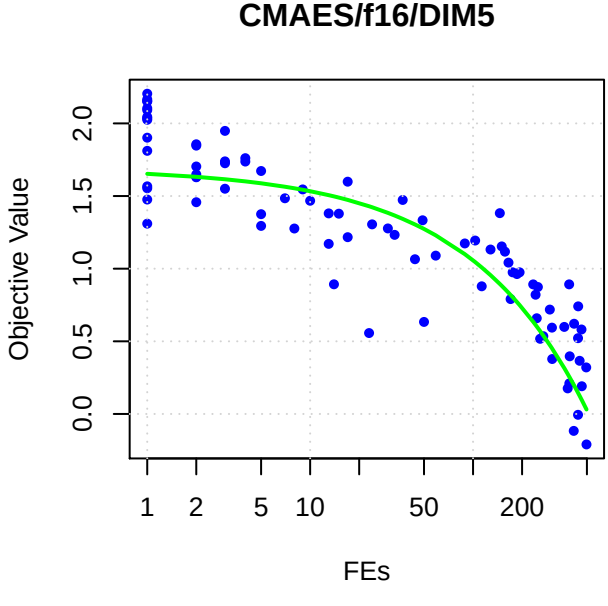
1.2
1.6
2.0
1
5
50
500
5000
FEs


CMAES/f16/DIM5
Objective Value
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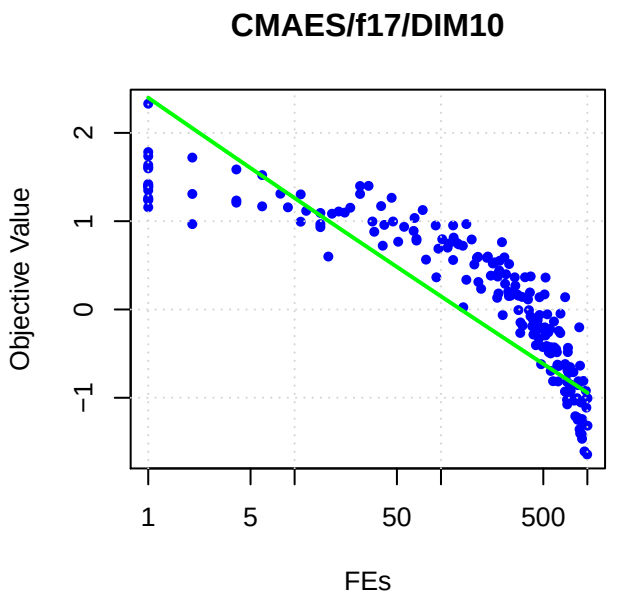
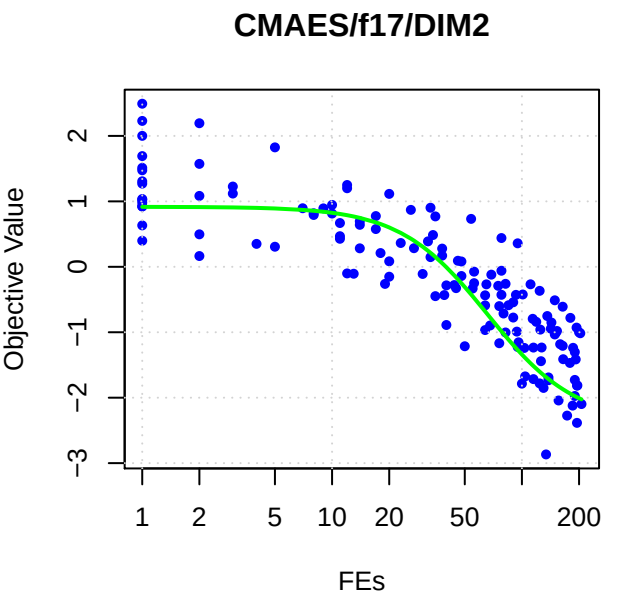
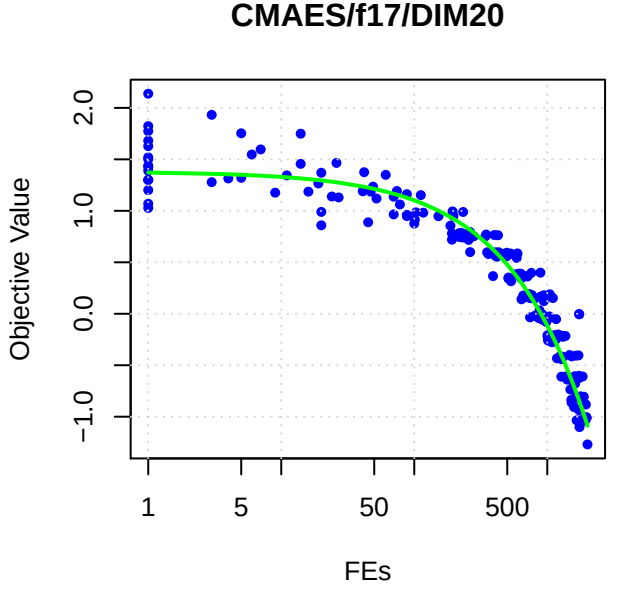
0.5
1.0
1.5
2.0
1
2
5
10
50
200
FEs


CMAES/f17/DIM10
Objective Value
FEs
2
1
0
−1
1
5
50
500


CMAES/f17/DIM2
Objective Value
FEs
2
1
0
−1
−2
−3
1
2
5
10
20
50
200


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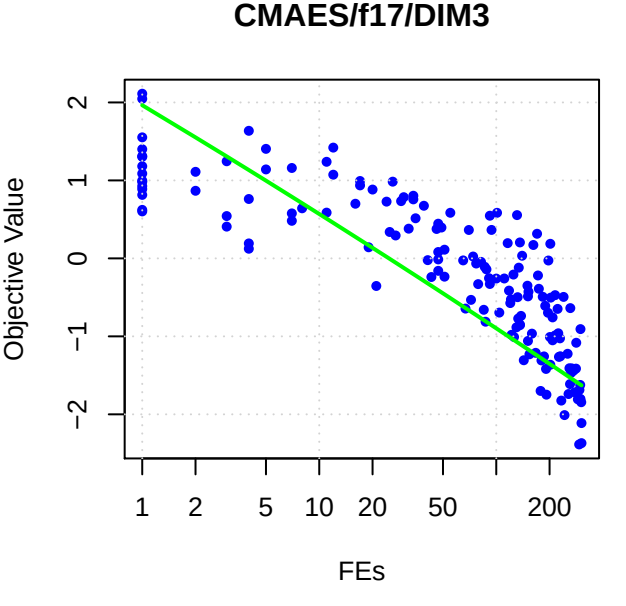
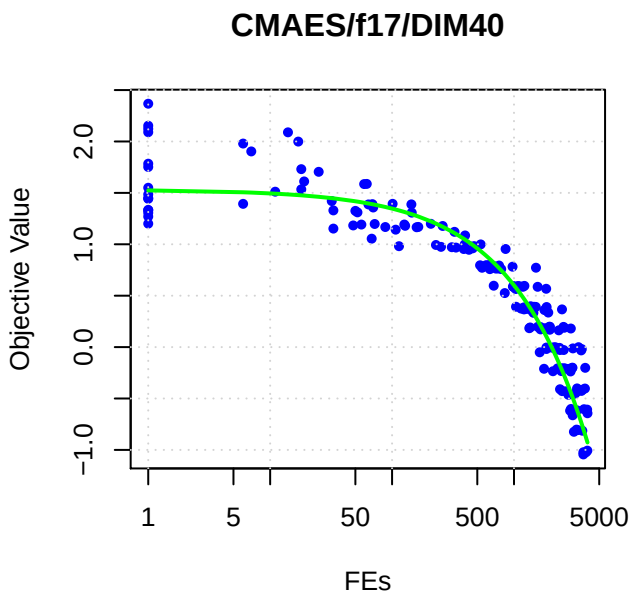
0.0
−1.0
1
5
50
500


CMAES/f17/DIM3
Objective Value
FEs
2
1
0
−1
−2
1
2
5
10
20
50
200


CMAES/f17/DIM40
Objective Value
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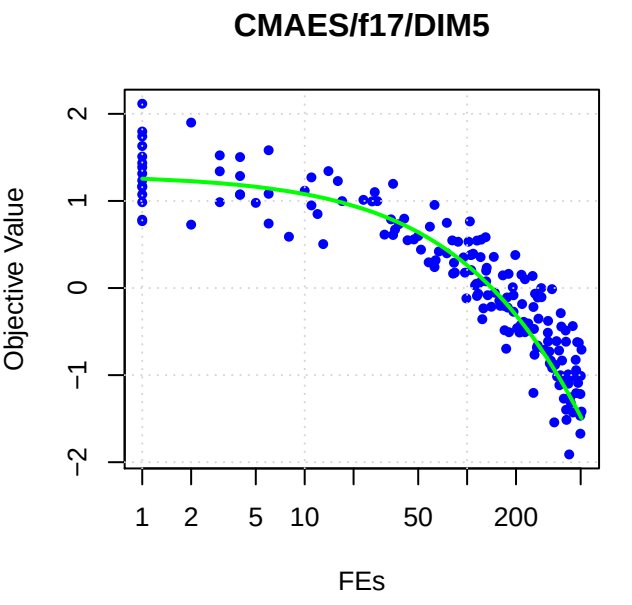
1.0
0.0
−1.0
1
5
50
500
5000
FEs


CMAES/f17/DIM5
Objective Value
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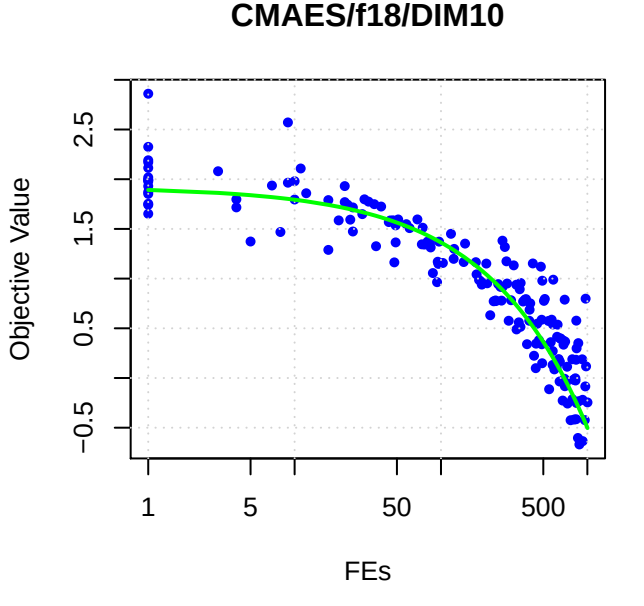
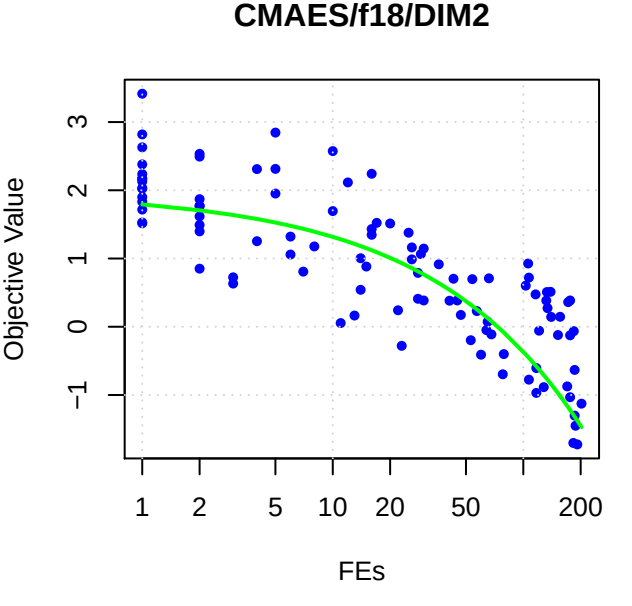
0
−1
−2
1
2
5
10
50
200
FEs


CMAES/f18/DIM10
Objective Value
2.5
1.5
0.5
−0.5
1
5
50
500
FEs


CMAES/f18/DIM2
Objective Value
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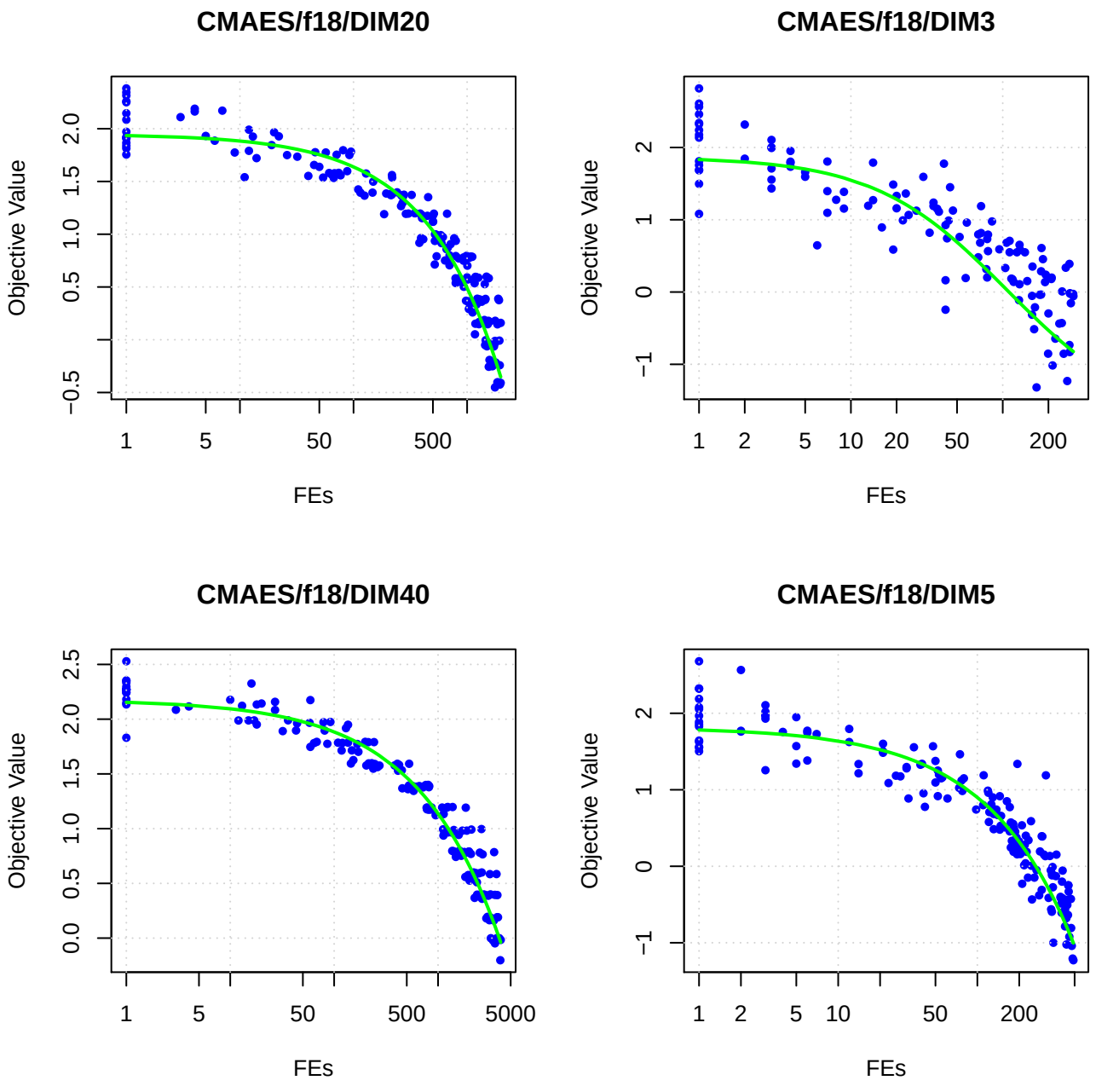
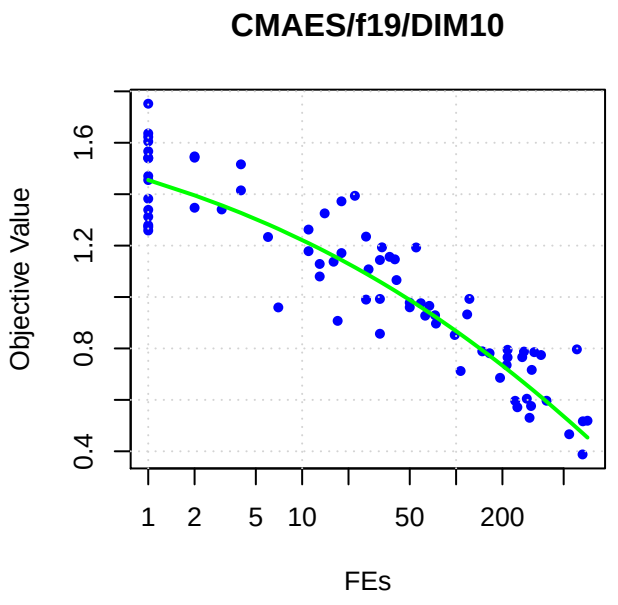
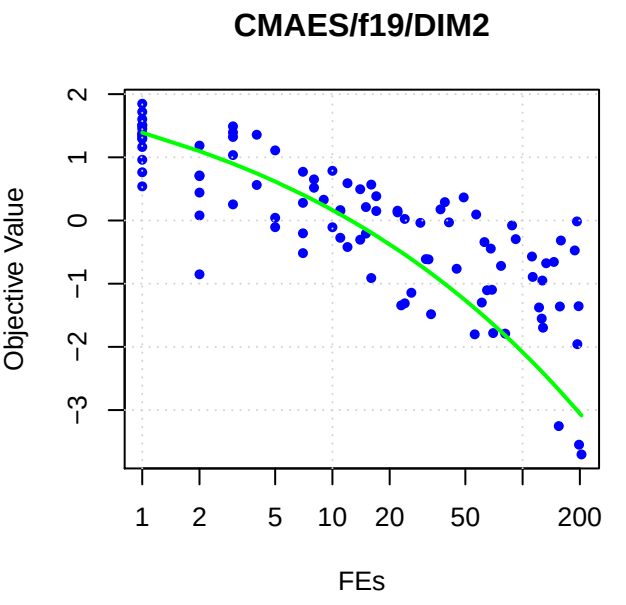
2
1
0
−1
1
2
5
10
20
50
200
FEs


CMAES/f18/DIM20
Objective Value
FEs
CMAES/f18/DIM3
Objective Value
FEs
CMAES/f18/DIM40
Objective Value
FEs
CMAES/f18/DIM5
Objective Value
FEs


CMAES/f19/DIM10
Objective Value
0.4
0.8
1.2
1.6
1
2
5
10
50
200
FEs


CMAES/f19/DIM2
Objective Value
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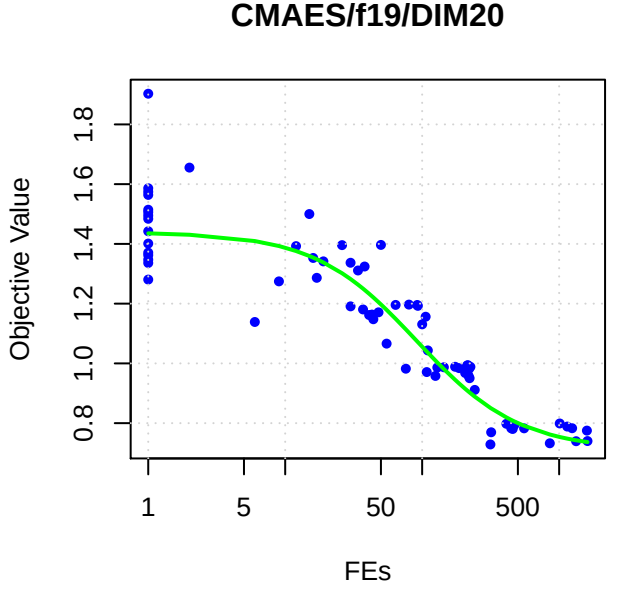
−2
−1
0
1
2
1
2
5
10
20
50
200
FEs


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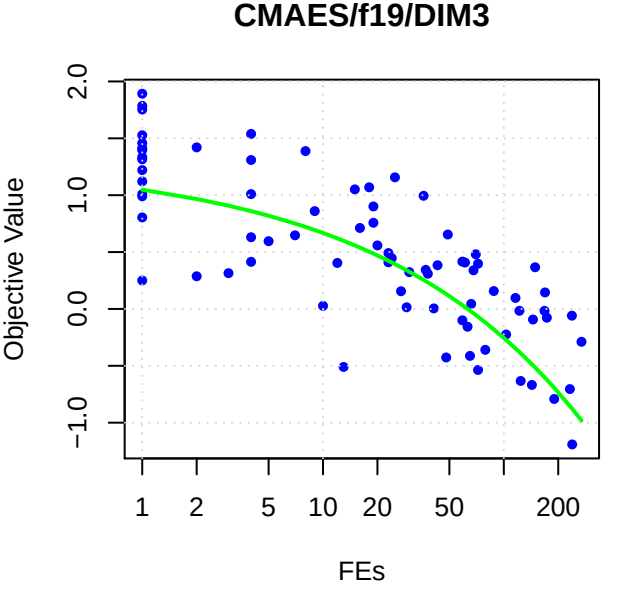
1.0
1.2
1.4
1.6
1.8
1
5
50
500
FEs


CMAES/f19/DIM3
Objective Value
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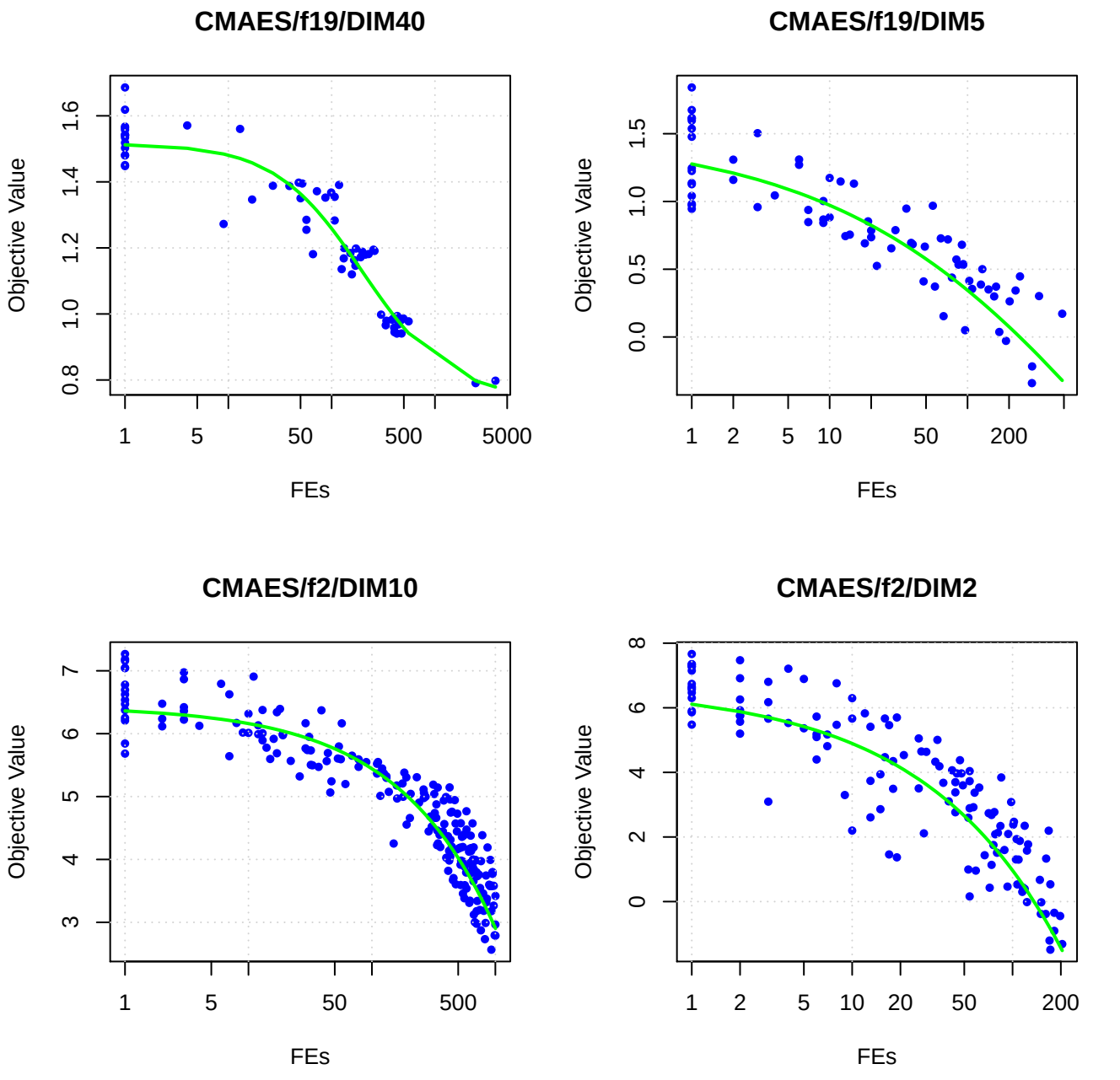
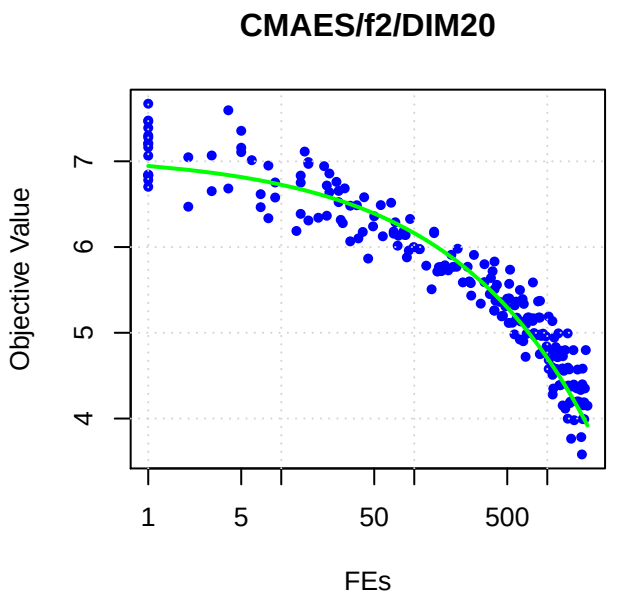
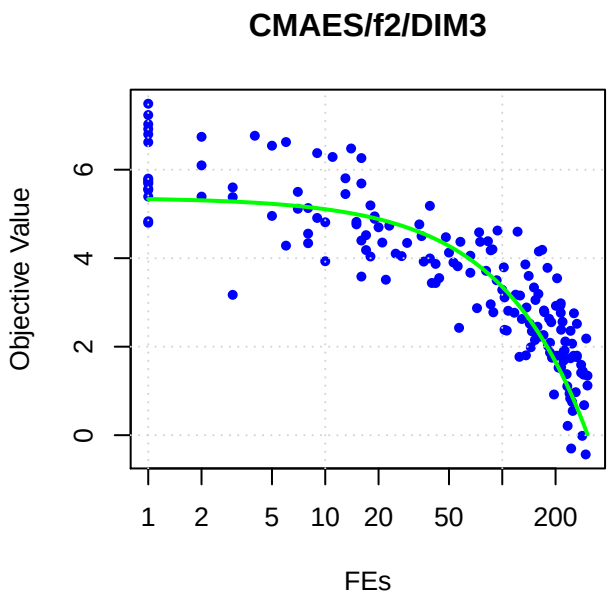
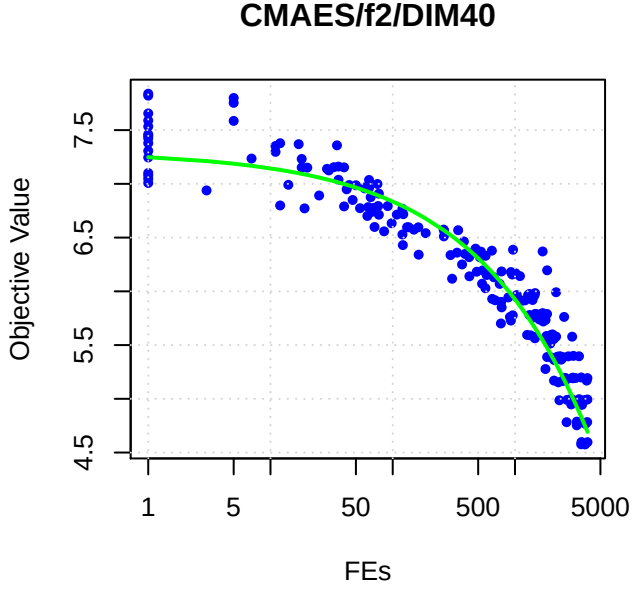
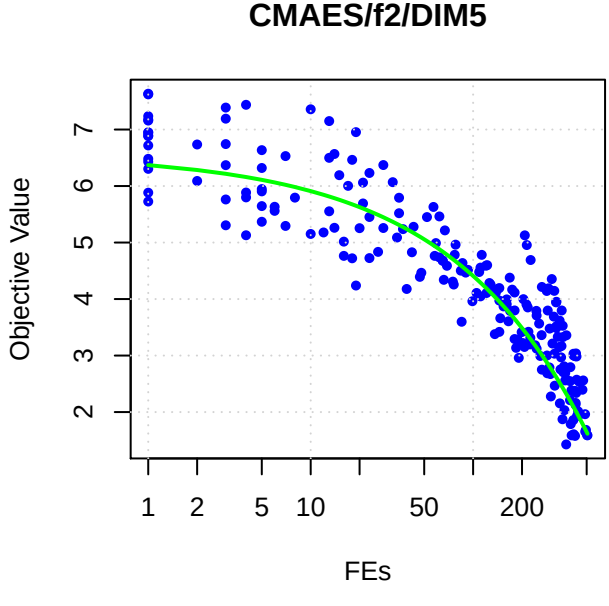
0.0
1.0
2.0
1
2
5
10
20
50
200
FEs

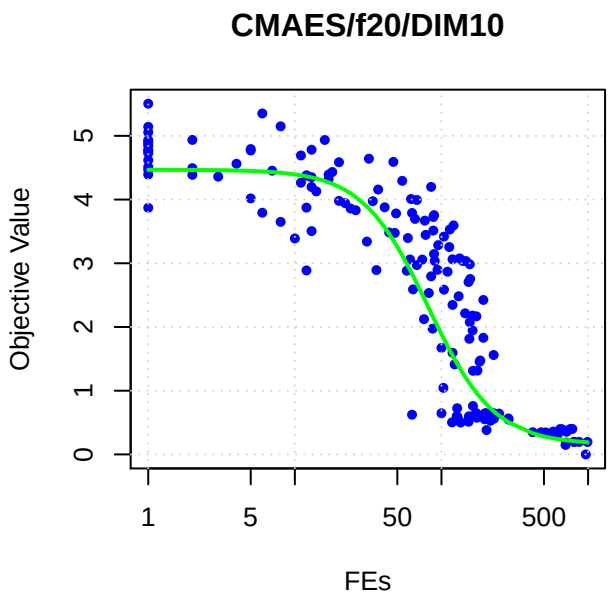

CMAES/f19/DIM40
Objective Value
0.8
1.0
1.2
1.4
1.6
1
5
50
500
5000
FEs
CMAES/f19/DIM5
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
50
200
FEs
CMAES/f2/DIM10
Objective Value
3
4
5
6
7
1
5
50
500
FEs
CMAES/f2/DIM2
Objective Value
0
2
4
6
8
1
2
5
10
20
50
200
FEs

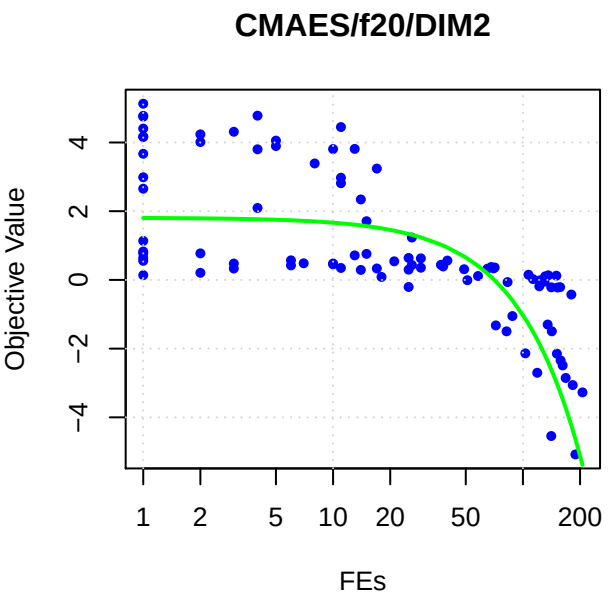

CMAES/f2/DIM20
Objective Value
FEs
4
5
6
7
1
5
50
500

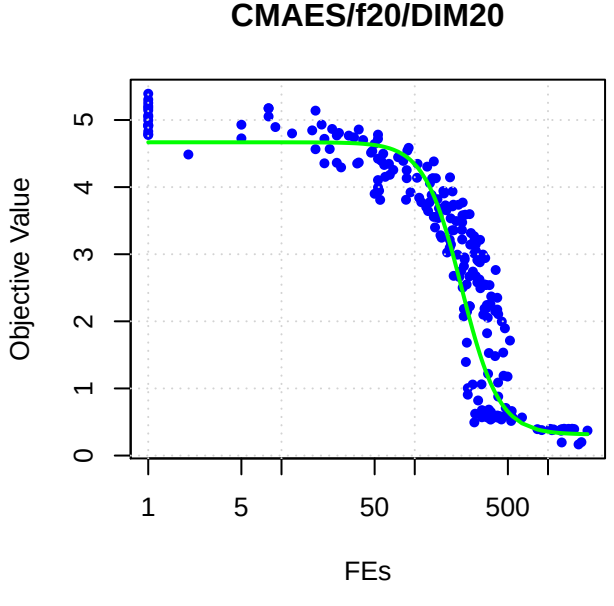

CMAES/f2/DIM3
Objective Value
FEs
0
2
4
6
1
2
5
10
20
50
200

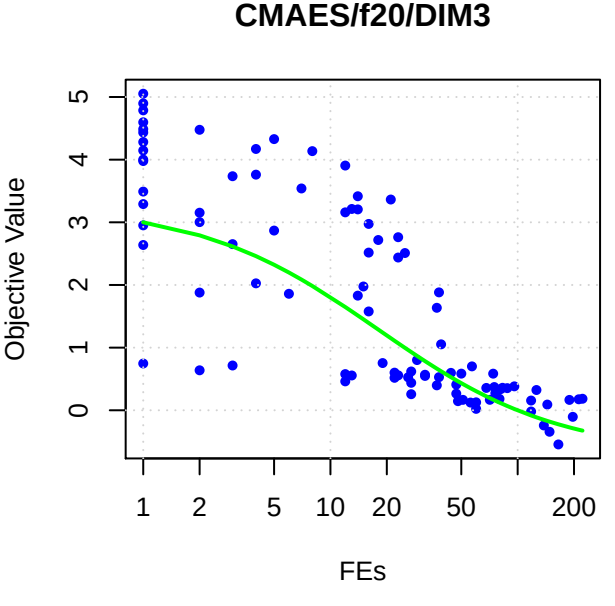

CMAES/f2/DIM40
Objective Value
FEs
4.5
5.5
6.5
7.5
1
5
50
500
5000

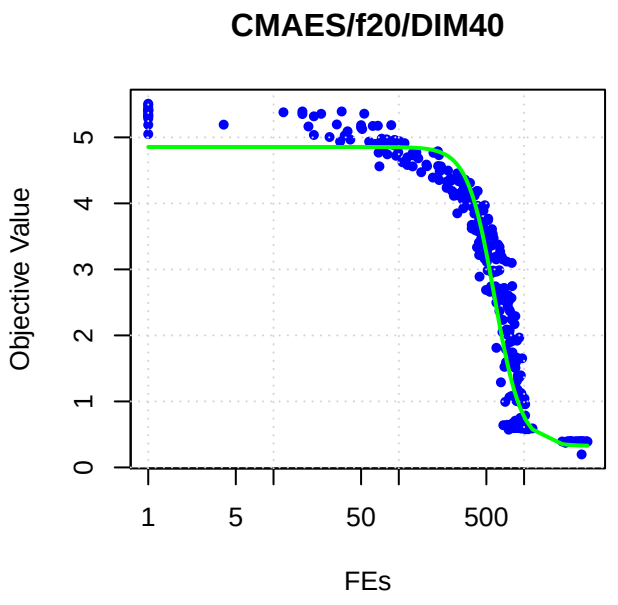

CMAES/f2/DIM5
Objective Value
FEs
2
3
4
5
6
7
1
2
5
10
50
200

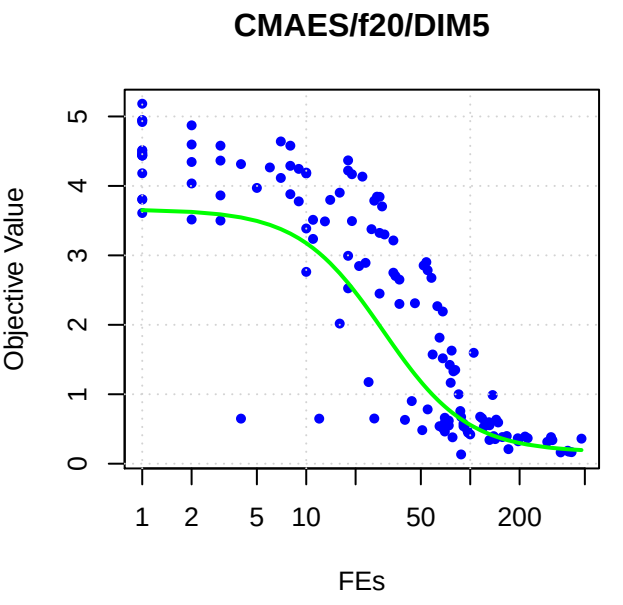

CMAES/f20/DIM10
Objective Value
0
1
2
3
4
5
1
5
50
500
FEs

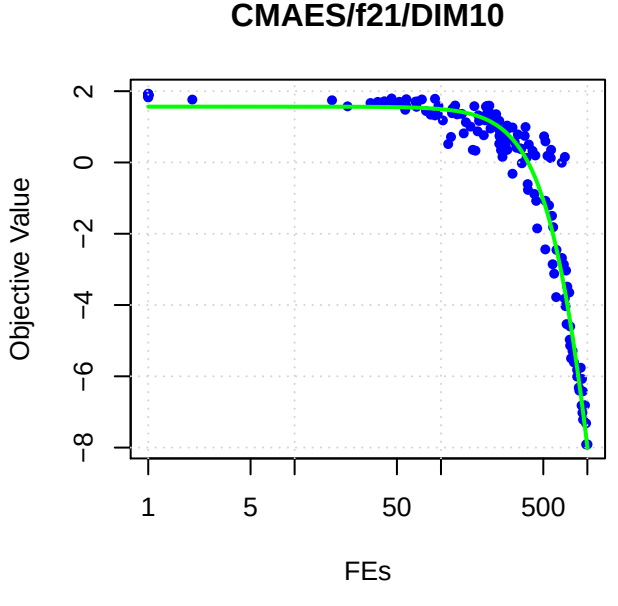

CMAES/f20/DIM2
Objective Value
−4
−2
0
2
4
1
2
5
10
20
50
200
FEs

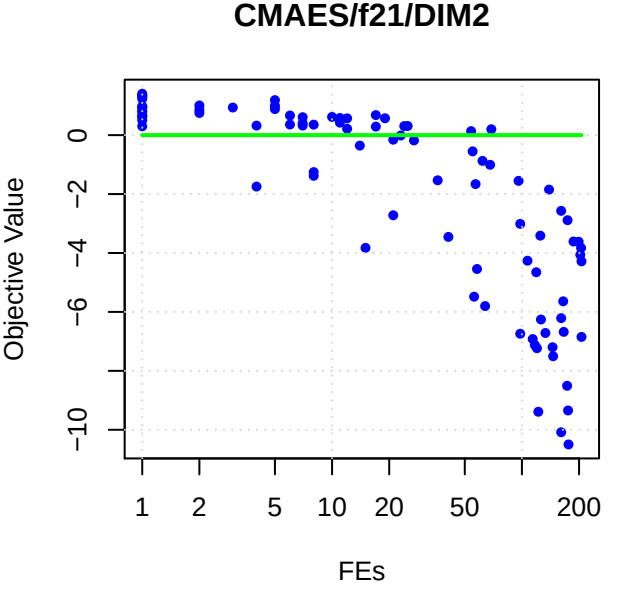

CMAES/f20/DIM20
Objective Value
0
1
2
3
4
5
1
5
50
500
FEs

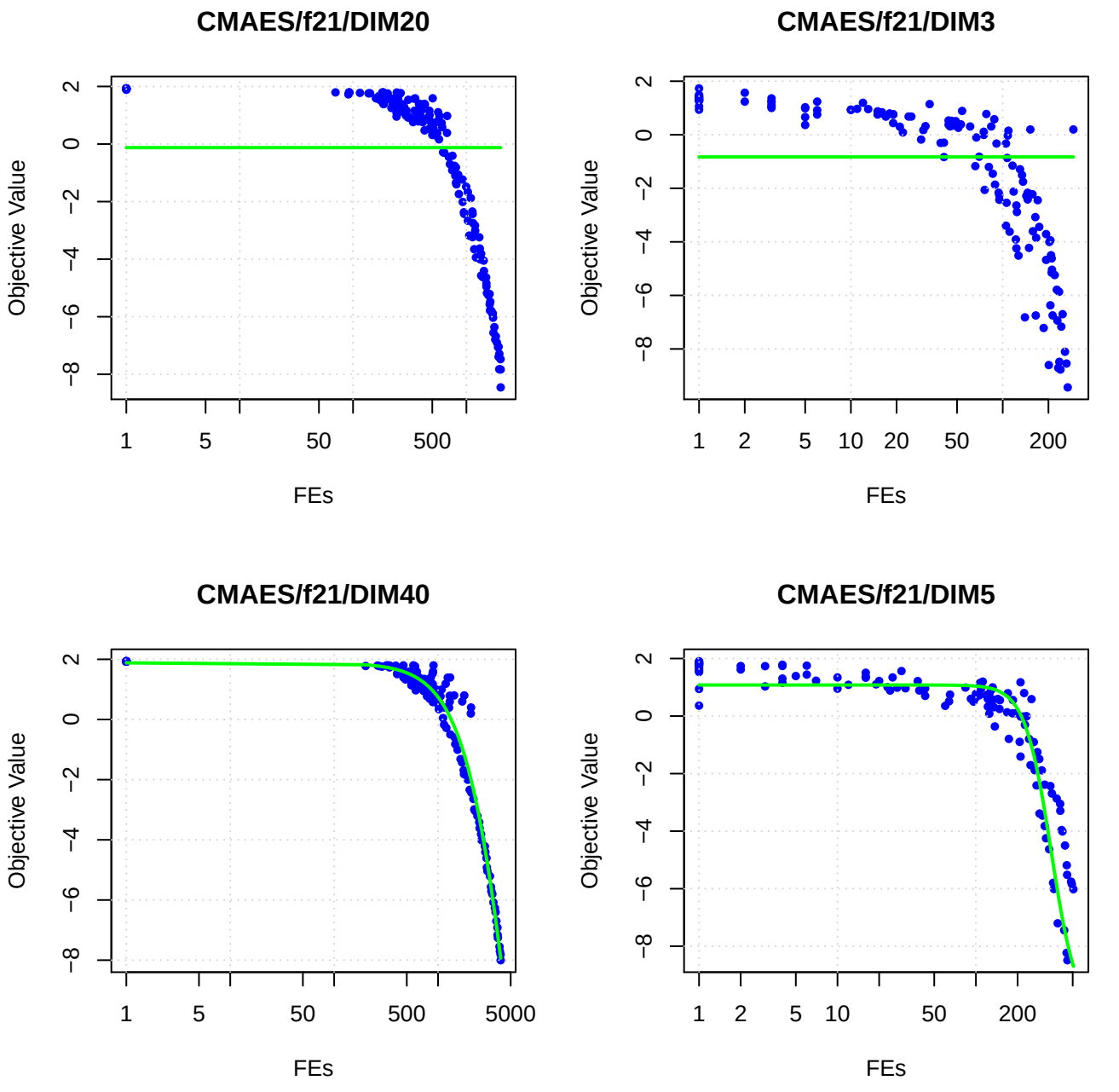

CMAES/f20/DIM3
Objective Value
0
1
2
3
4
5
1
2
5
10
20
50
200
FEs

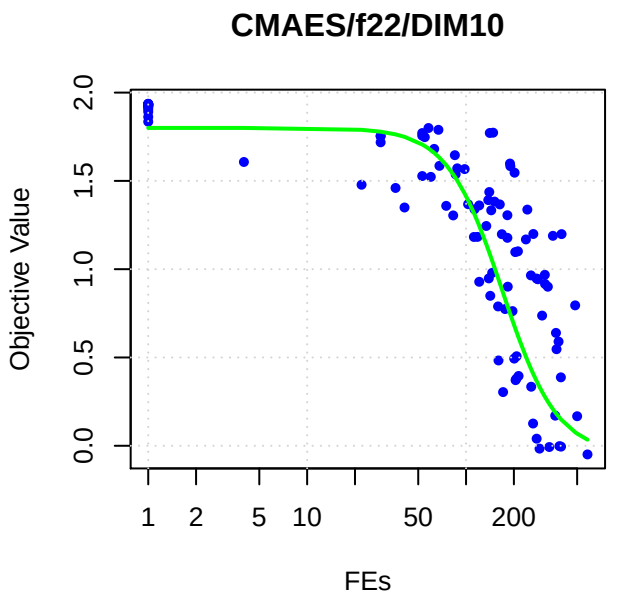

CMAES/f20/DIM40
Objective Value
0
1
2
3
4
5
1
5
50
500
FEs

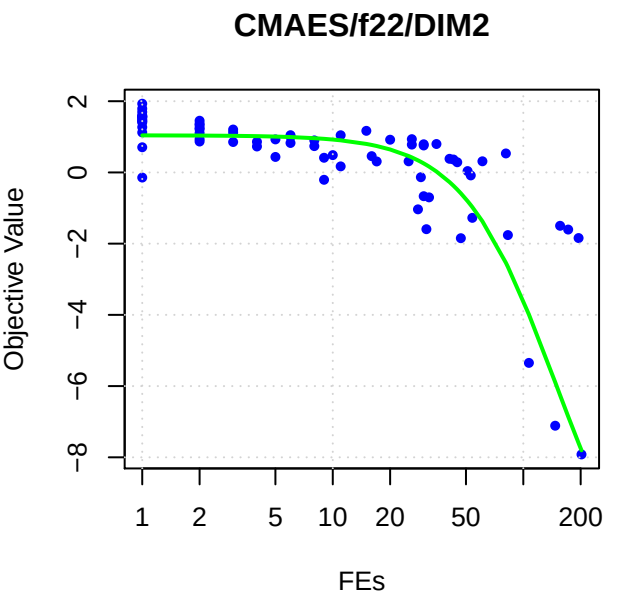

CMAES/f20/DIM5
Objective Value
0
1
2
3
4
5
1
2
5
10
50
200
FEs

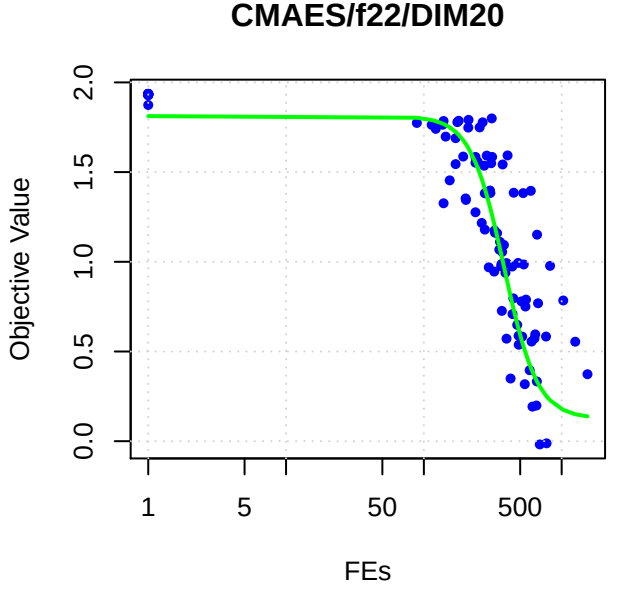

CMAES/f21/DIM10
Objective Value
2
0
−2
−4
−6
−8
1
5
50
500
FEs

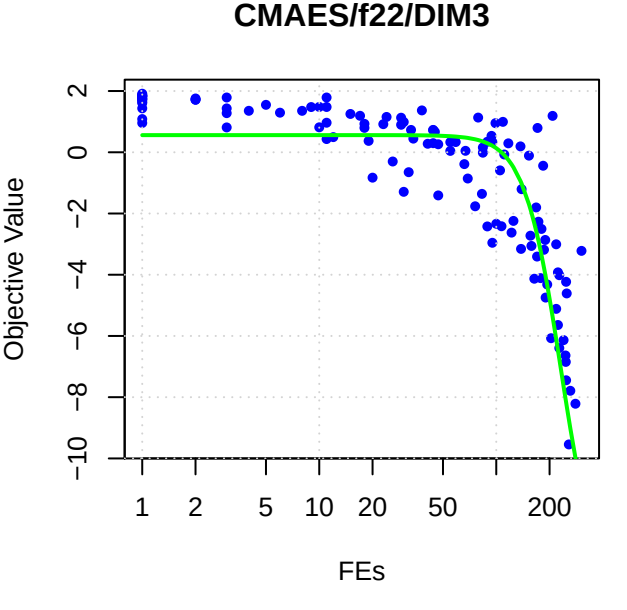

CMAES/f21/DIM2
Objective Value
0
−2
−4
−6
−10
1
2
5
10
20
50
200
FEs

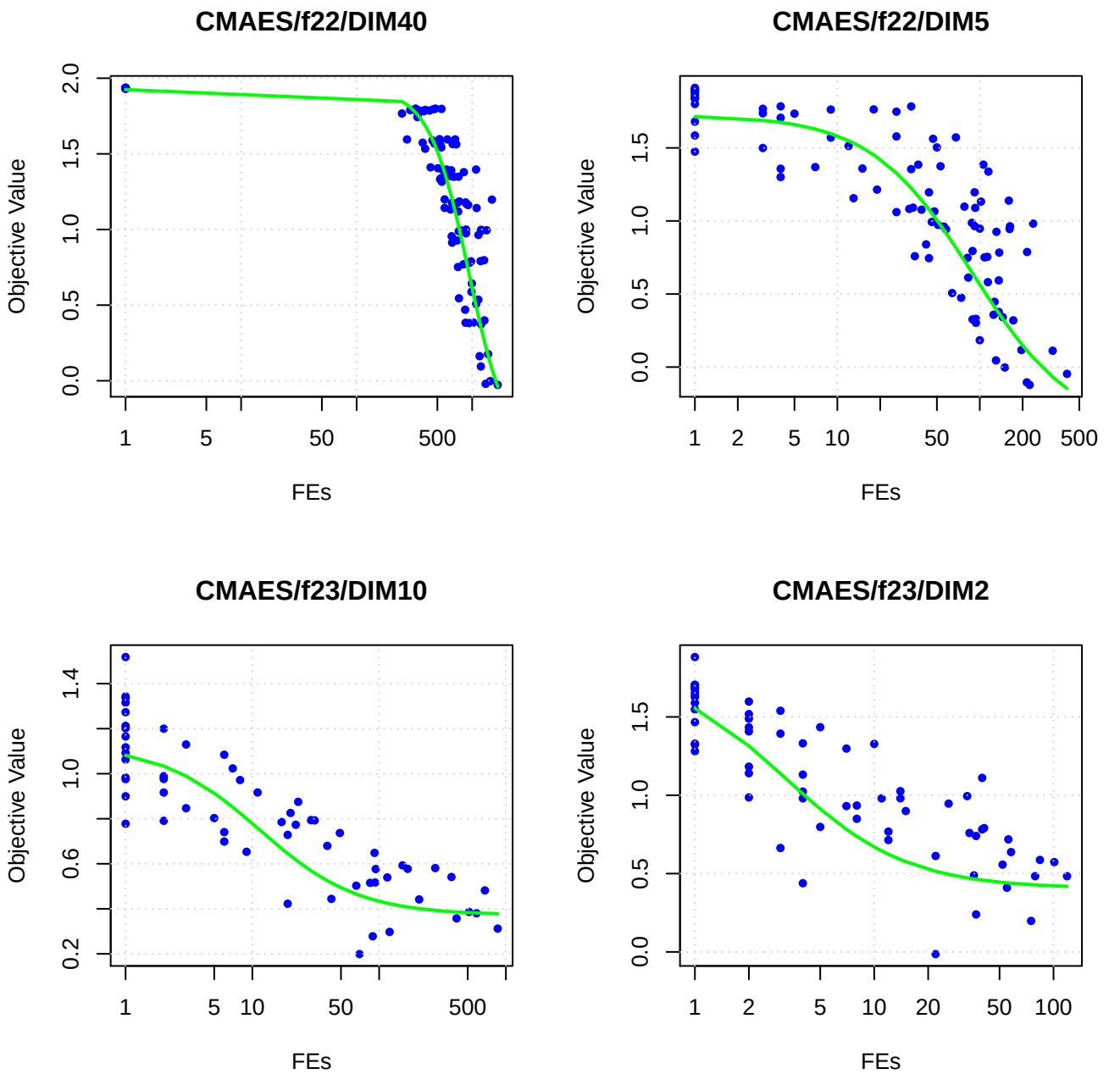

CMAES/f21/DIM20
Objective Value
FEs
CMAES/f21/DIM3
Objective Value
FEs
CMAES/f21/DIM40
Objective Value
FEs
CMAES/f21/DIM5
Objective Value
FEs

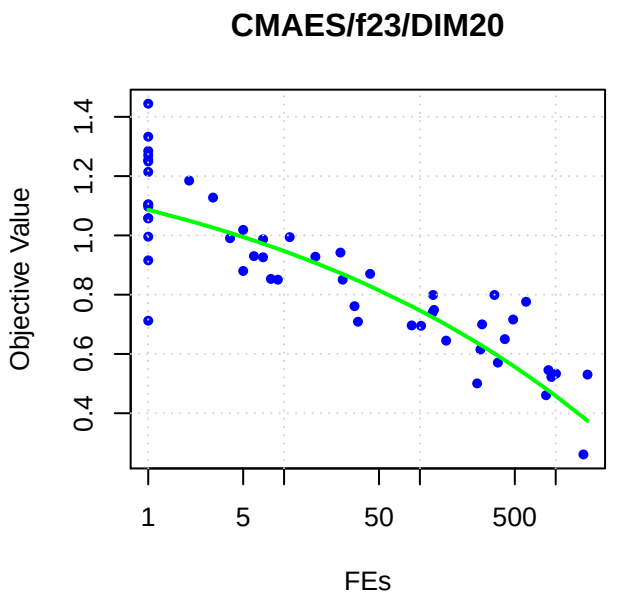

CMAES/f22/DIM10
Objective Value
0.0
0.5
1.0
1.5
2.0
1
2
5
10
50
200
FEs

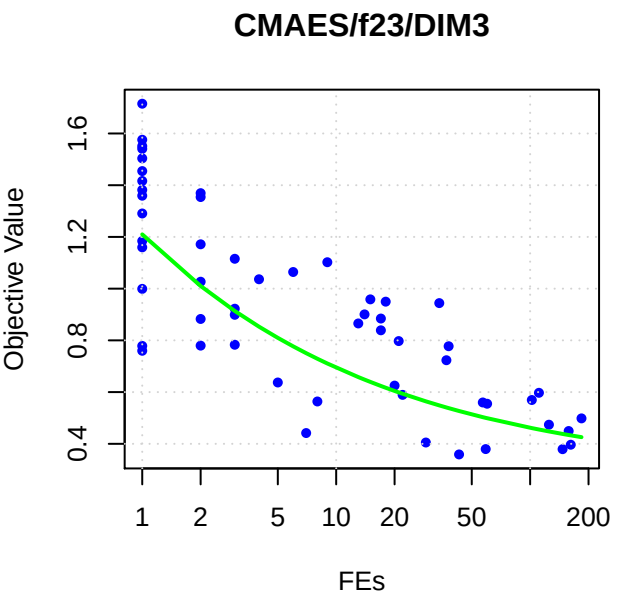

CMAES/f22/DIM2
Objective Value
2
0
−2
−4
−6
−8
1
2
5
10
20
50
200
FEs

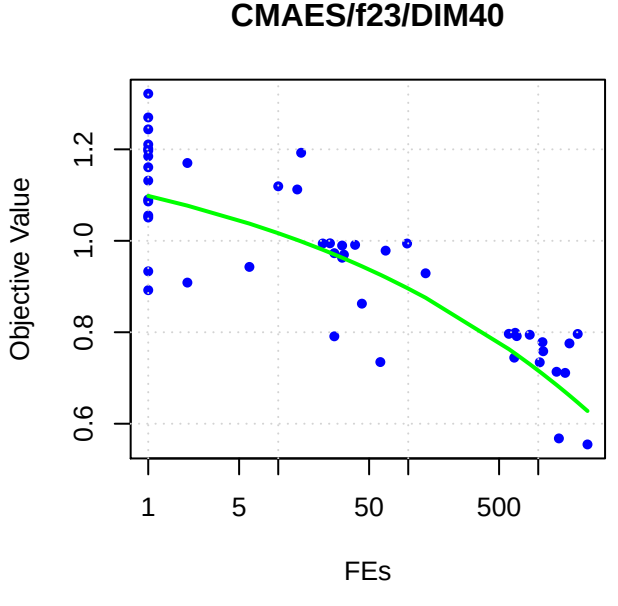

CMAES/f22/DIM20
Objective Value
0.0
0.5
1.0
1.5
2.0
1
5
50
500
FEs

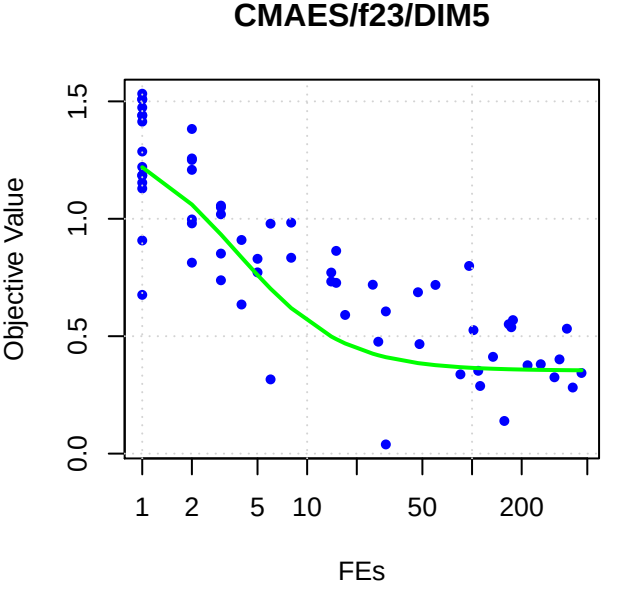

CMAES/f22/DIM3
Objective Value
2
0
−2
−4
−6
−8
−10
1
2
5
10
20
50
200
FEs

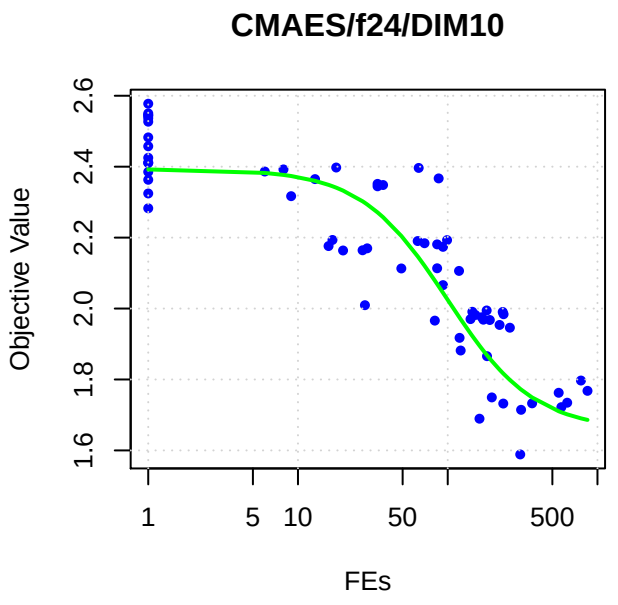

CMAES/f22/DIM40
Objective Value
0.0
0.5
1.0
1.5
2.0
1
5
50
500
FEs
CMAES/f22/DIM5
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
50
200
500
FEs
CMAES/f23/DIM10
Objective Value
0.2
0.6
1.0
1.4
1
5
10
50
500
FEs
CMAES/f23/DIM2
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
20
50
100
FEs

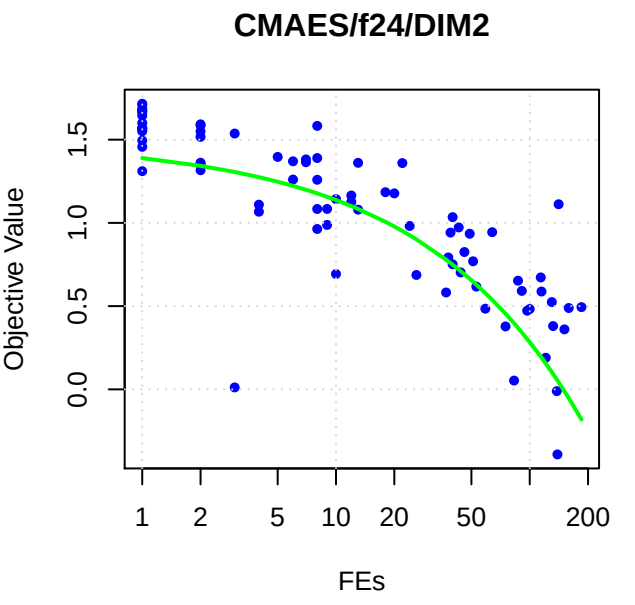

CMAES/f23/DIM20
Objective Value
0.4
0.6
0.8
1.0
1.2
1.4
1
5
50
500
FEs

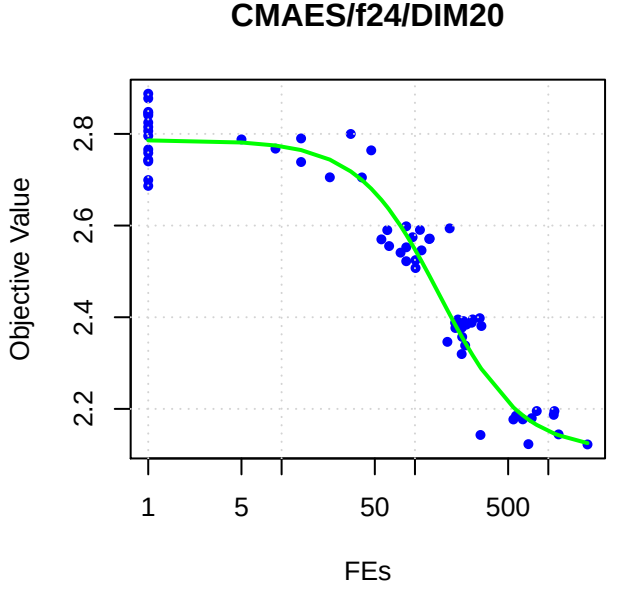

CMAES/f23/DIM3
Objective Value
0.4
0.8
1.2
1.6
1
2
5
10
20
50
200
FEs

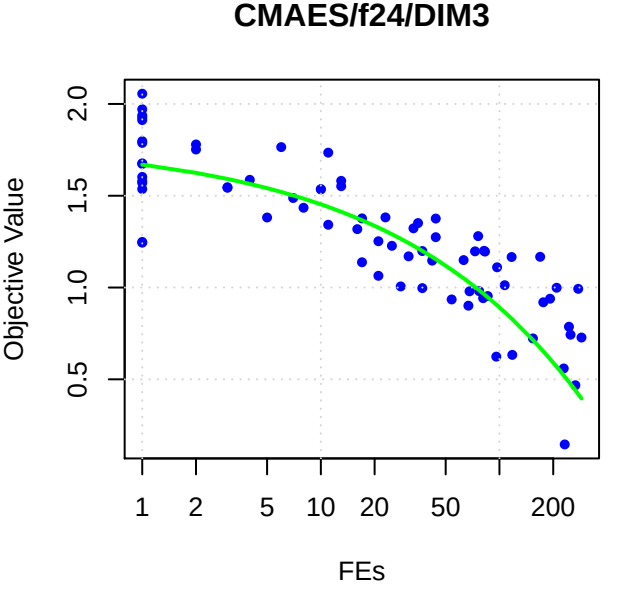

CMAES/f23/DIM40
Objective Value
0.6
0.8
1.0
1.2
1
5
50
500
FEs

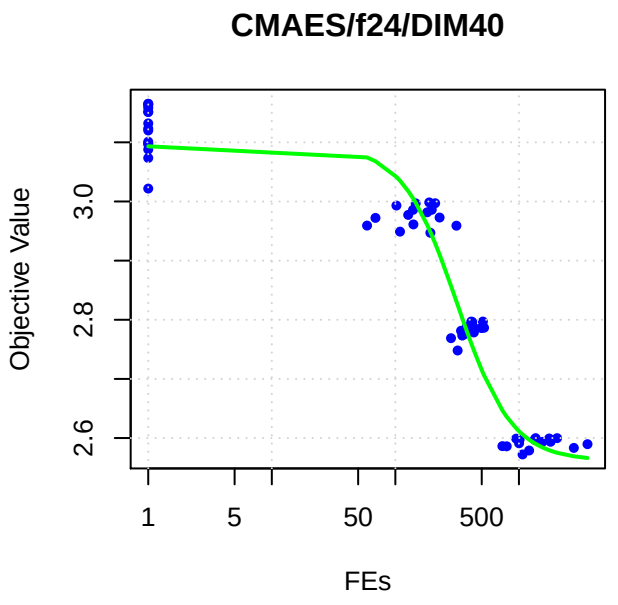

CMAES/f23/DIM5
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
50
200
FEs

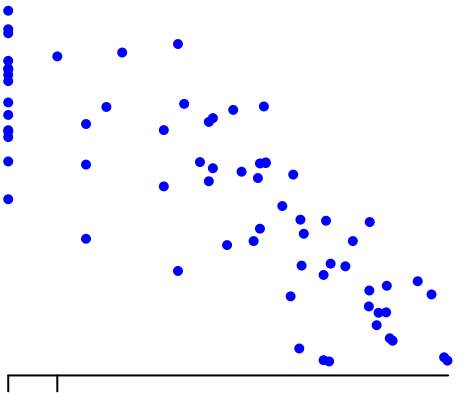

CMAES/f24/DIM10
Objective Value
1.6
1.8
2.0
2.2
2.4
2.6
1
5
10
50
500
FEs

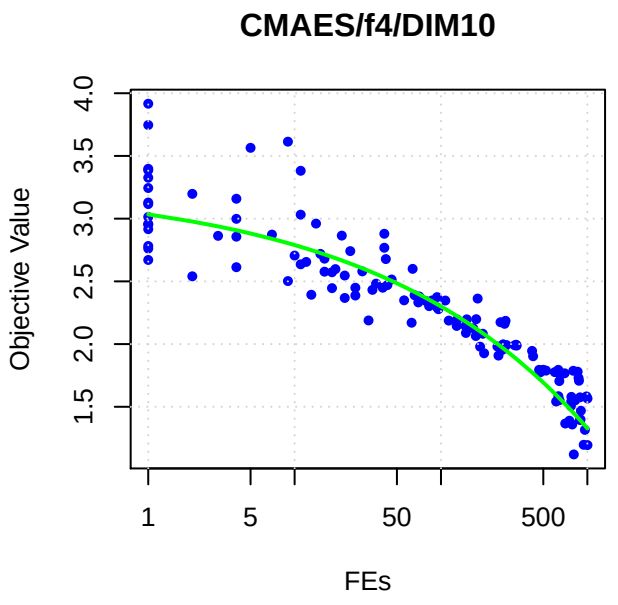

CMAES/f24/DIM2
Objective Value
0.0
0.5
1.0
1.5
1
2
5
10
20
50
200
FEs

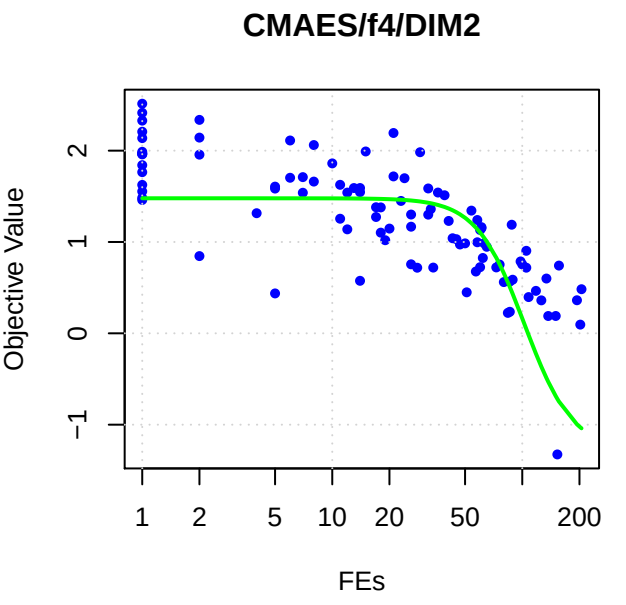

CMAES/f24/DIM20
Objective Value
2.2
2.4
2.6
2.8
1
5
50
500
FEs

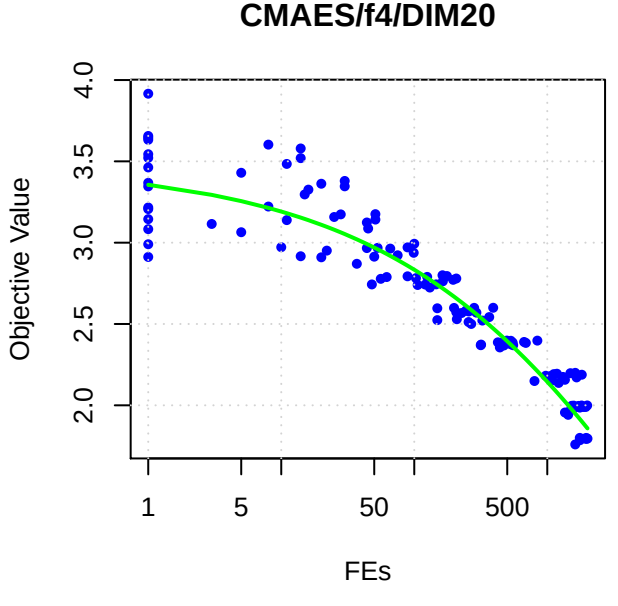

CMAES/f24/DIM3
Objective Value
0.5
1.0
1.5
2.0
1
2
5
10
20
50
200
FEs

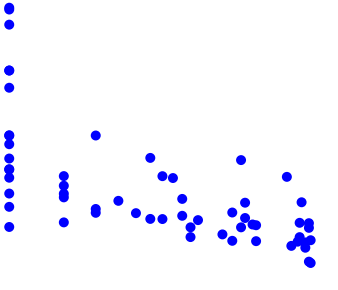

CMAES/f24/DIM40
Objective Value
3.0
2.8
2.6
1
5
50
500
FEs

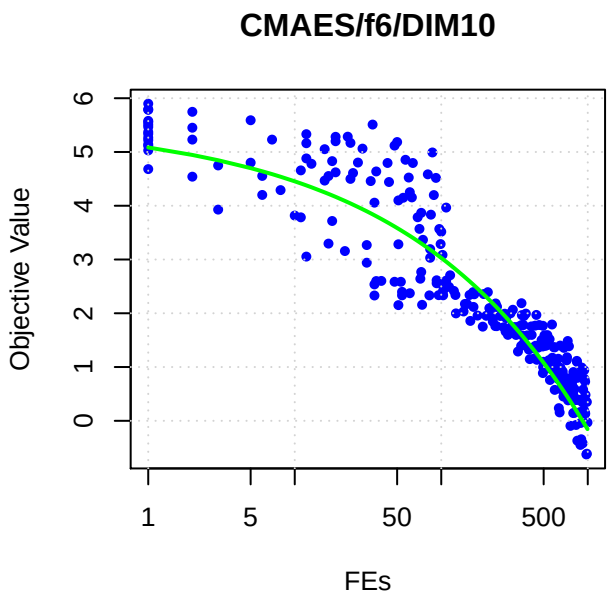


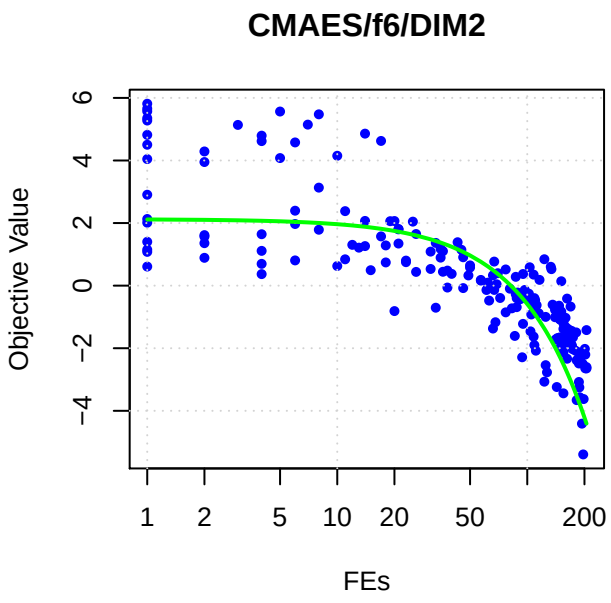

CMAES/f4/DIM10
Objective Value
4.0
3.5
3.0
2.5
2.0
1.5
1
5
50
500
FEs

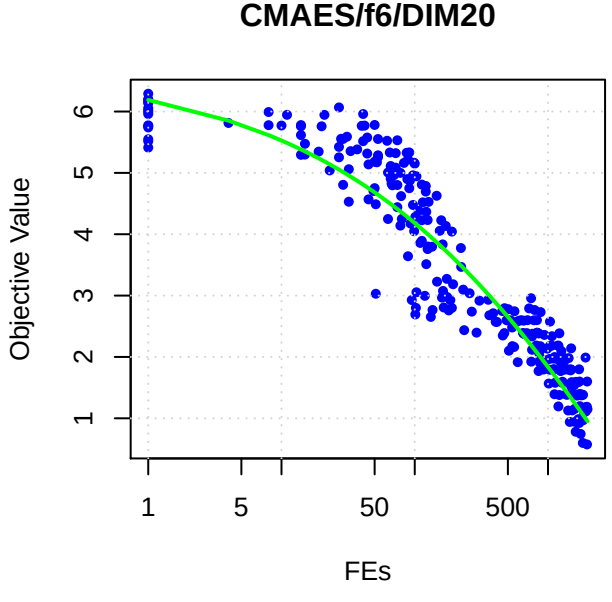

CMAES/f4/DIM2
Objective Value
2
1
0
−1
1
2
5
10
20
50
200
FEs

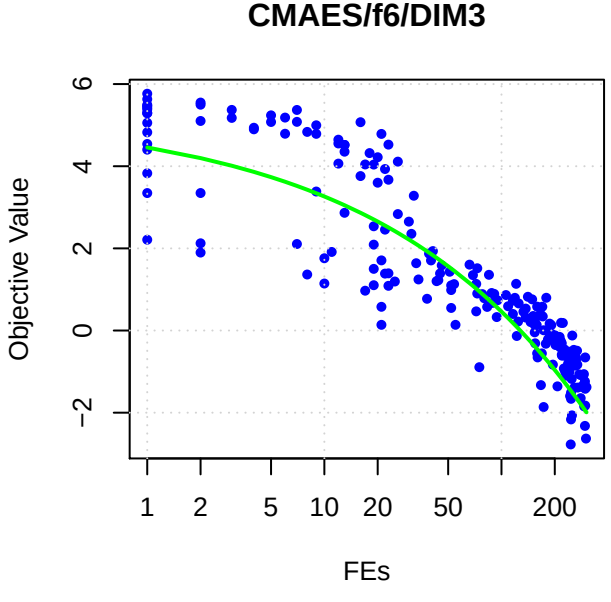

CMAES/f4/DIM20
Objective Value
4.0
3.5
3.0
2.5
2.0
1
5
50
500
FEs

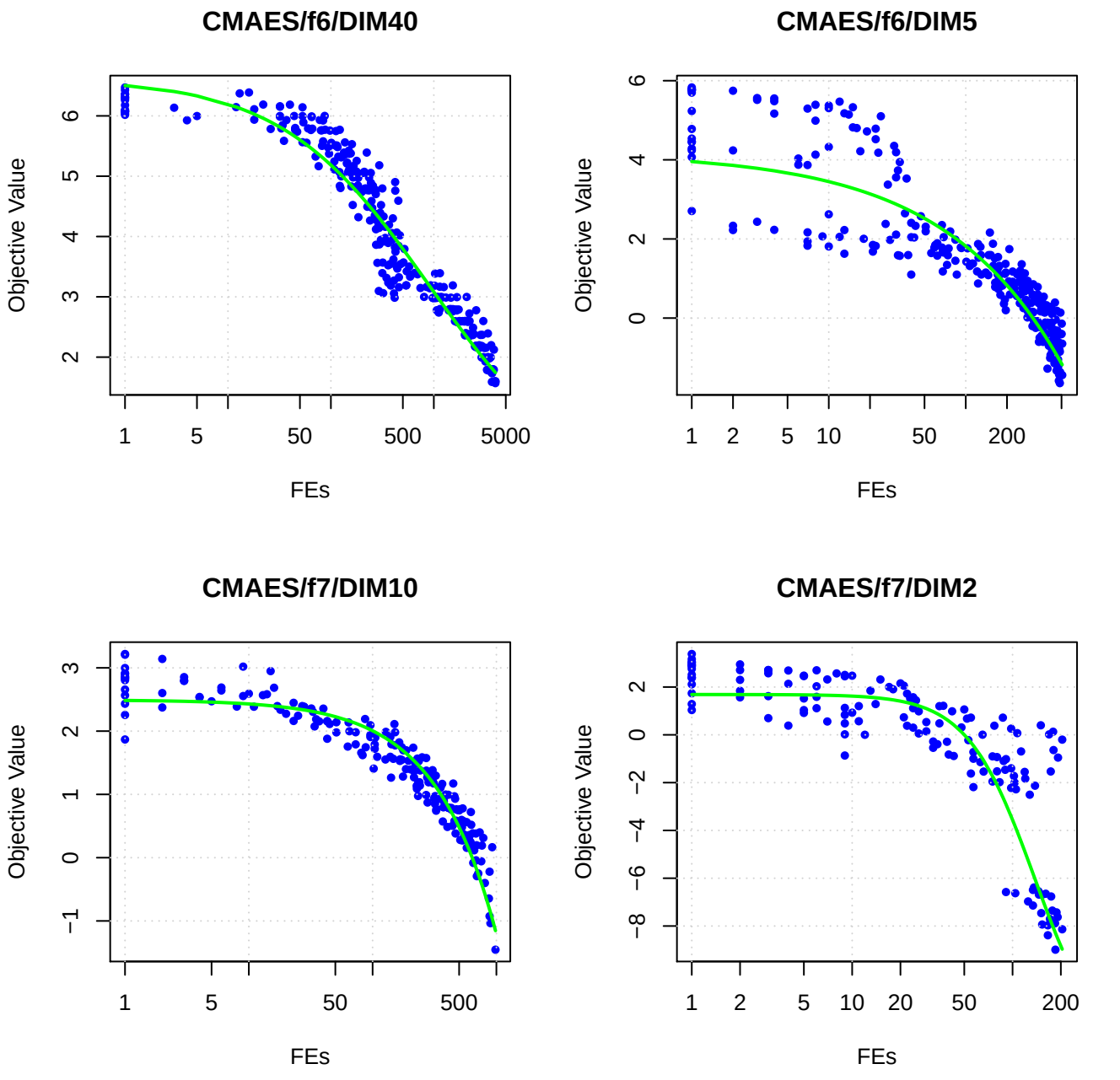


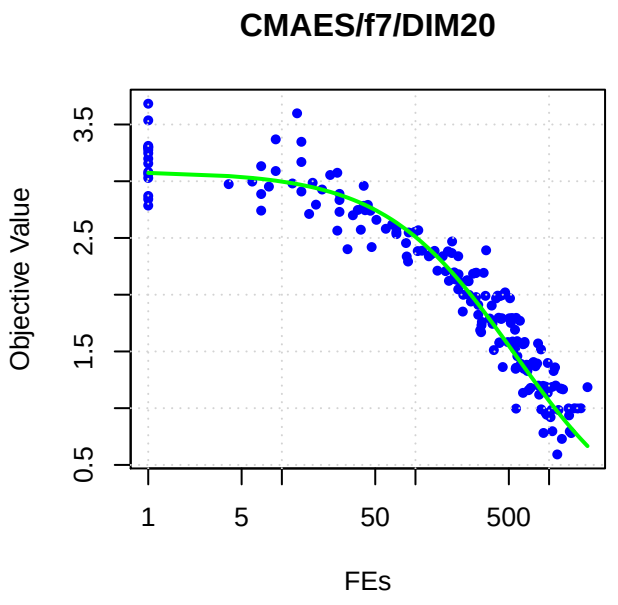

CMAES/f6/DIM10
Objective Value
FEs
0
1
2
3
4
5
6
1
5
50
500

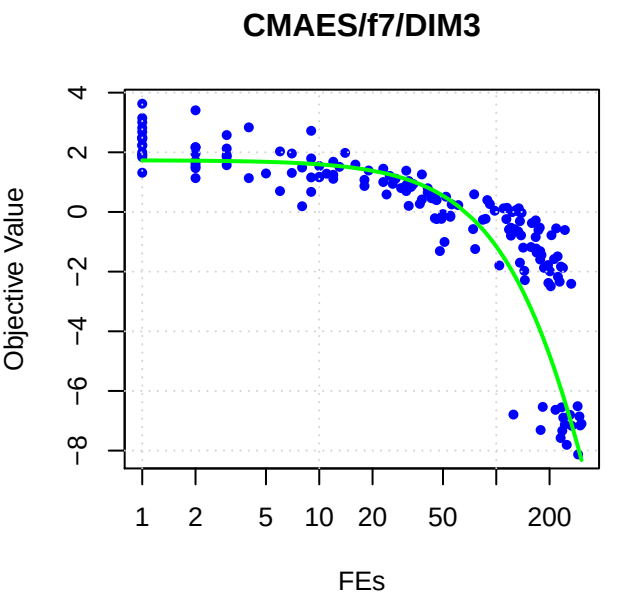

CMAES/f6/DIM2
Objective Value
FEs
−4
−2
0
2
4
6
1
2
5
10
20
50
200


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


CMAES/f6/DIM3
Objective Value
FEs
−2
0
2
4
6
1
2
5
10
20
50
200


CMAES/f6/DIM40
Objective Value
FEs
CMAES/f6/DIM5
Objective Value
FEs
CMAES/f7/DIM10
Objective Value
FEs
CMAES/f7/DIM2
Objective Value
FEs


CMAES/f7/DIM20
Objective Value
0.5
1.5
2.5
3.5
1
5
50
500
FEs


CMAES/f7/DIM3
Objective Value
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−6
−4
−2
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1
2
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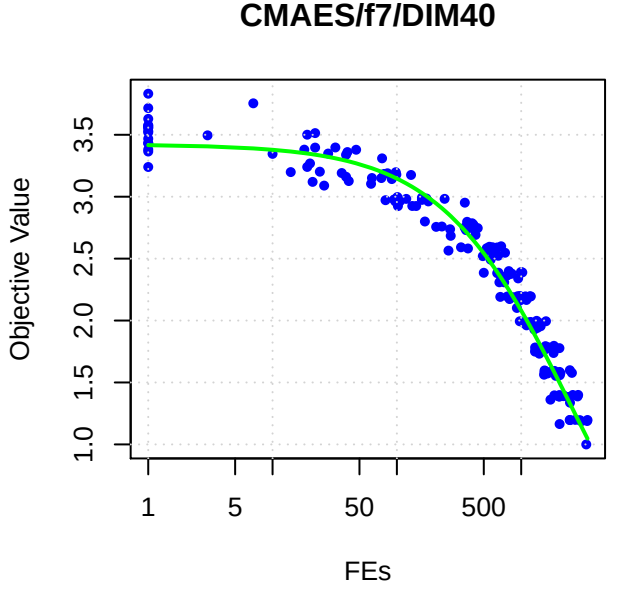
200
FEs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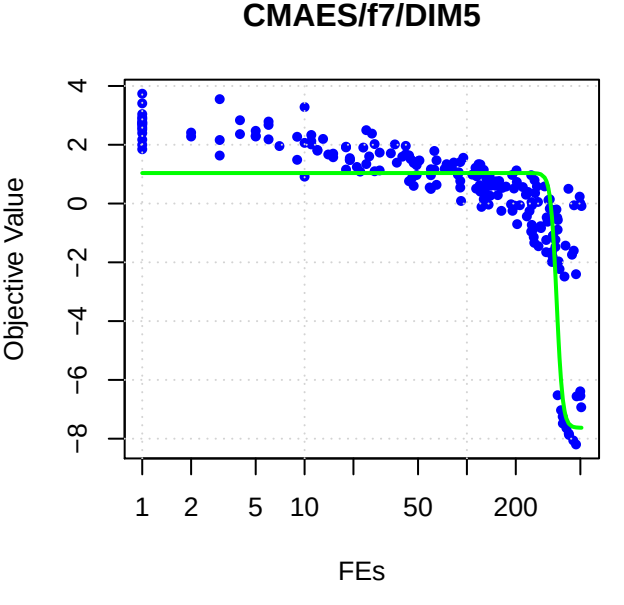
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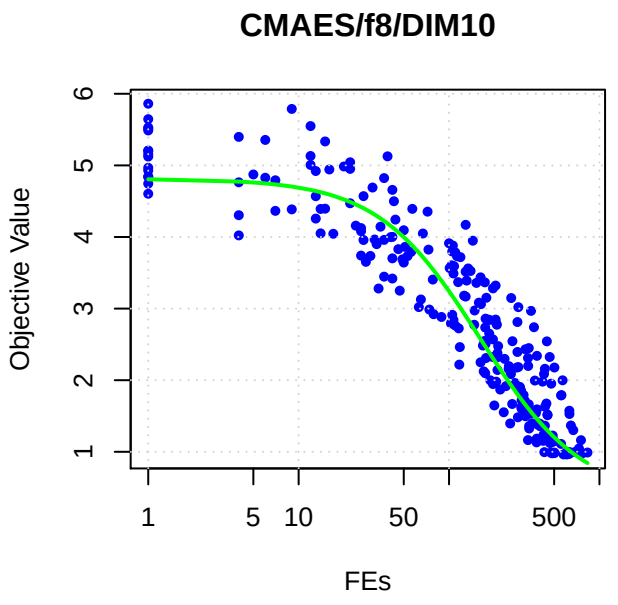
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Objective Value
FEs
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3
4
5
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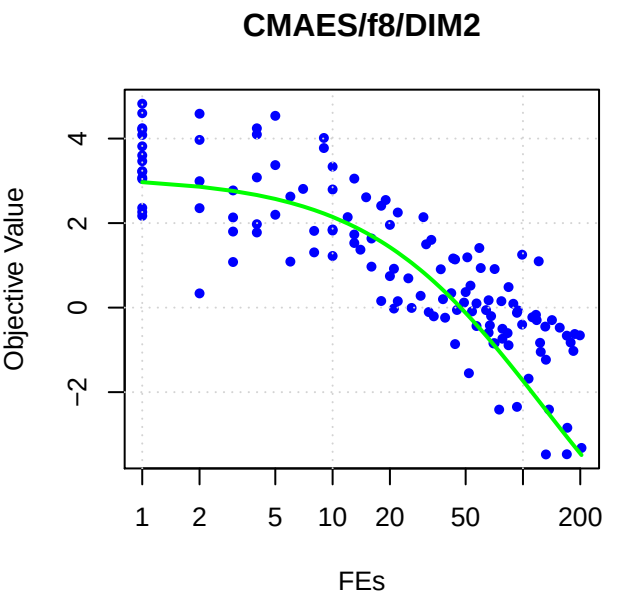
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Objective Value
FEs
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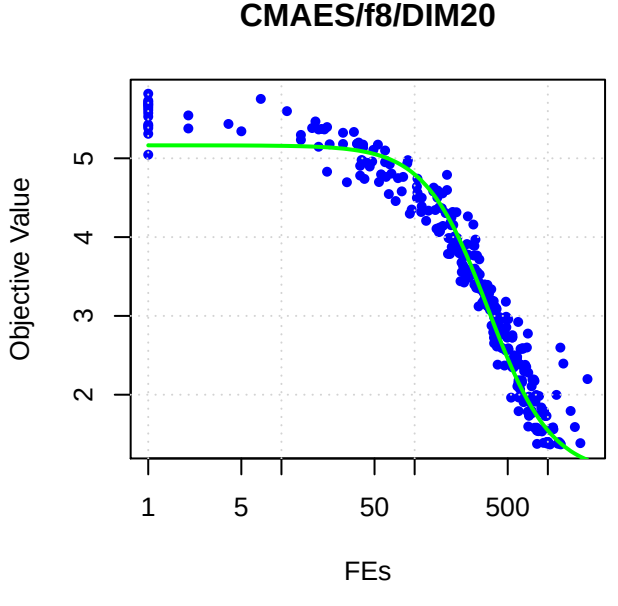
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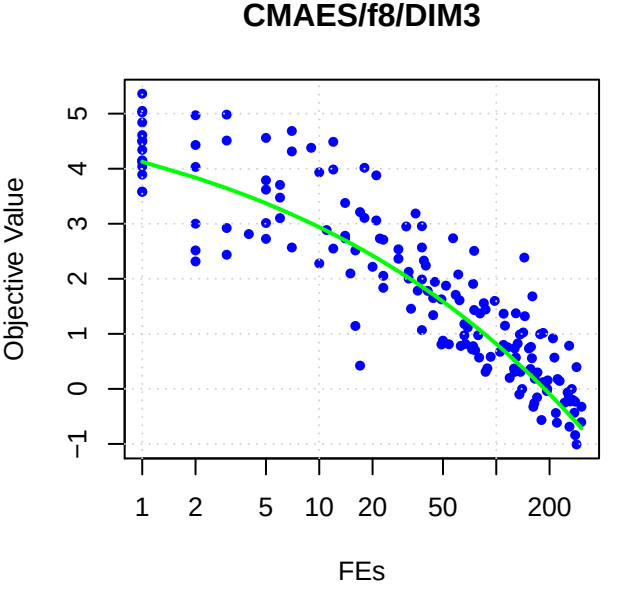
5


CMAES/f8/DIM3
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FEs
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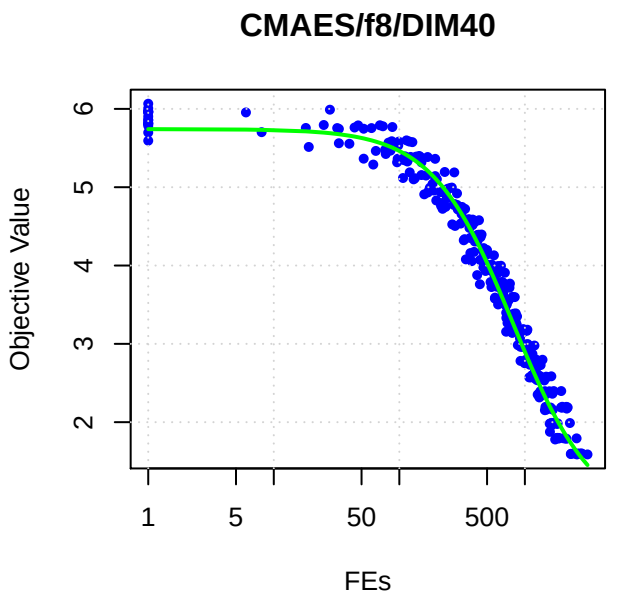
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FEs
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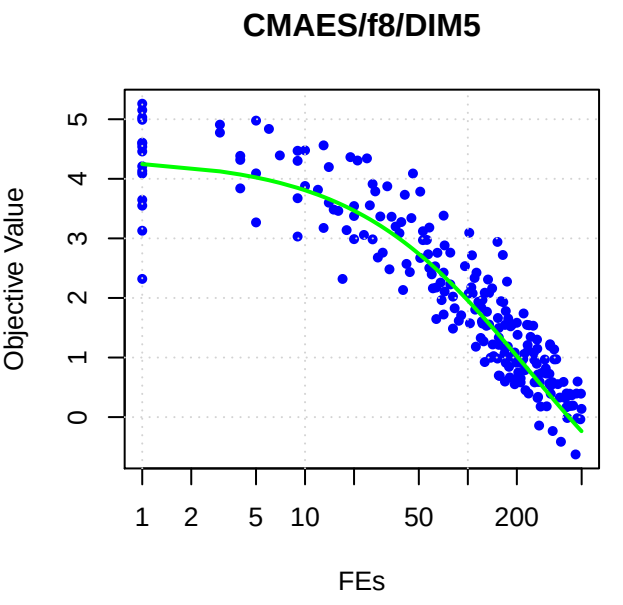
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Objective Value
FEs
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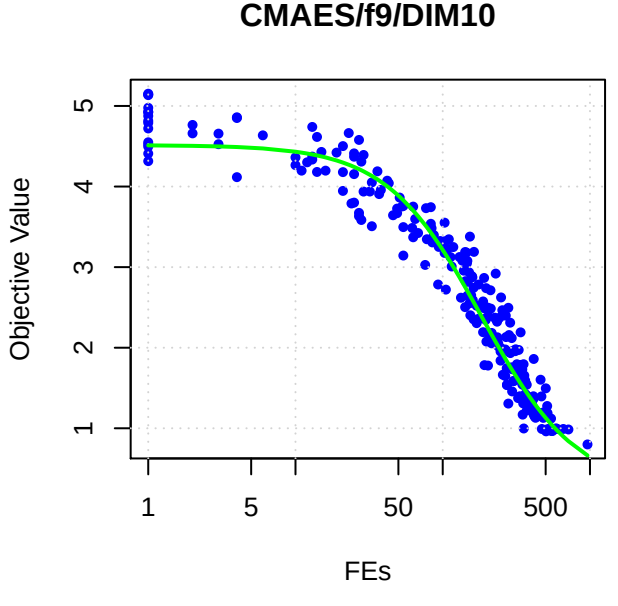
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Objective Value
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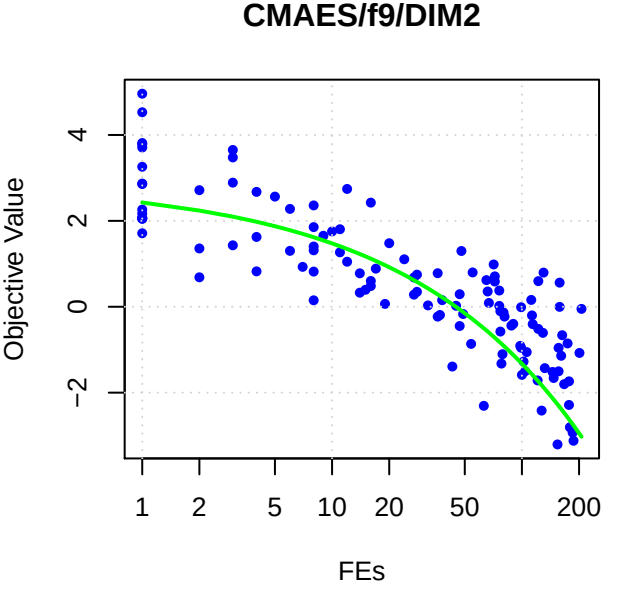
CMAES/f9/DIM2
Objective Value
FEs
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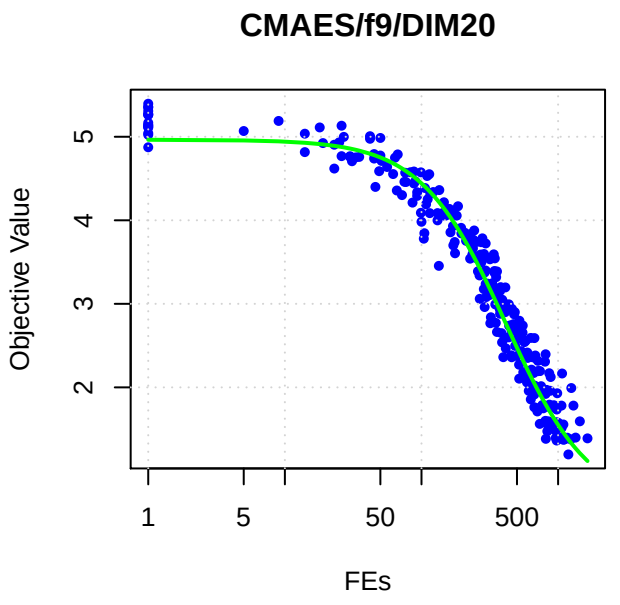
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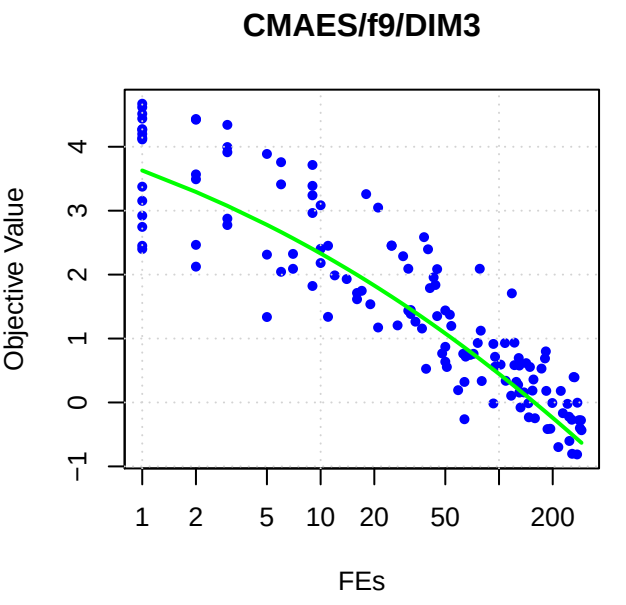
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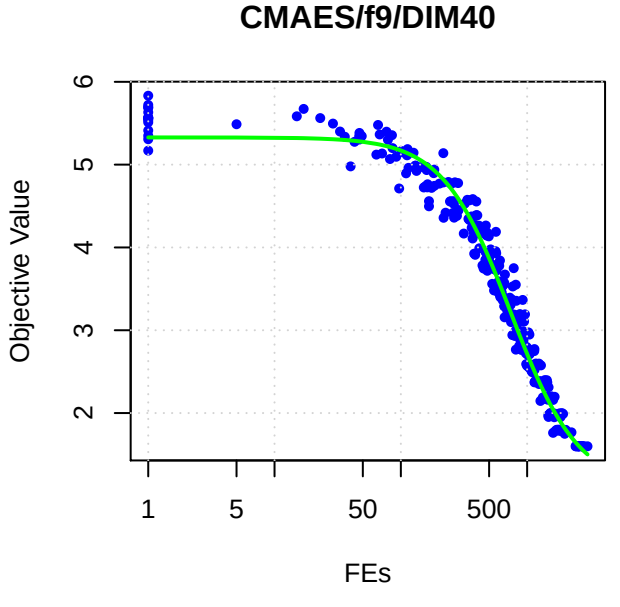
CMAES/f9/DIM40
Objective Value
FEs
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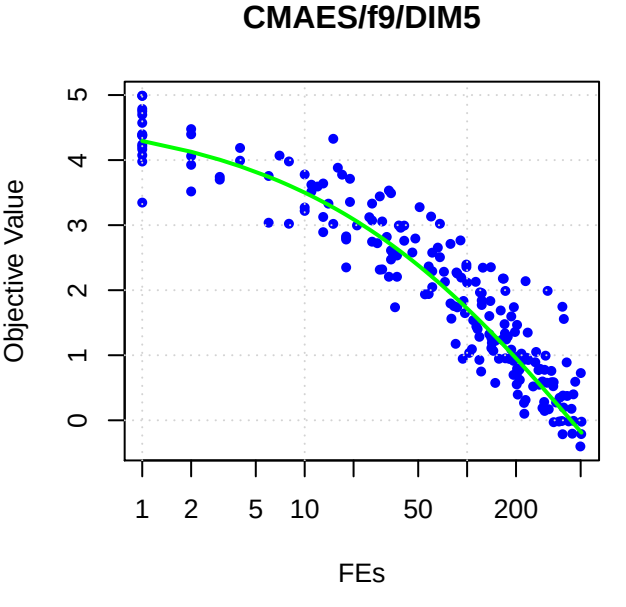
CMAES/f9/DIM5
Objective Value
FEs
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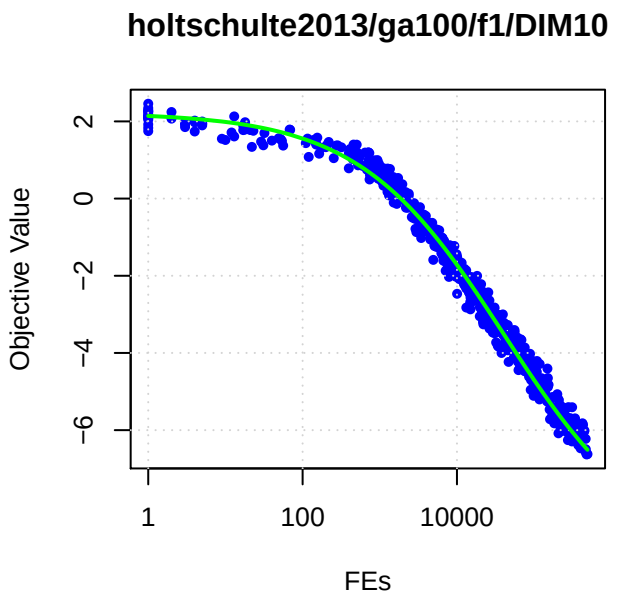
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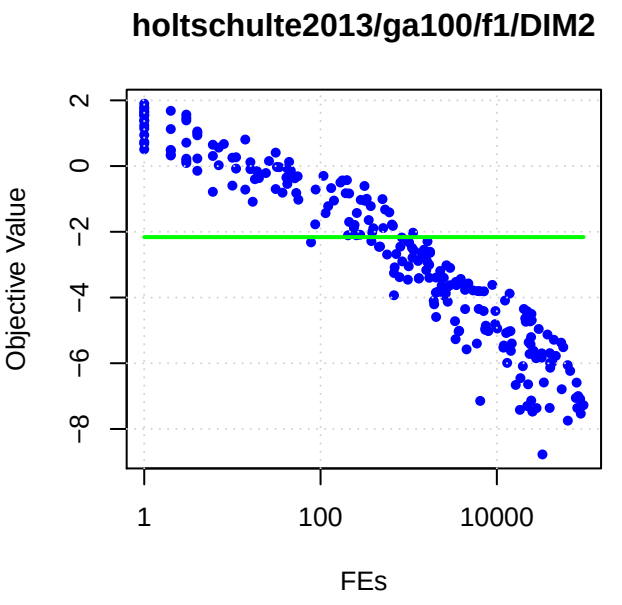
FEs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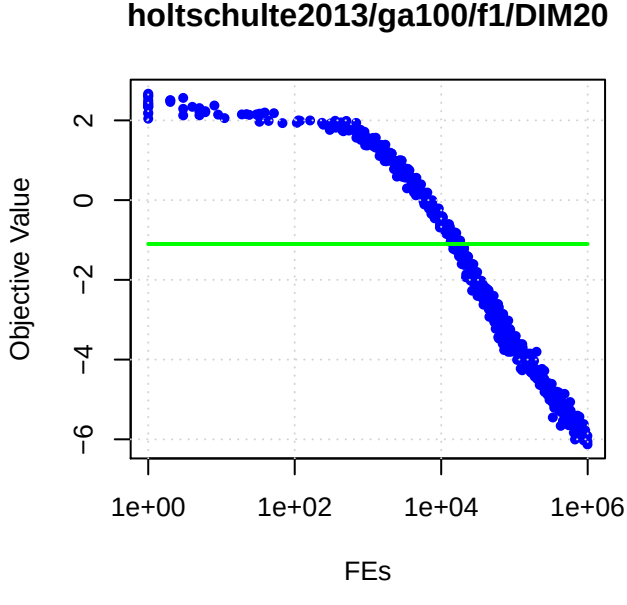
FEs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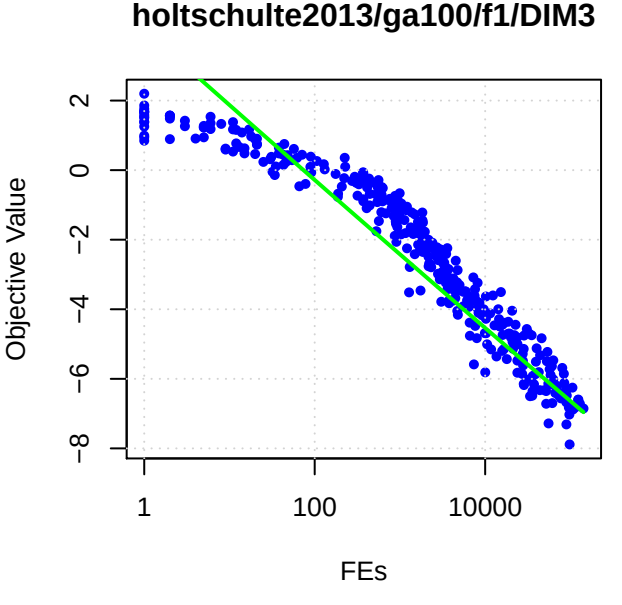
FEs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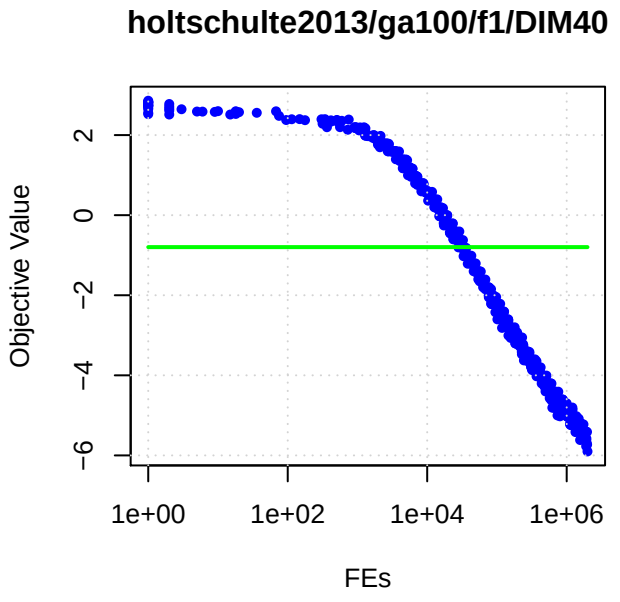
FEs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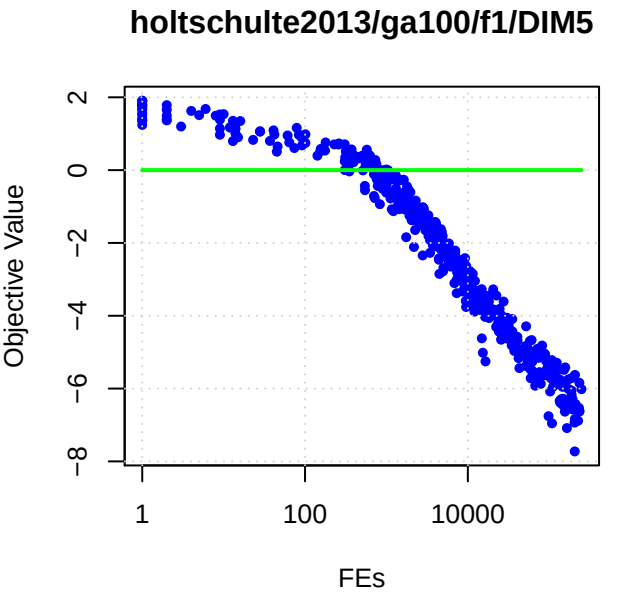
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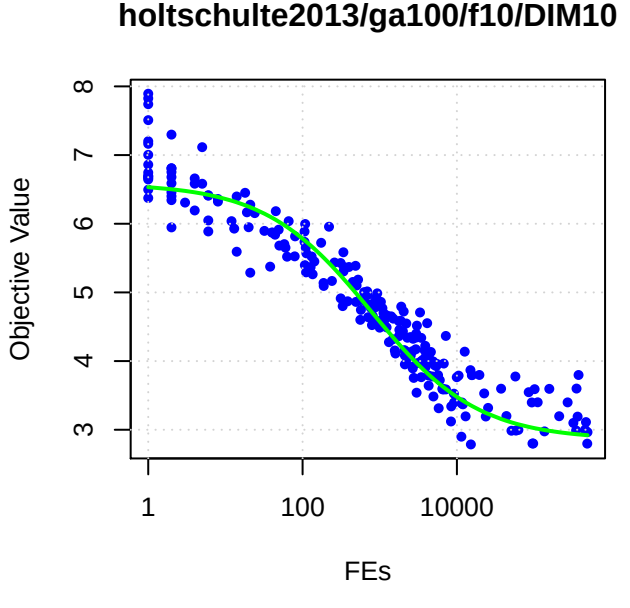
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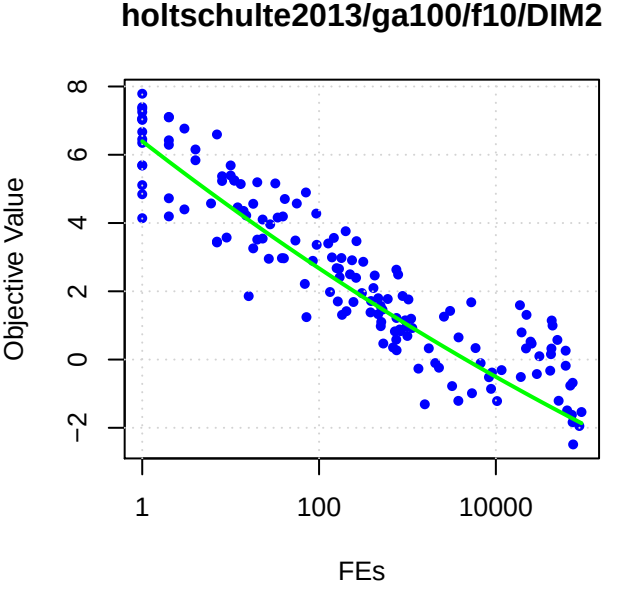
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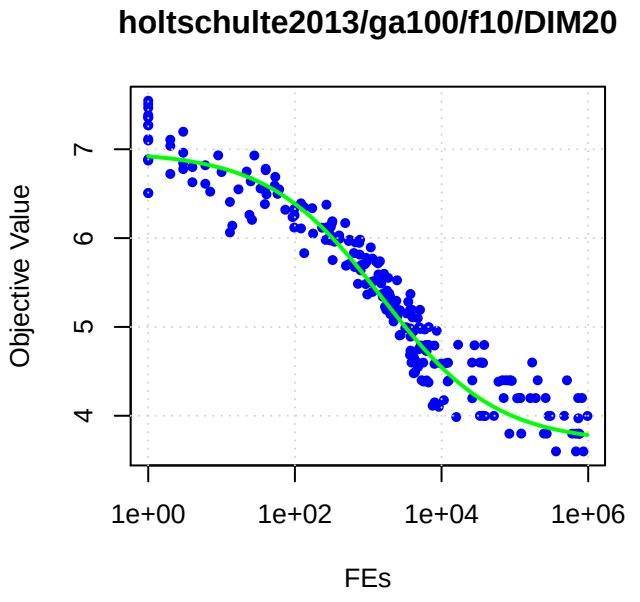
FEs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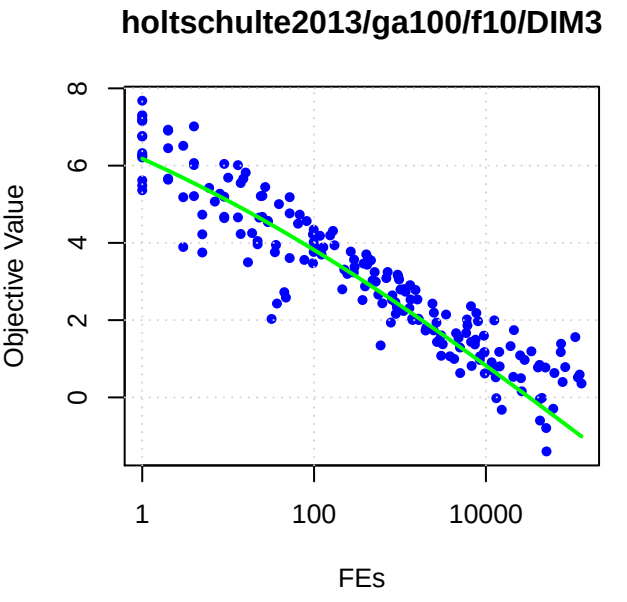
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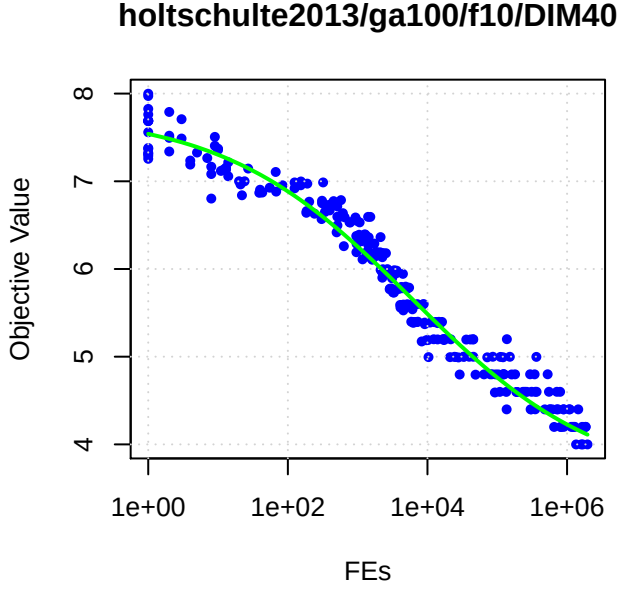
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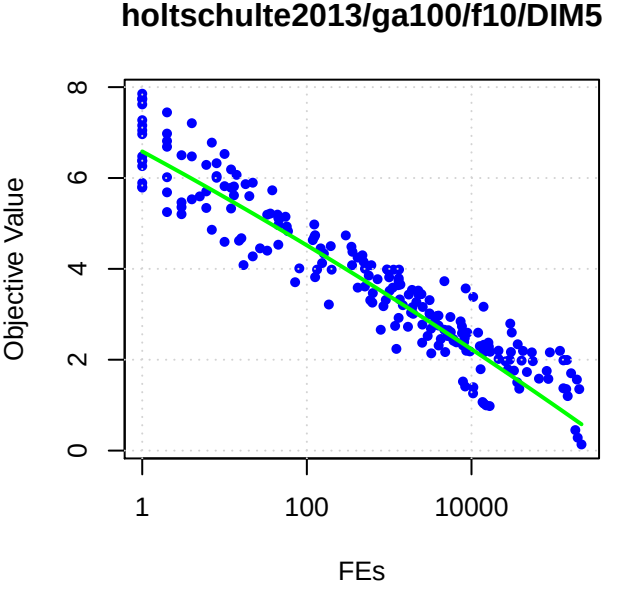
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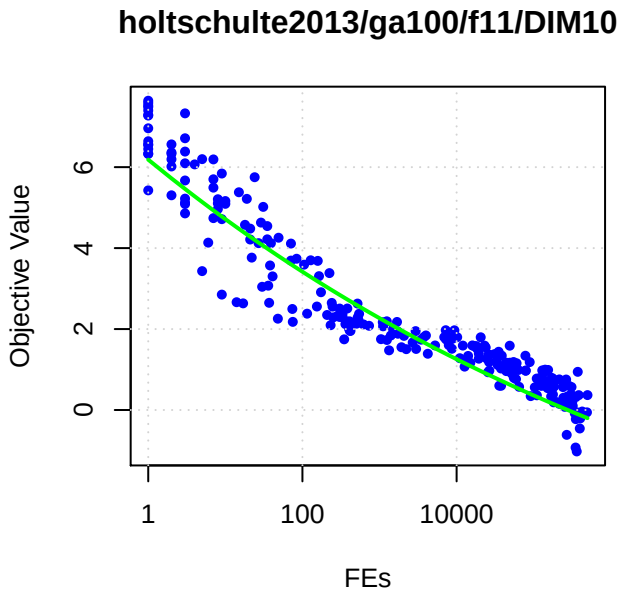
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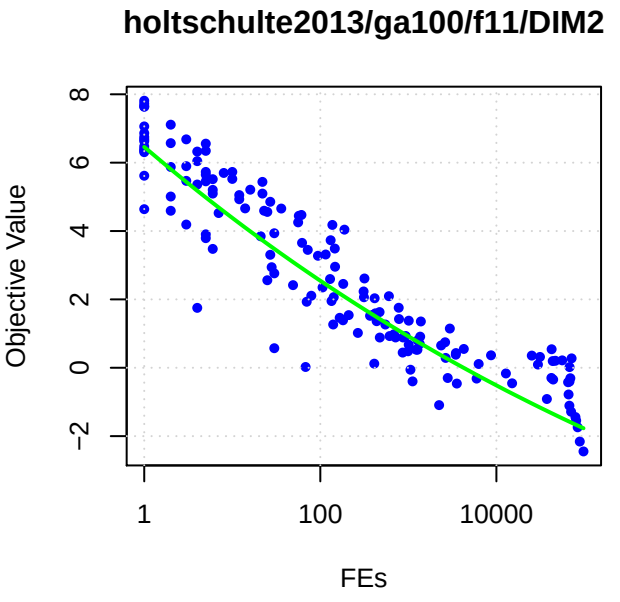
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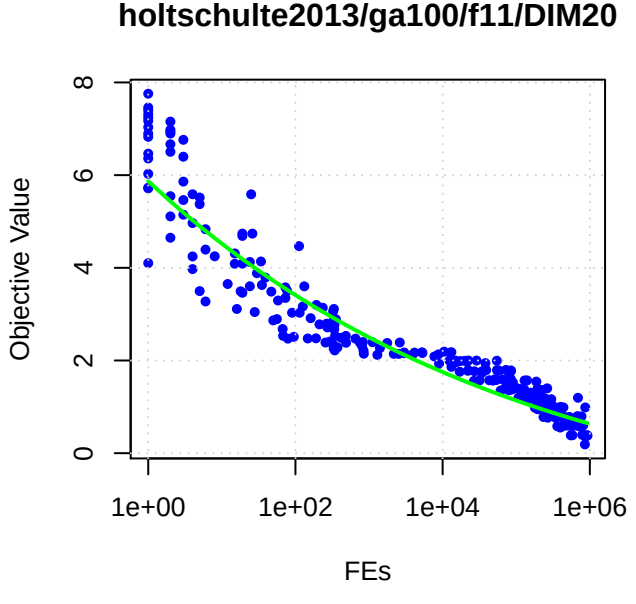
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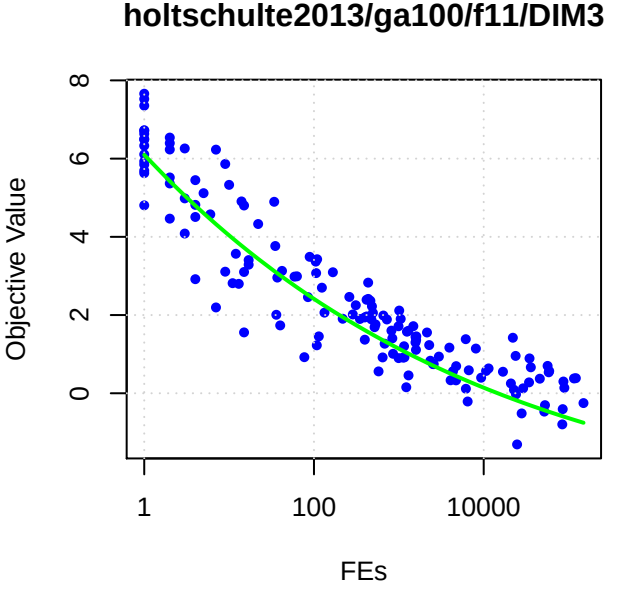
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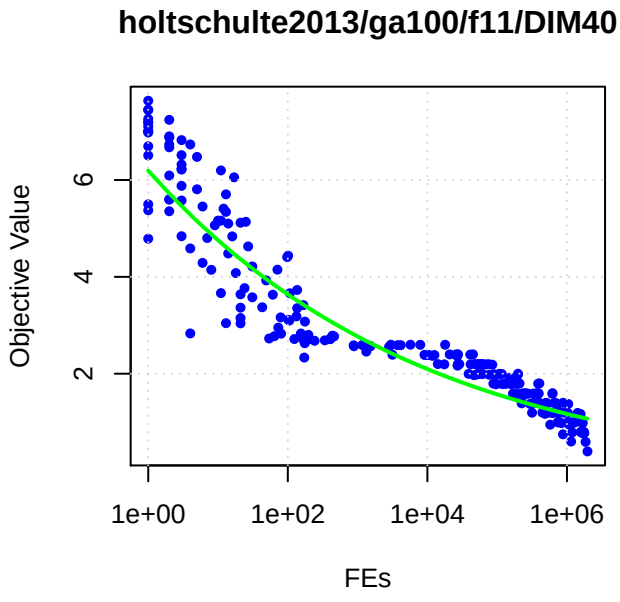
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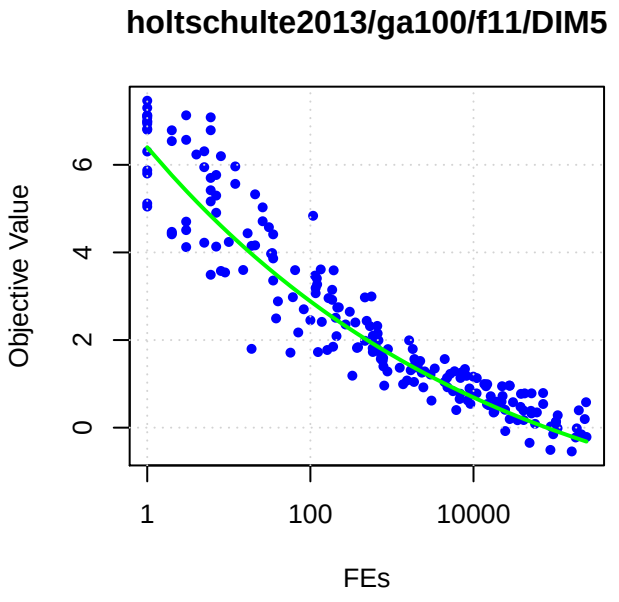
FEs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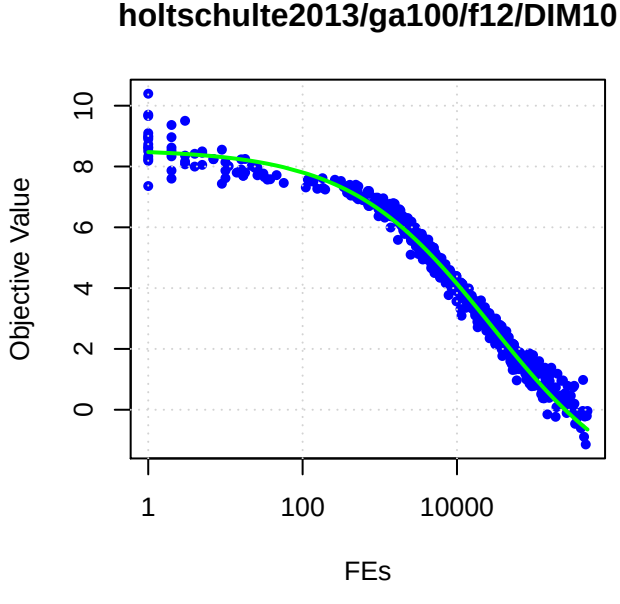
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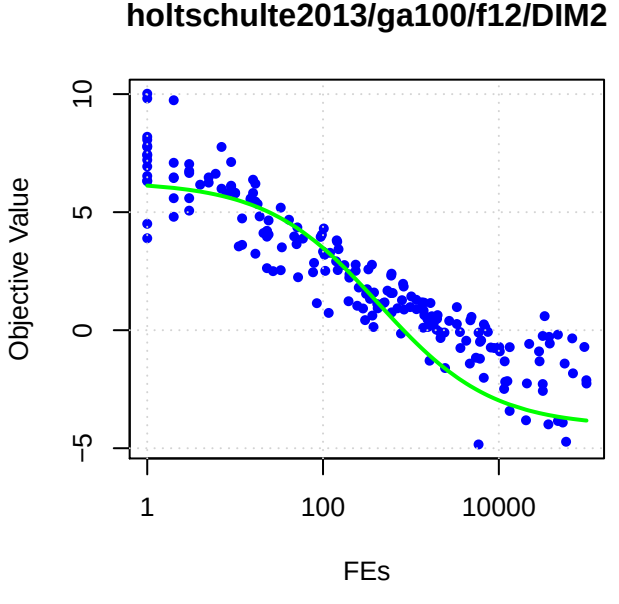
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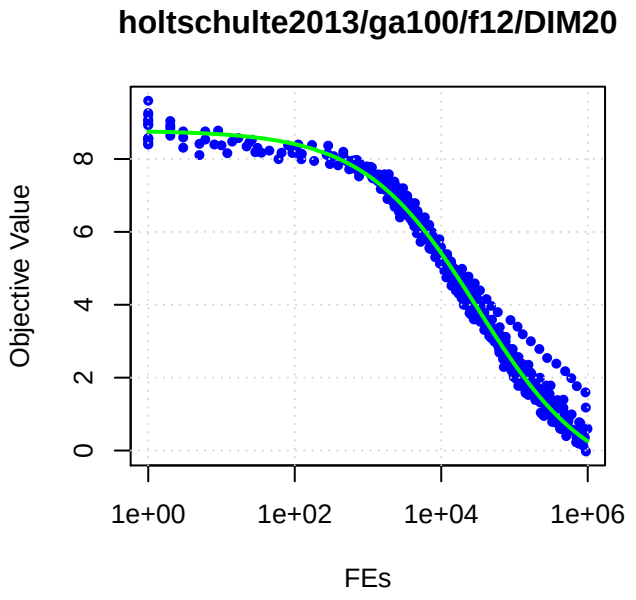
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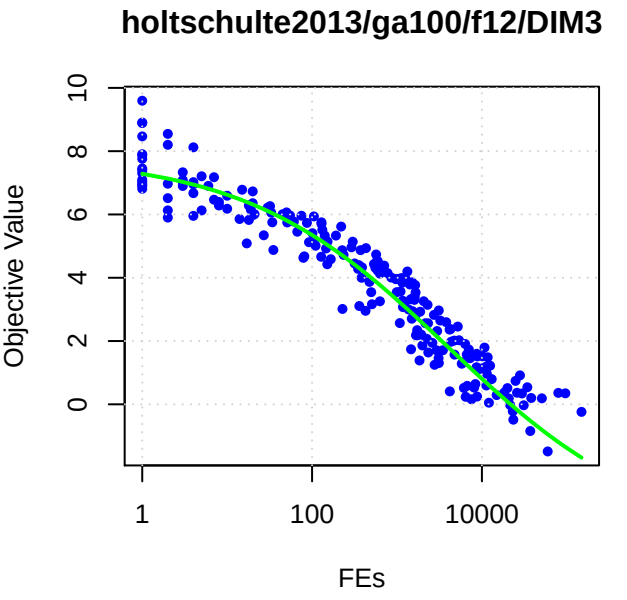
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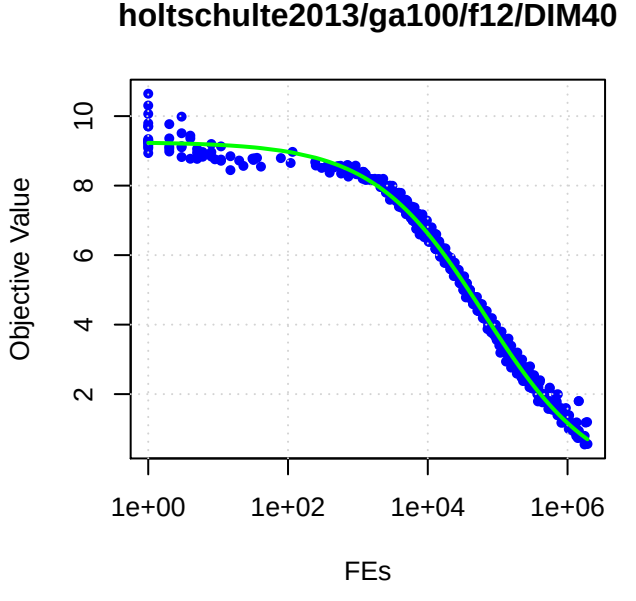
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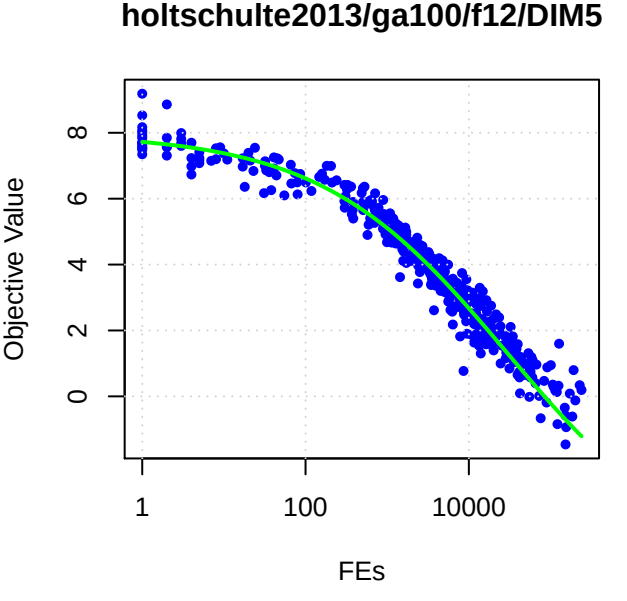
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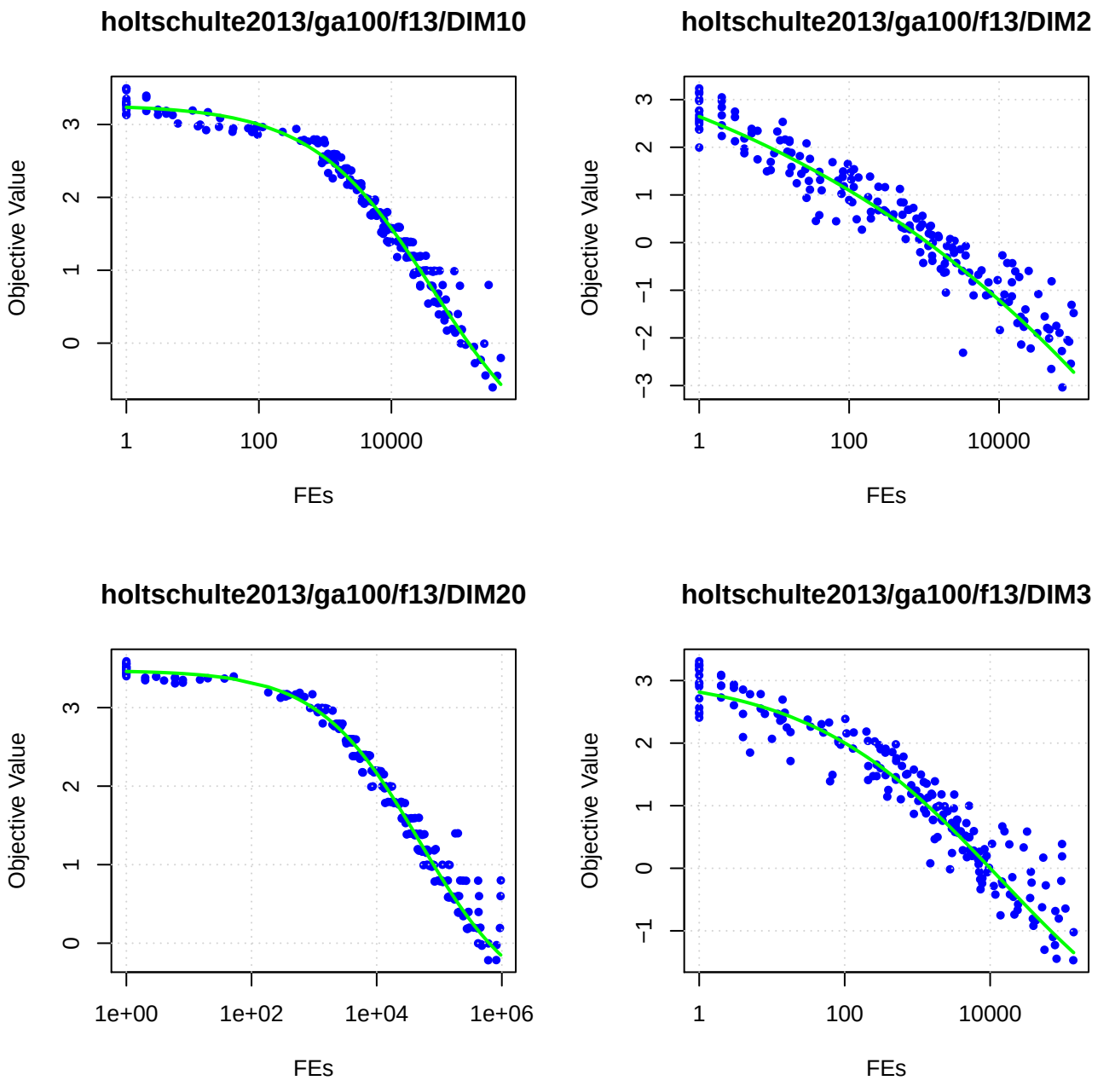
FEs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FEs
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10000
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holtschulte2013/ga100/f13/DIM2
Objective Value
FEs
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100
10000
−3
−2
−1
0
1
2
3
holtschulte2013/ga100/f13/DIM20
Objective Value
FEs
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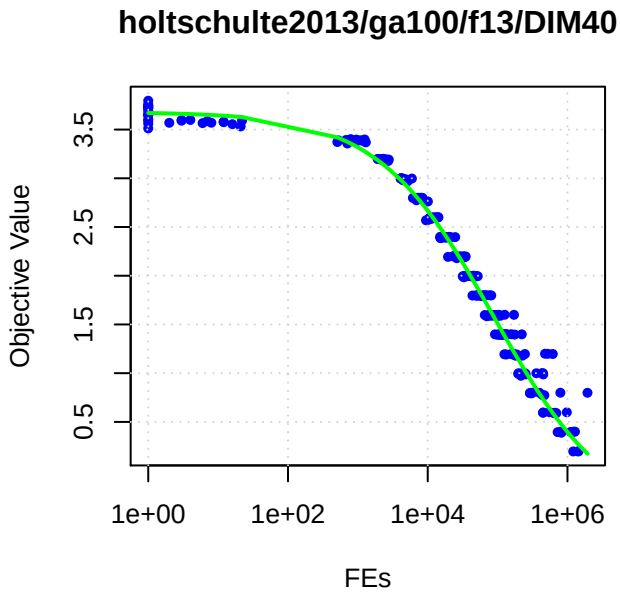
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1e+04
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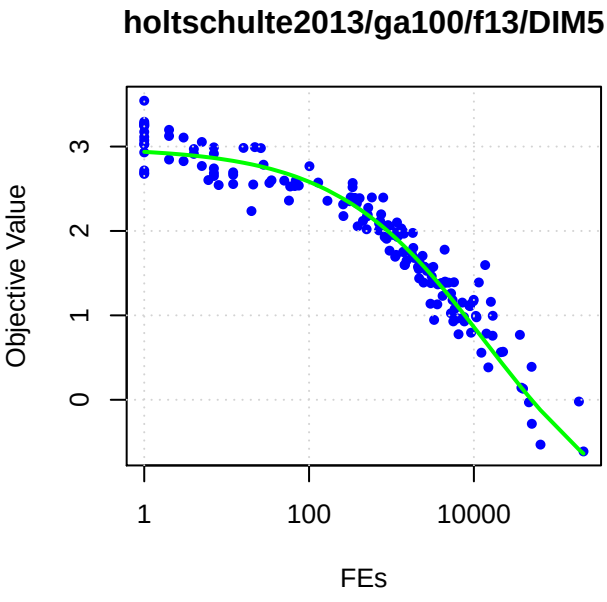
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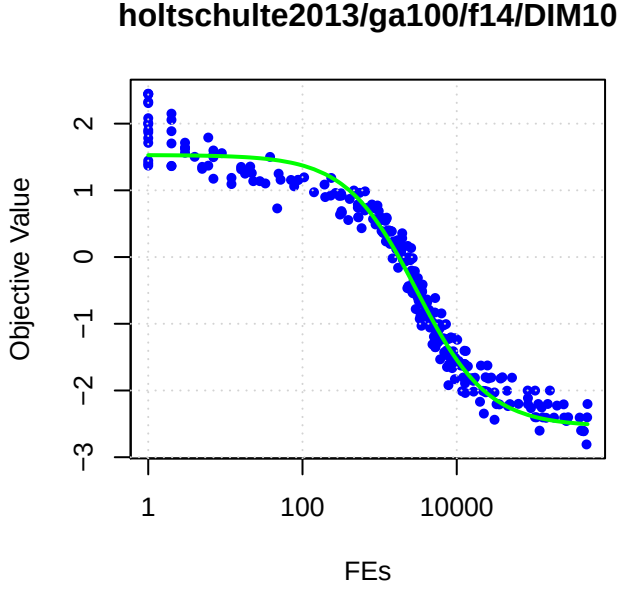
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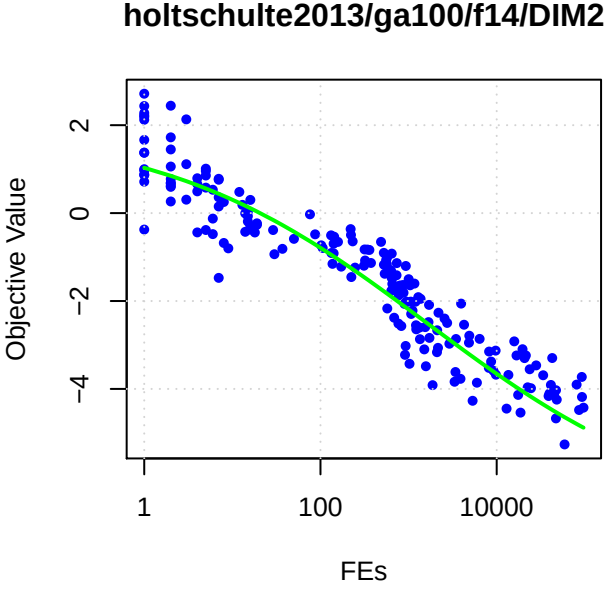
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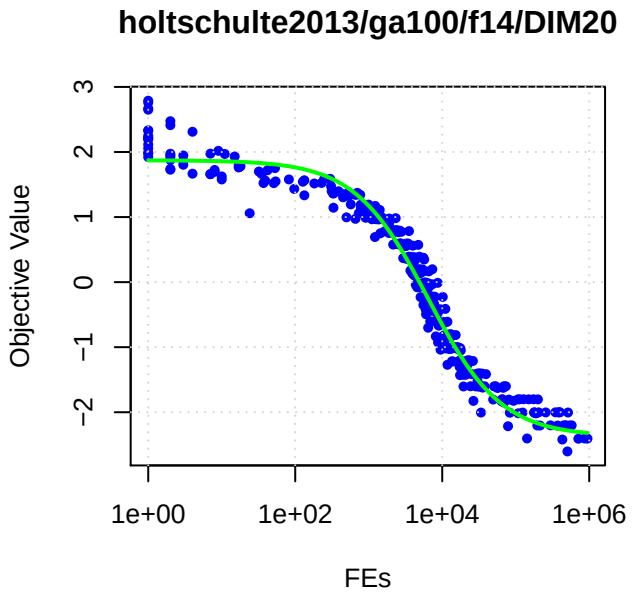
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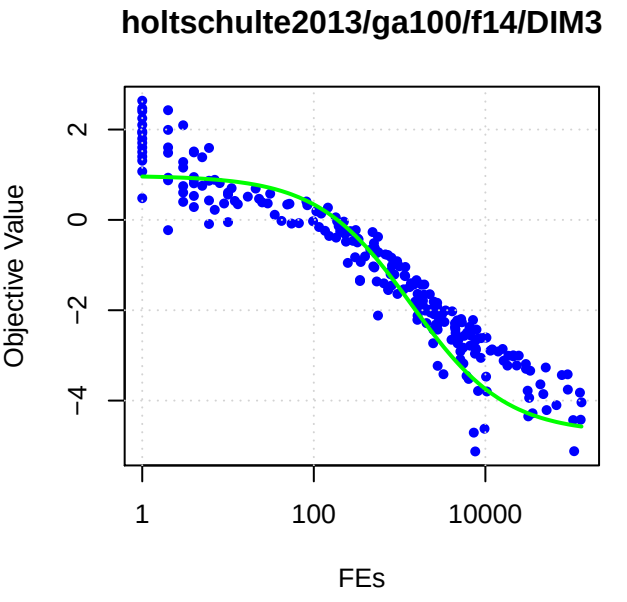
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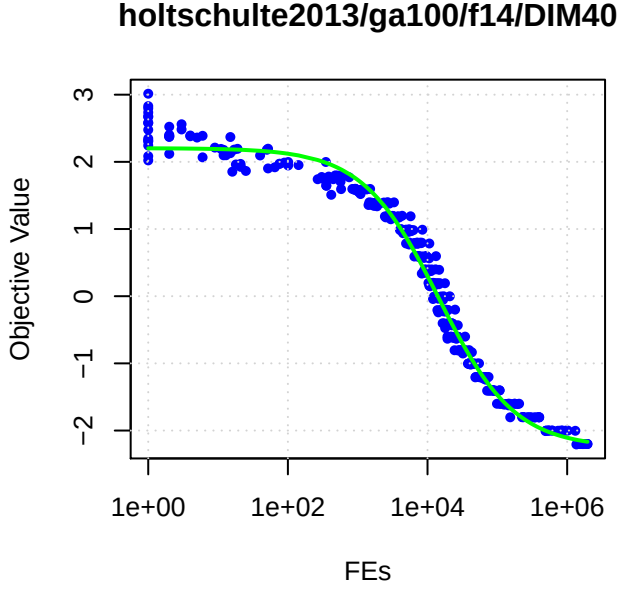
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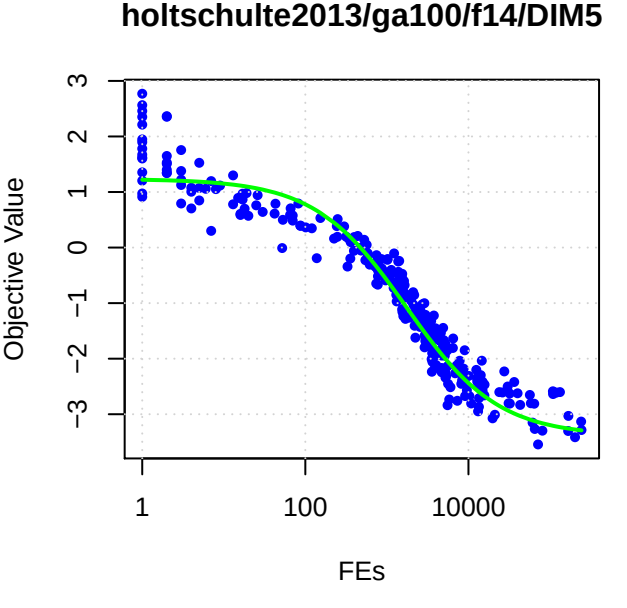
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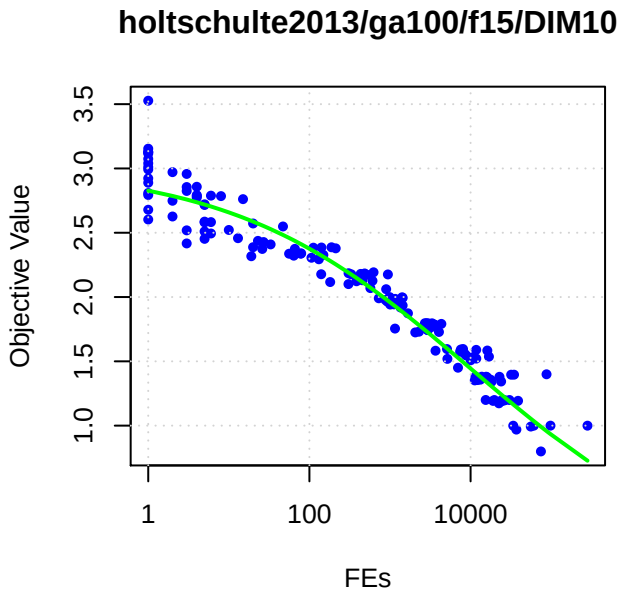
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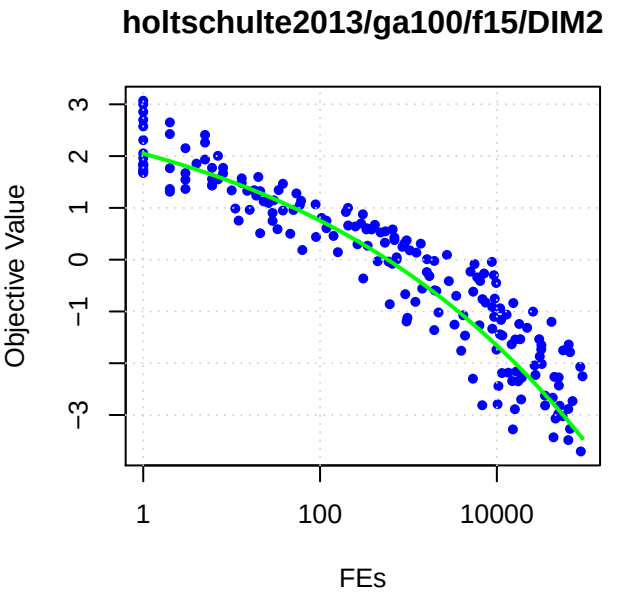
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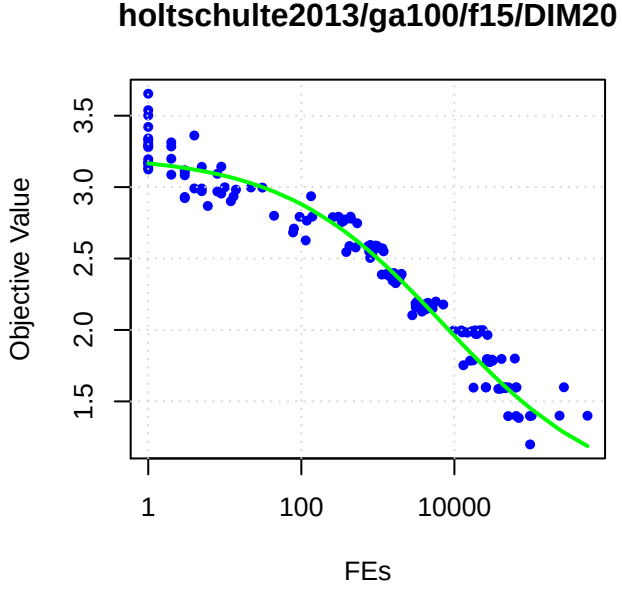
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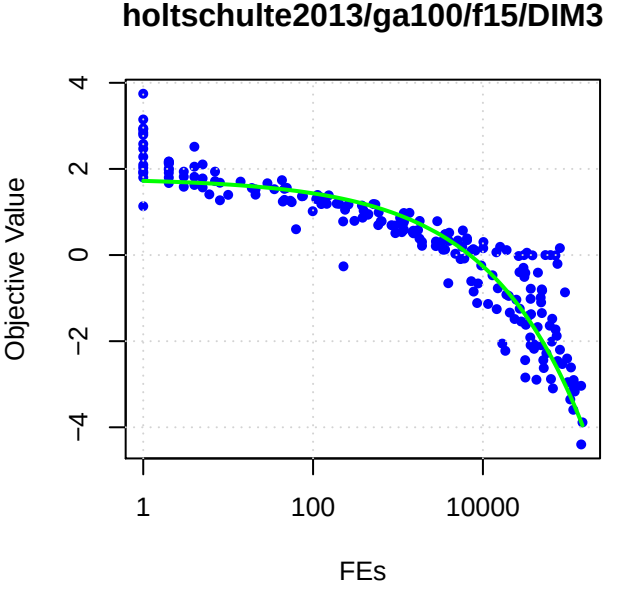
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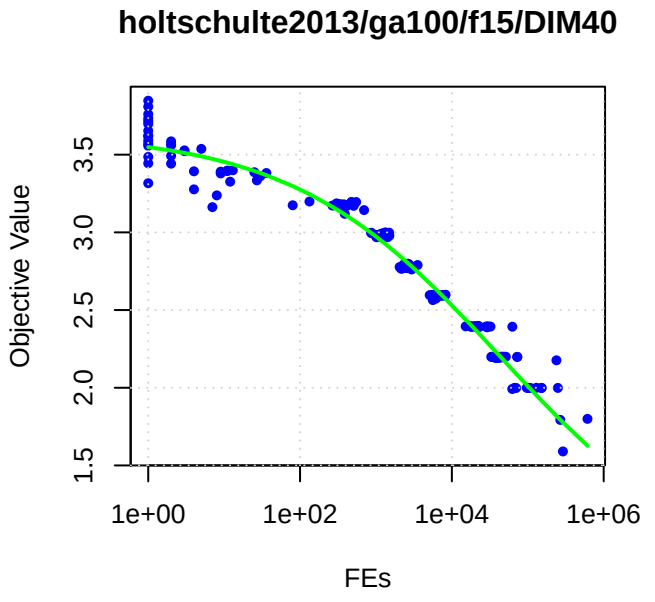
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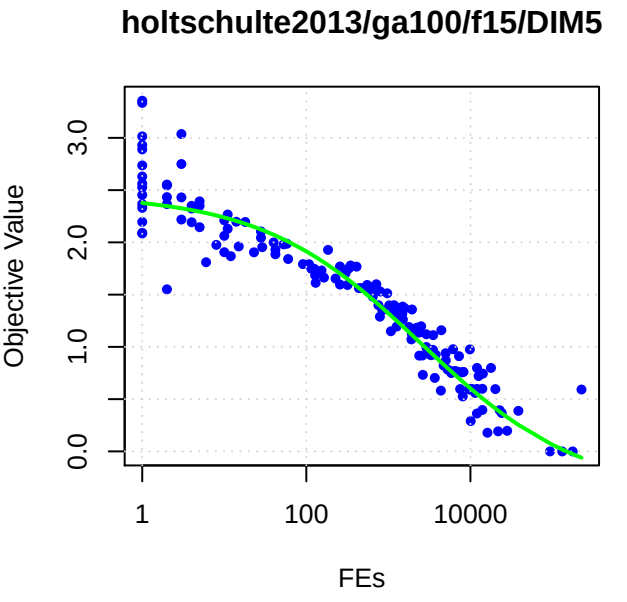
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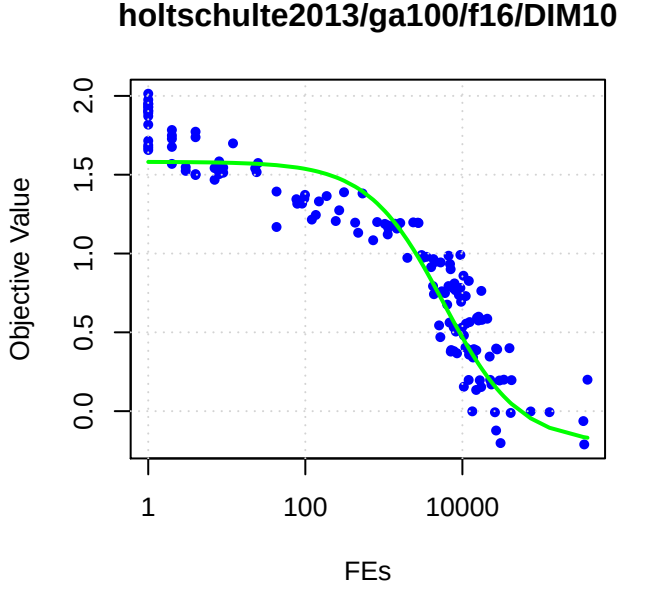
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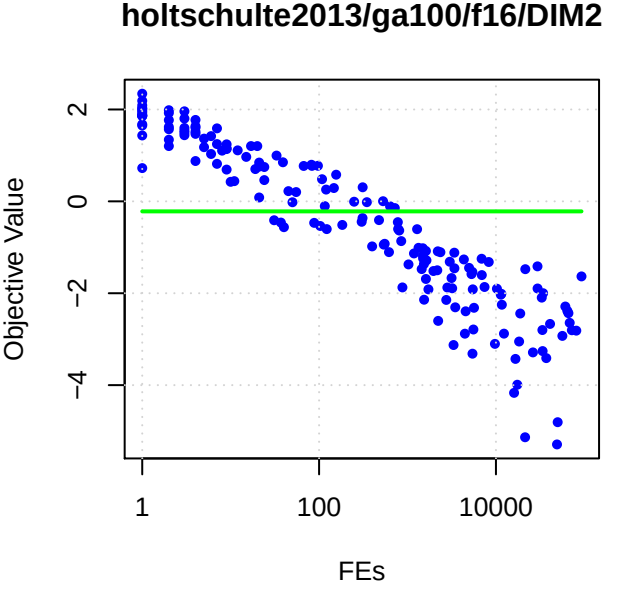
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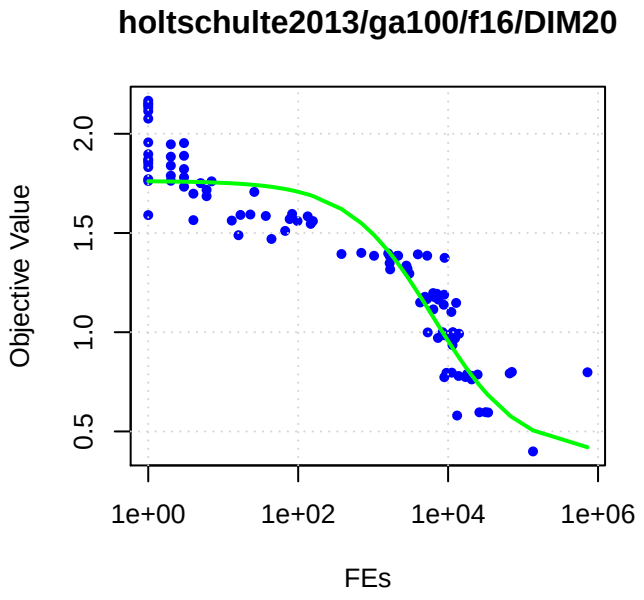
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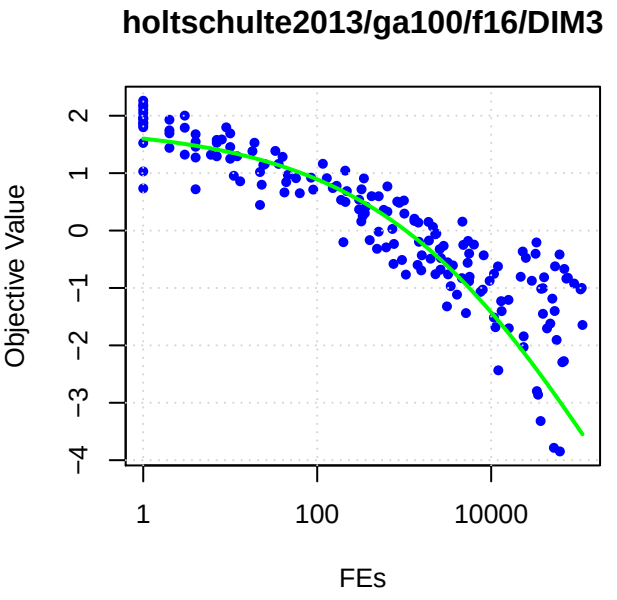
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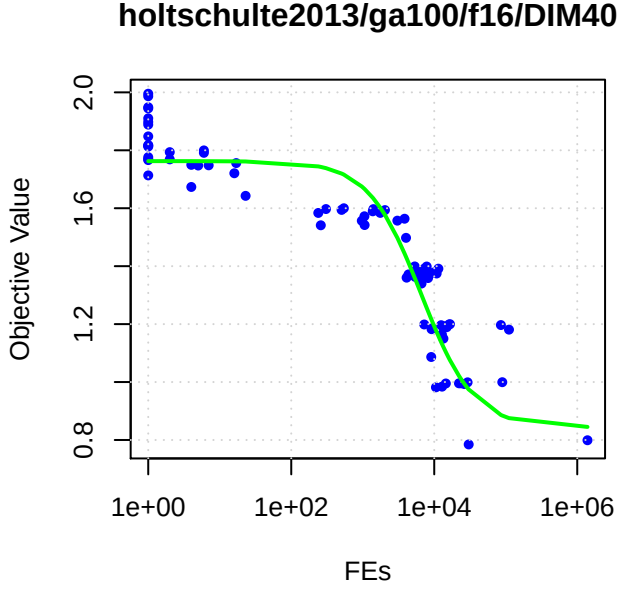
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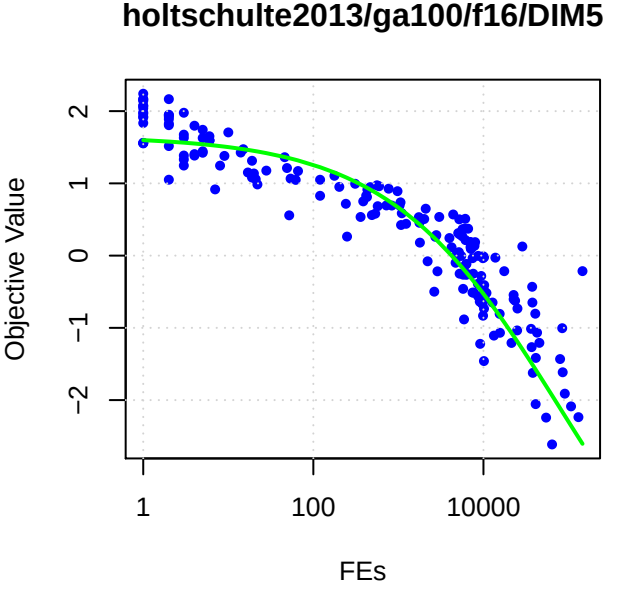
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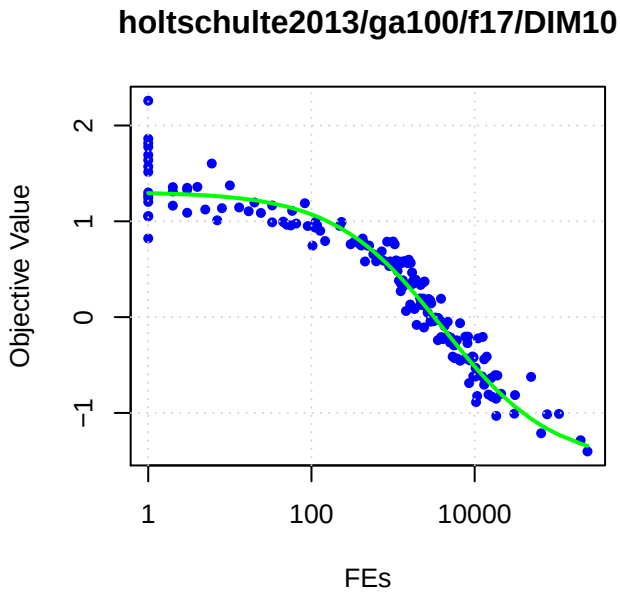
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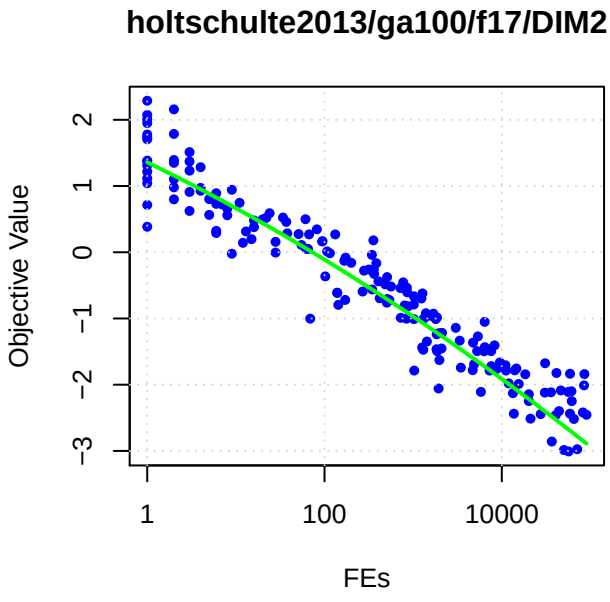
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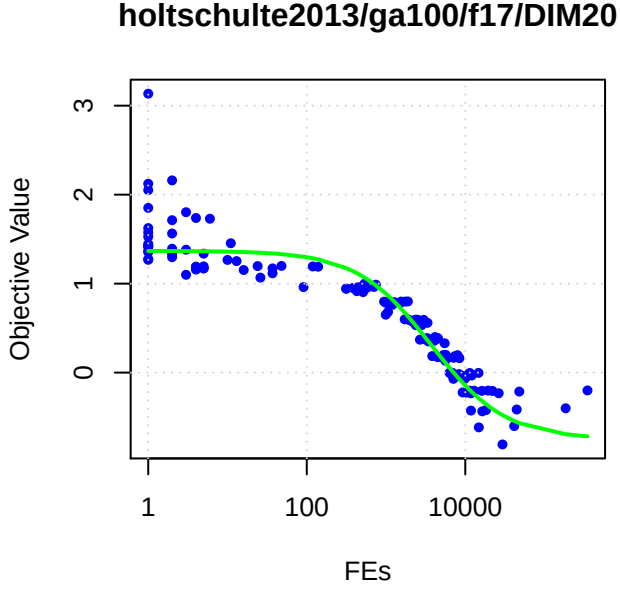
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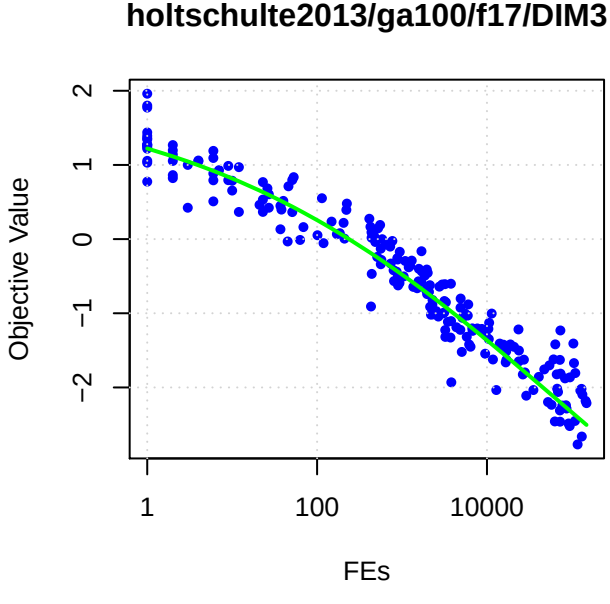
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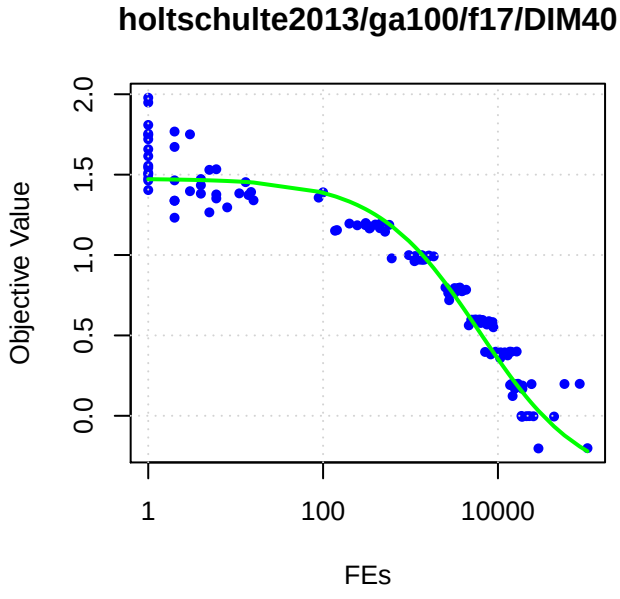
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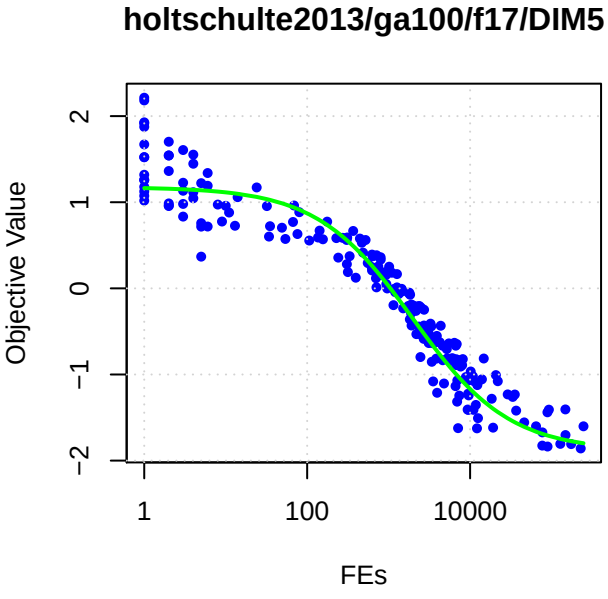
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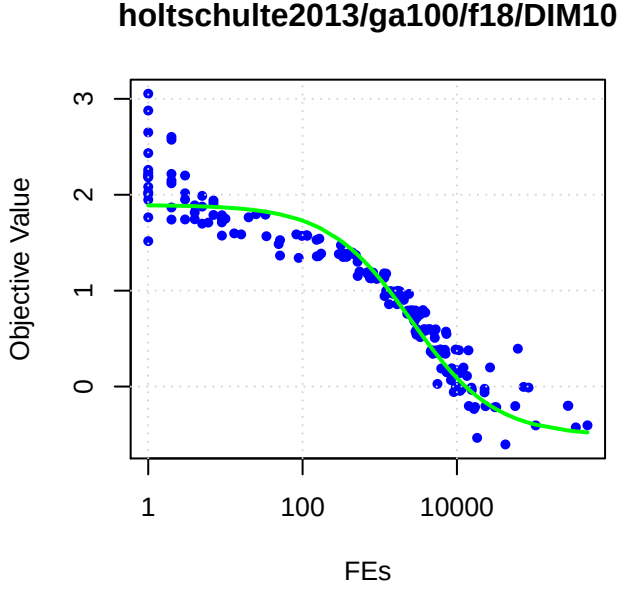
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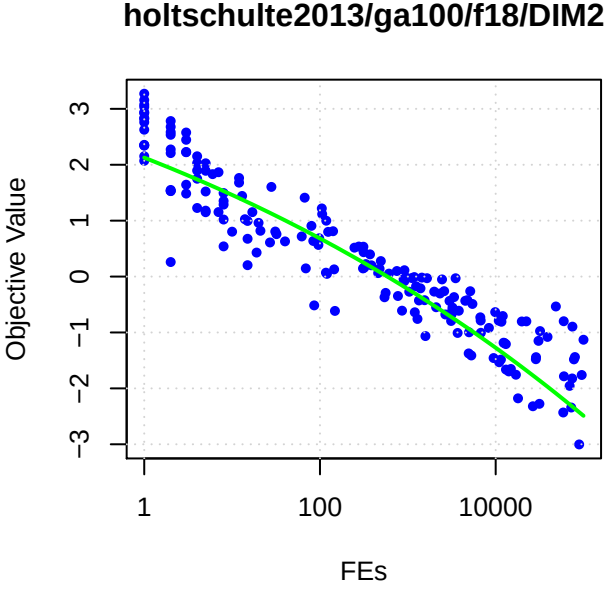
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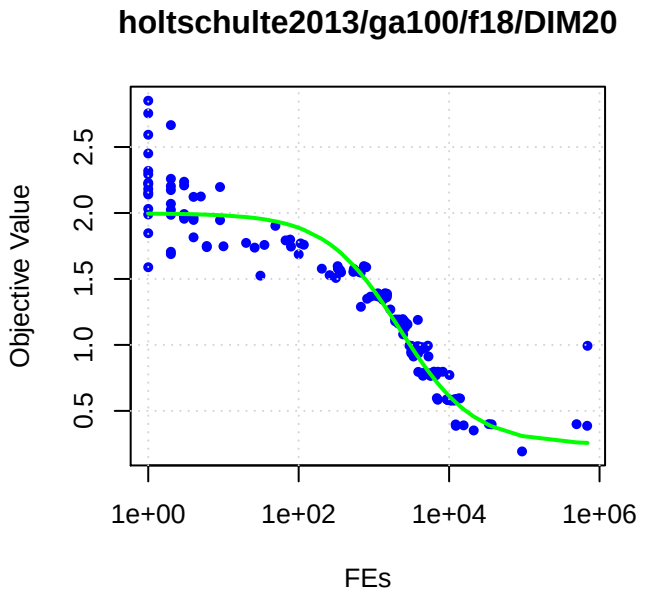
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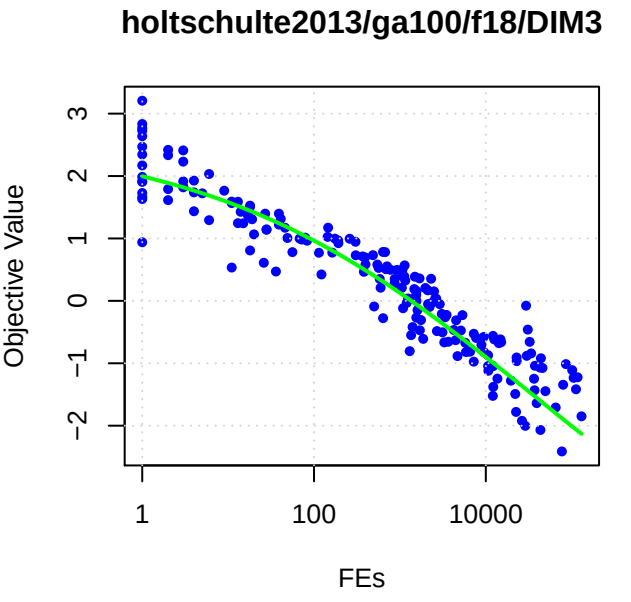
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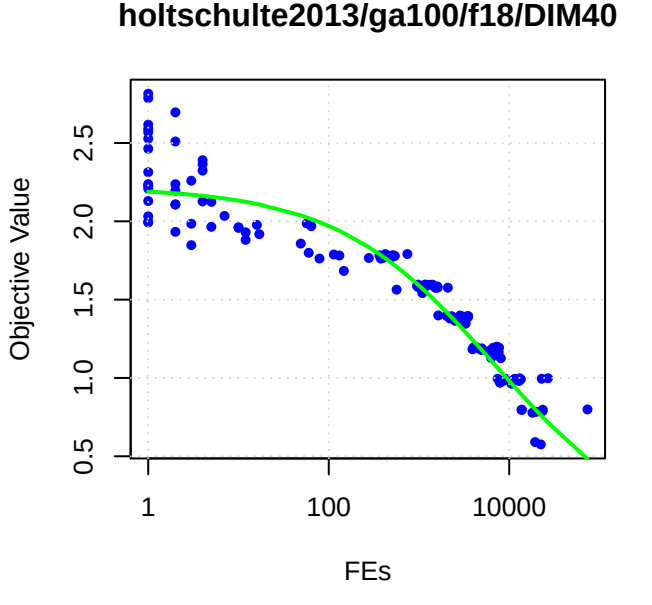
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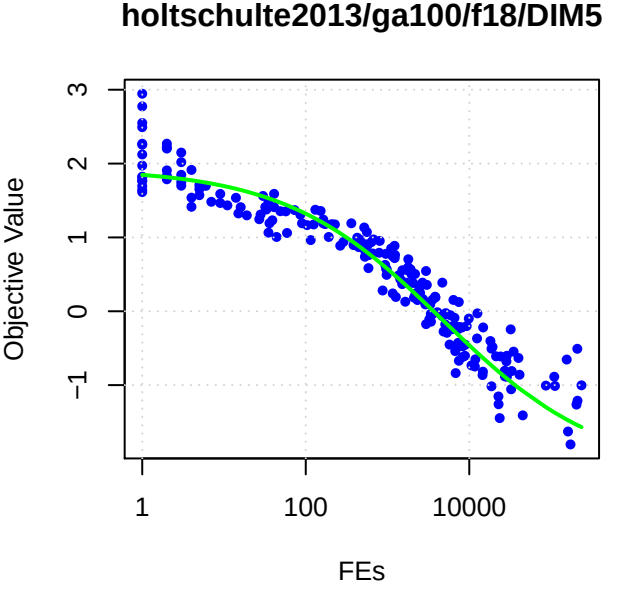
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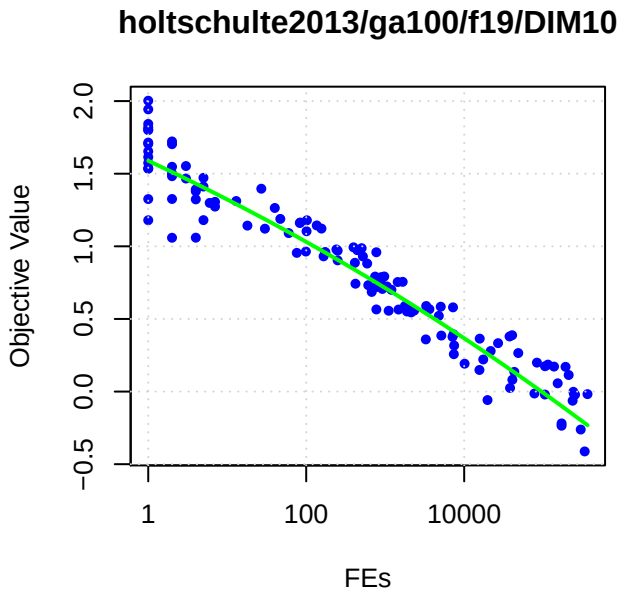
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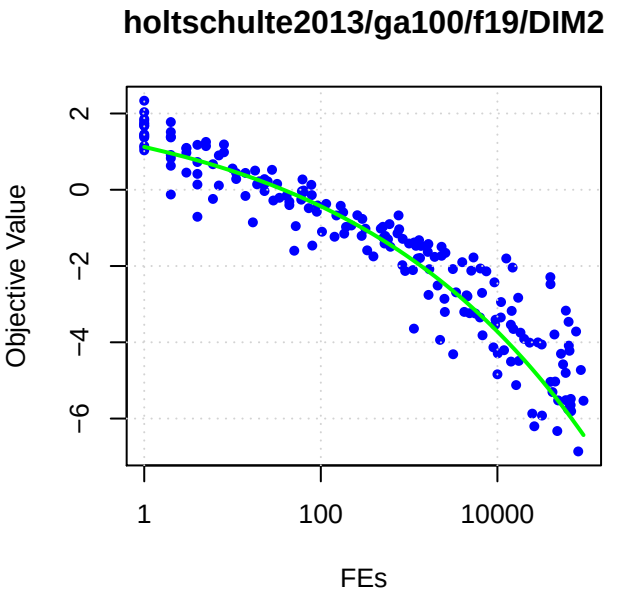
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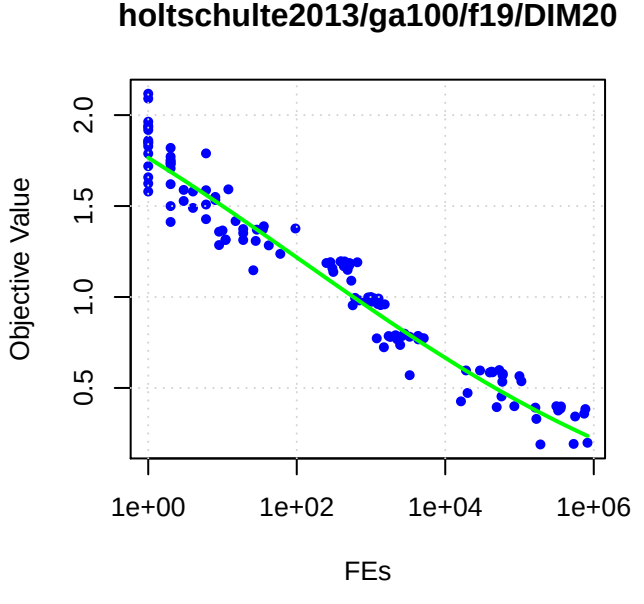
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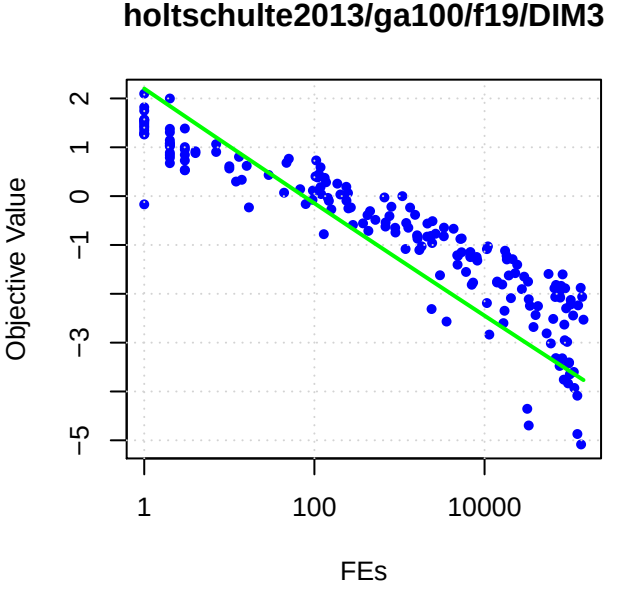
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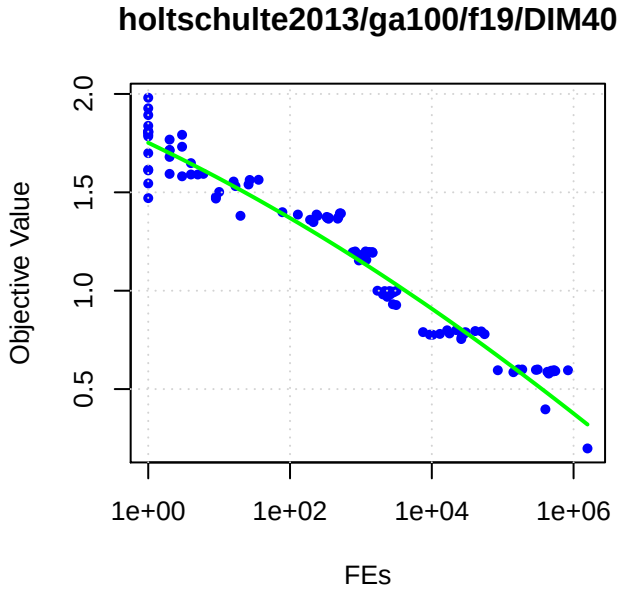
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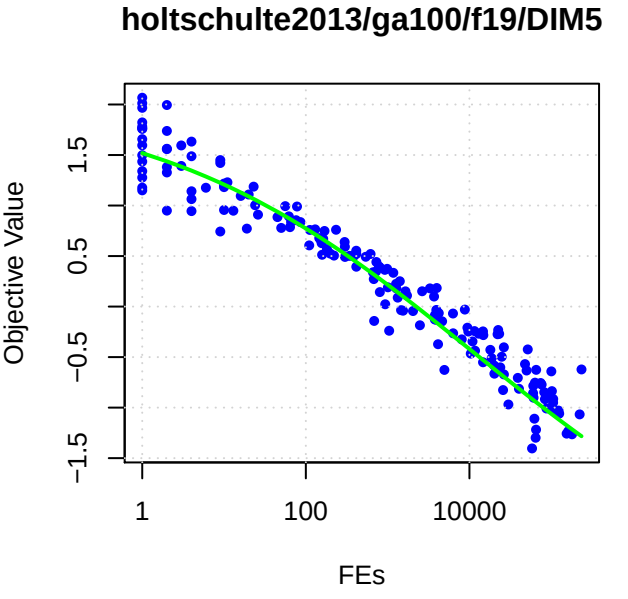
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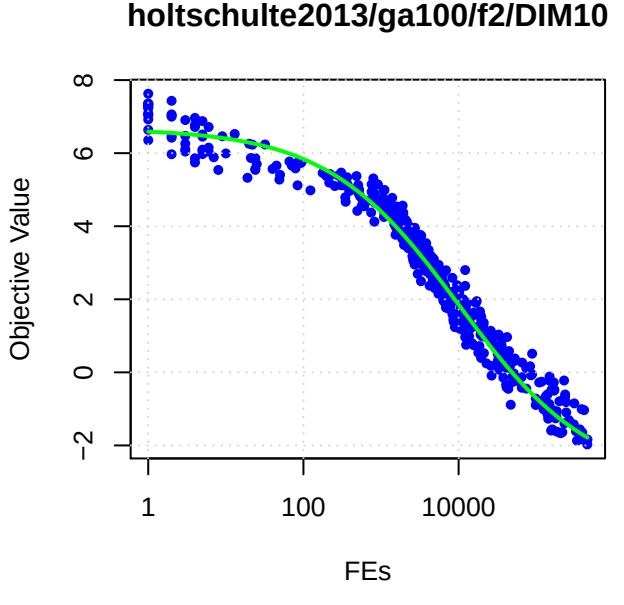
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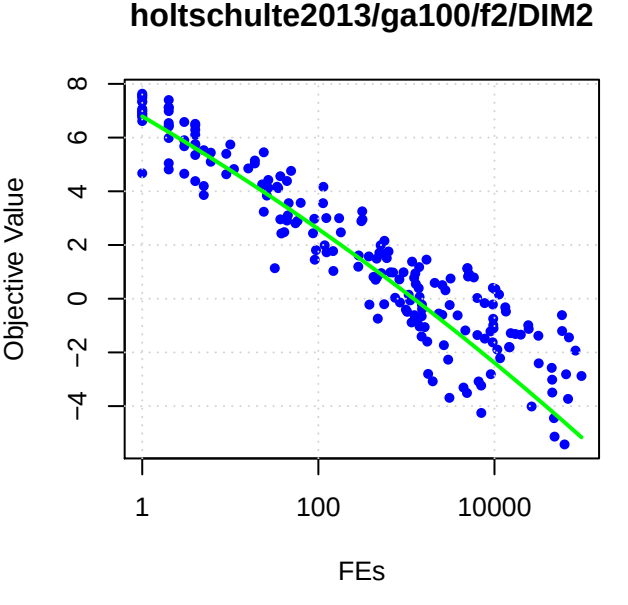
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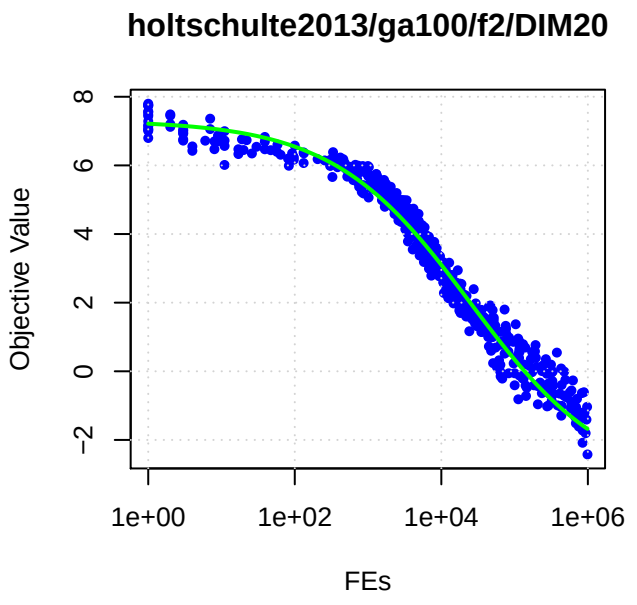
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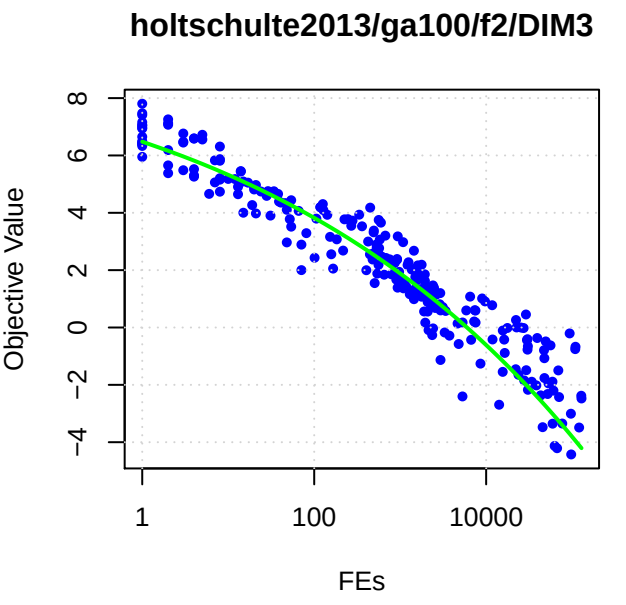
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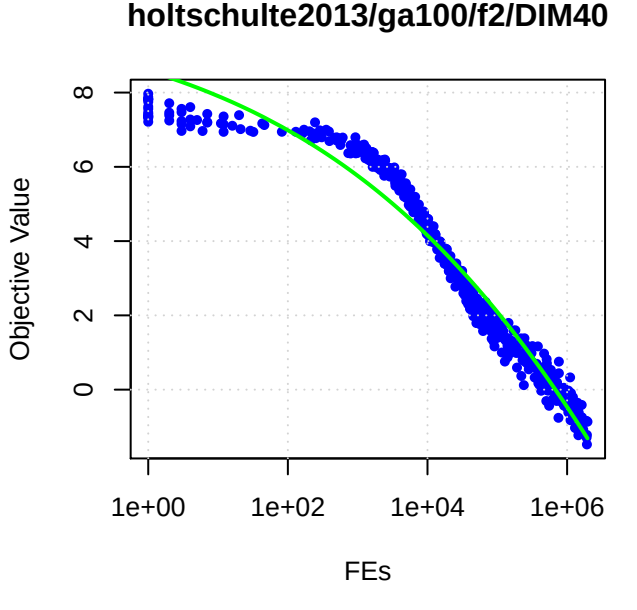
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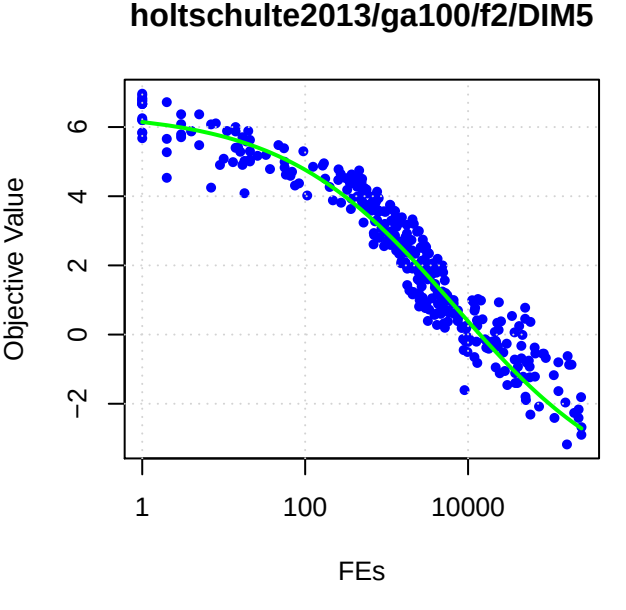
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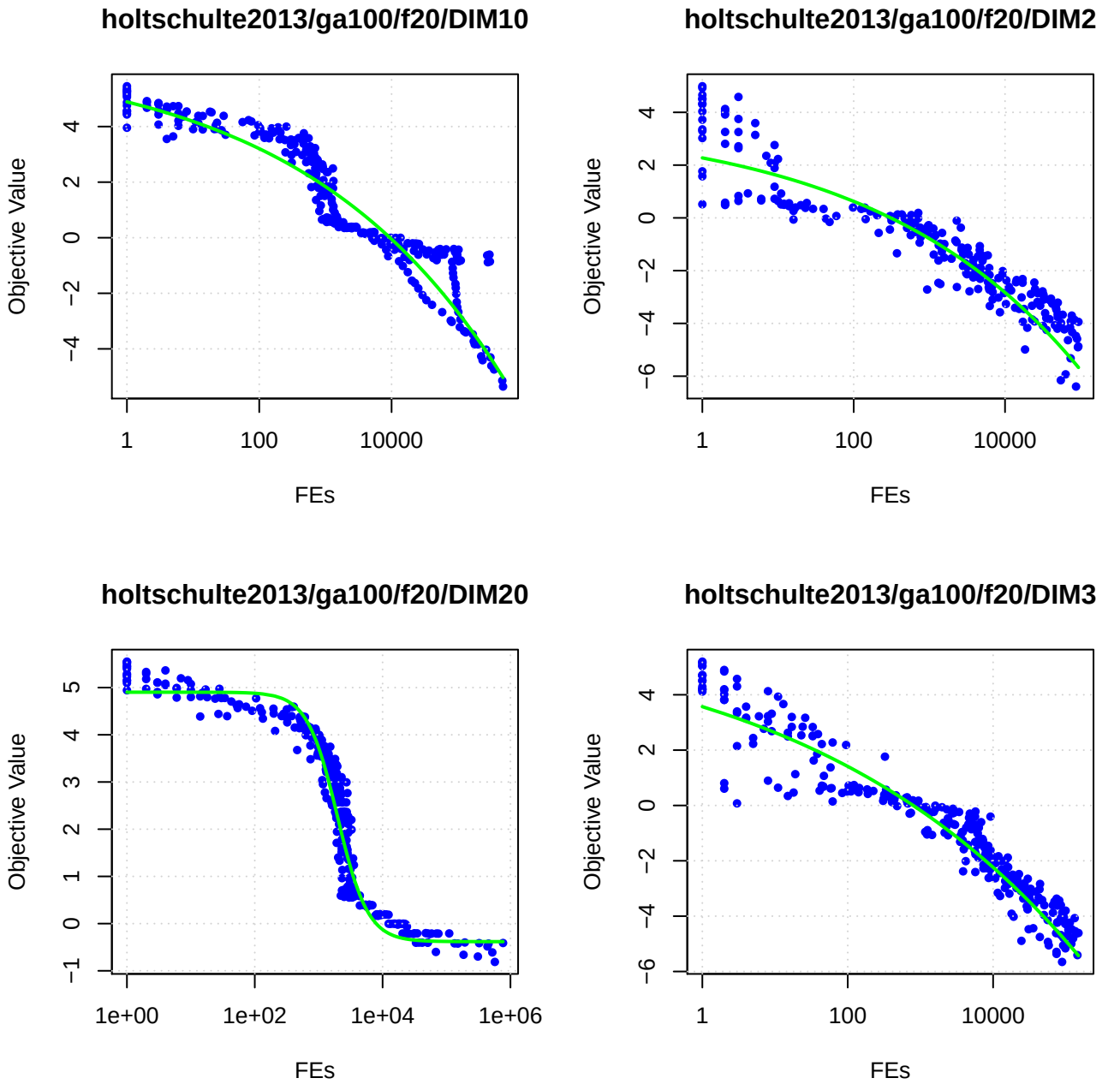
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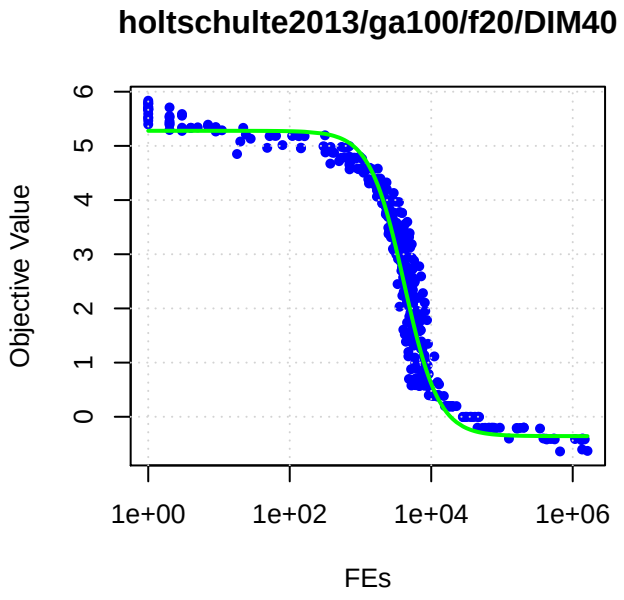
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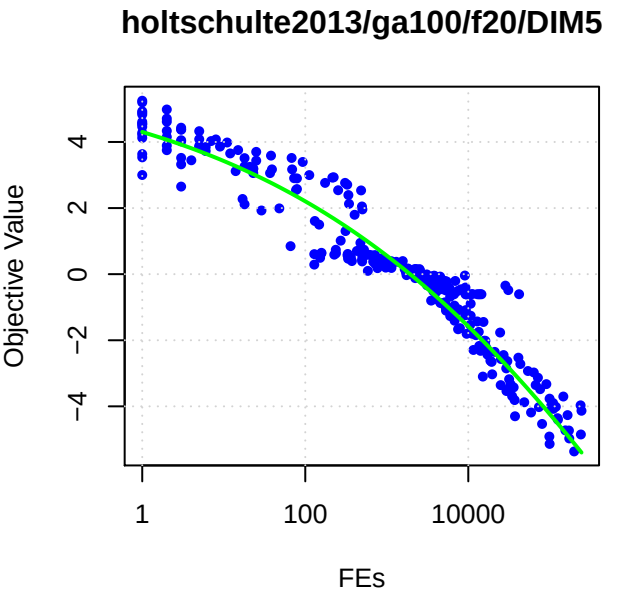
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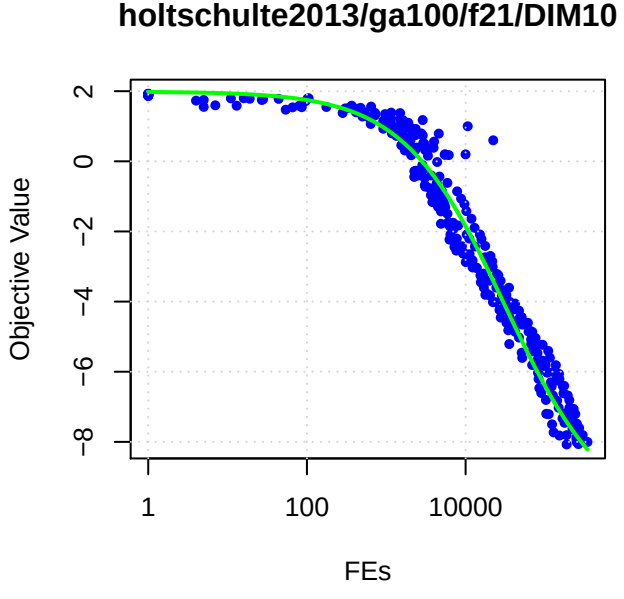
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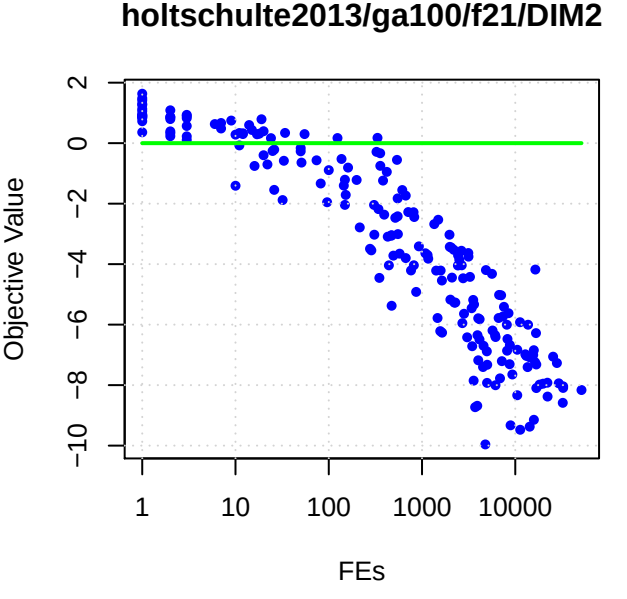
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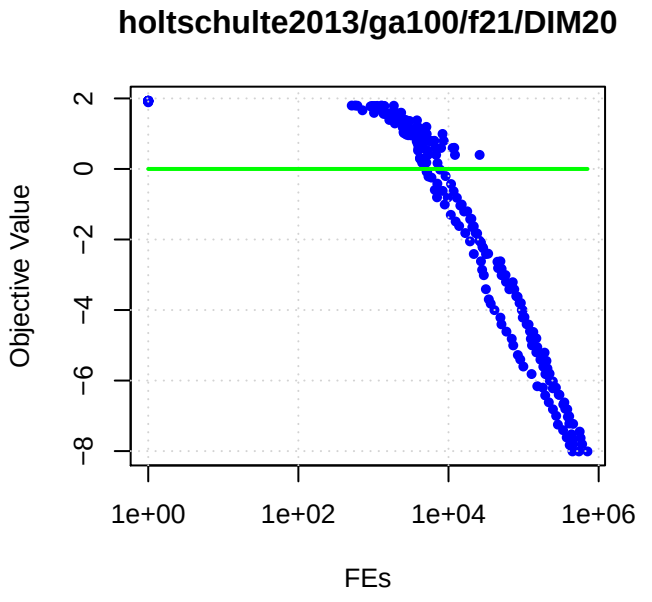
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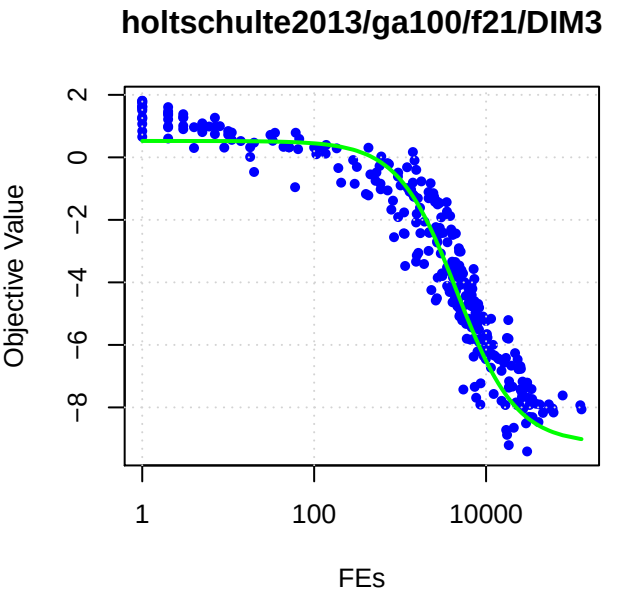
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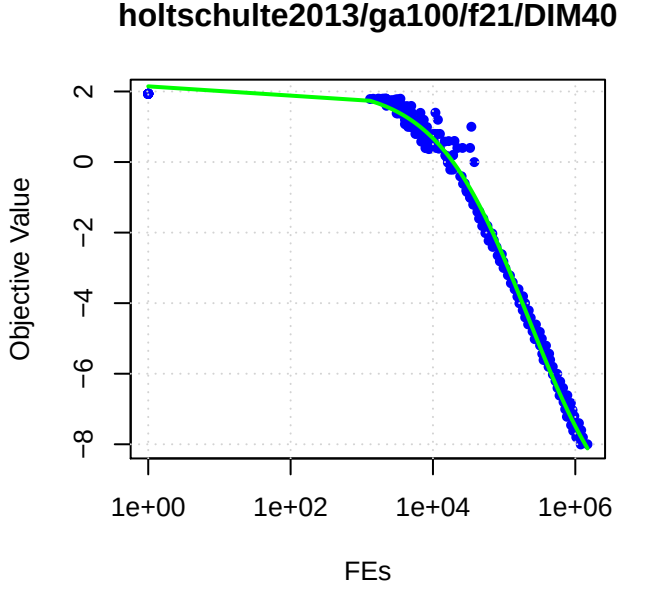
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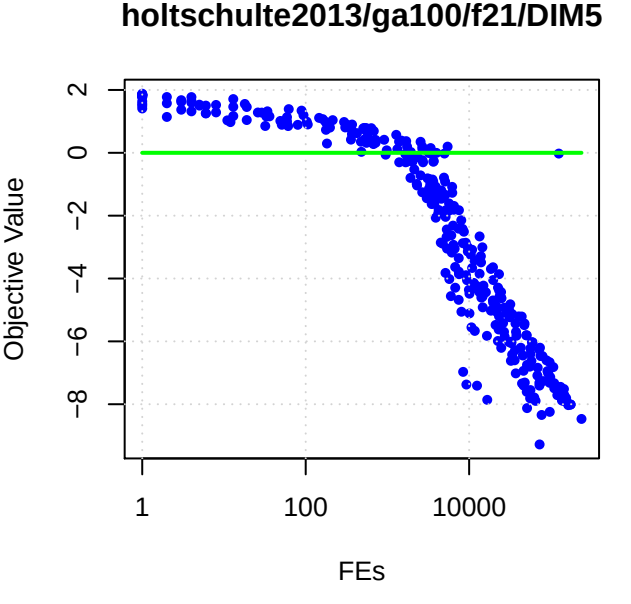
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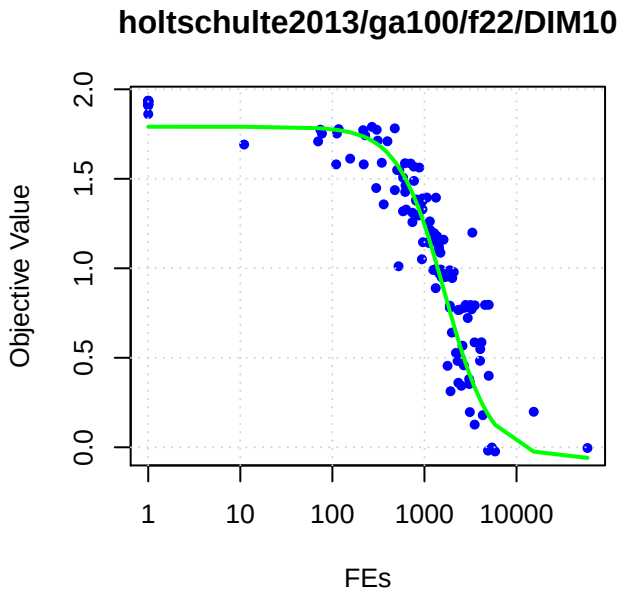
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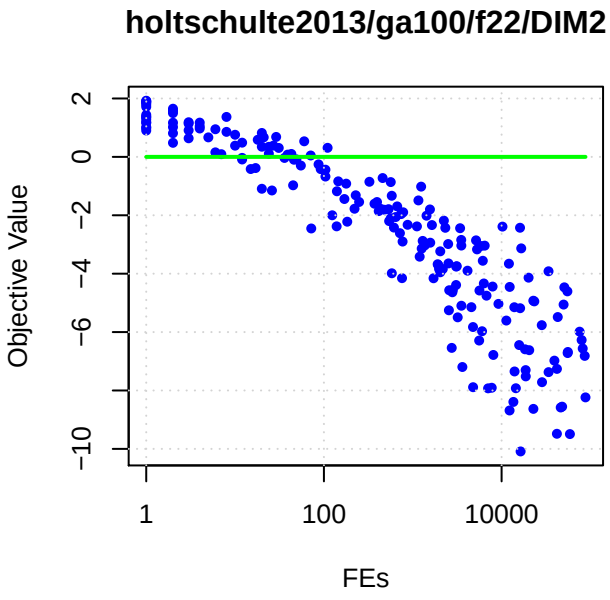
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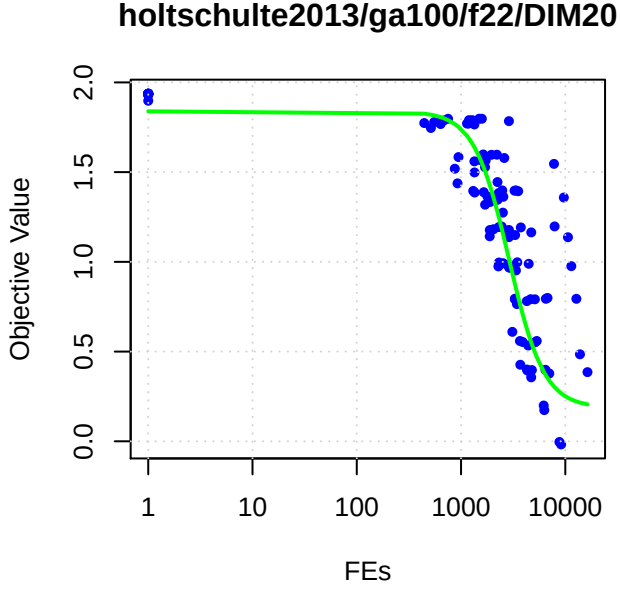
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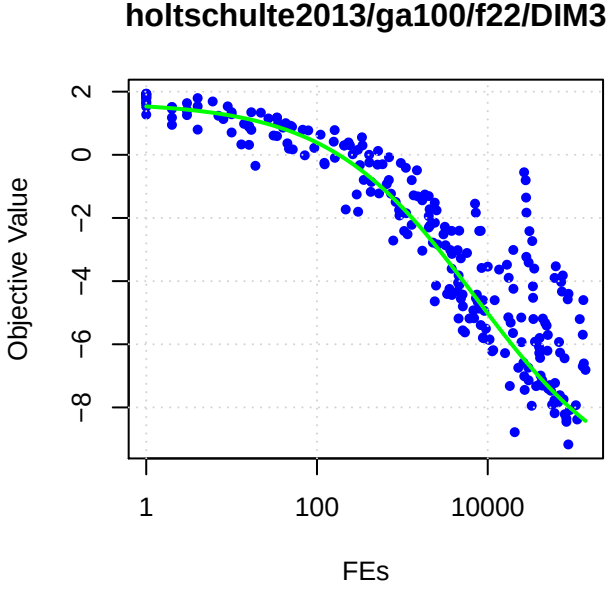
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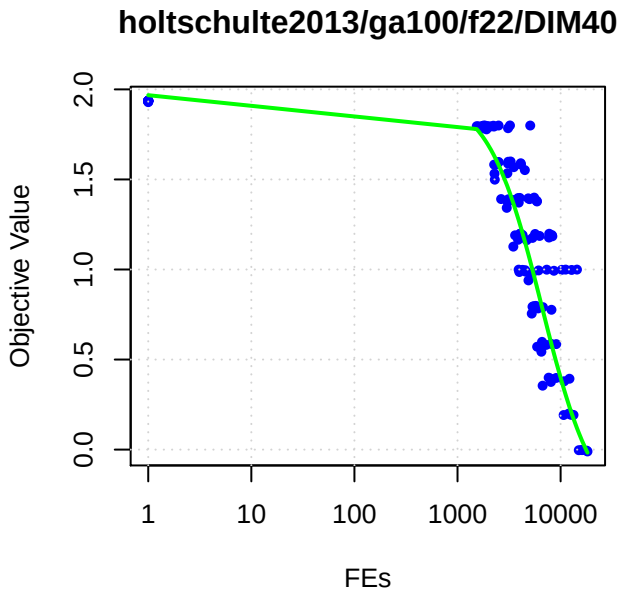
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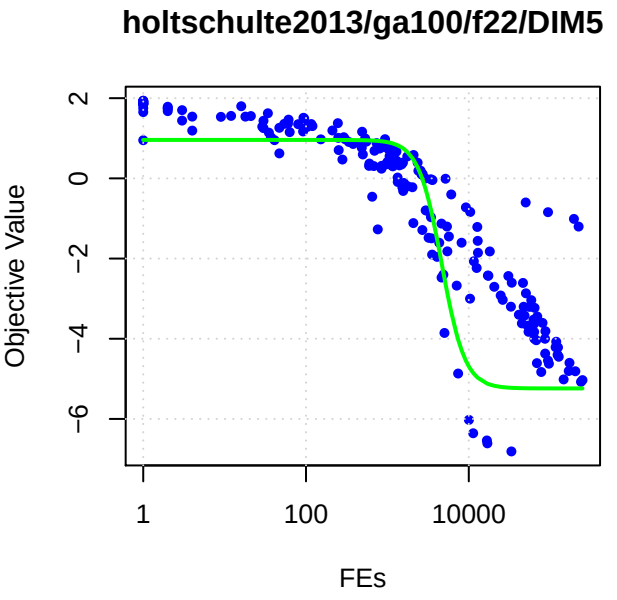
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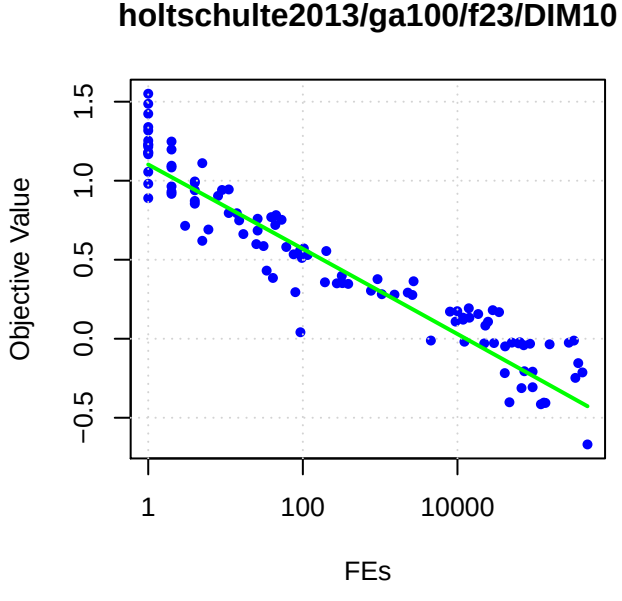
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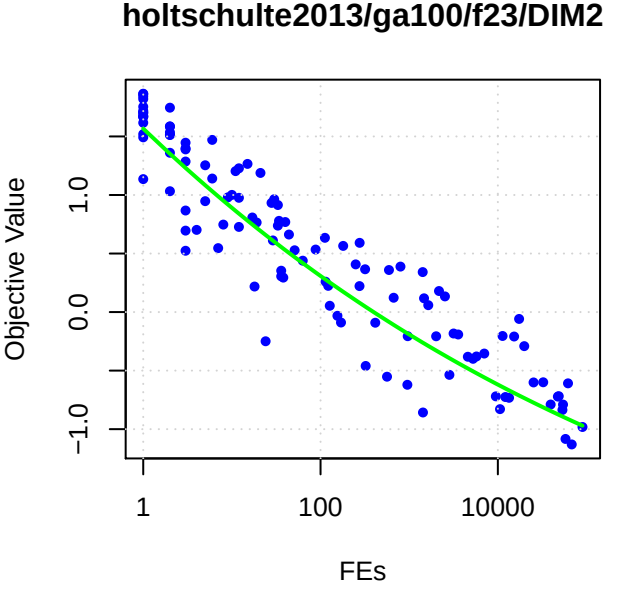
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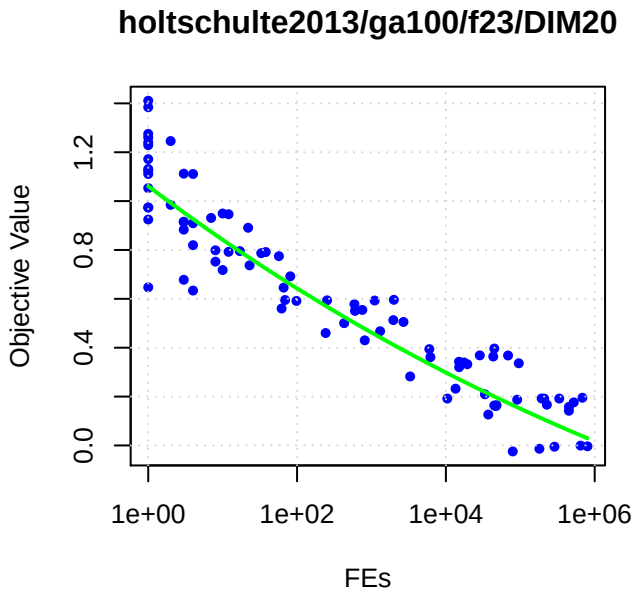
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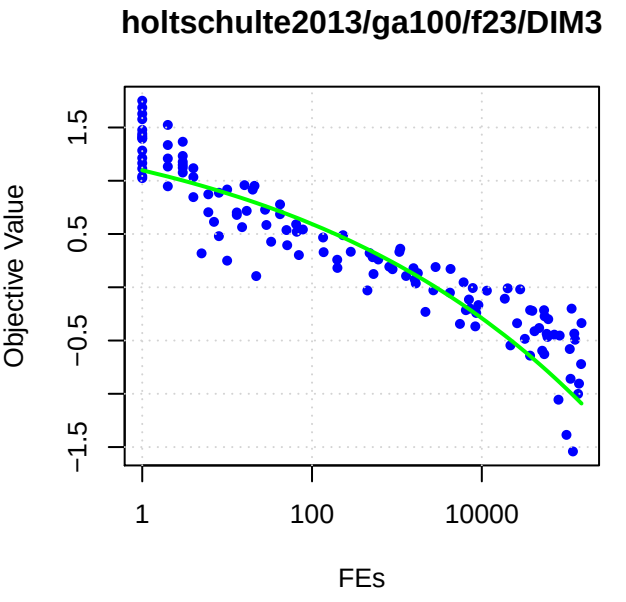
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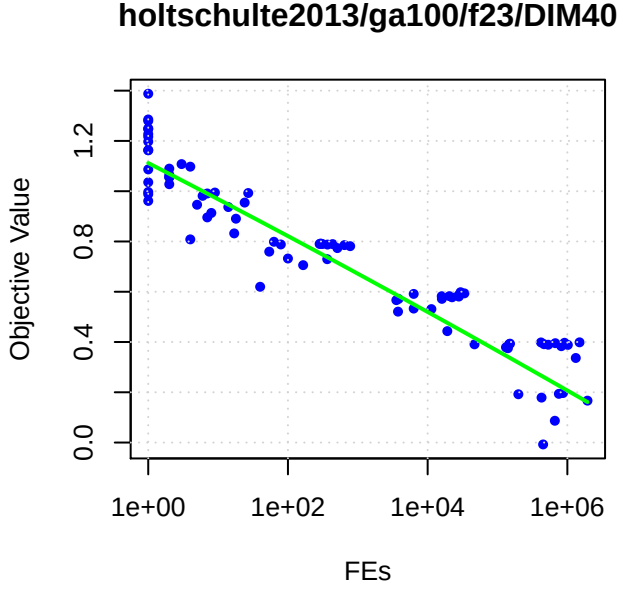
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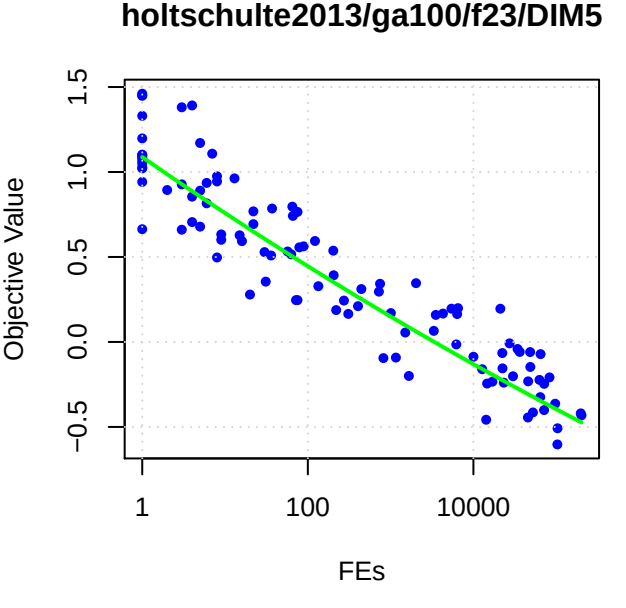
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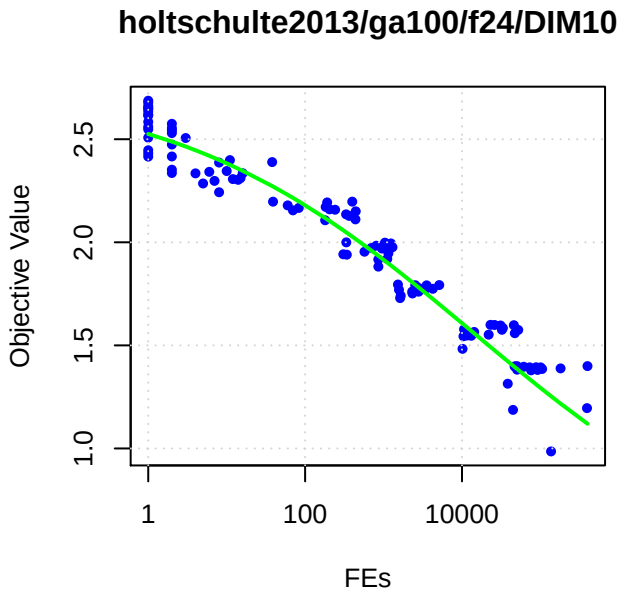
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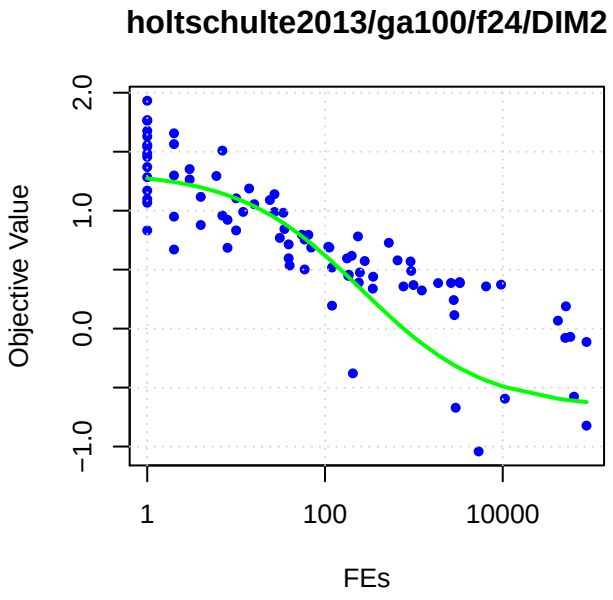
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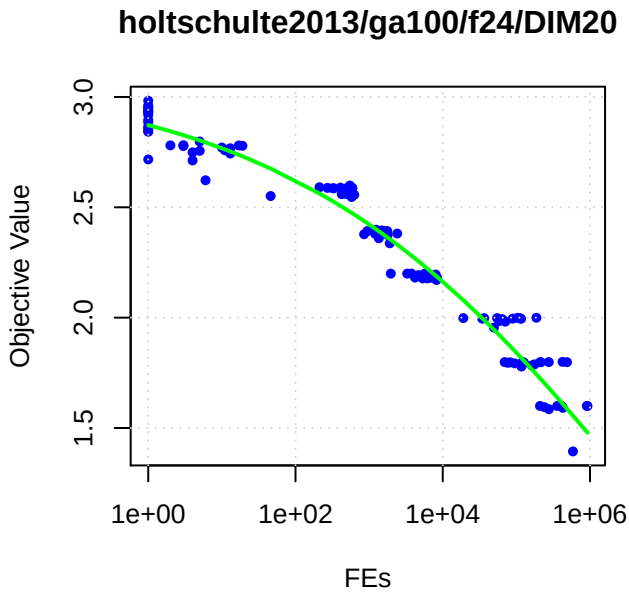
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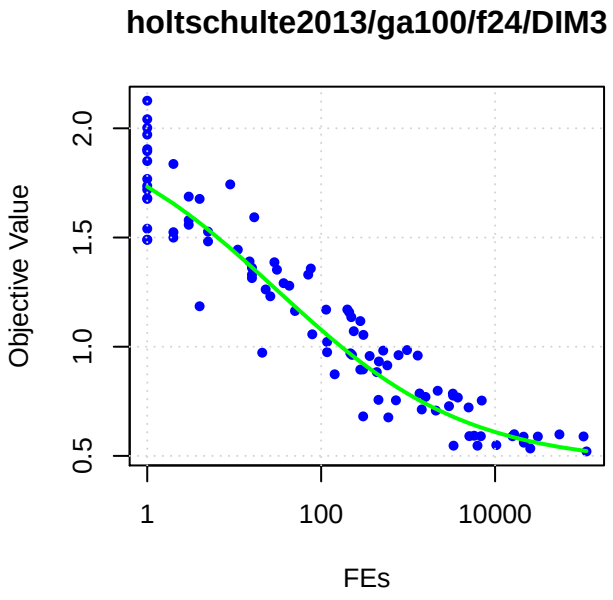
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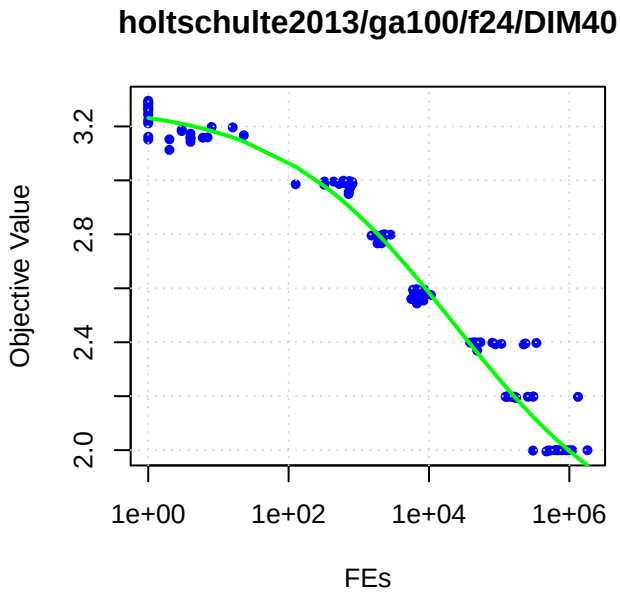
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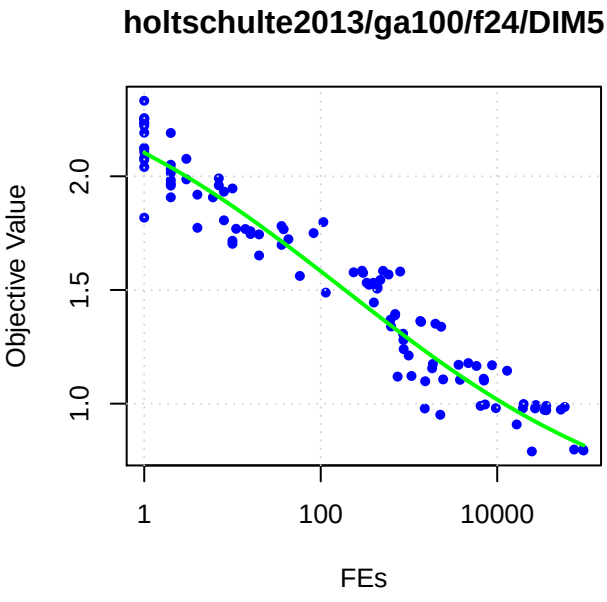
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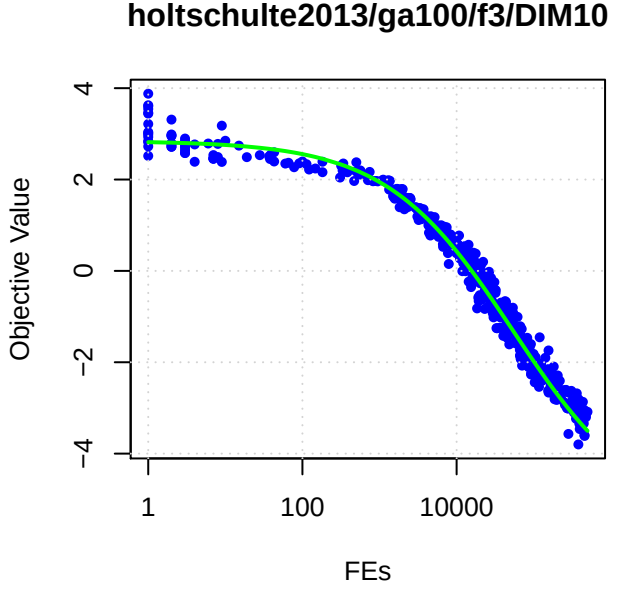
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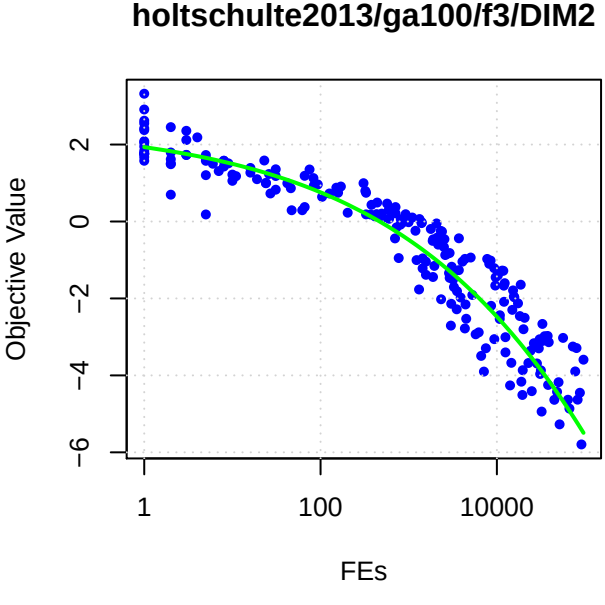
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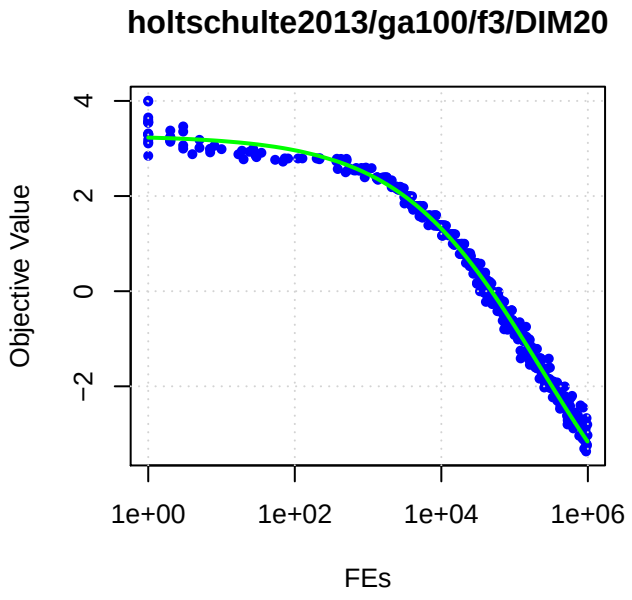
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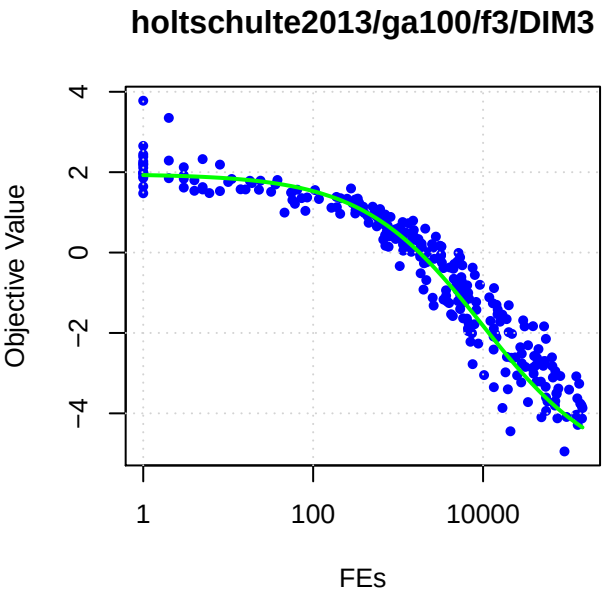
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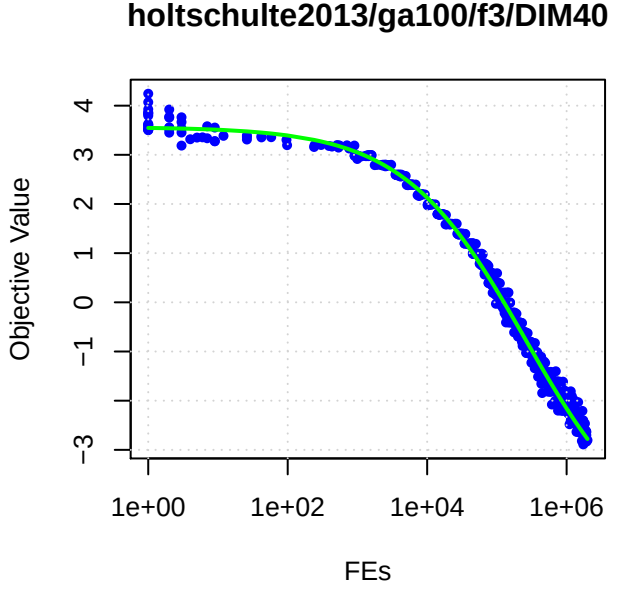
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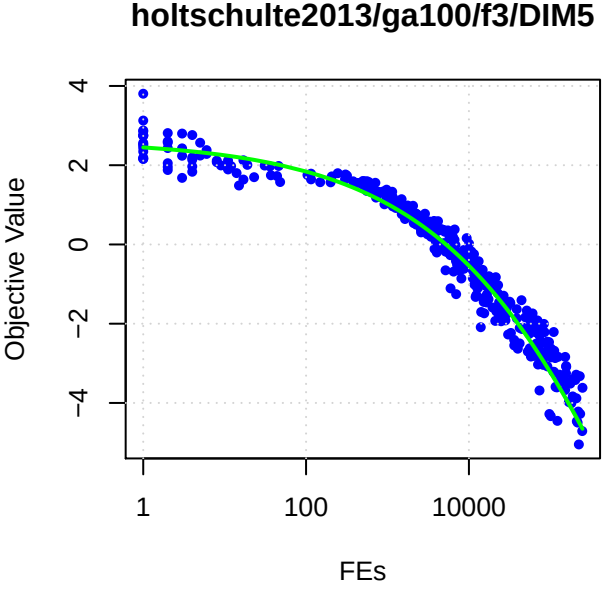
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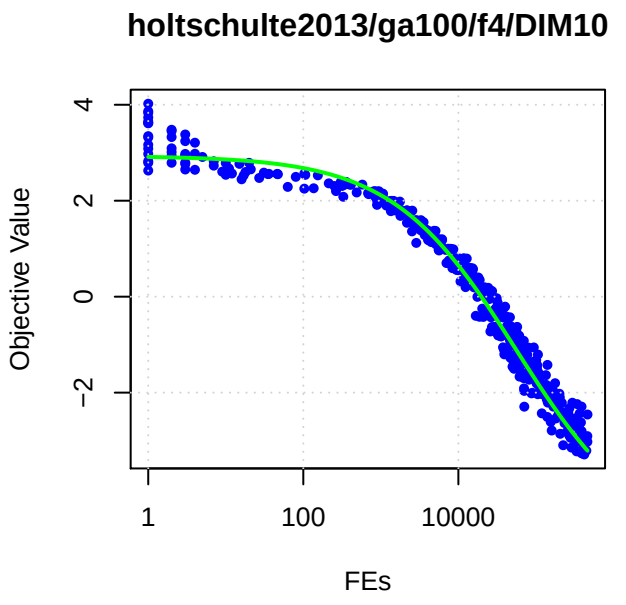
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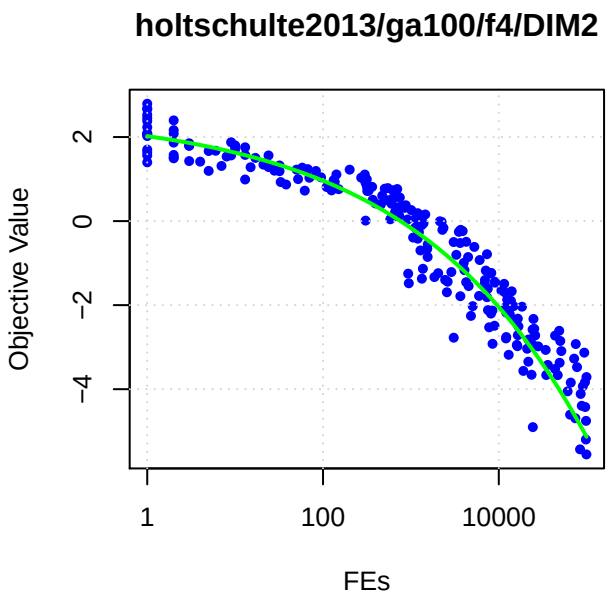
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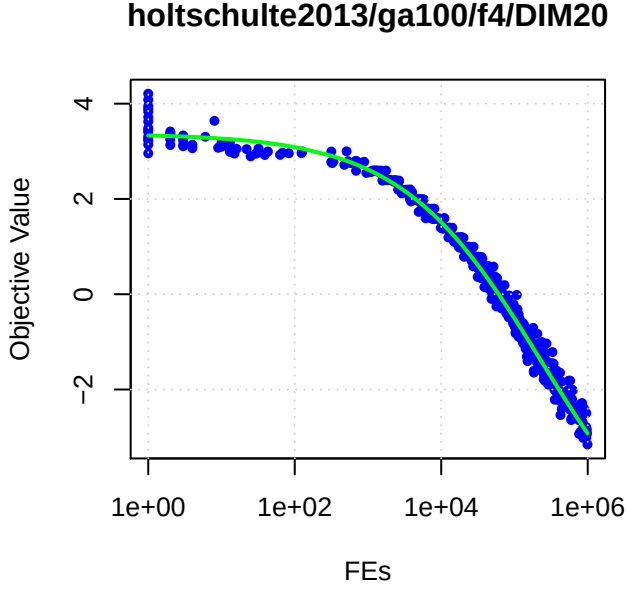
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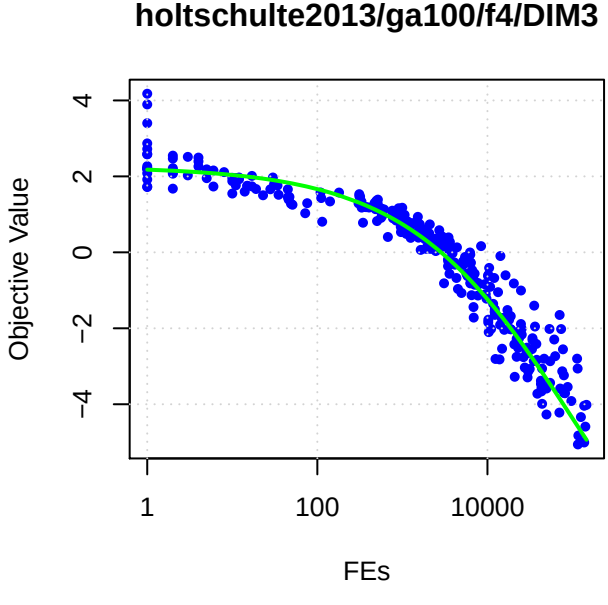
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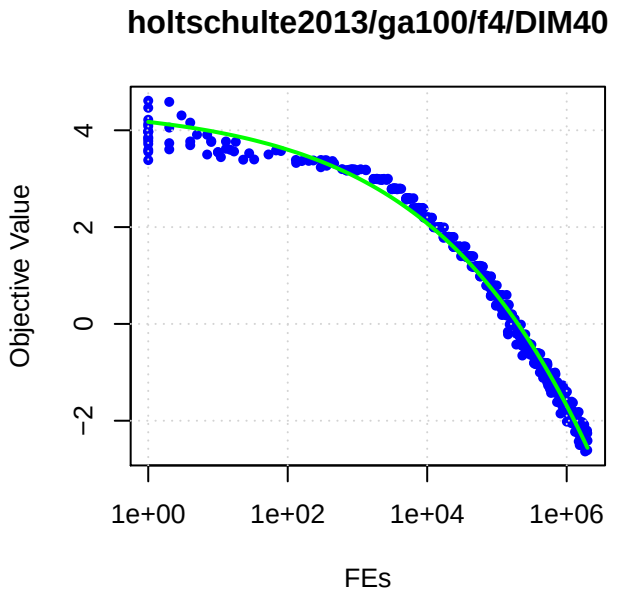
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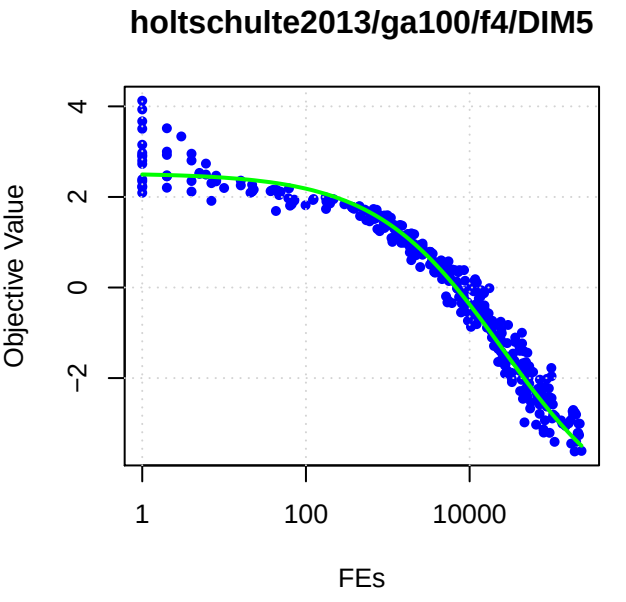
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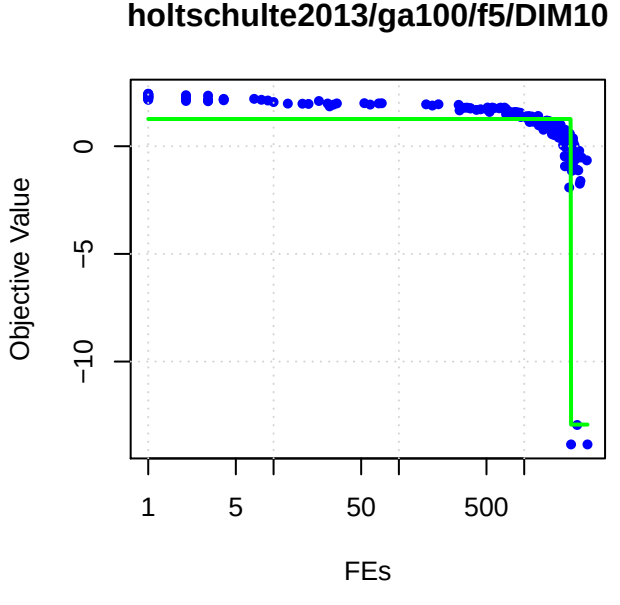
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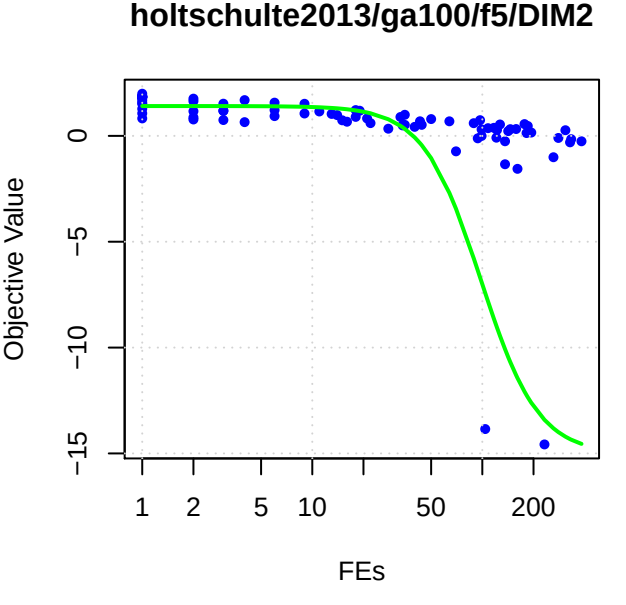
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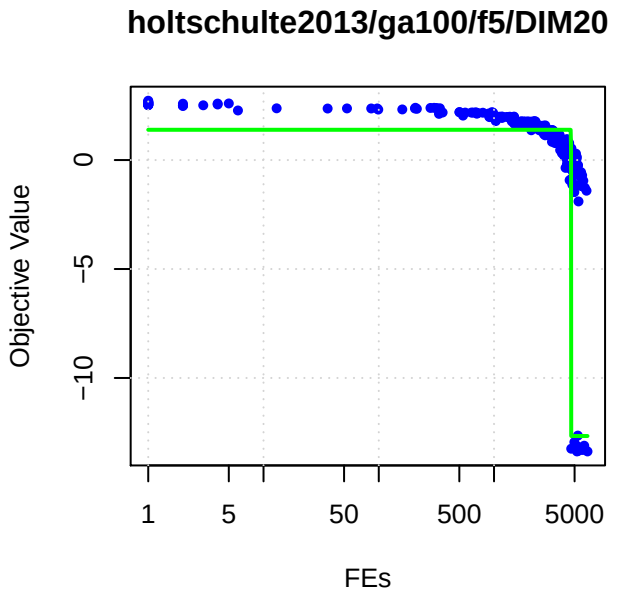
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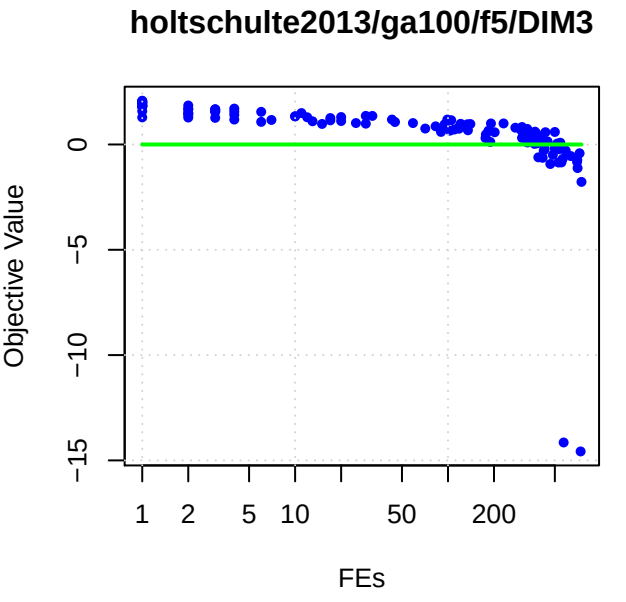
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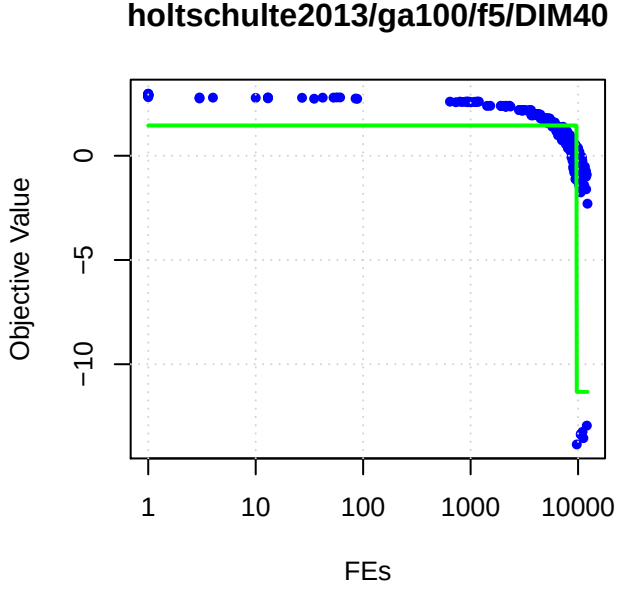
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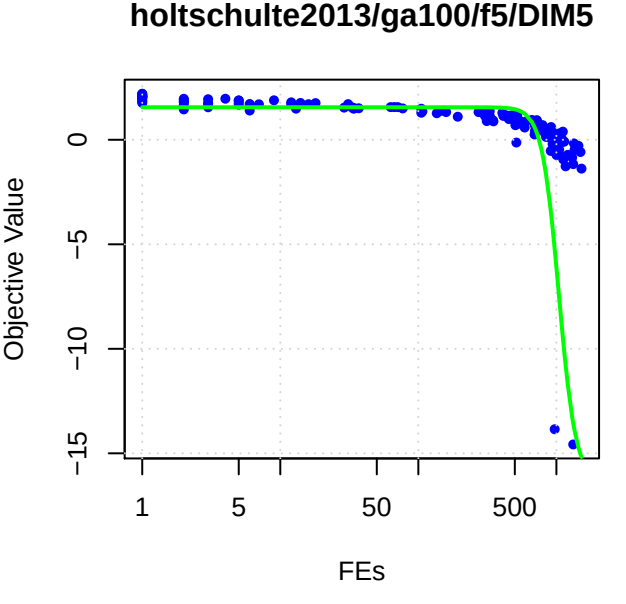
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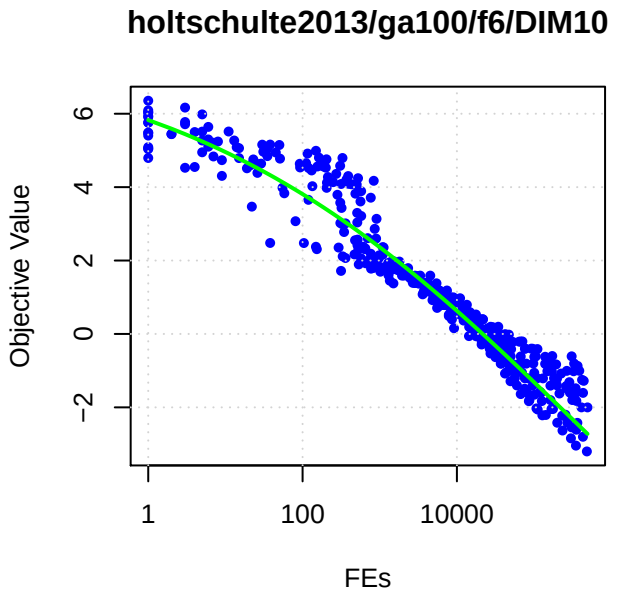
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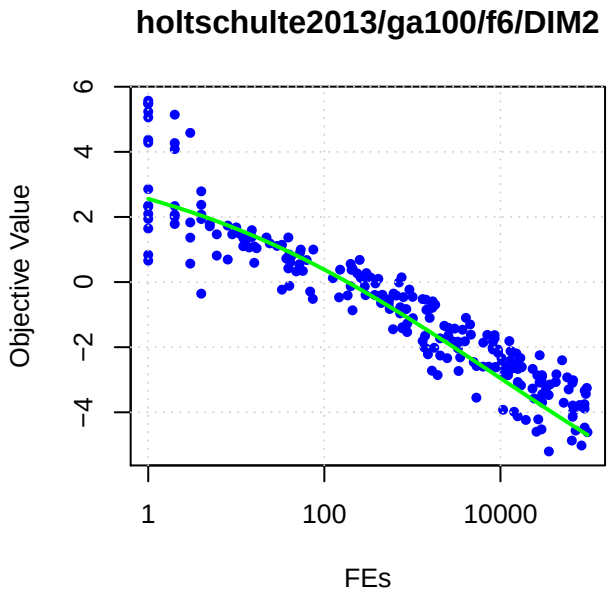
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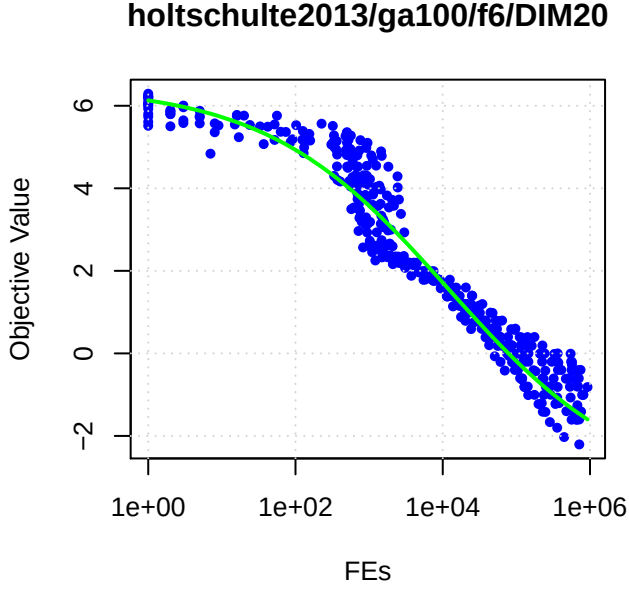
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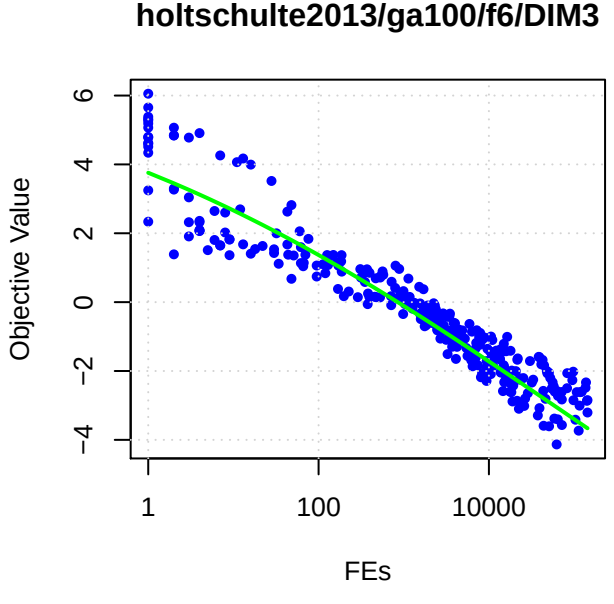
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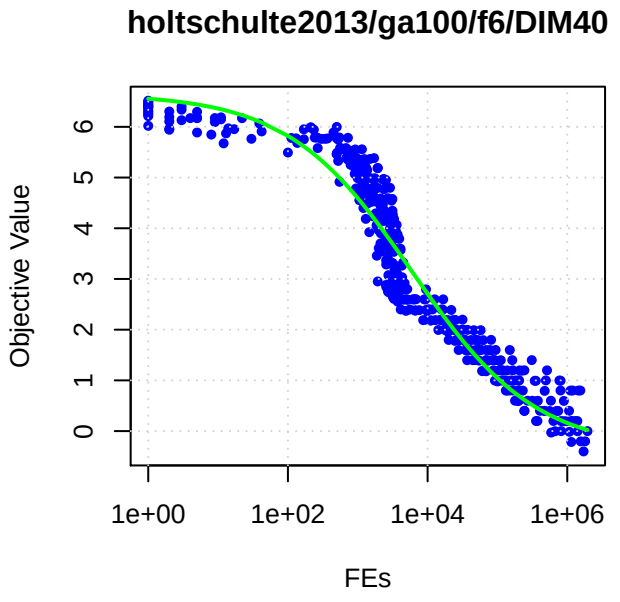
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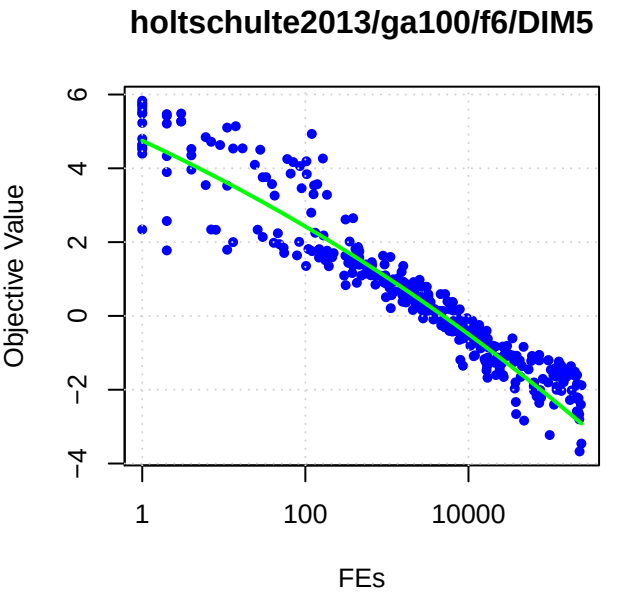
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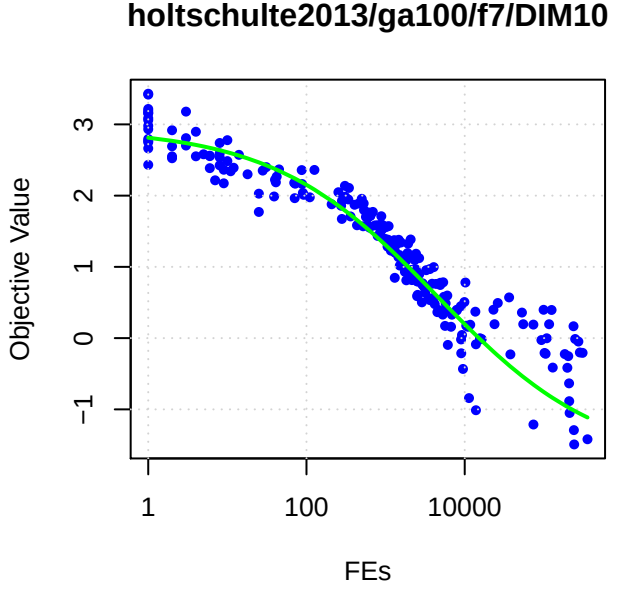
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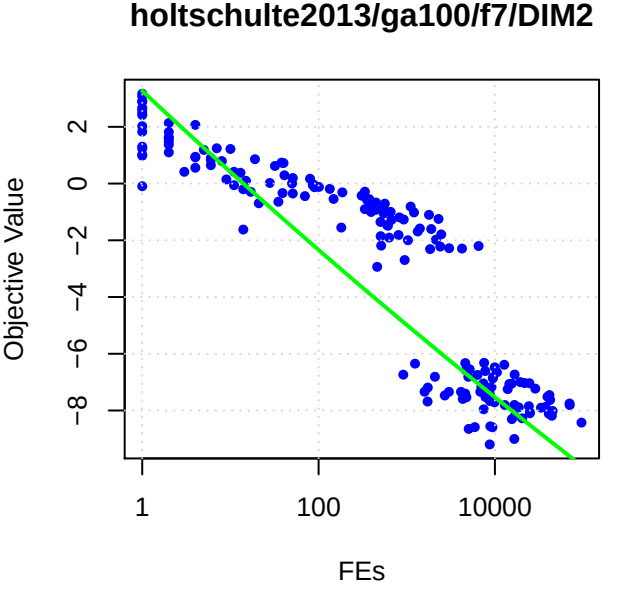
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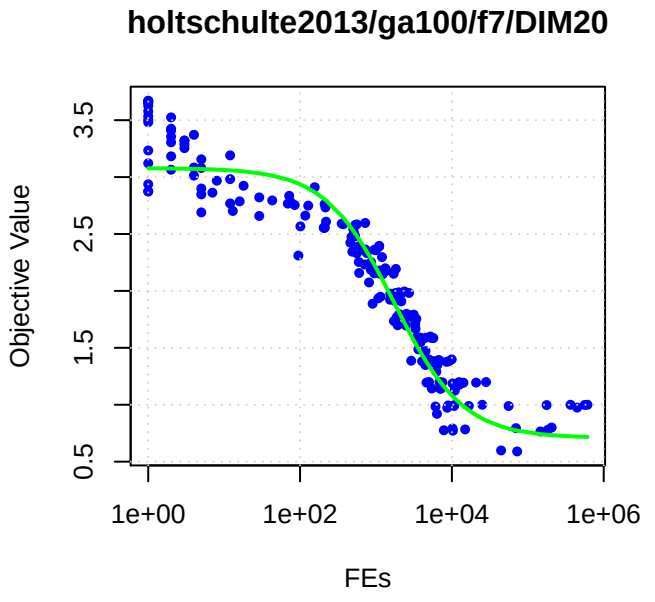
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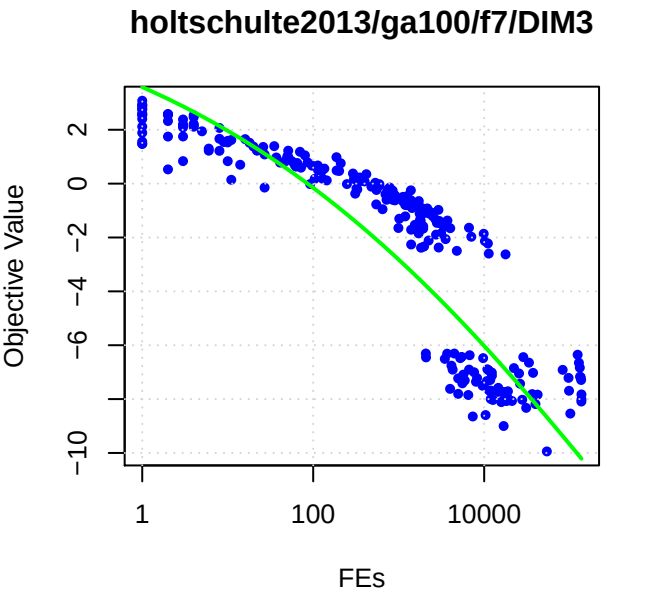
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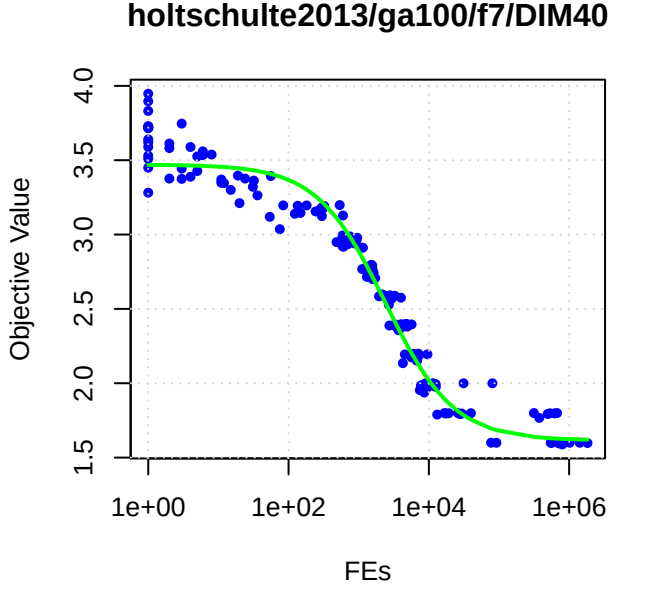
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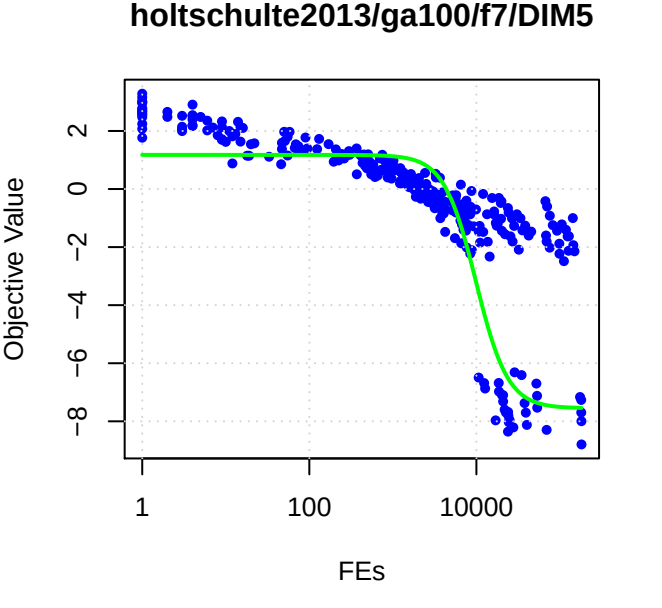
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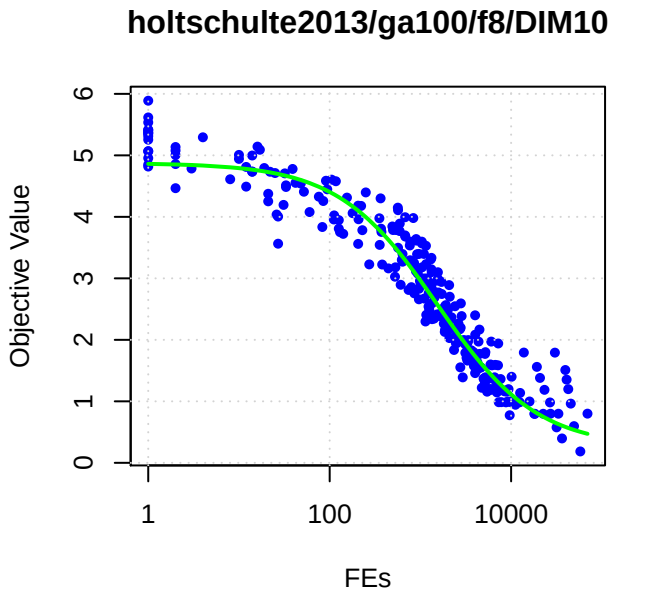
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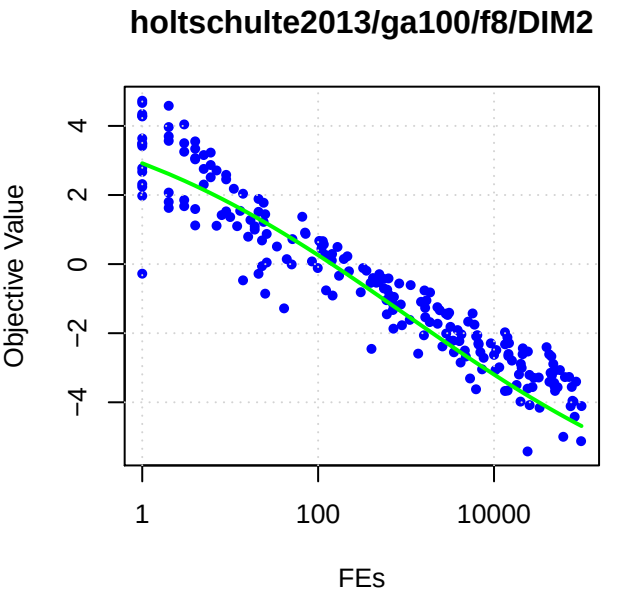
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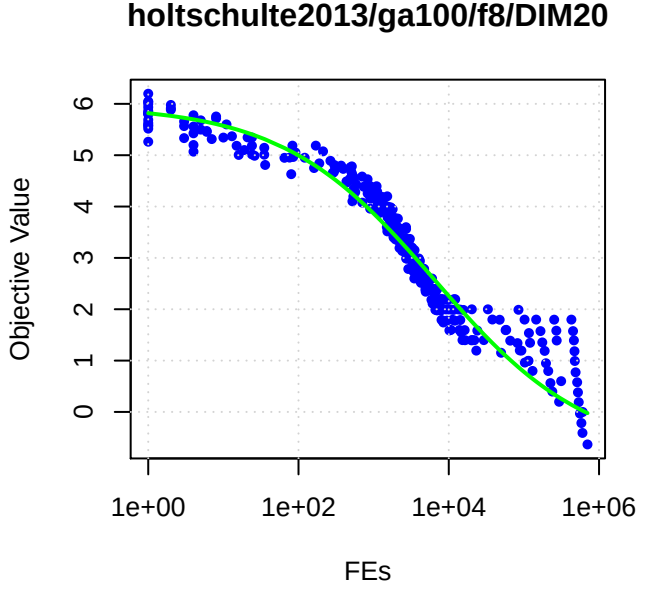
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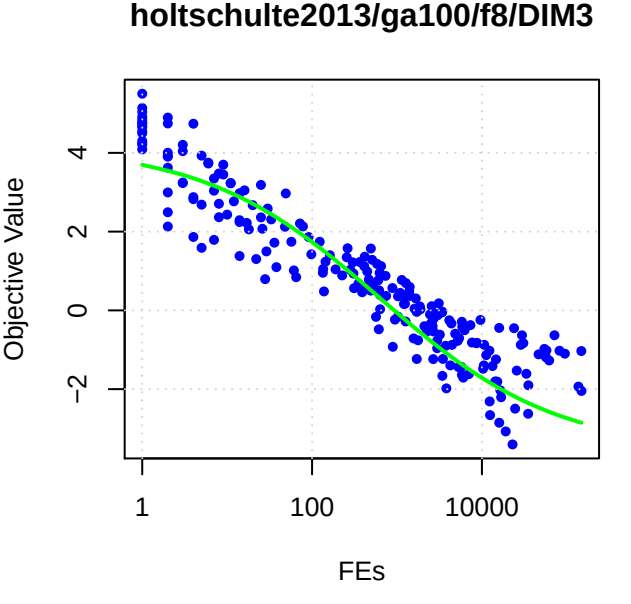
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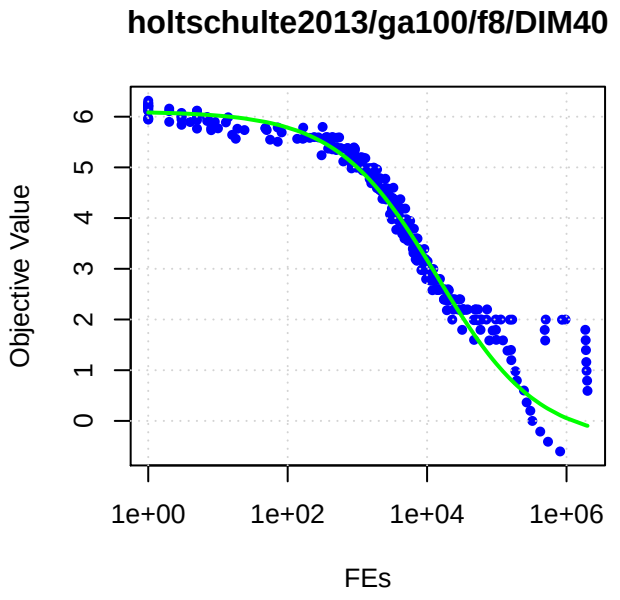
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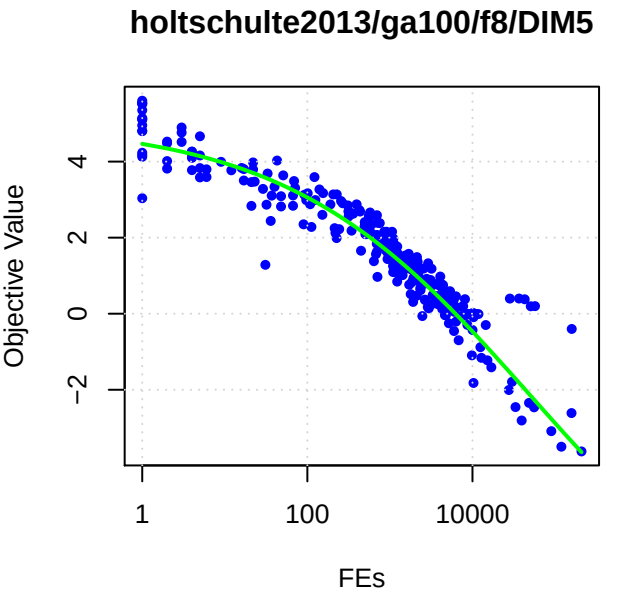
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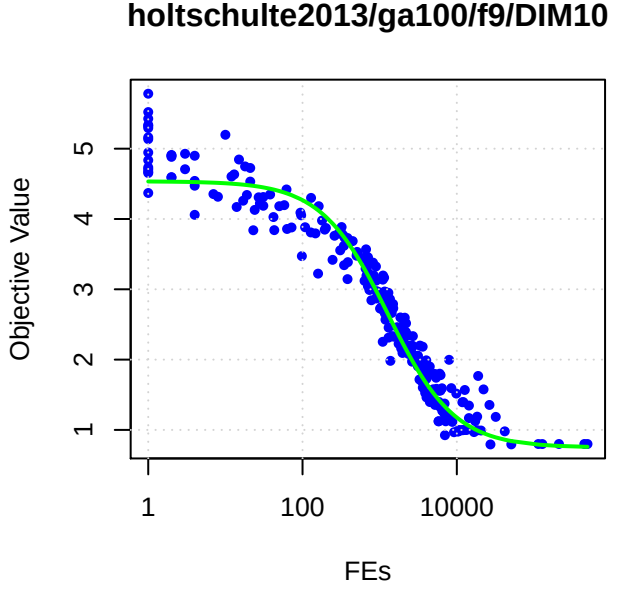
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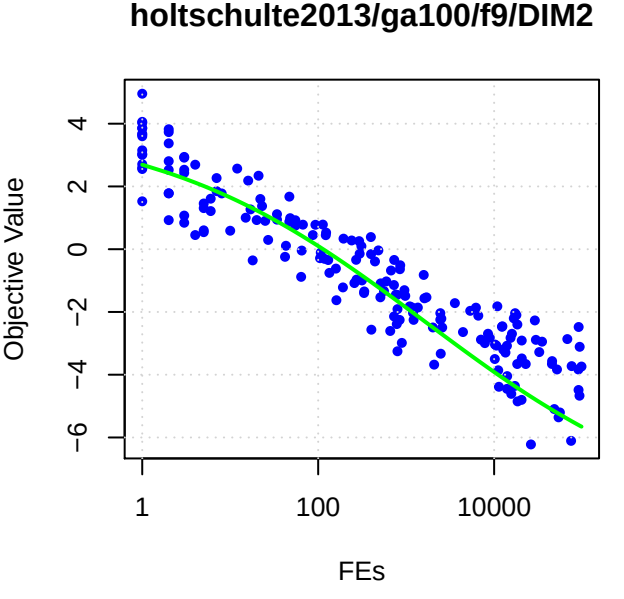
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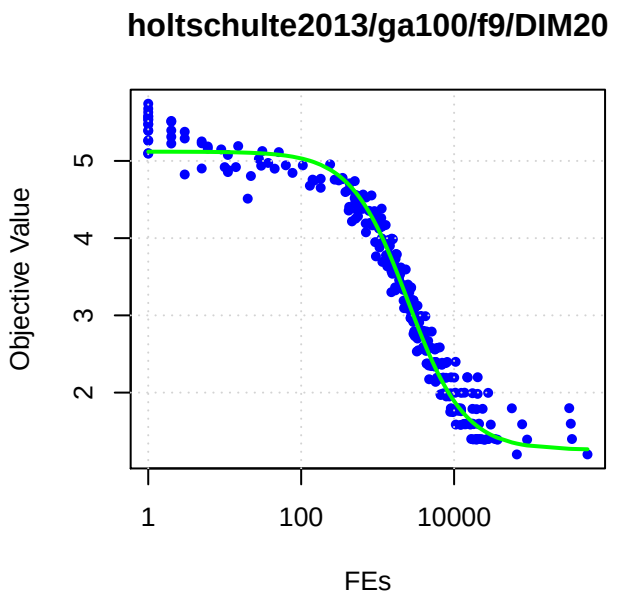
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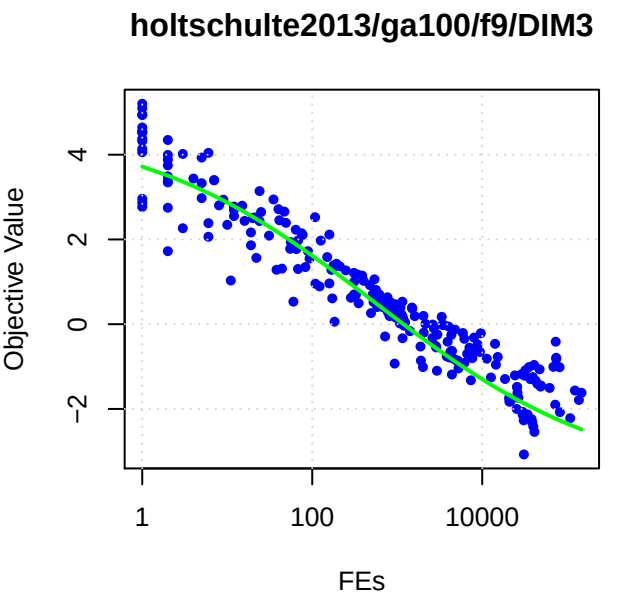
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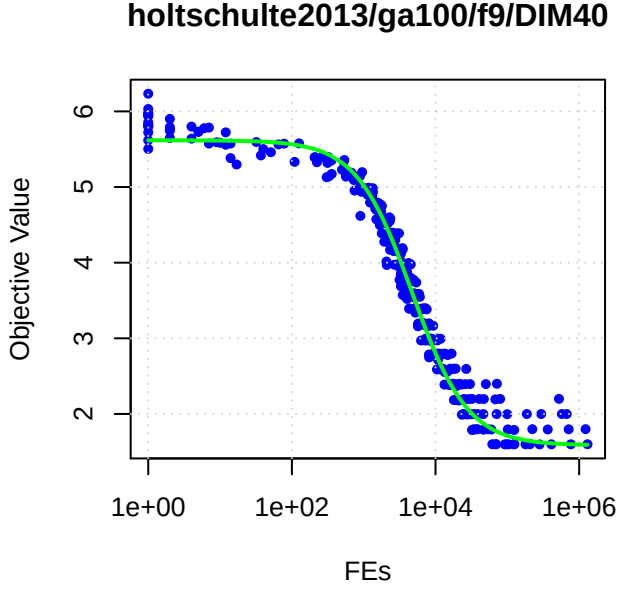
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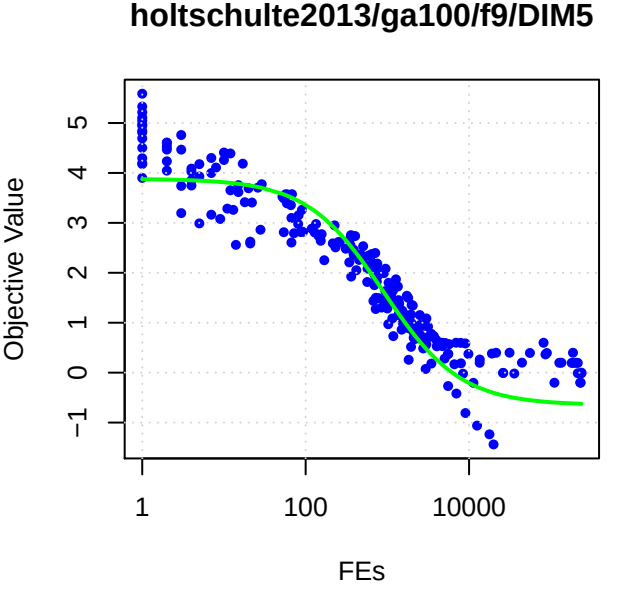
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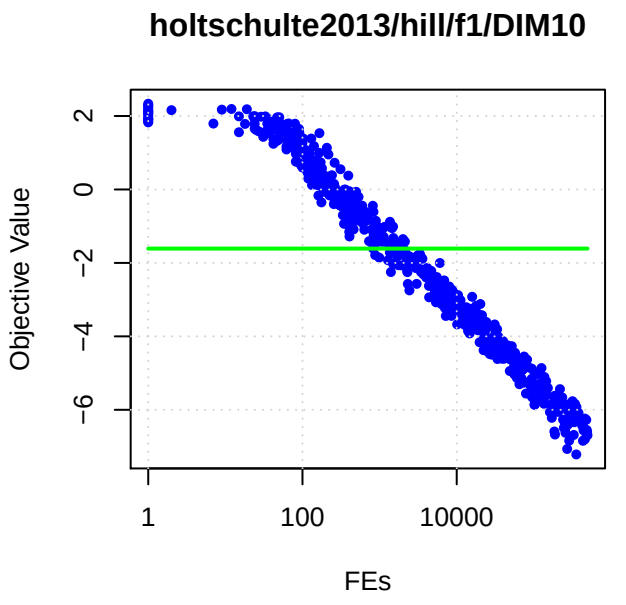
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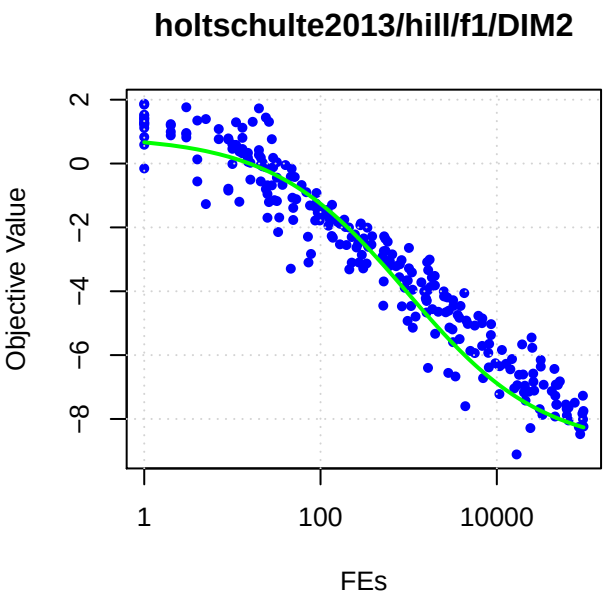
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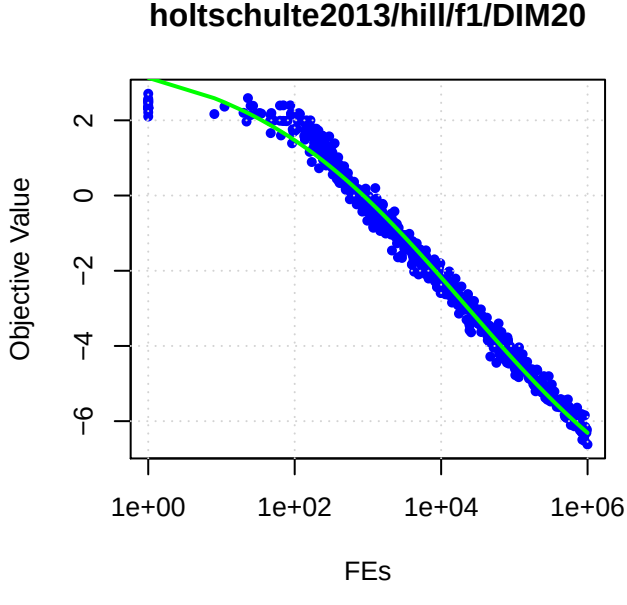
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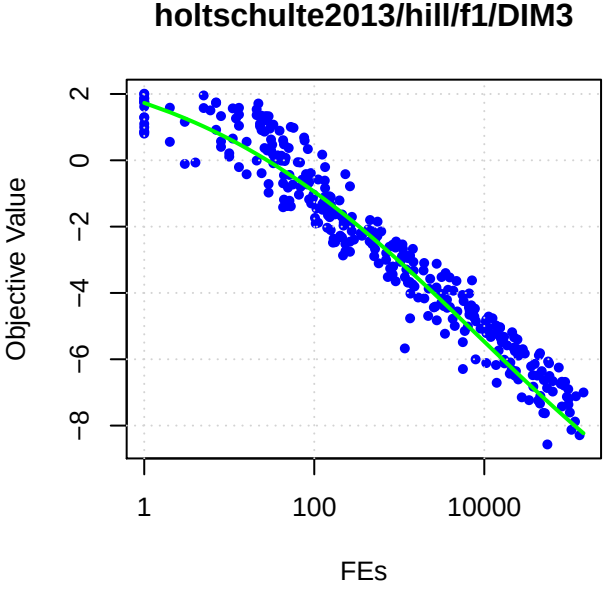
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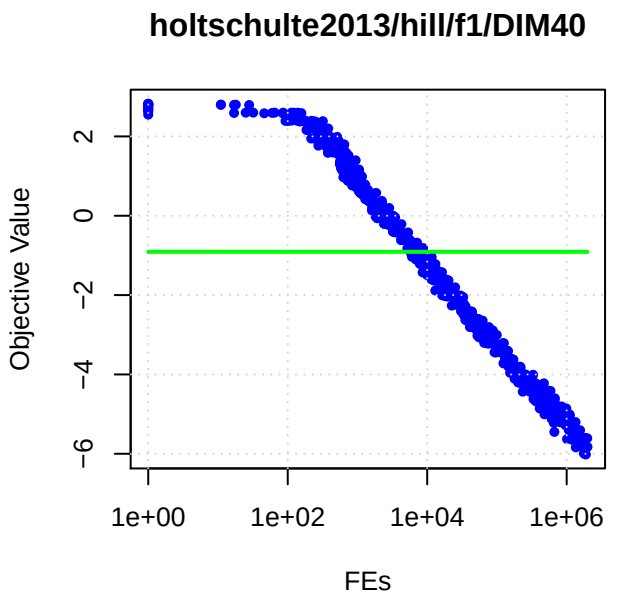
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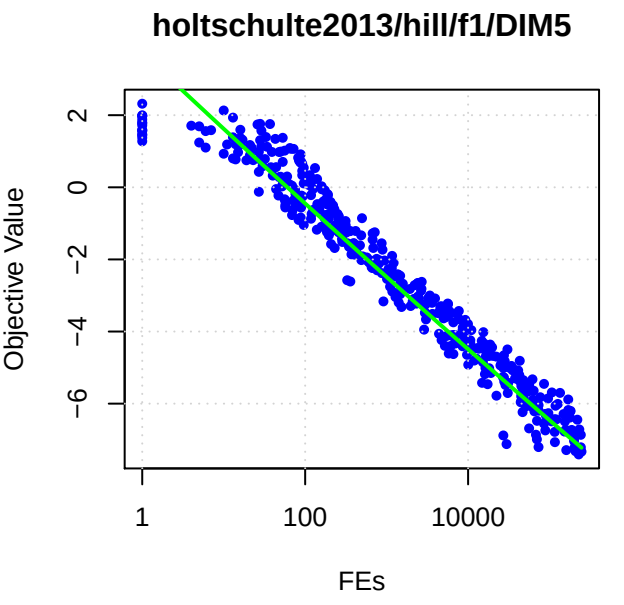
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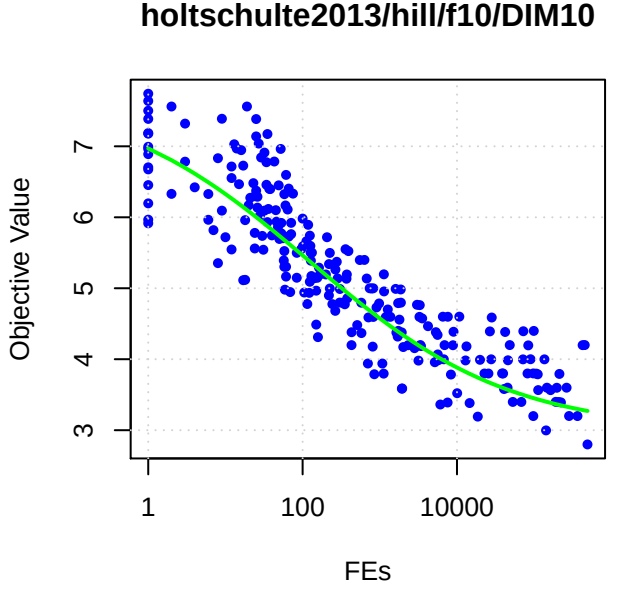
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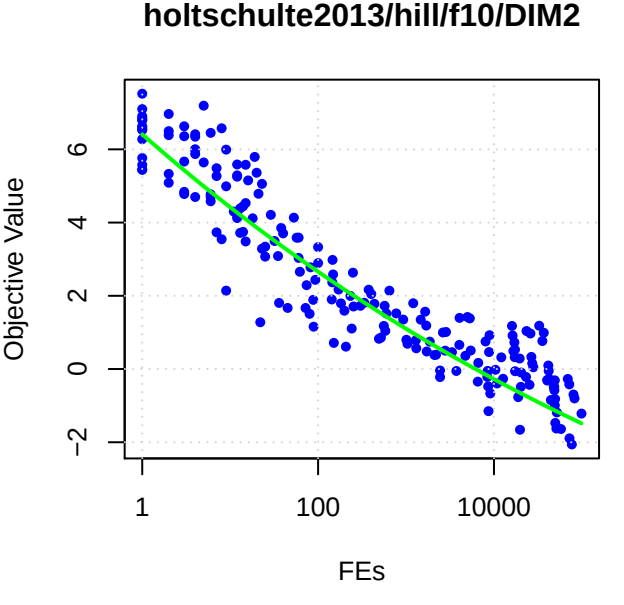
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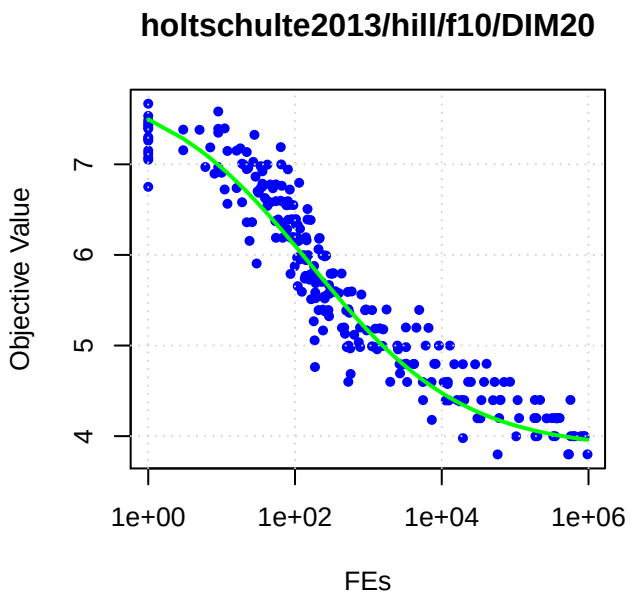
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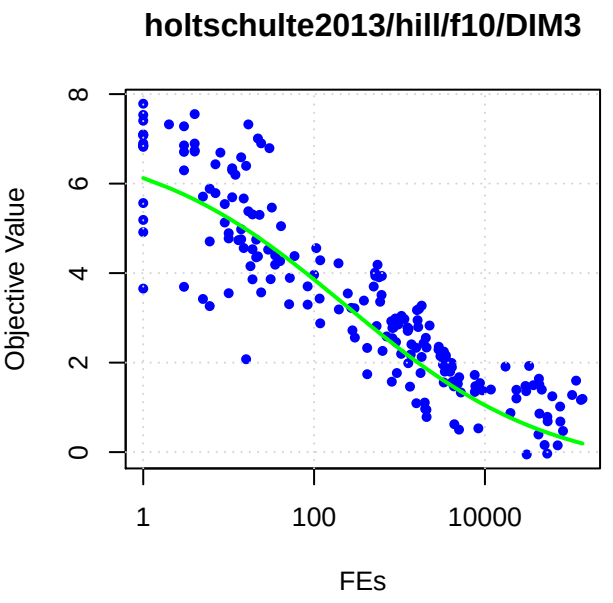
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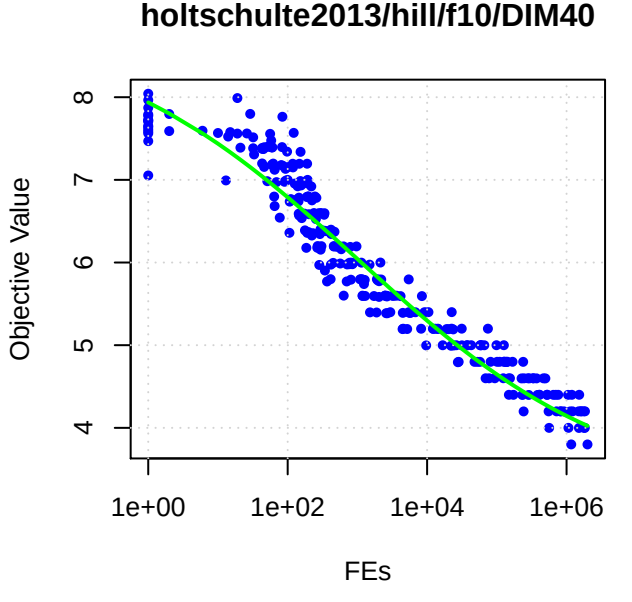
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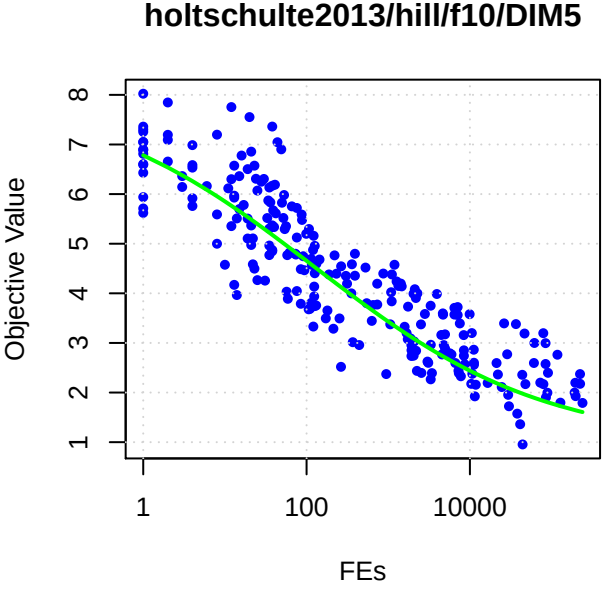
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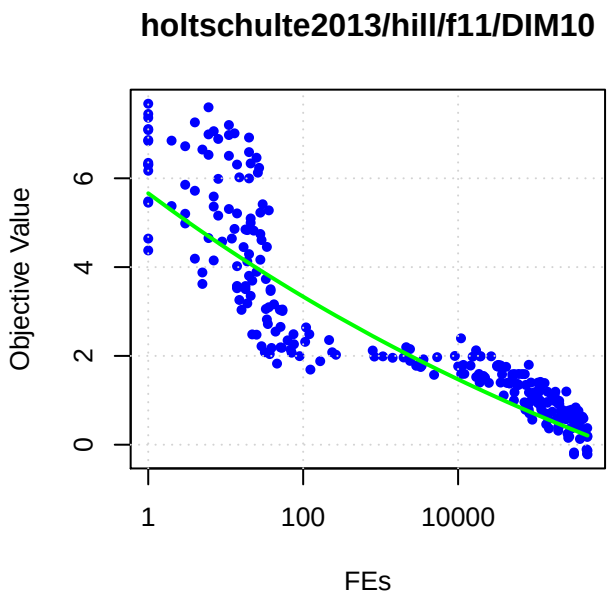
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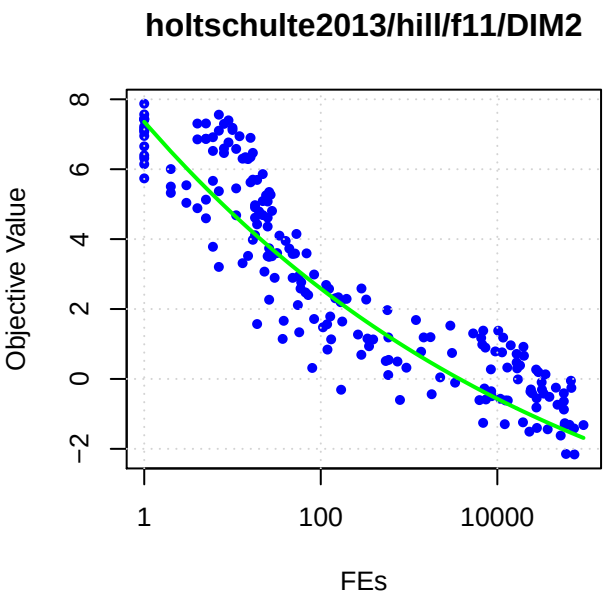
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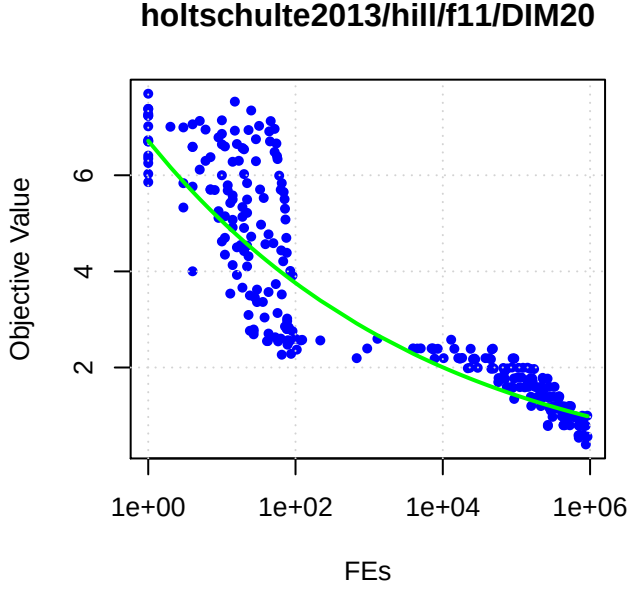
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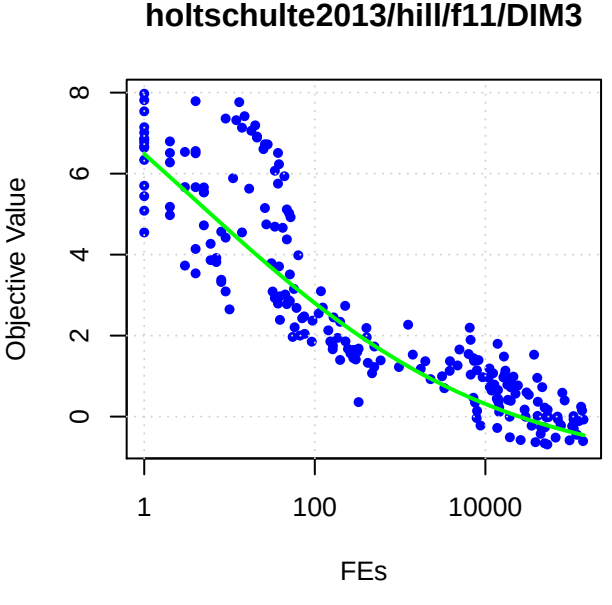
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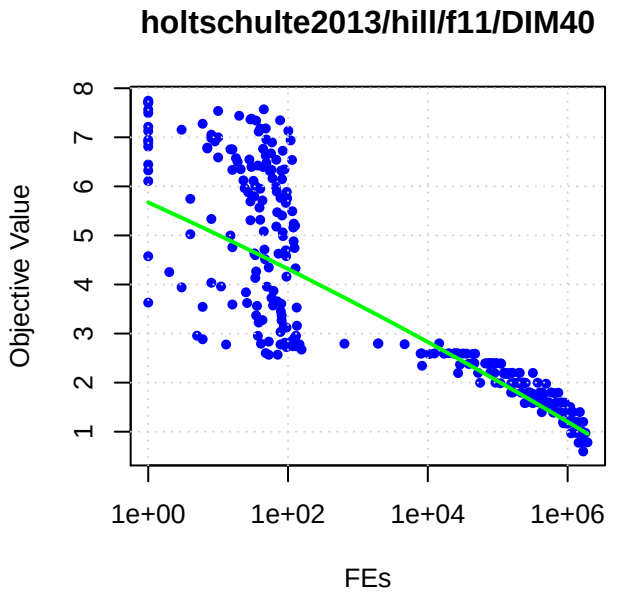
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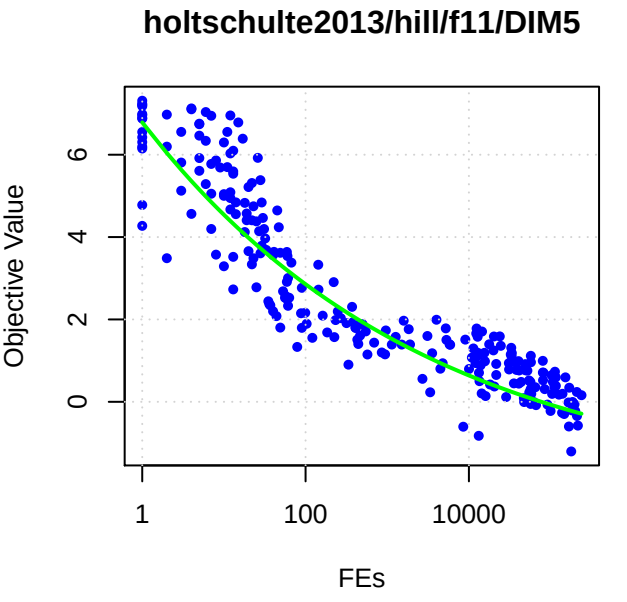
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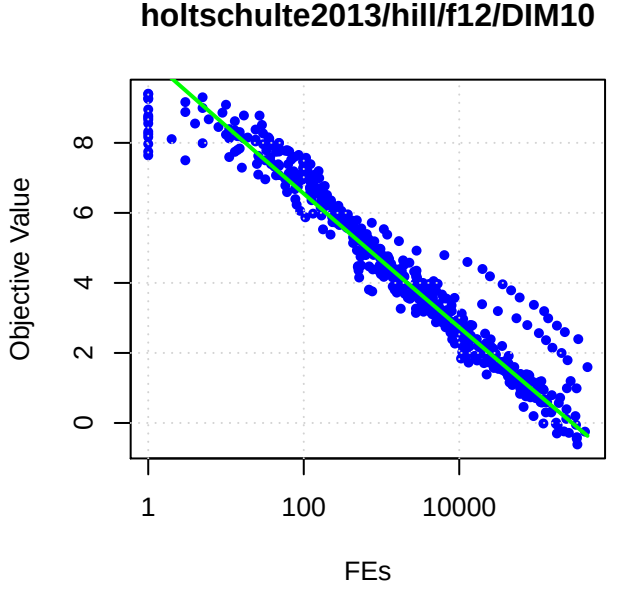
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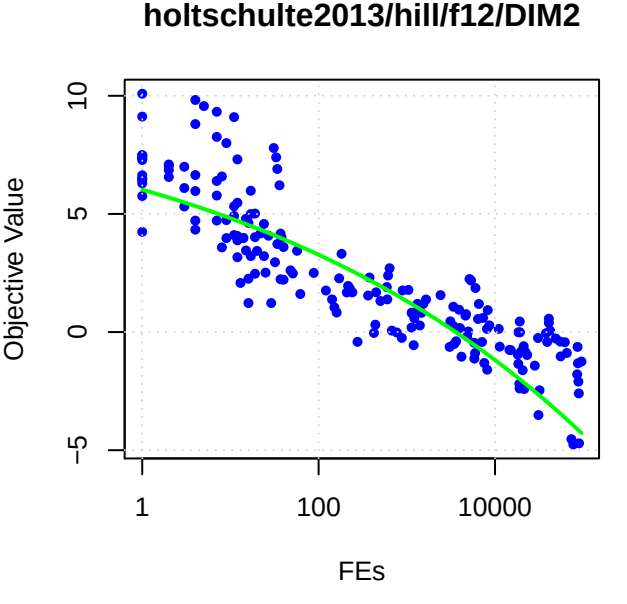
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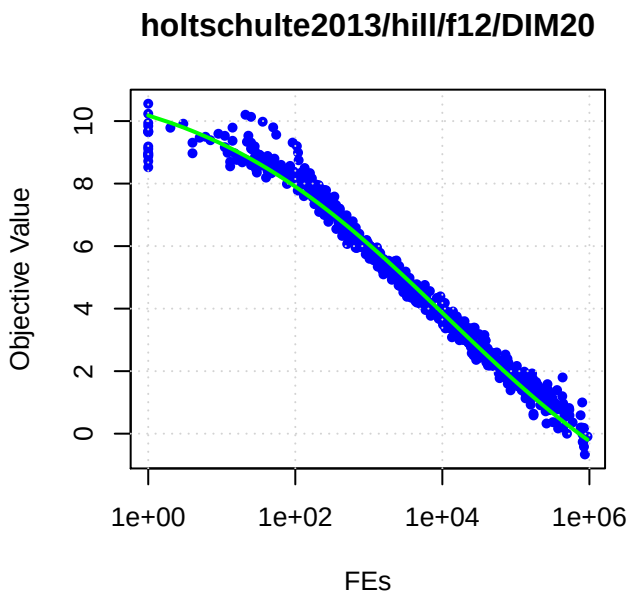
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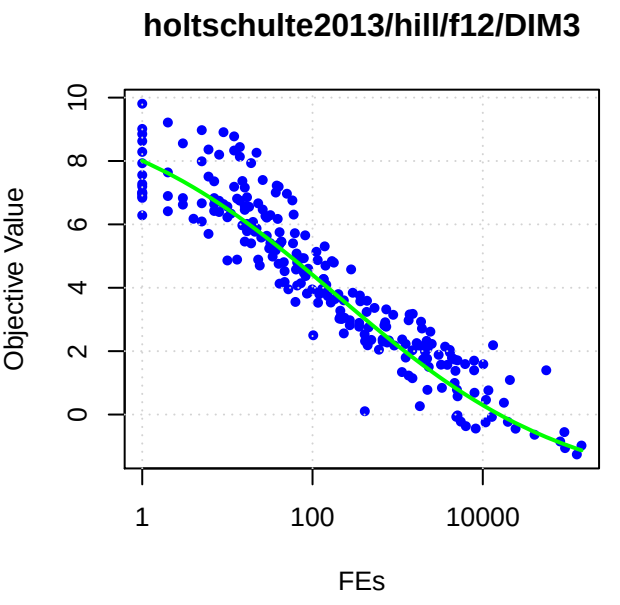
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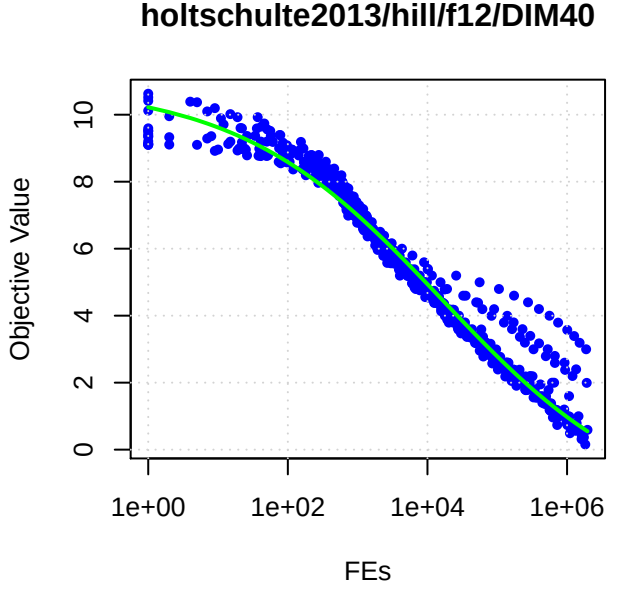
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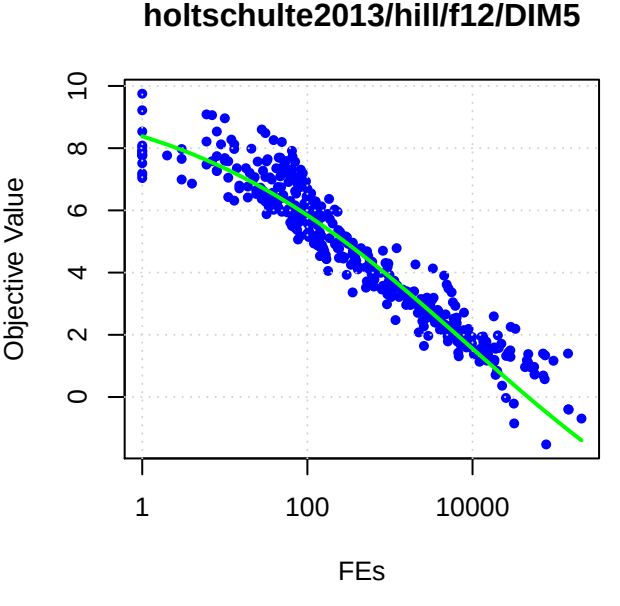
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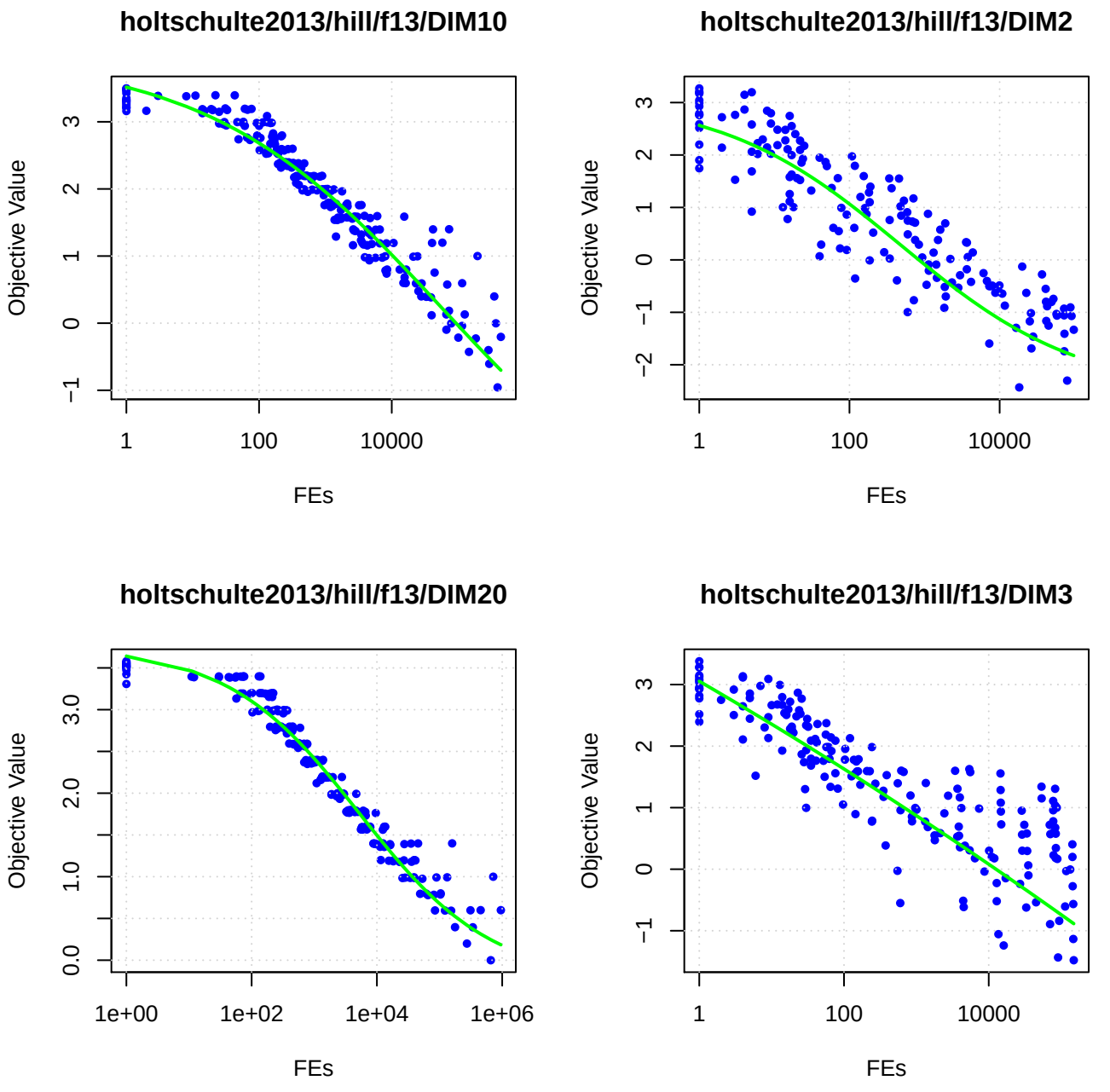
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Objective Value
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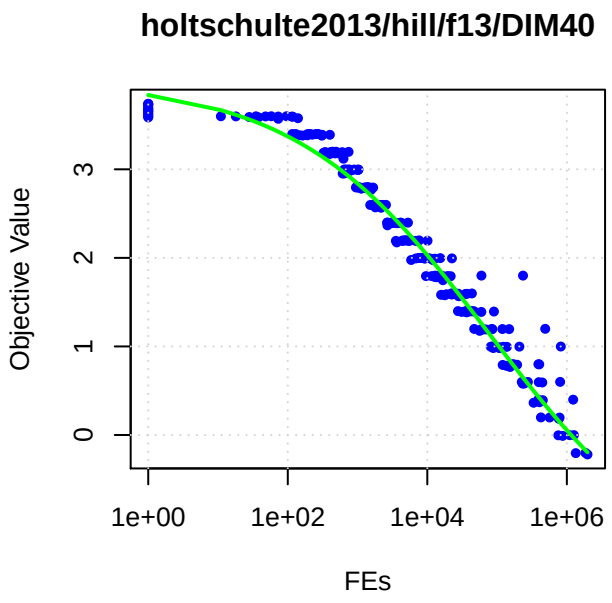
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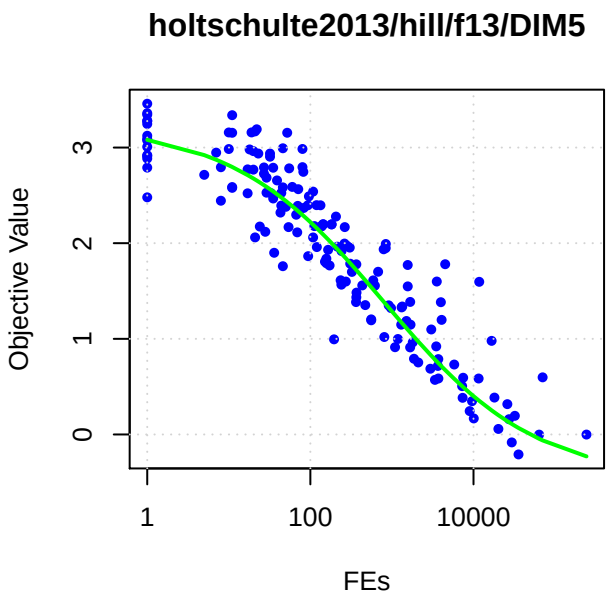
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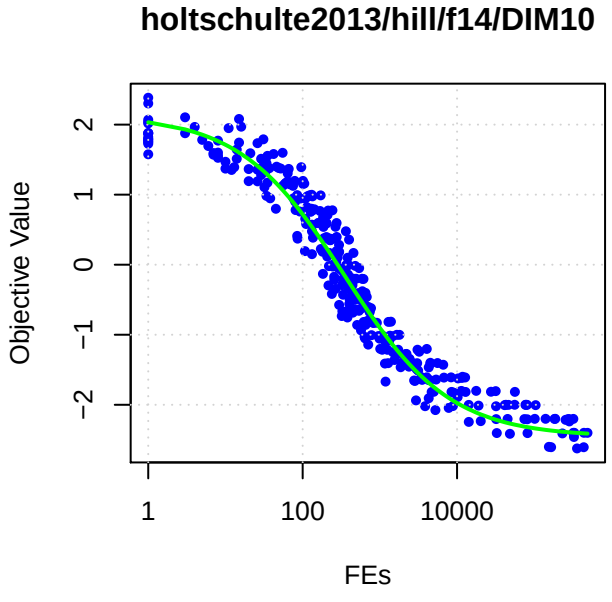
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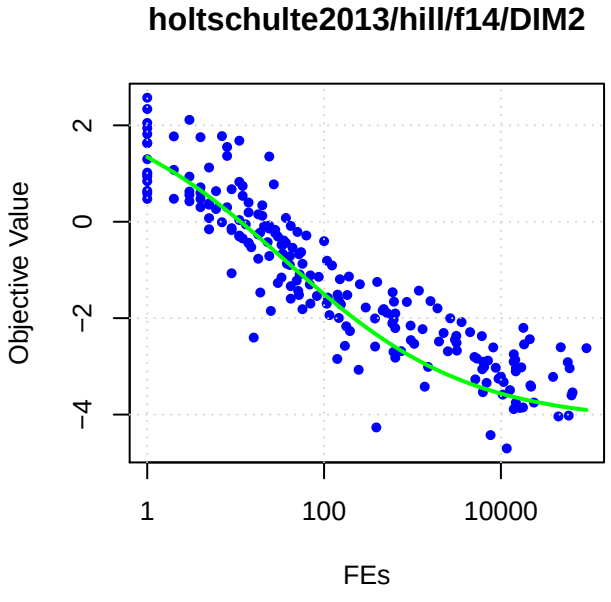
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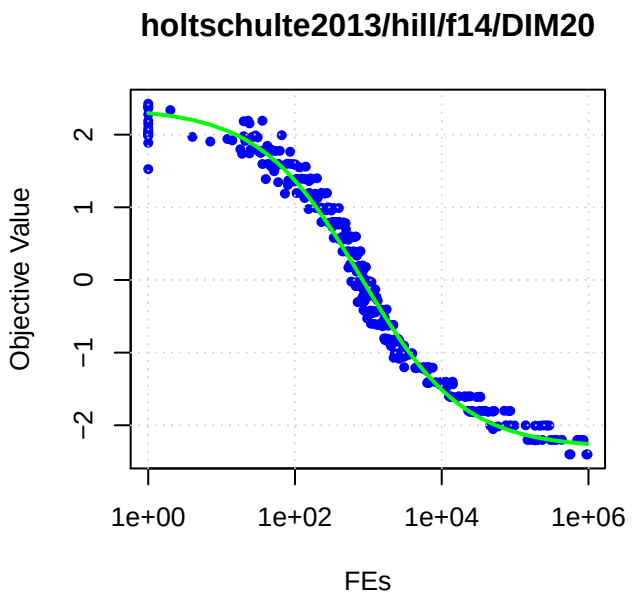
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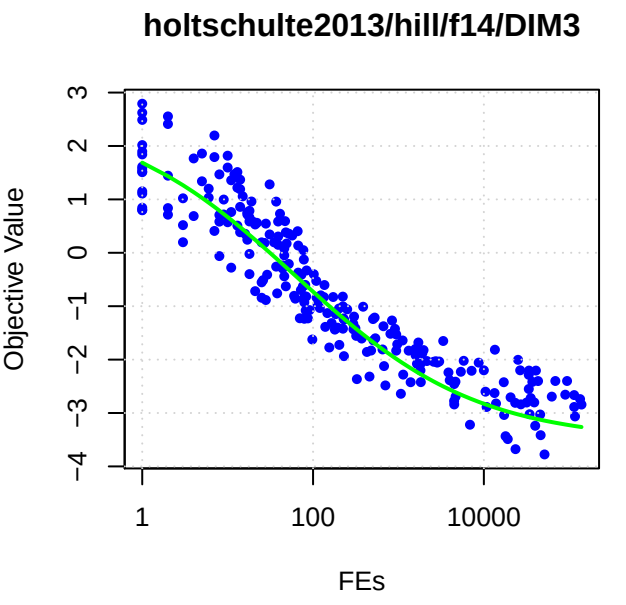
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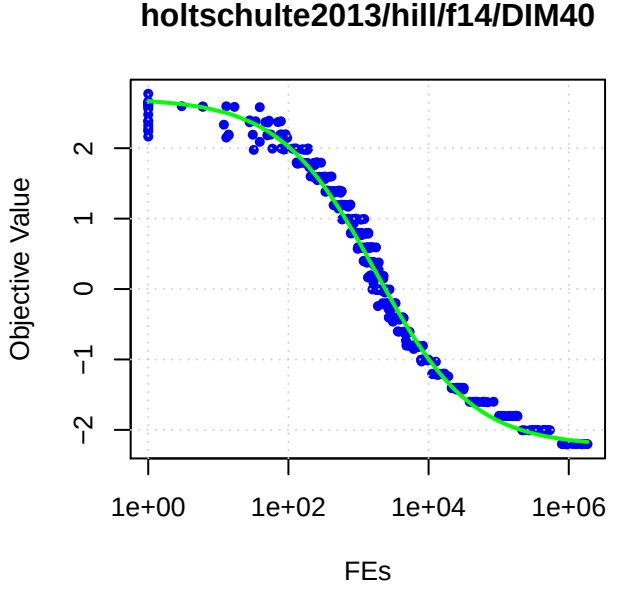
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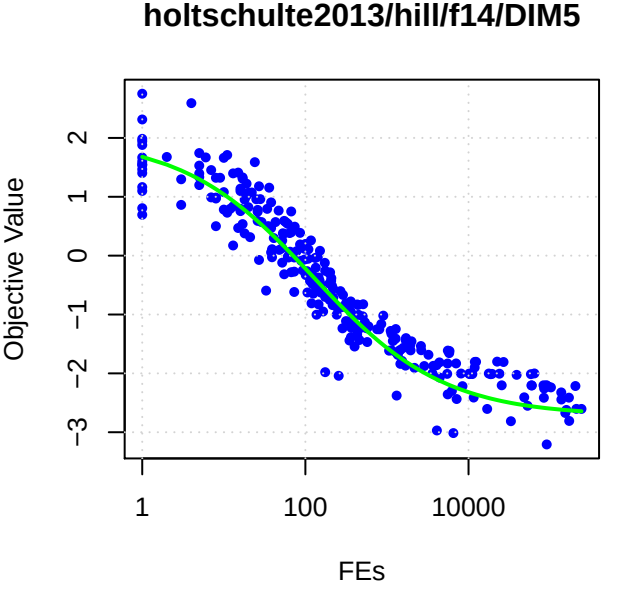
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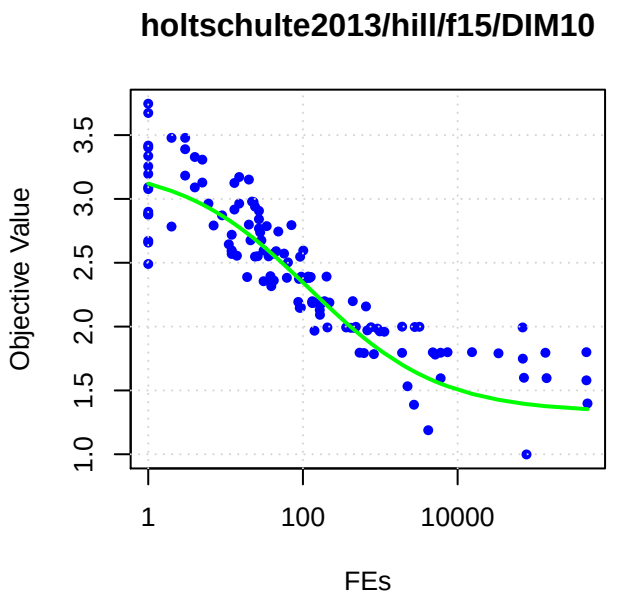
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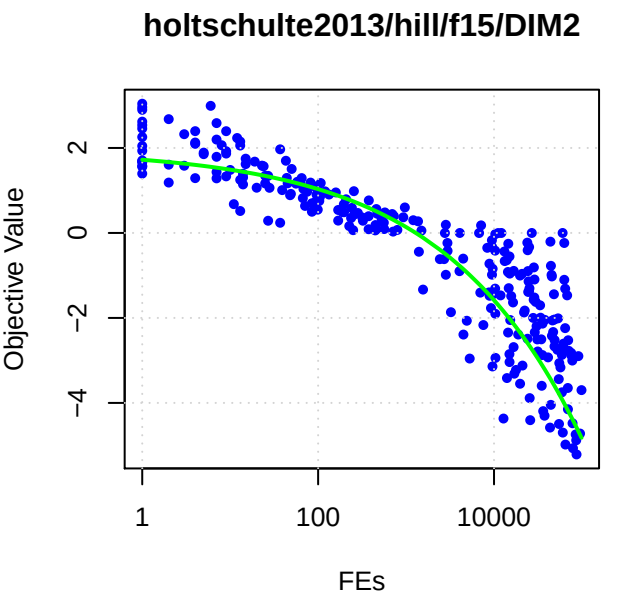
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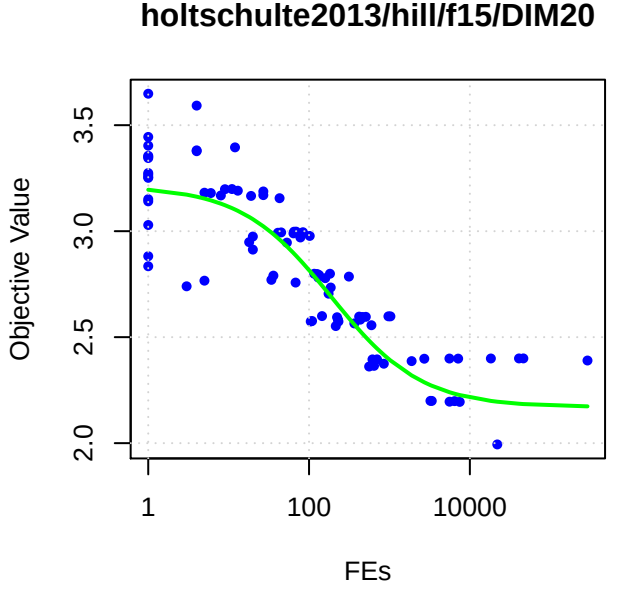
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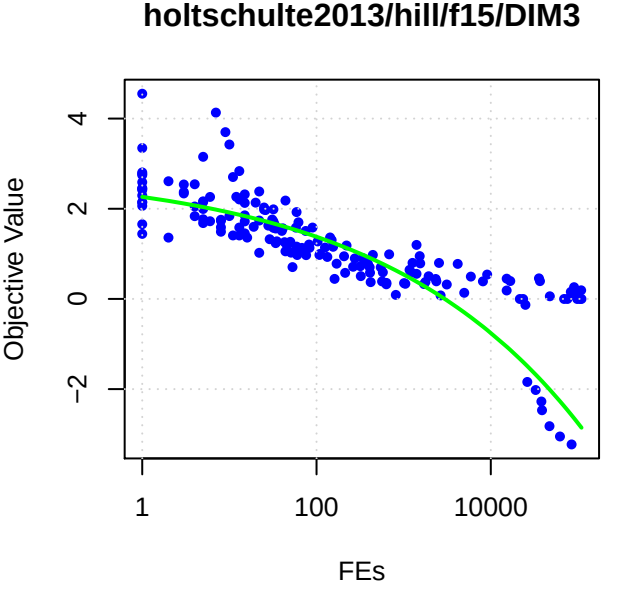
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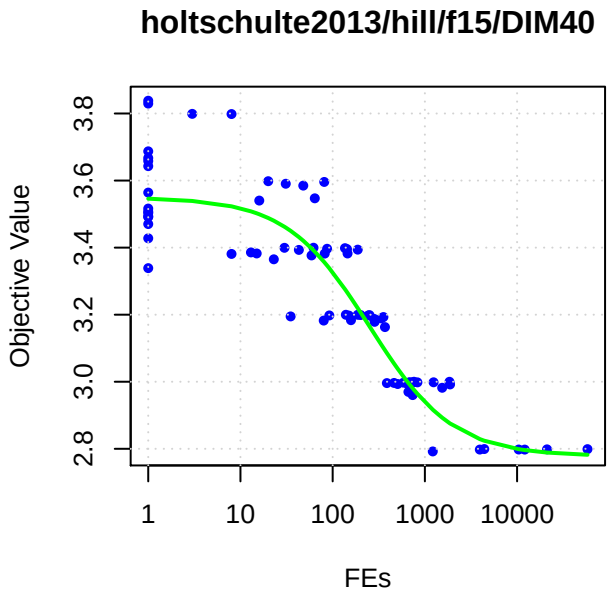
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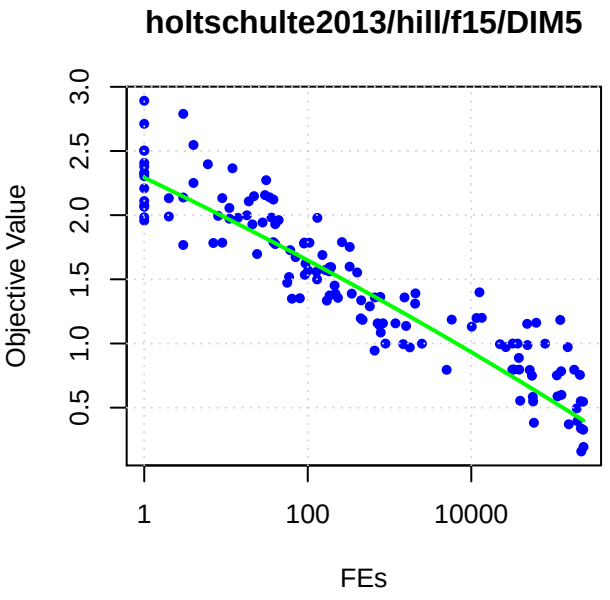
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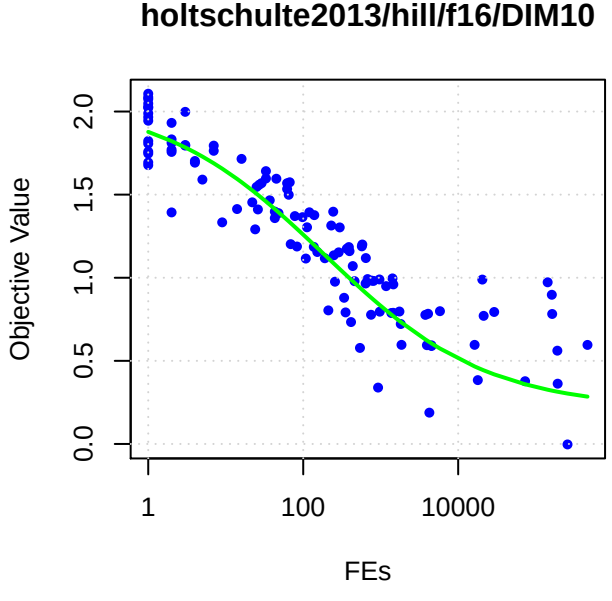
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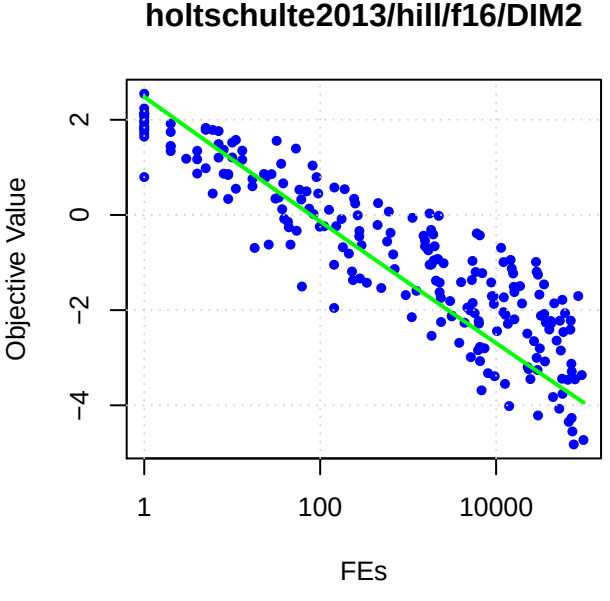
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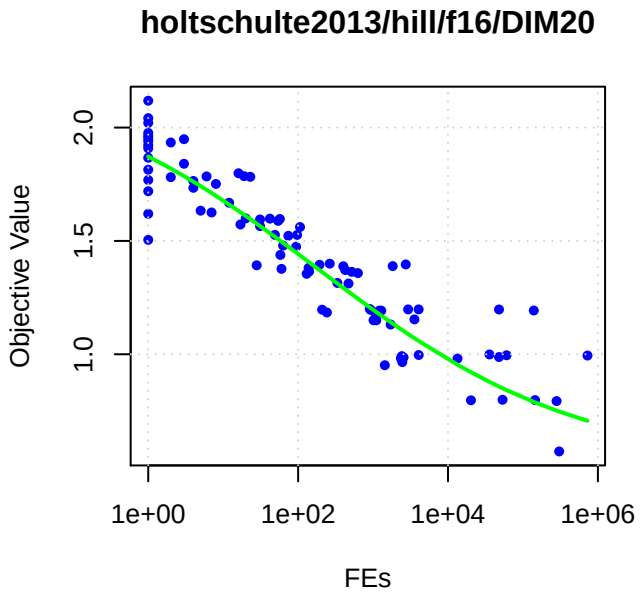
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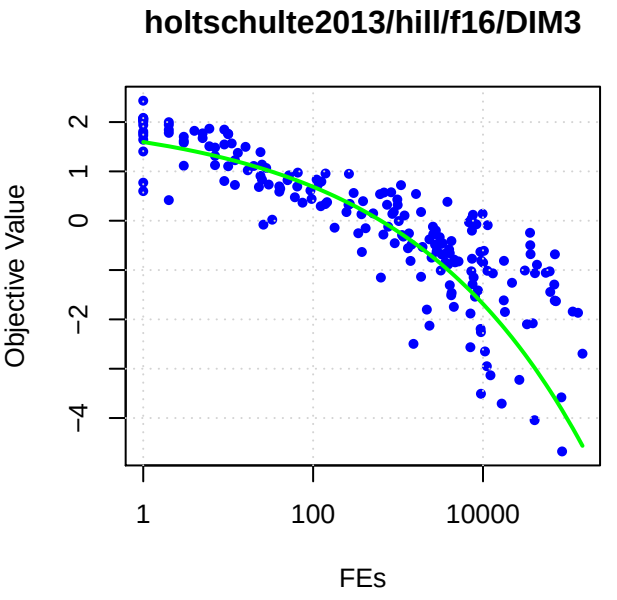
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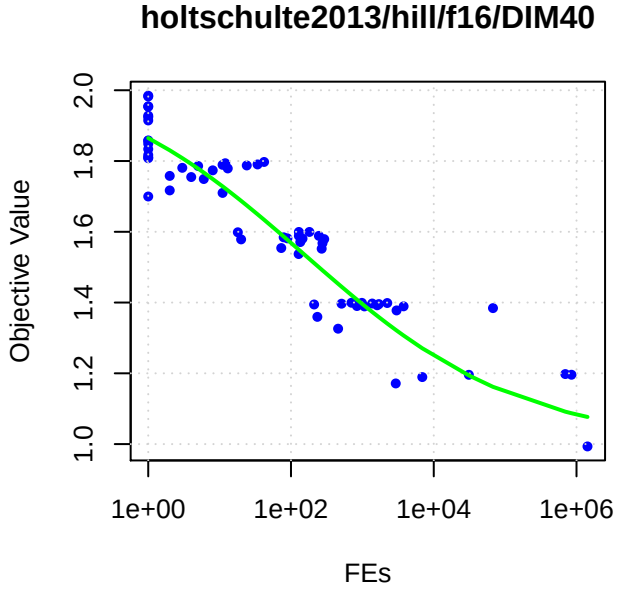
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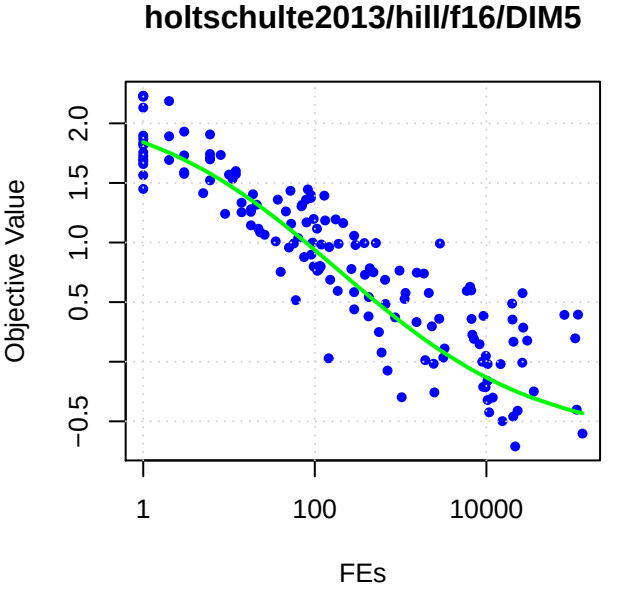
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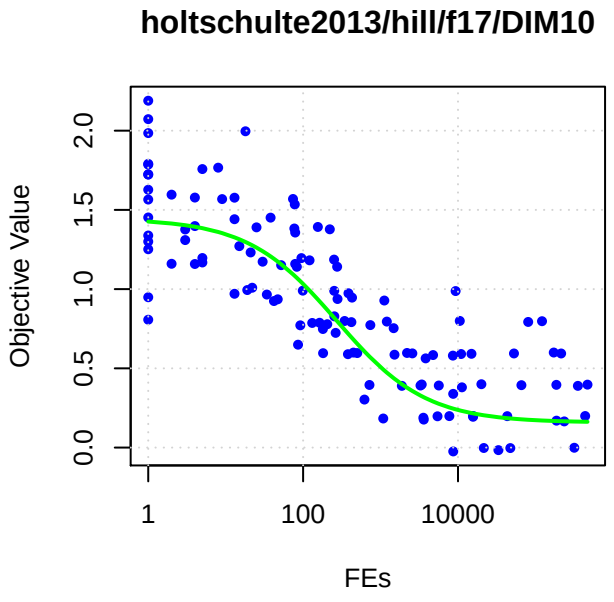
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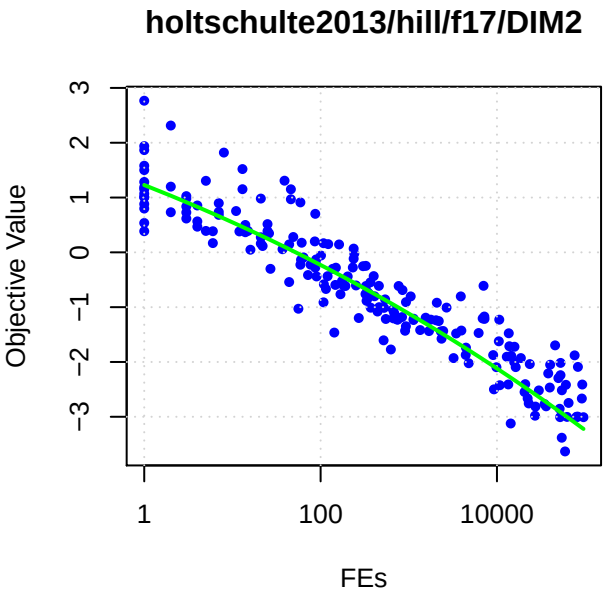
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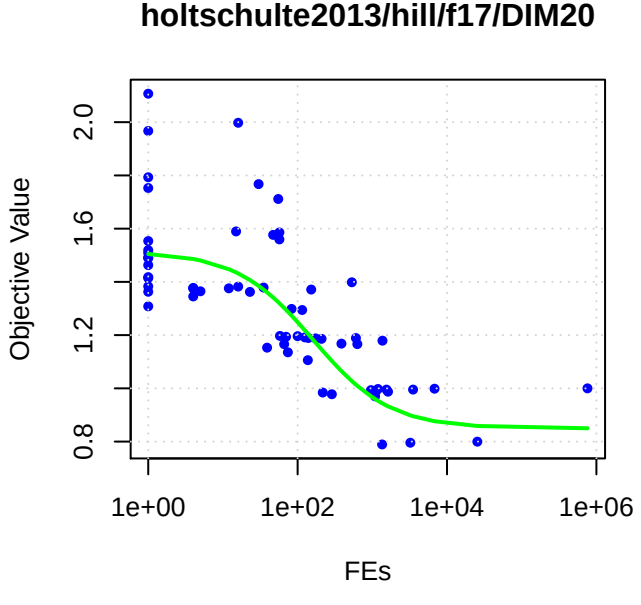
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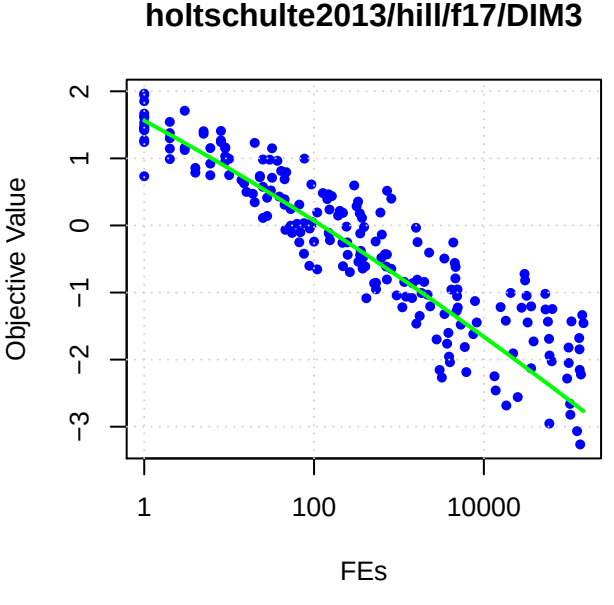
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Objective Value
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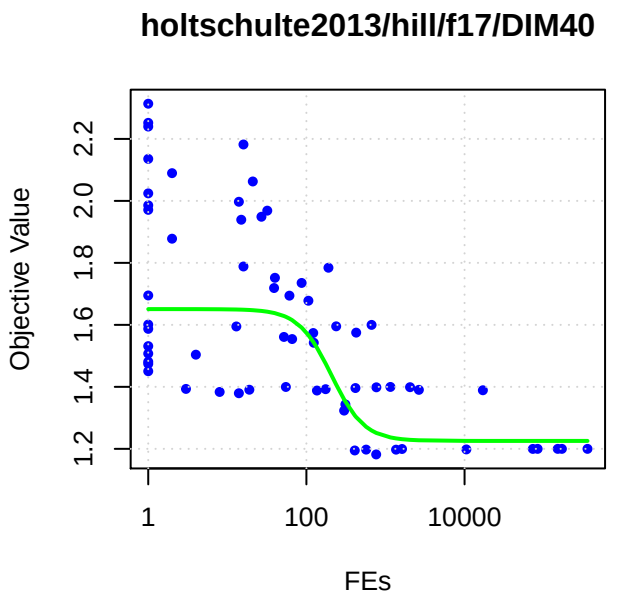
2
1
100
10000
FEs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1.6
1.8
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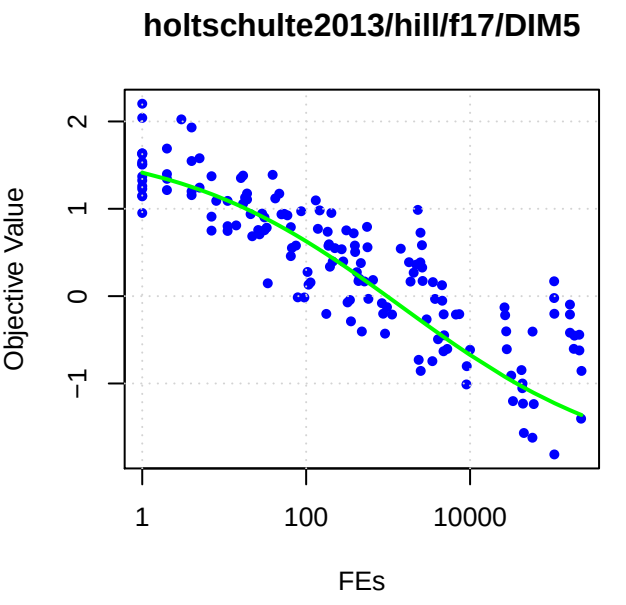
2.2
1
100
10000
FEs


holtschulte2013/hill/f17/DIM5
Objective Value
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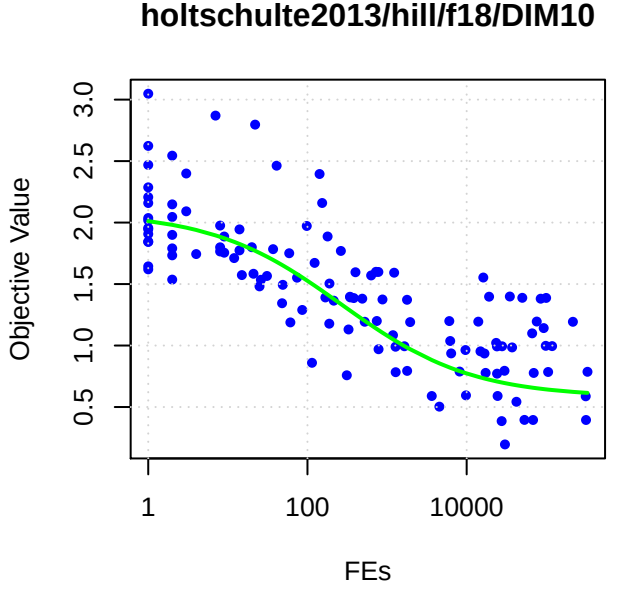
1
100
10000
FEs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2.5
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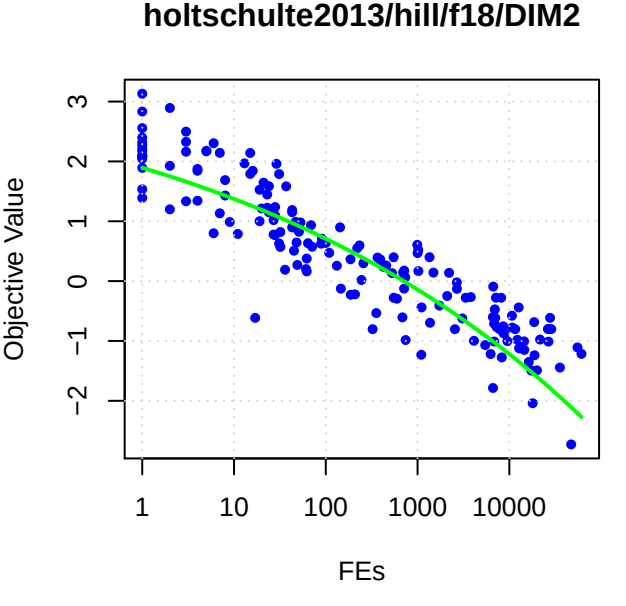
1
100
10000
FEs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Objective Value
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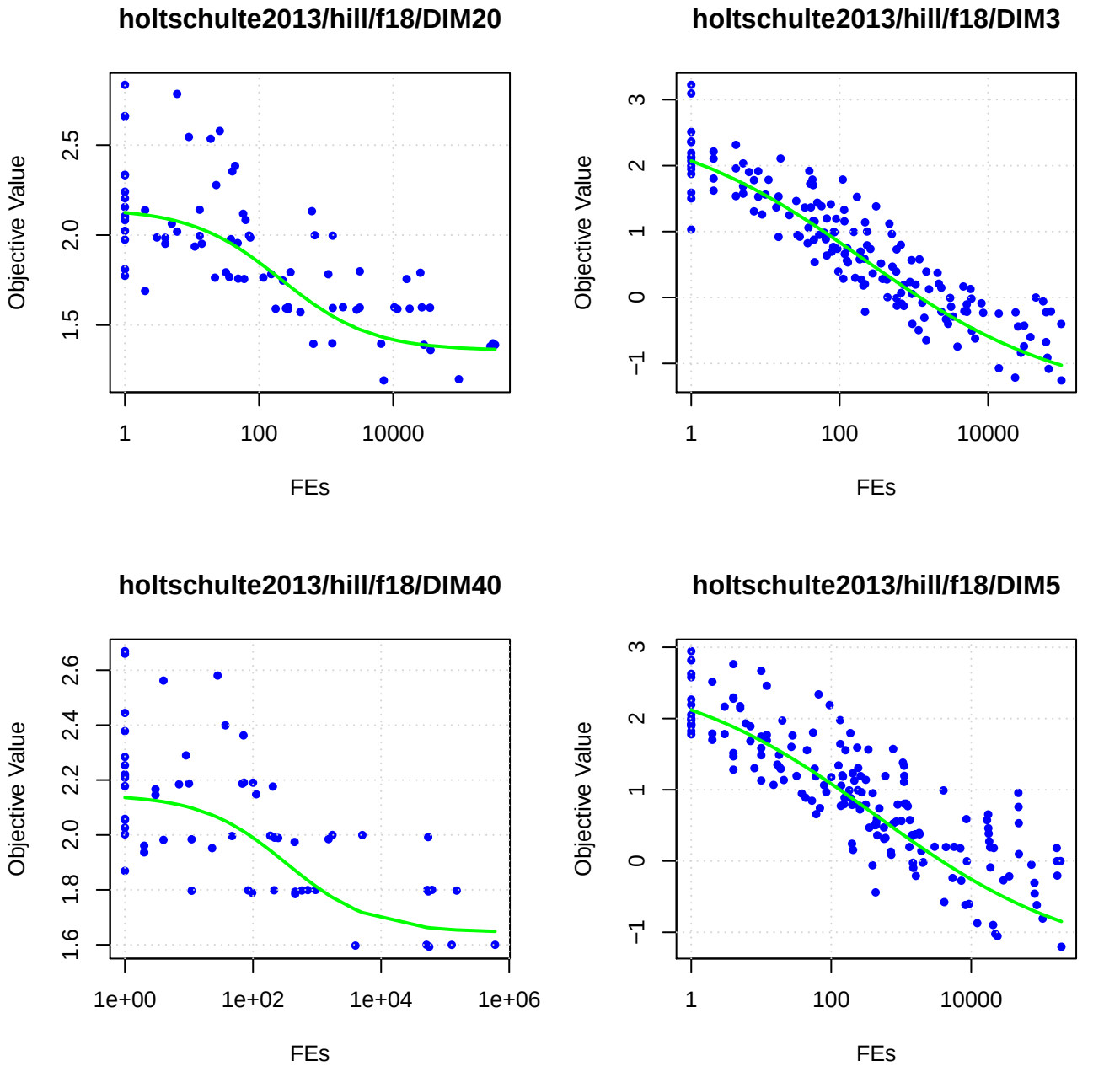
1000
10000
FEs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Objective Value
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1.5
1
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10000
FEs
holtschulte2013/hill/f18/DIM3
Objective Value
3
2
1
0
−1
1
100
10000
FEs
holtschulte2013/hill/f18/DIM40
Objective Value
2.6
2.4
2.2
2.0
1.8
1.6
1e+00
1e+02
1e+04
1e+06
FEs
holtschulte2013/hill/f18/DIM5
Objective Value
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1
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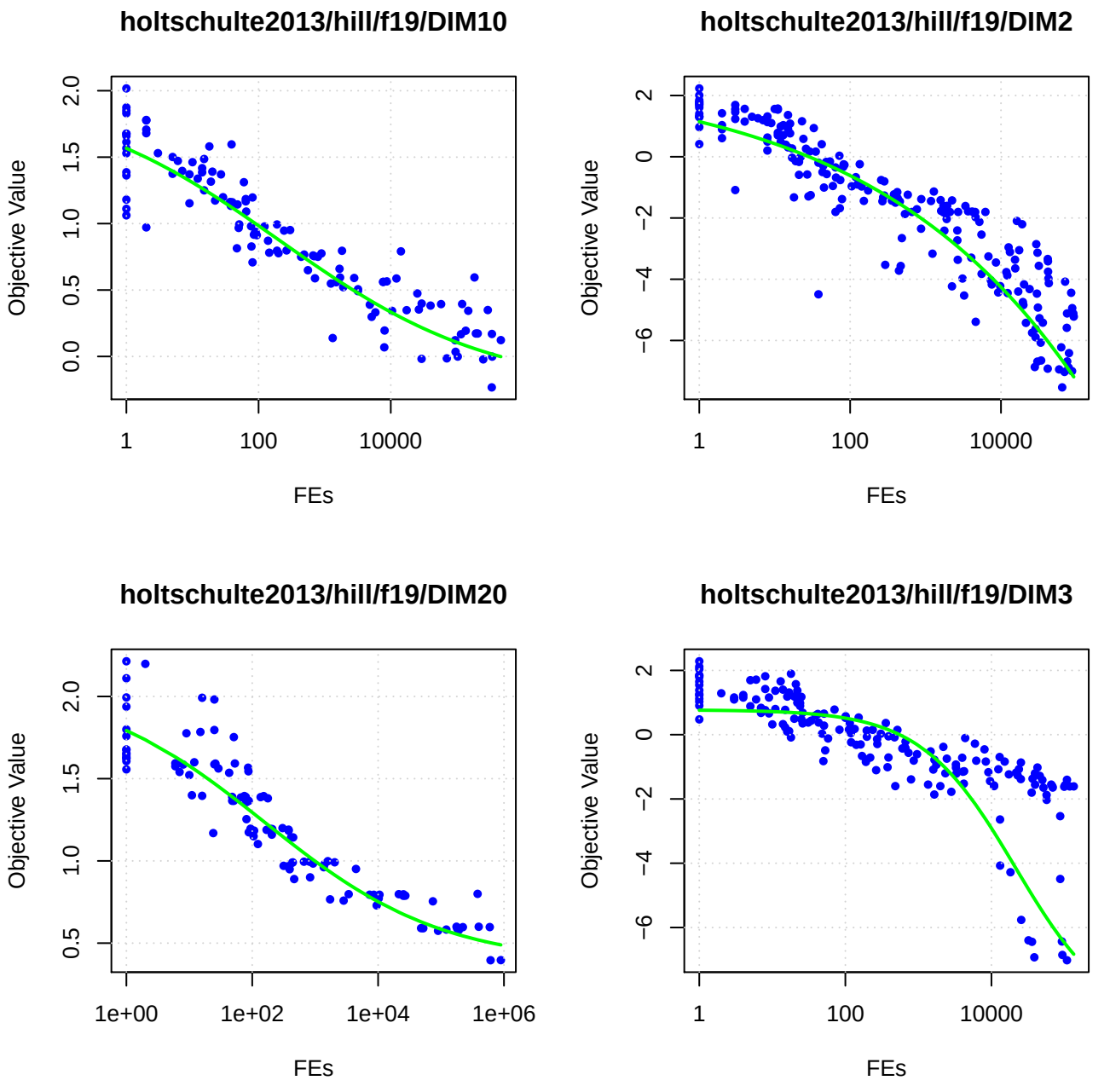
1
100
10000
FEs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Objective Value
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1.0
1.5
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1
100
10000
FEs
holtschulte2013/hill/f19/DIM2
Objective Value
2
0
−2
−4
−6
1
100
10000
FEs
holtschulte2013/hill/f19/DIM20
Objective Value
0.5
1.0
1.5
2.0
1e+00
1e+02
1e+04
1e+06
FEs
holtschulte2013/hill/f19/DIM3
Objective Value
2
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−2
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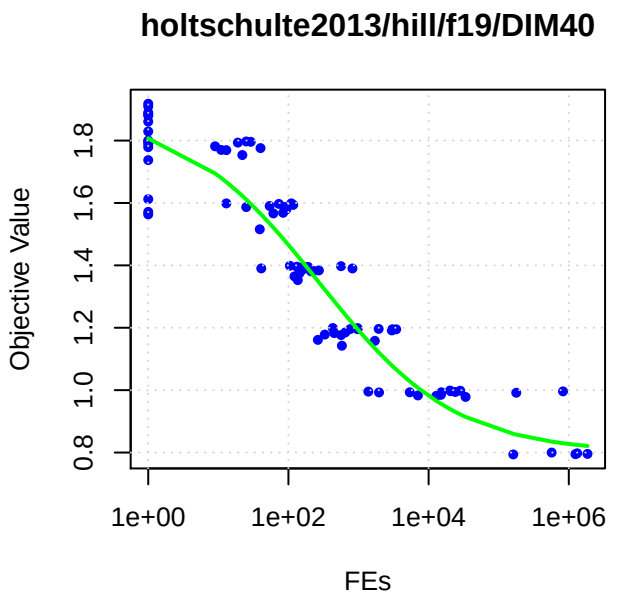
−6
1
100
10000
FEs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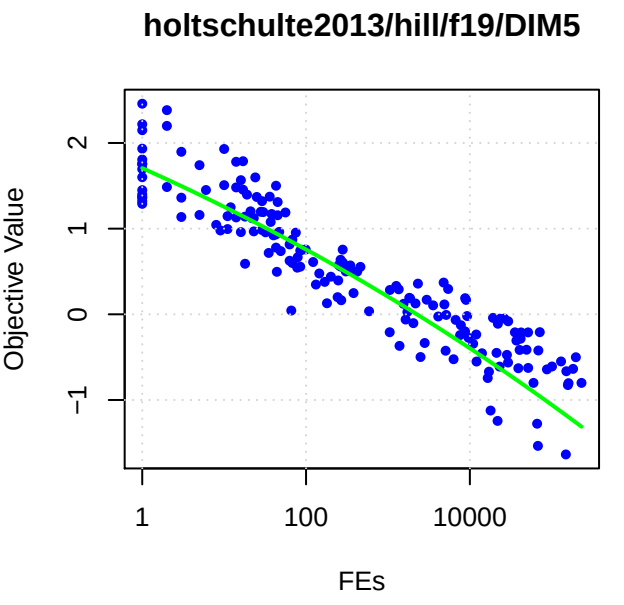
1.6
1.8
1e+00
1e+02
1e+04
1e+06
FEs


holtschulte2013/hill/f19/DIM5
Objective Value
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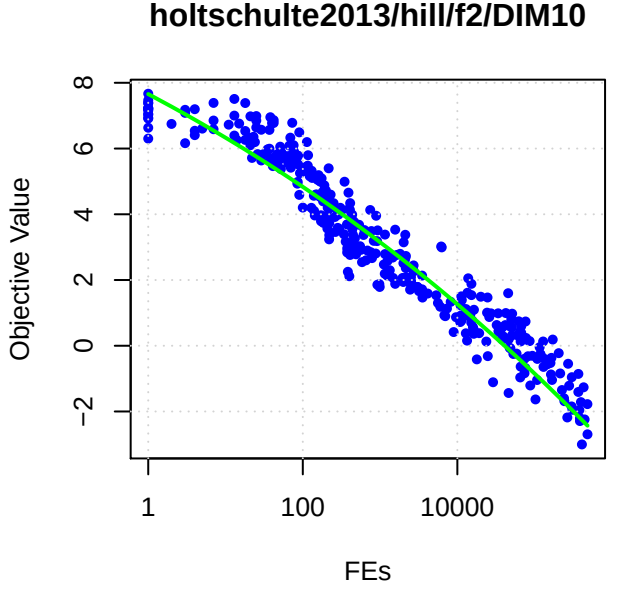
1
2
1
100
10000
FEs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Objective Value
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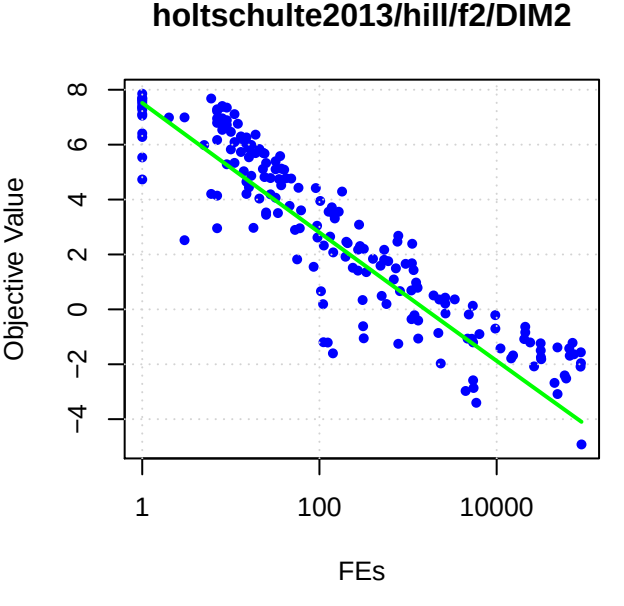
6
8
1
100
10000
FEs


holtschulte2013/hill/f2/DIM2
Objective Value
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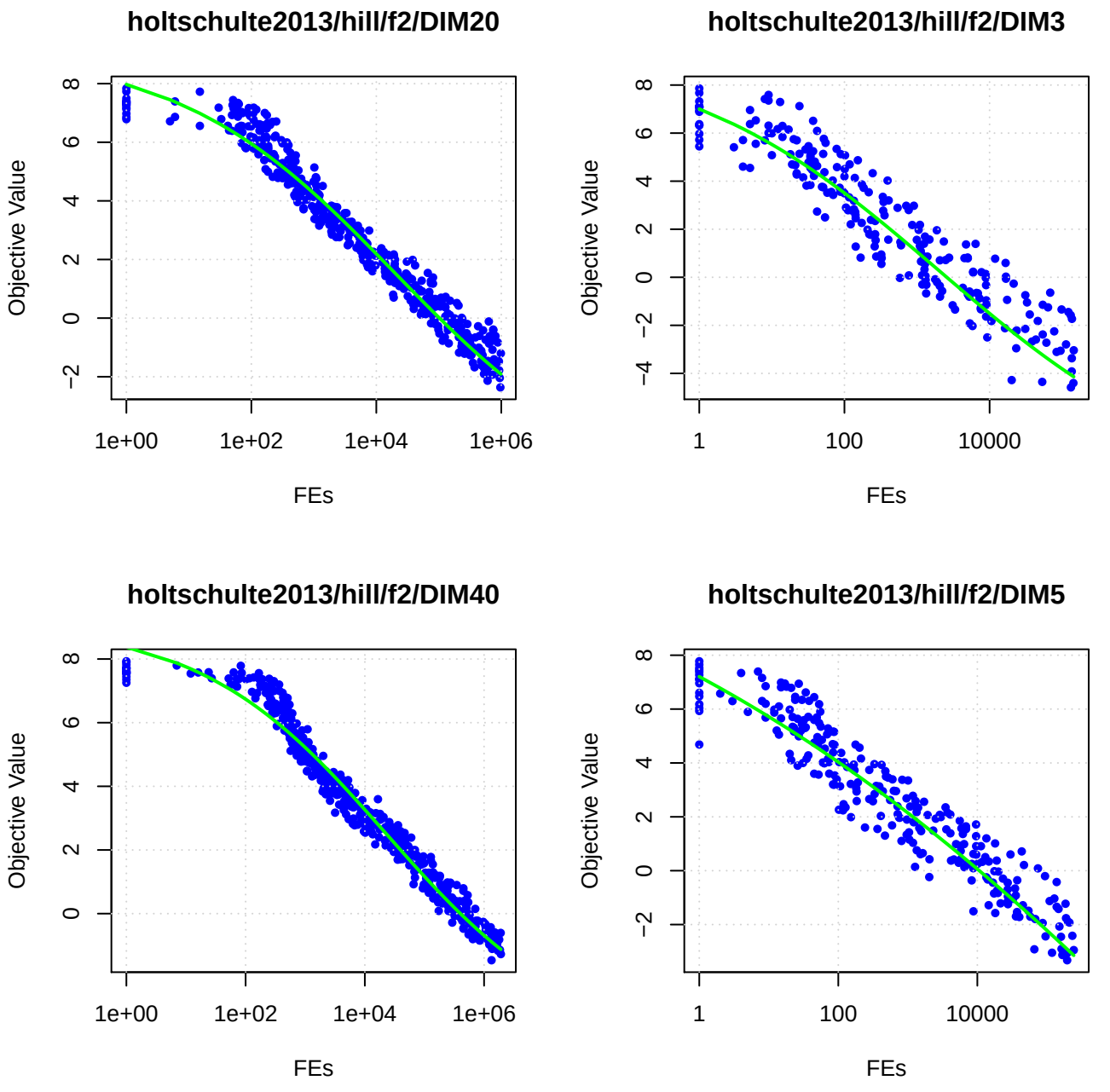
2
4
6
8
1
100
10000
FEs


holtschulte2013/hill/f2/DIM20
Objective Value
FEs
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1e+02
1e+04
1e+06
8
6
4
2
0
−2
holtschulte2013/hill/f2/DIM3
Objective Value
FEs
1
100
10000
8
6
4
2
0
−2
−4
holtschulte2013/hill/f2/DIM40
Objective Value
FEs
1e+00
1e+02
1e+04
1e+06
8
6
4
2
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holtschulte2013/hill/f2/DIM5
Objective Value
FEs
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100
10000
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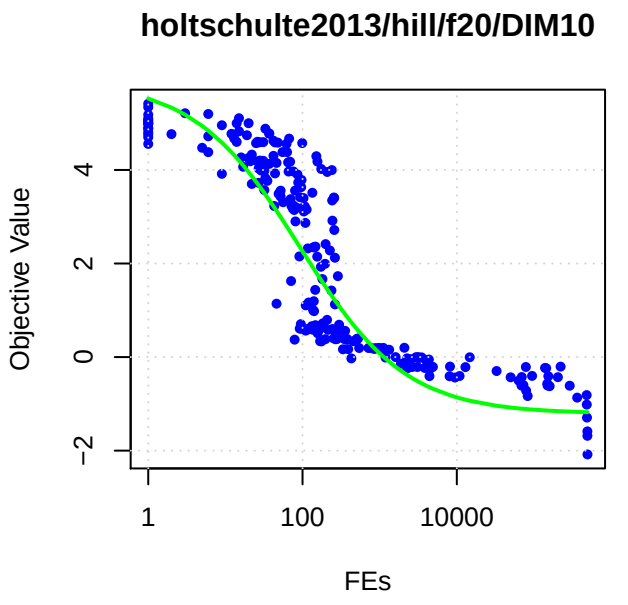
6
4
2
0
−2


holtschulte2013/hill/f20/DIM10
Objective Value
FEs
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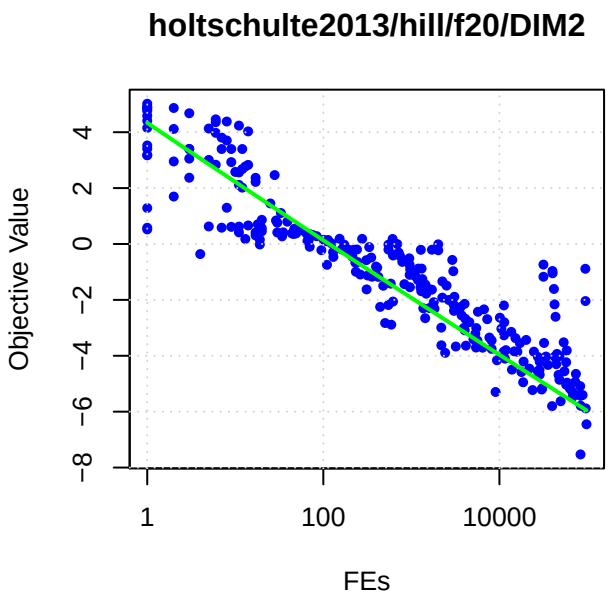
holtschulte2013/hill/f20/DIM2
Objective Value
FEs
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10000
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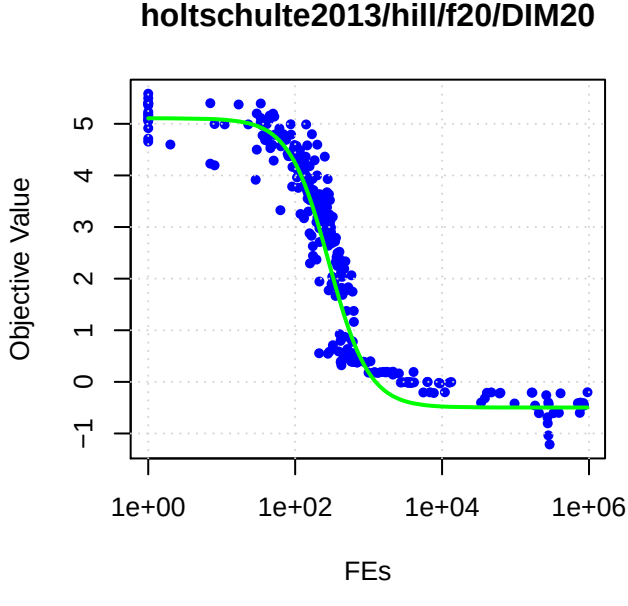
−6
−4
−2
0
2
4


holtschulte2013/hill/f20/DIM20
Objective Value
FEs
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1e+02
1e+04
1e+06
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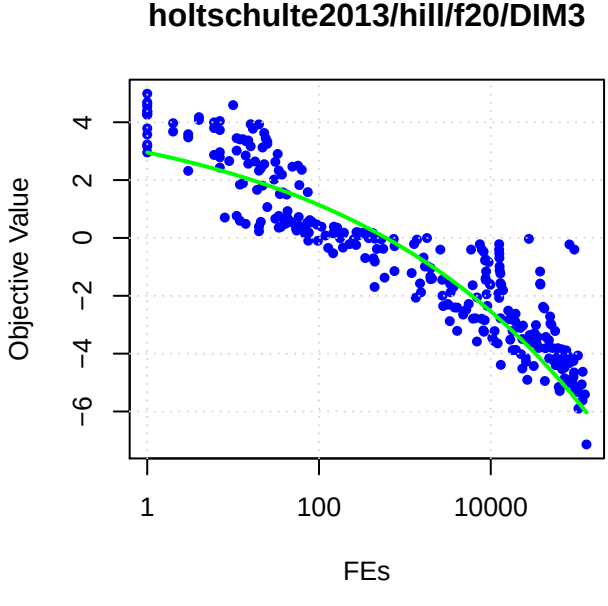
2
3
4
5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Objective Value
FEs
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100
10000
−6
−4
−2
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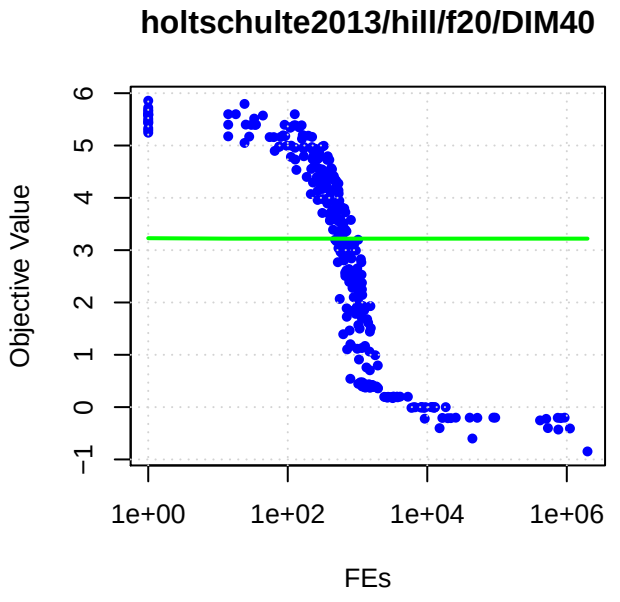
2
4


holtschulte2013/hill/f20/DIM40
Objective Value
FEs
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1e+02
1e+04
1e+06
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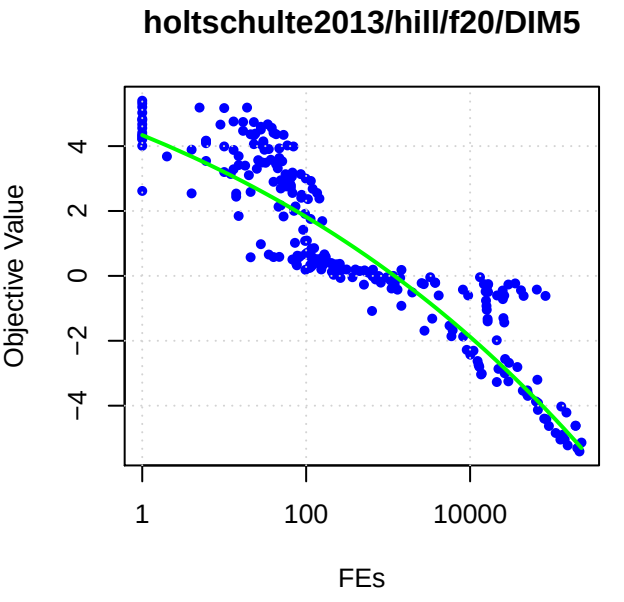
2
3
4
5
6


holtschulte2013/hill/f20/DIM5
Objective Value
FEs
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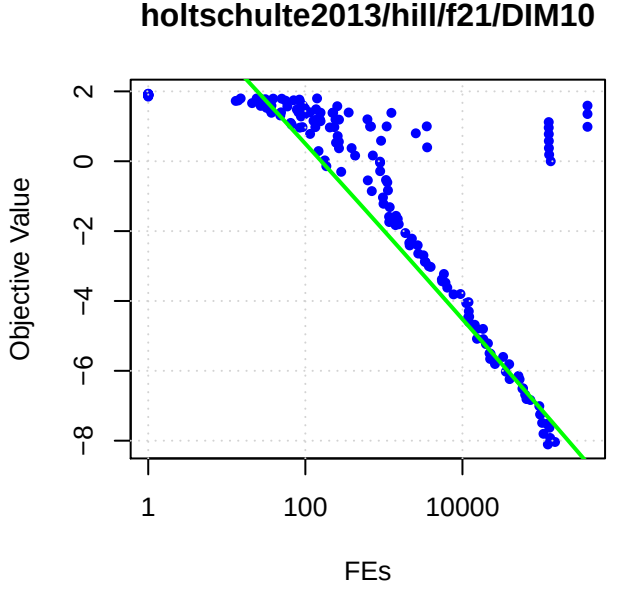
10000
−4
−2
0
2
4


holtschulte2013/hill/f21/DIM10
Objective Value
FEs
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10000
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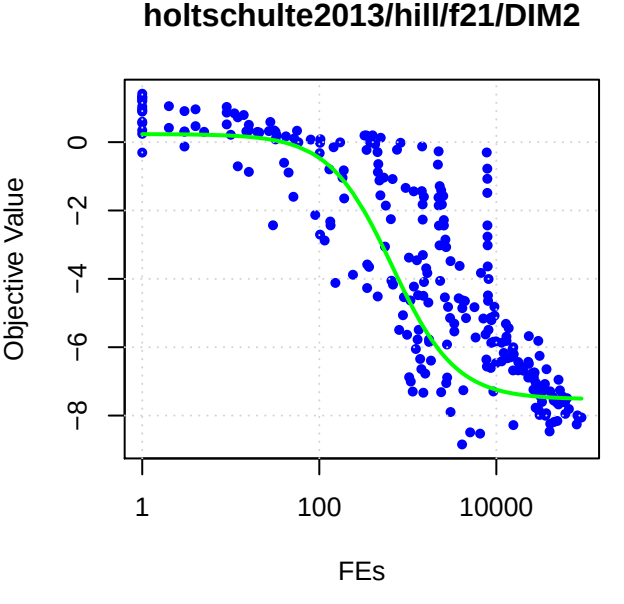
−4
−2
0
2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Objective Value
FEs
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10000
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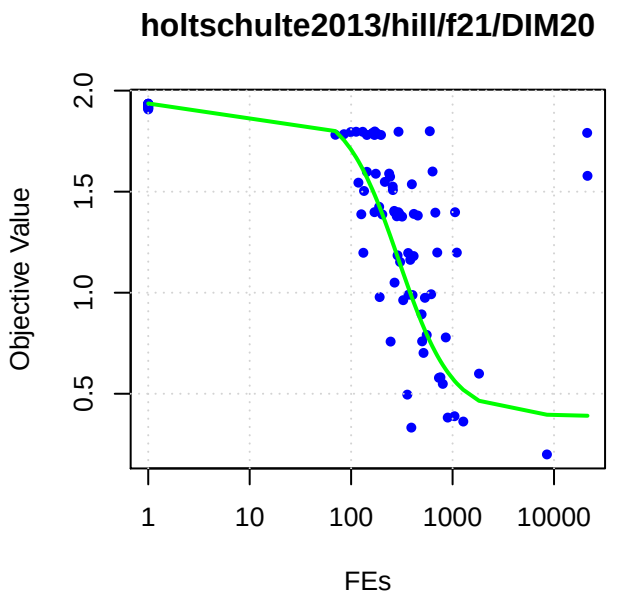
−4
−2
0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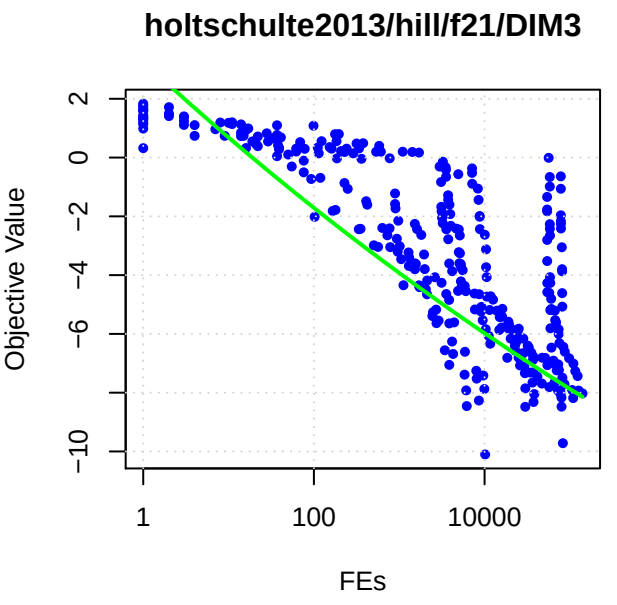
1000
10000
FEs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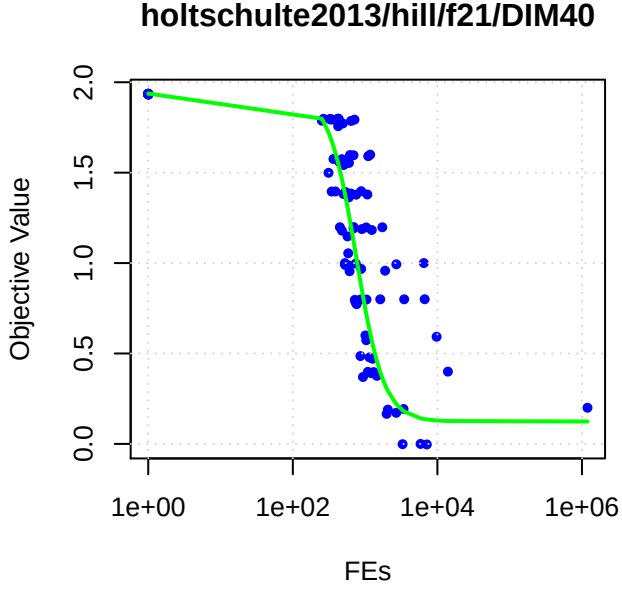
10000
FEs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Objective Value
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1e+02
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1e+06
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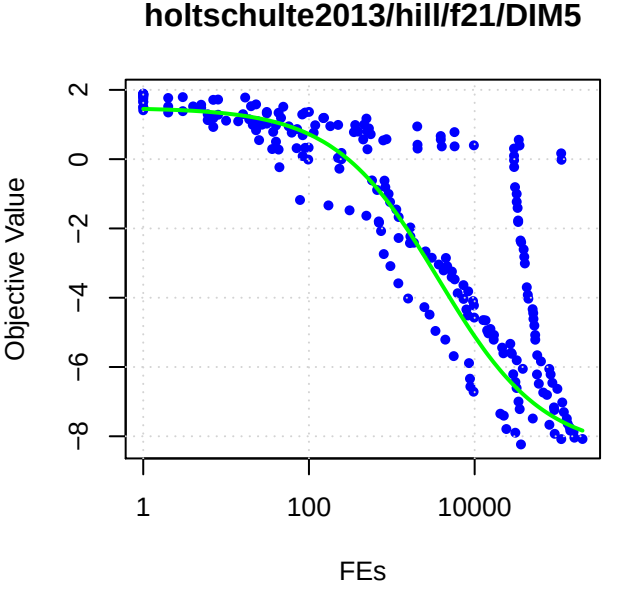
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Objective Value
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−6
−8
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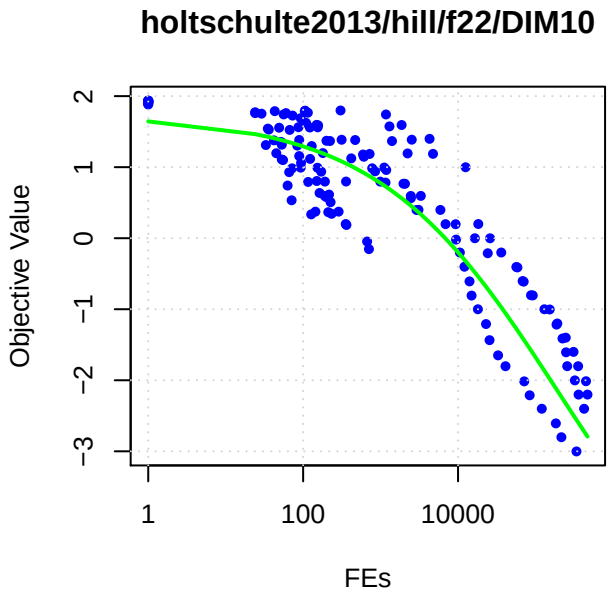
100
10000
FEs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Objective Value
FEs
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−2
−3
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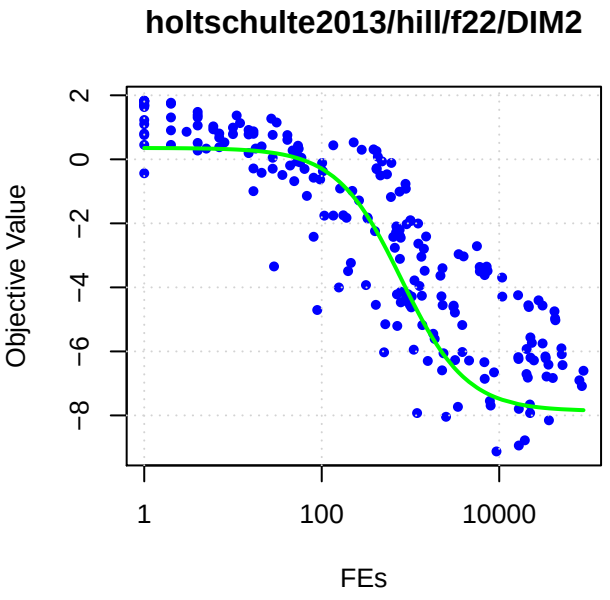
100
10000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Objective Value
FEs
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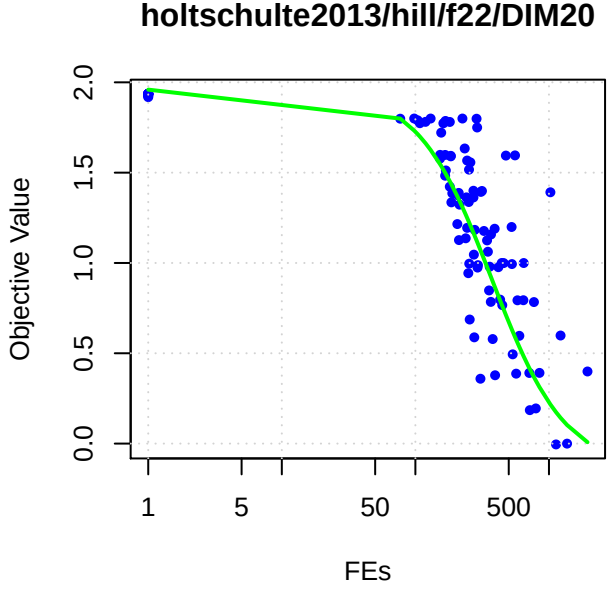
−4
−6
−8
1
100
10000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Objective Value
FEs
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1.0
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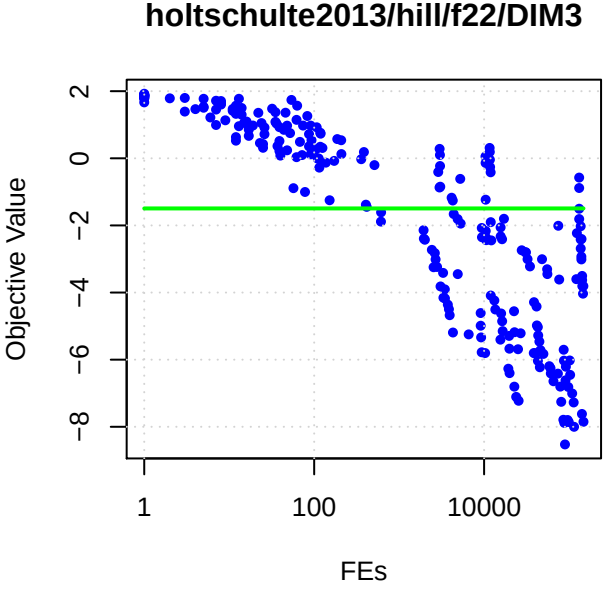
1
5
50
500


holtschulte2013/hill/f22/DIM3
Objective Value
FEs
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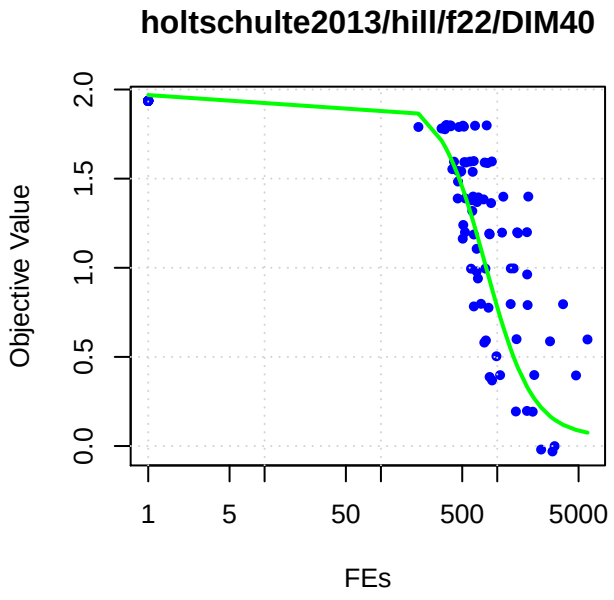
−2
−4
−6
−8
1
100
10000


holtschulte2013/hill/f22/DIM40
Objective Value
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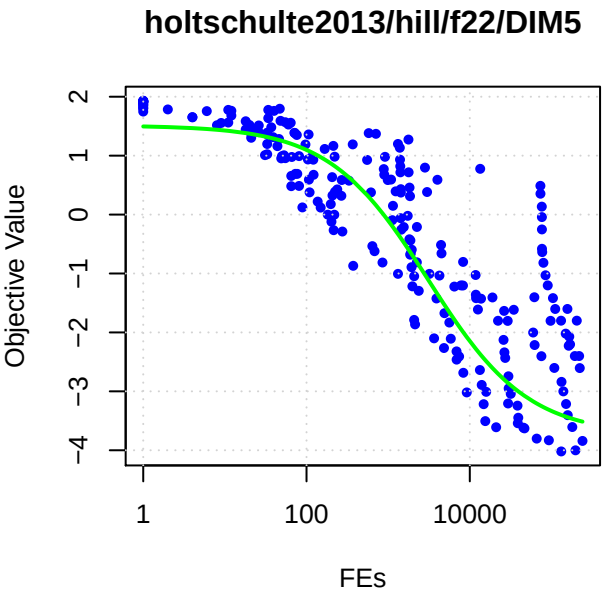
2.0
1
5
50
500
5000
FEs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Objective Value
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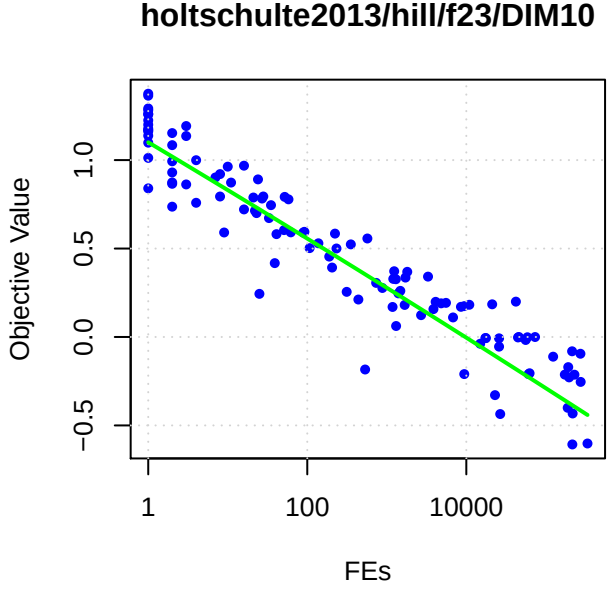
FEs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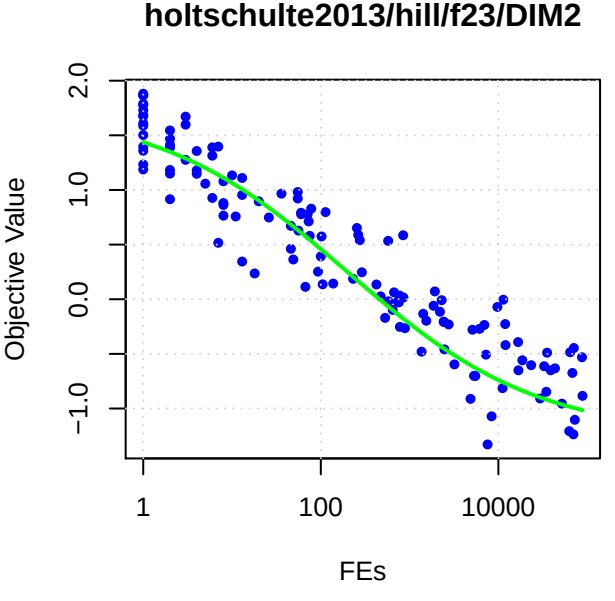
FEs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1.0
2.0
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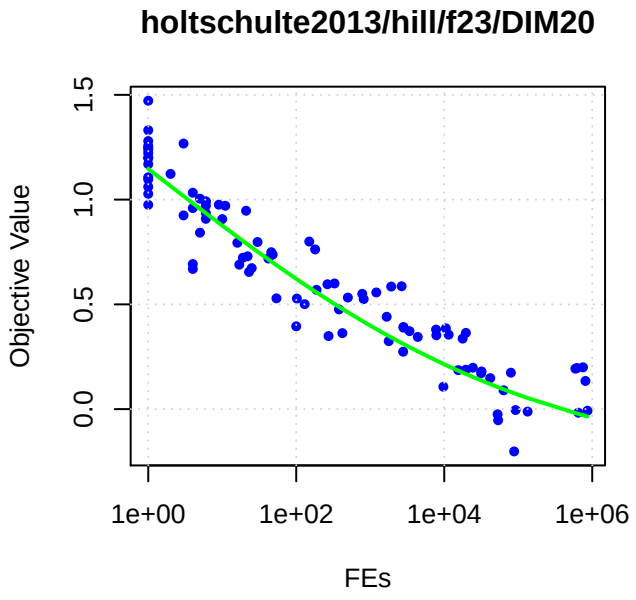
10000
FEs


holtschulte2013/hill/f23/DIM20
Objective Value
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1.5
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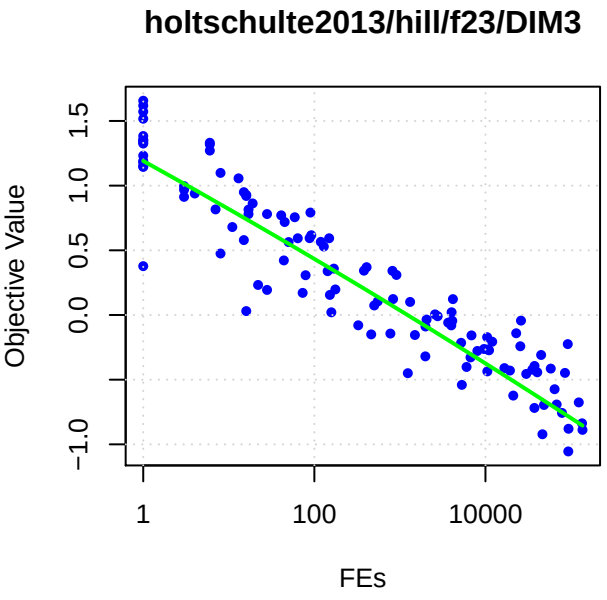
1e+02
1e+04
1e+06
FEs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Objective Value
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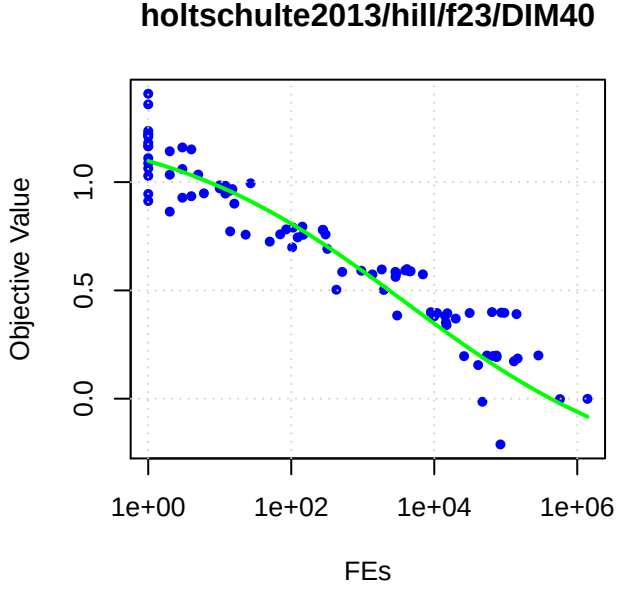
1.5
1
100
10000
FEs


holtschulte2013/hill/f23/DIM40
Objective Value
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1.0
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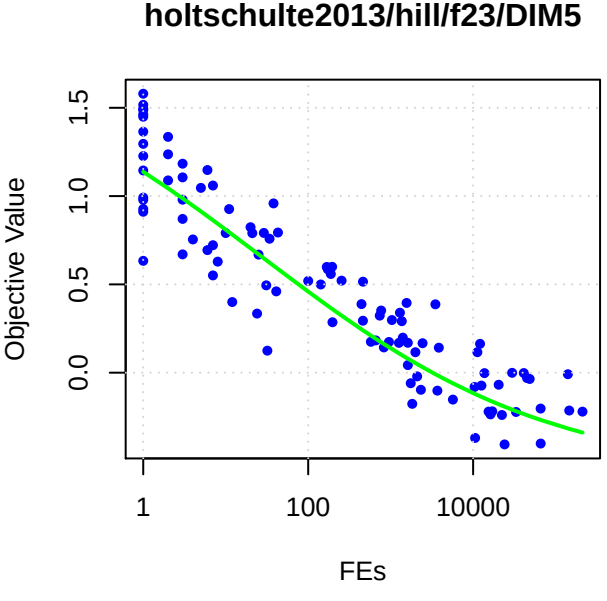
1e+02
1e+04
1e+06
FEs


holtschulte2013/hill/f23/DIM5
Objective Value
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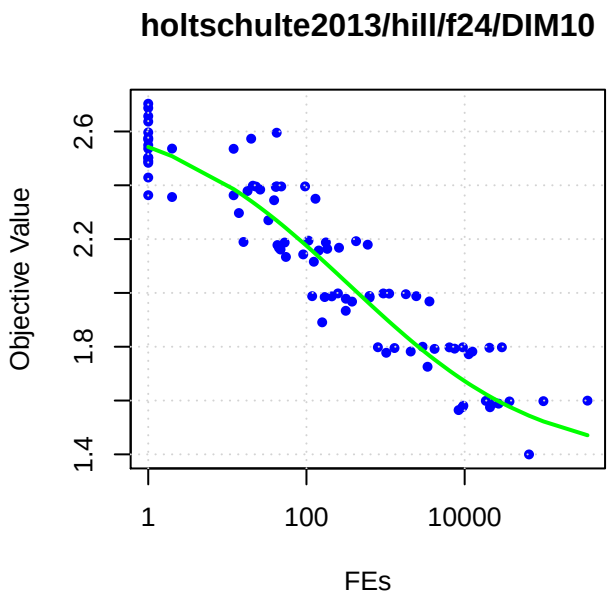
10000
FEs


holtschulte2013/hill/f24/DIM10
Objective Value
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1.4
1
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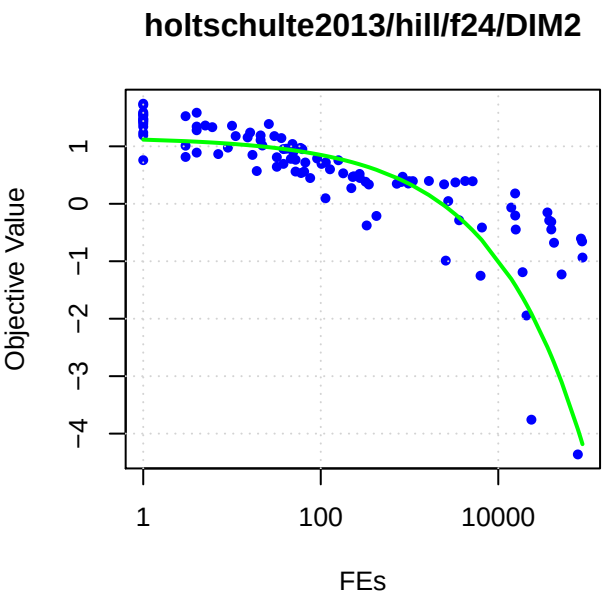
10000
FEs


holtschulte2013/hill/f24/DIM2
Objective Value
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−1
−2
−3
−4
1
100
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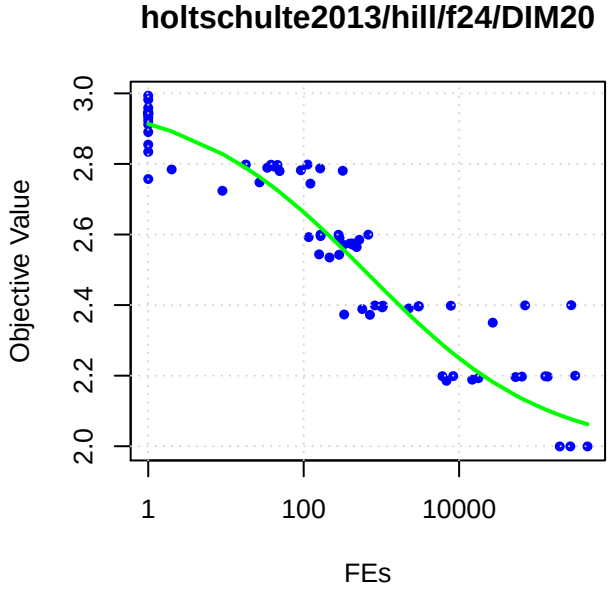
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2.6
2.4
2.2
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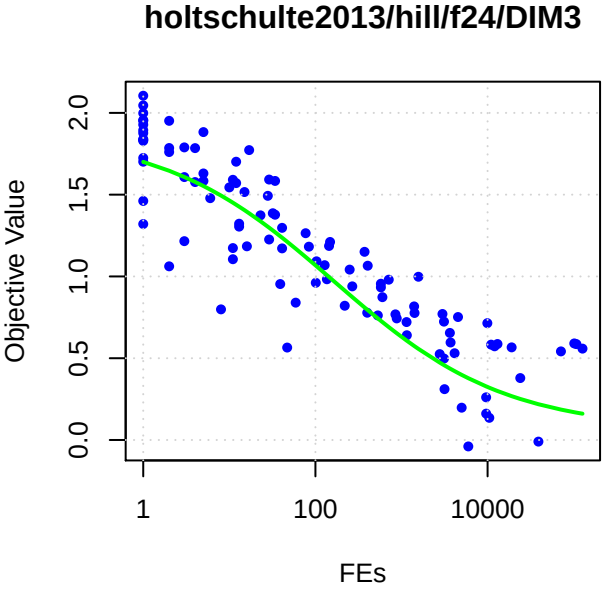
FEs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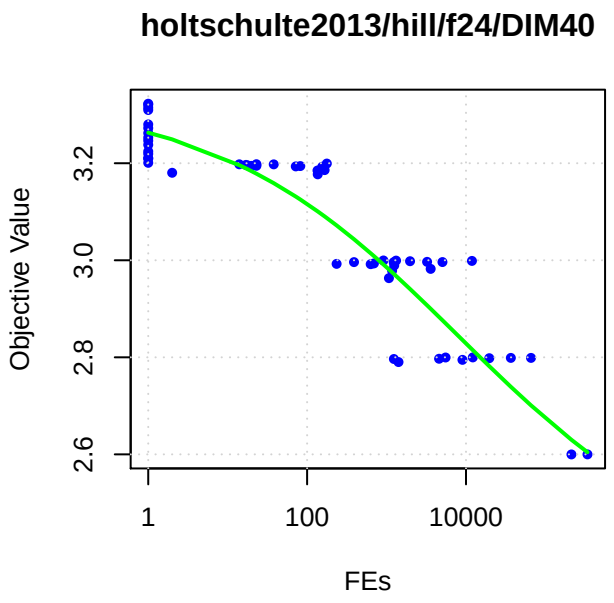
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2.8
2.6
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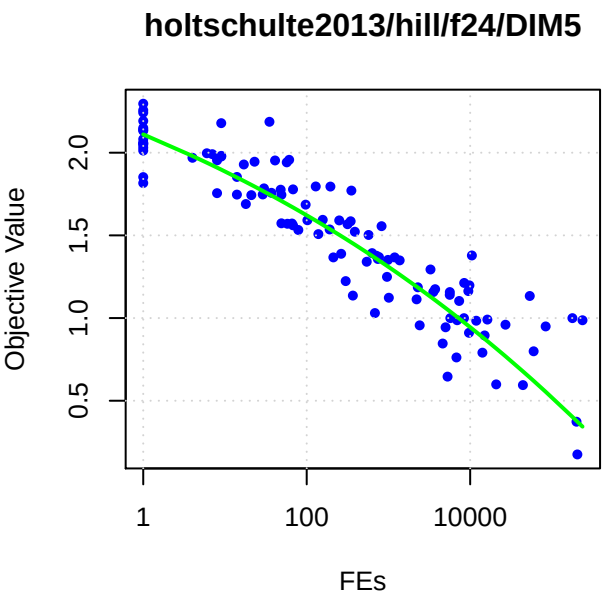
FEs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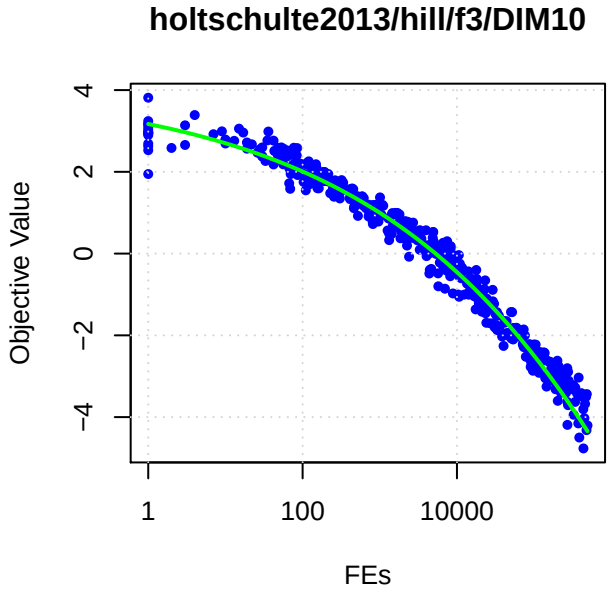
FEs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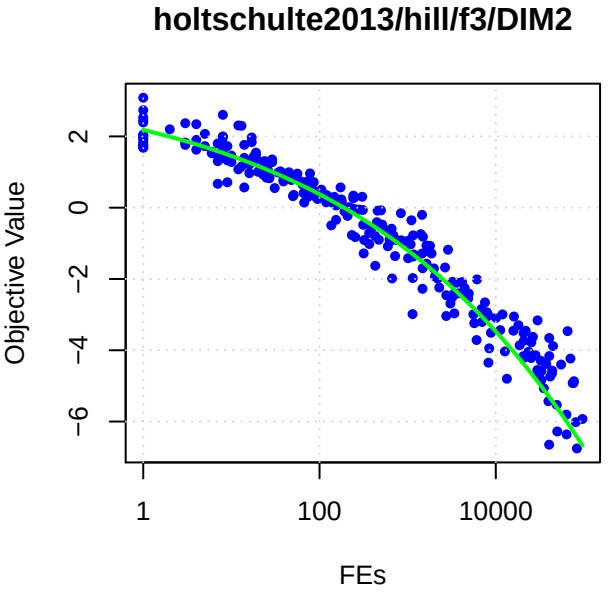
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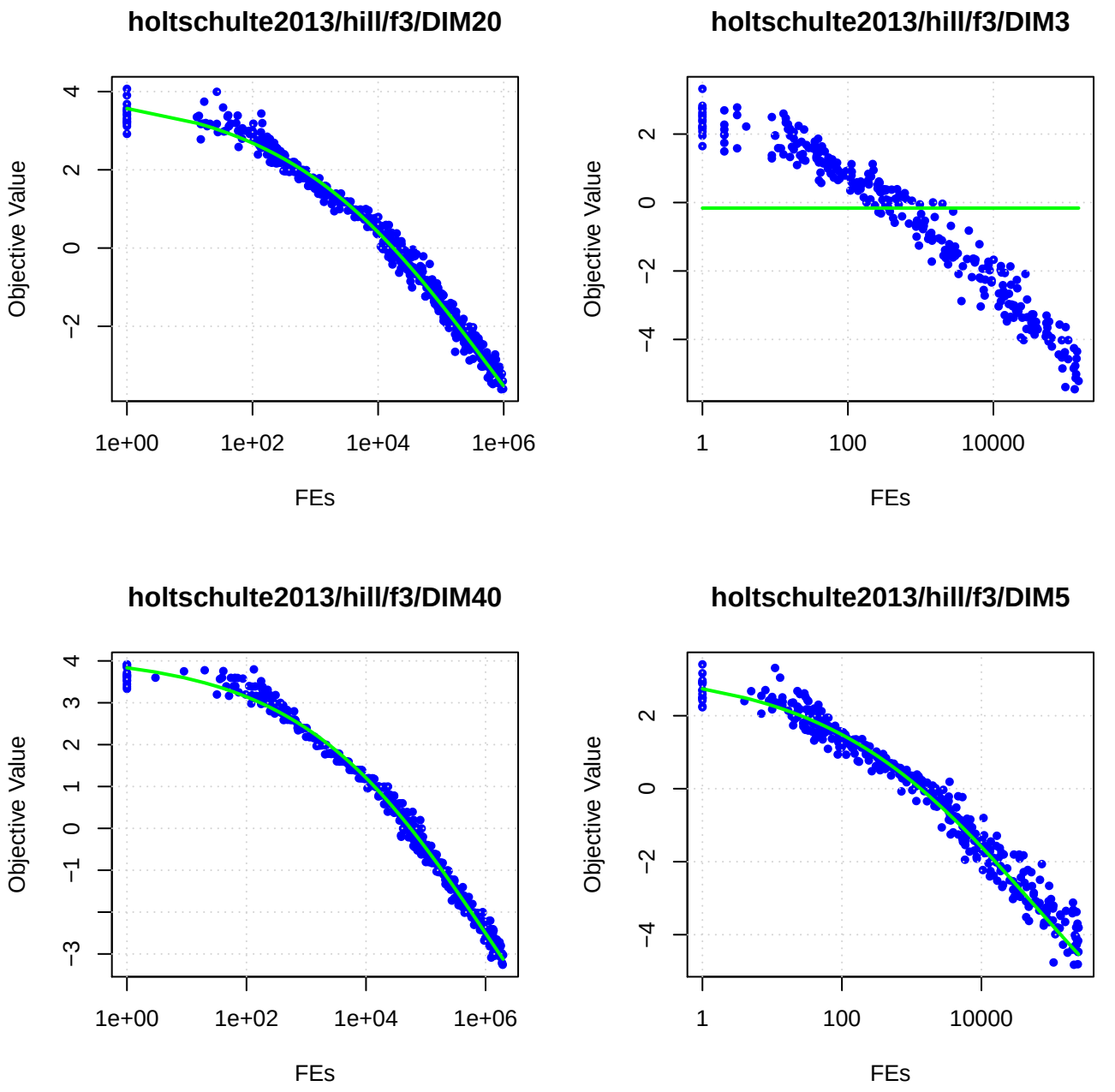
FEs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FEs
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1e+04
1e+06
4
2
0
−2
holtschulte2013/hill/f3/DIM3
Objective Value
FEs
1
100
10000
2
0
−2
−4
holtschulte2013/hill/f3/DIM40
Objective Value
FEs
1e+00
1e+02
1e+04
1e+06
4
3
2
1
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−1
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holtschulte2013/hill/f3/DIM5
Objective Value
FEs
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10000
2
0
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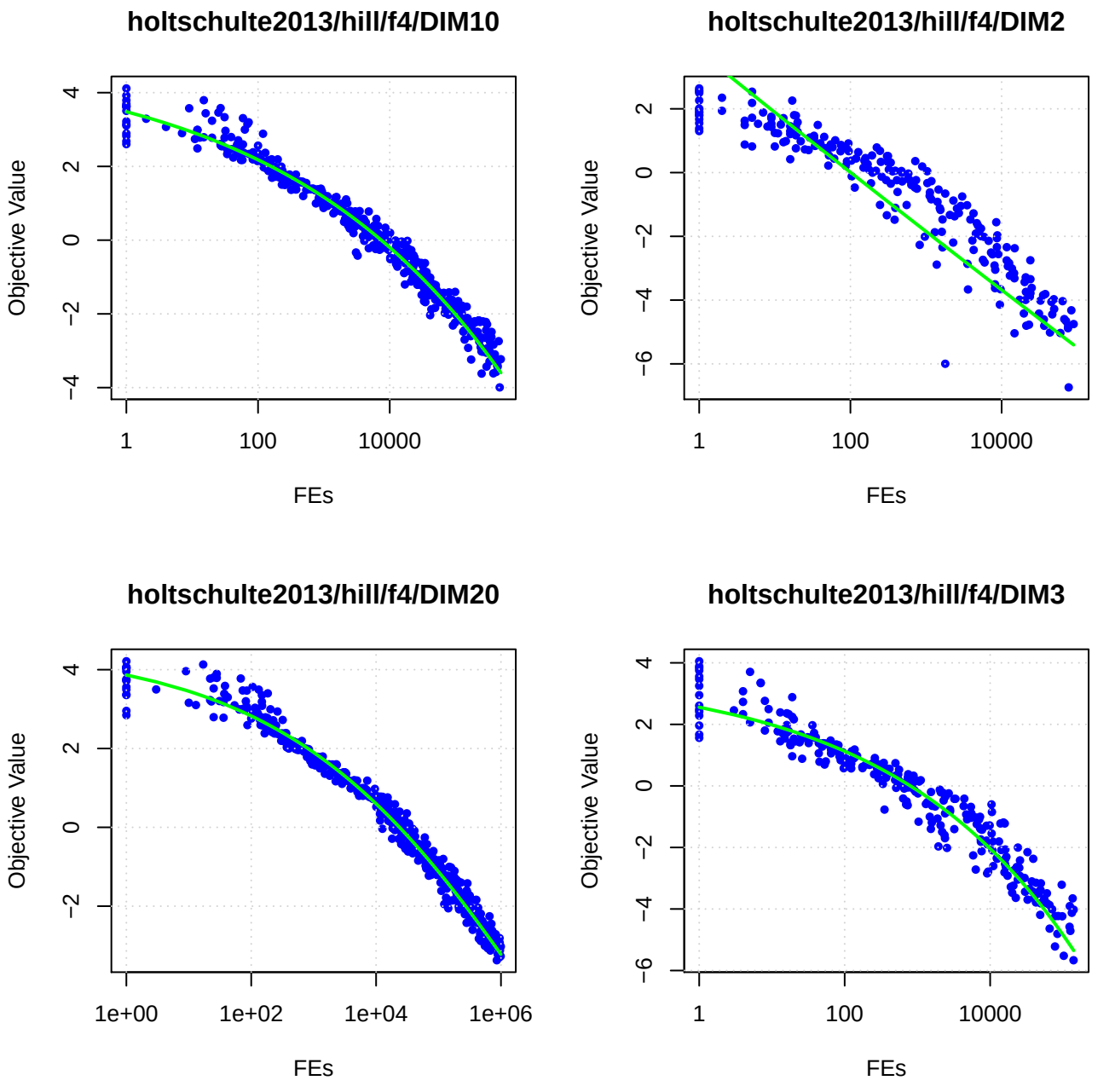
−4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FEs
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10000
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2
0
−2
−4
holtschulte2013/hill/f4/DIM2
Objective Value
FEs
1
100
10000
2
0
−2
−4
−6
holtschulte2013/hill/f4/DIM20
Objective Value
FEs
1e+00
1e+02
1e+04
1e+06
4
2
0
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holtschulte2013/hill/f4/DIM3
Objective Value
FEs
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10000
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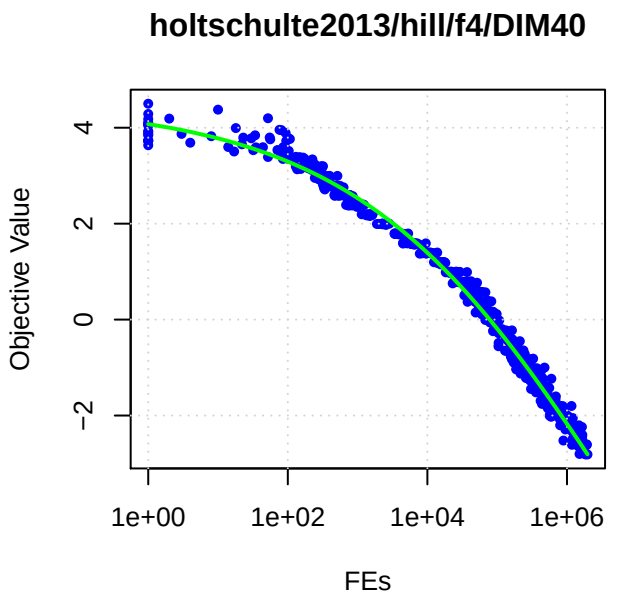
−4
−6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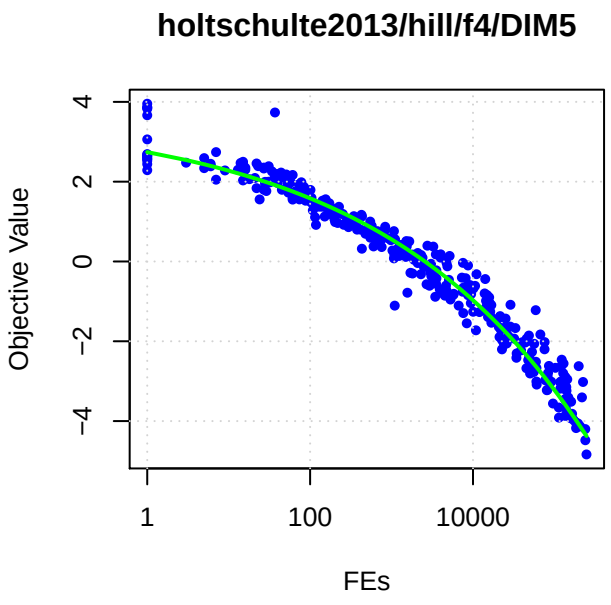
1e+02
1e+04
1e+06
FEs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Objective Value
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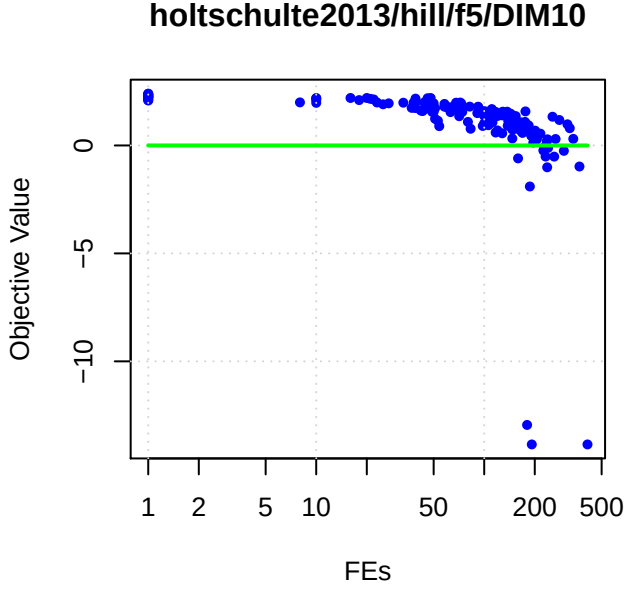
100
10000
FEs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Objective Value
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2
5
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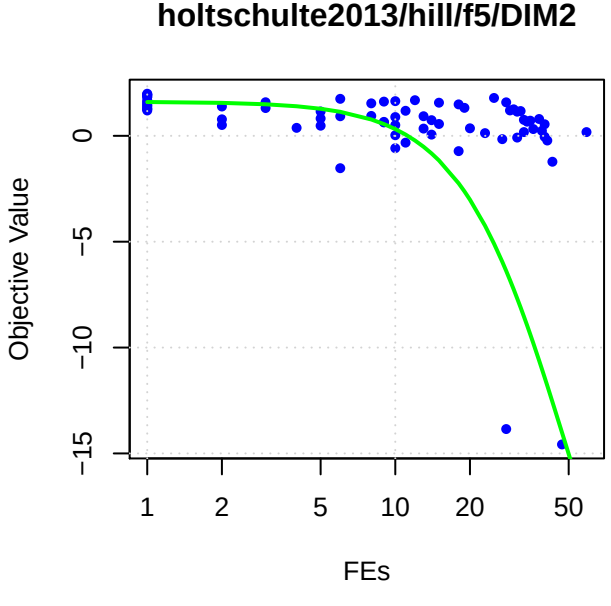
500
FEs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Objective Value
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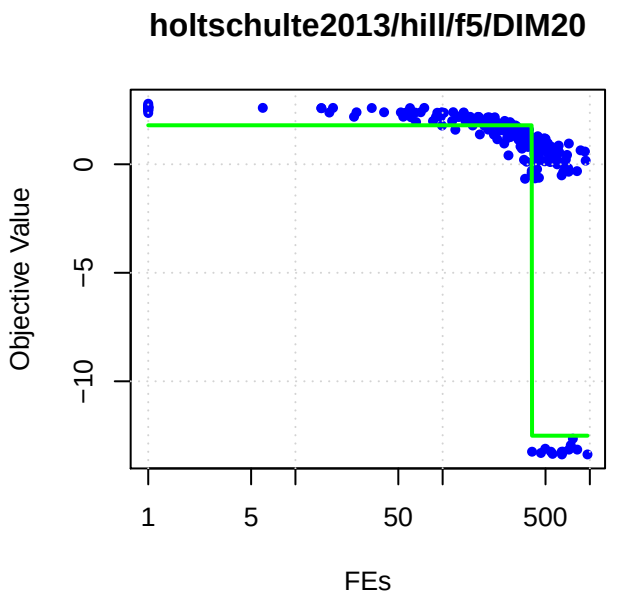
2
5
10
20
50
FEs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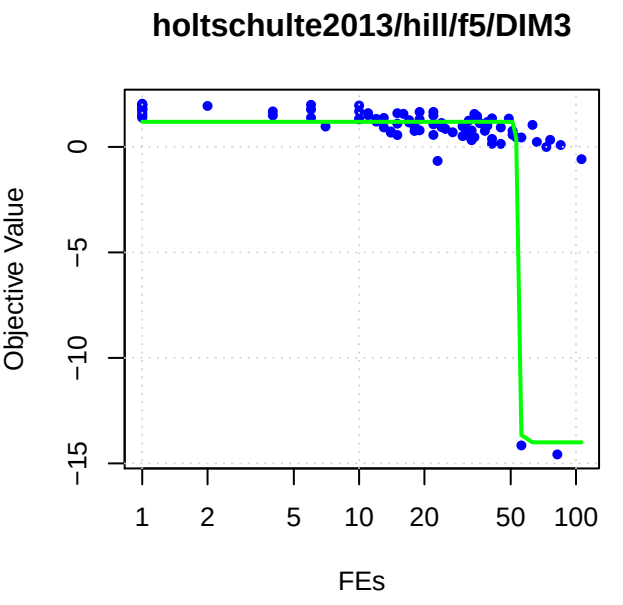
5
50
500
FEs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10
20
50
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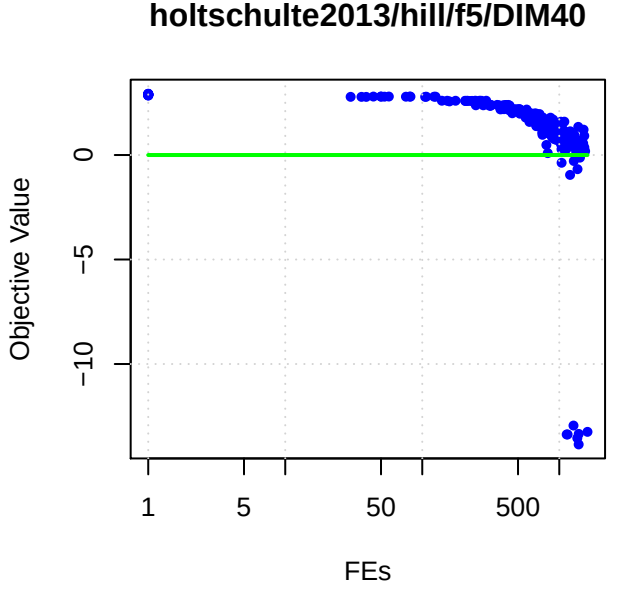
FEs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5
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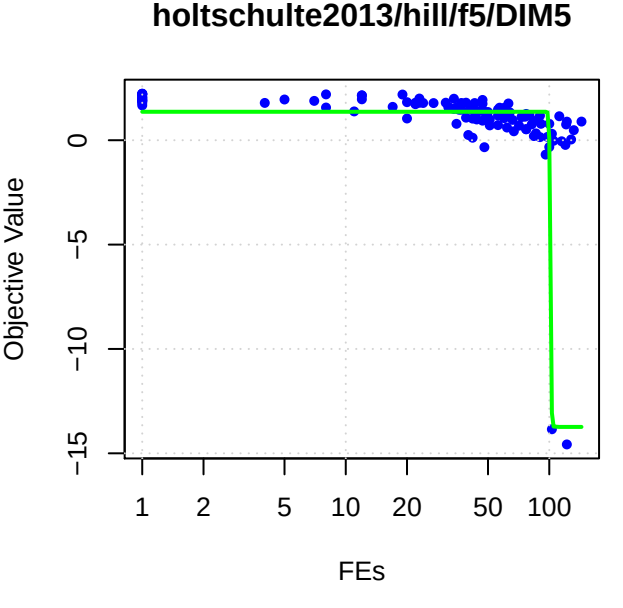
500
FEs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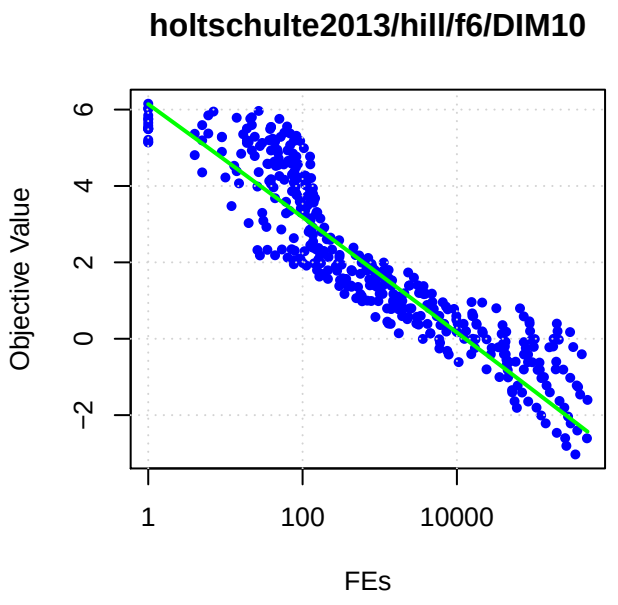
20
50
100
FEs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Objective Value
FEs
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10000
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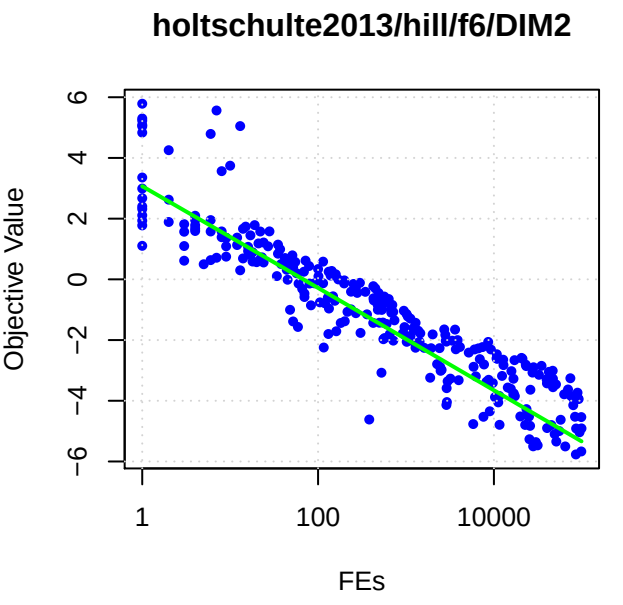
4
6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Objective Value
FEs
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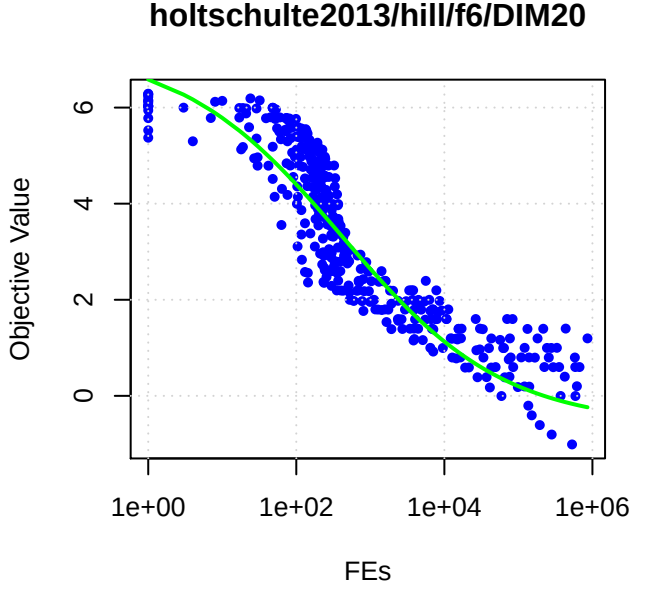
−2
0
2
4
6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Objective Value
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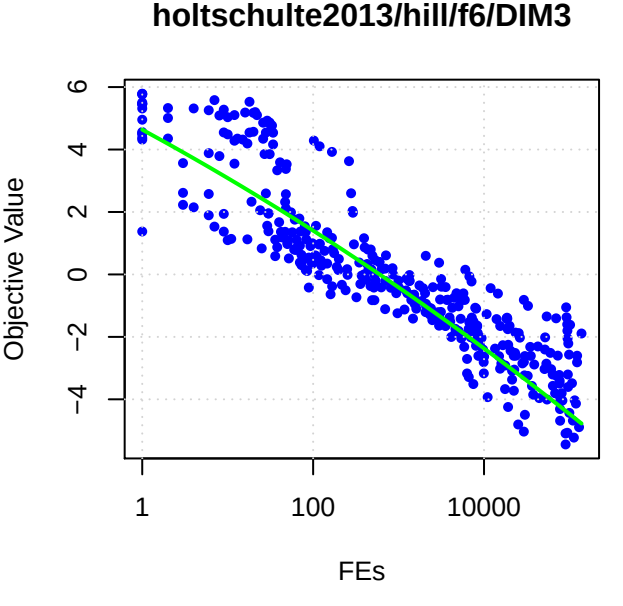
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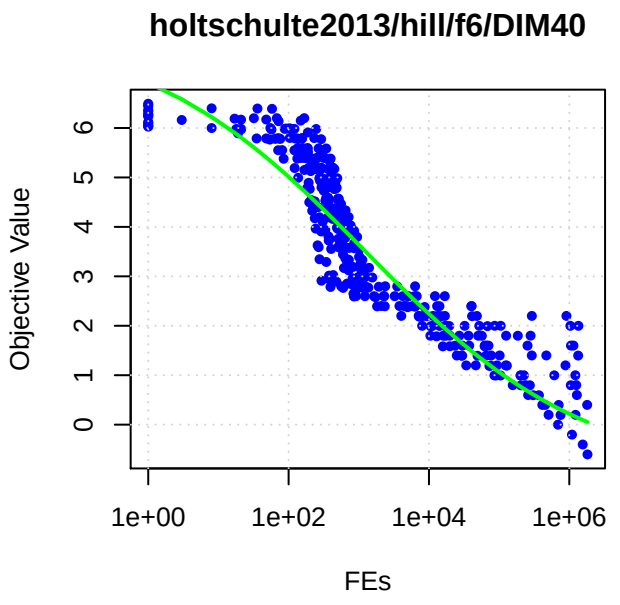
4
6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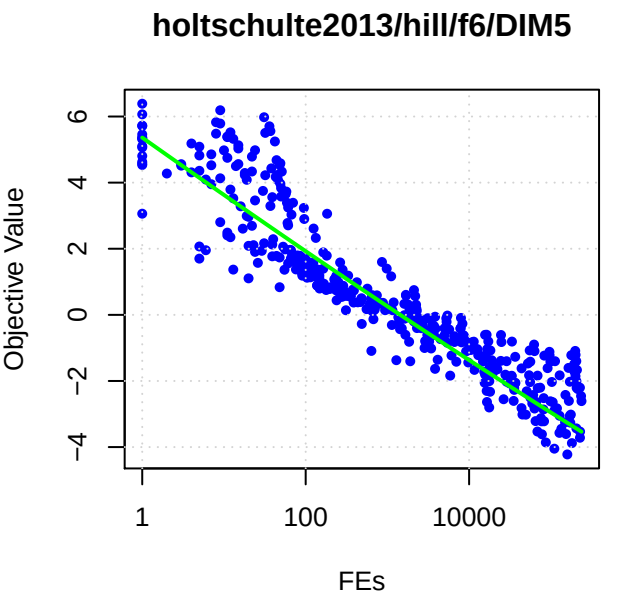
1e+06
FEs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Objective Value
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4
6
1
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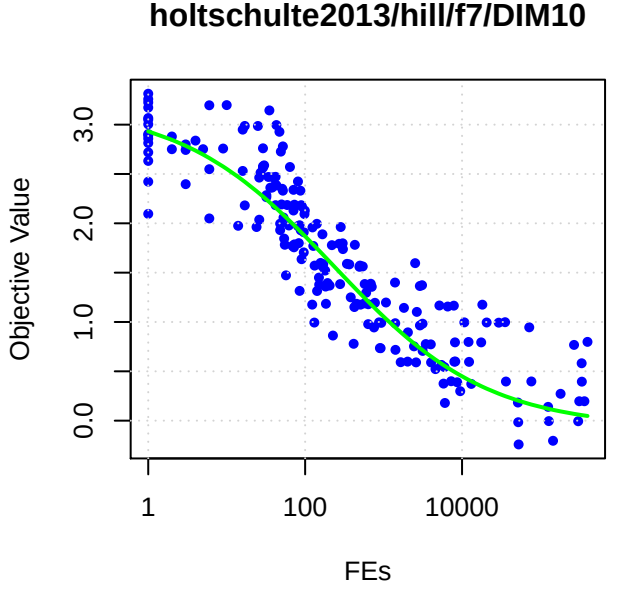
10000
FEs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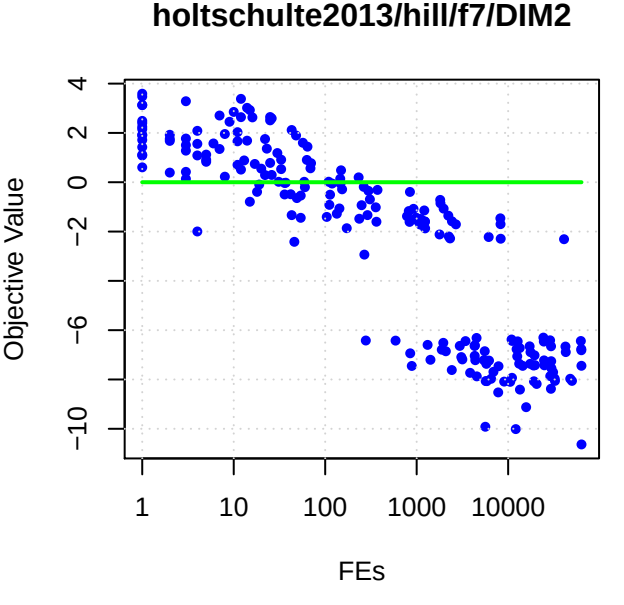
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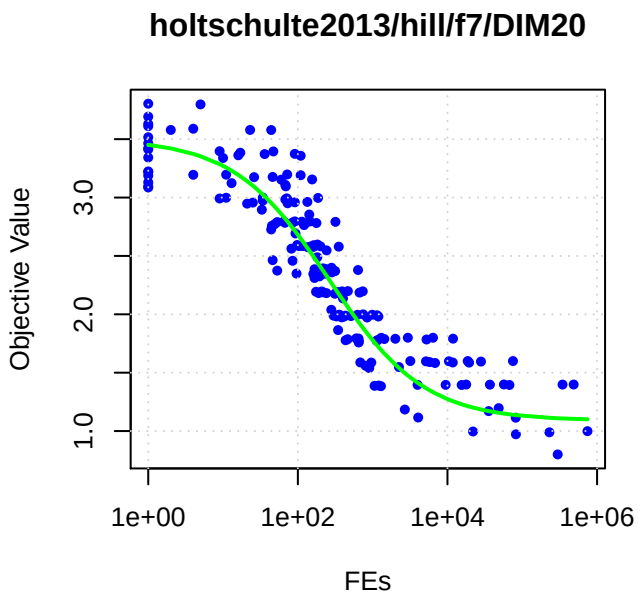
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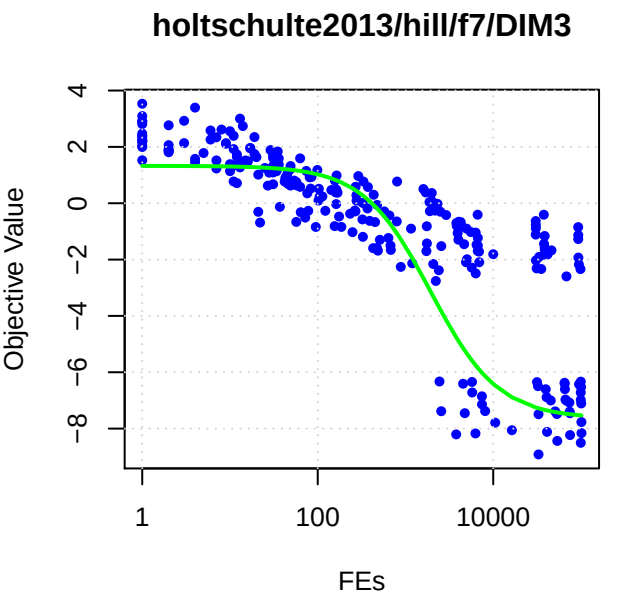
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Objective Value
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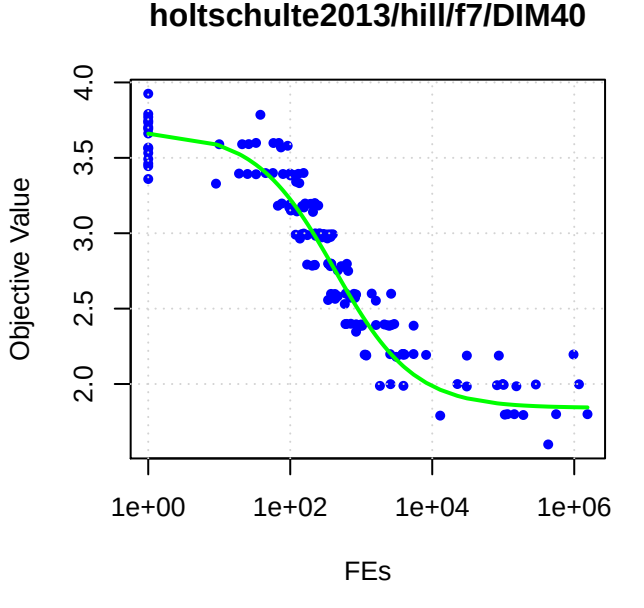
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3.5
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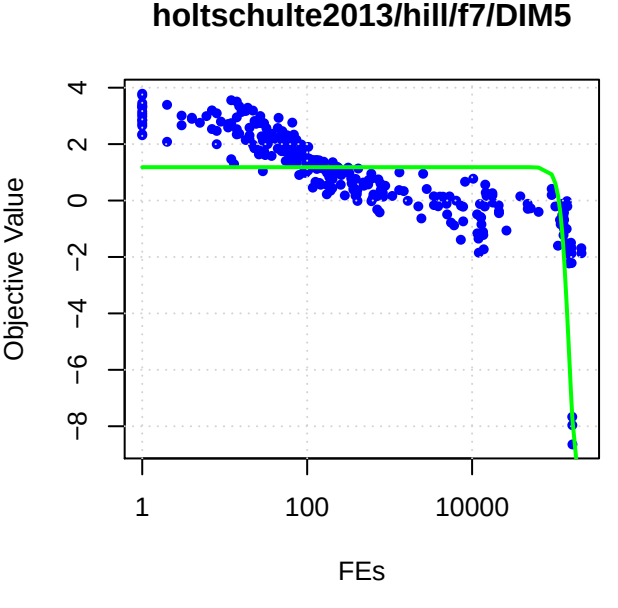
1e+06
FEs


holtschulte2013/hill/f7/DIM5
Objective Value
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−6
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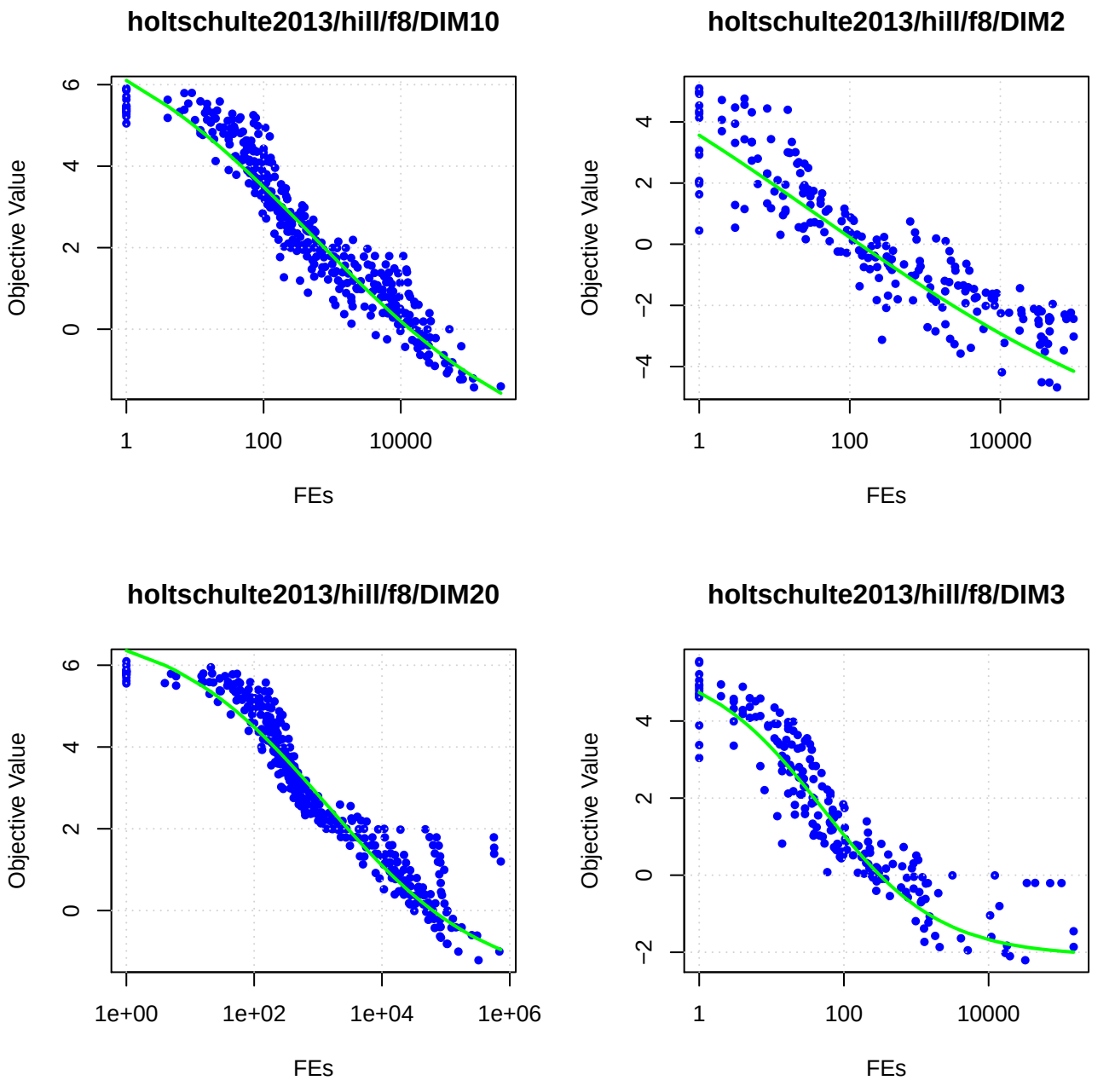
10000
FEs


holtschulte2013/hill/f8/DIM10
Objective Value
FEs
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100
10000
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2
4
6
holtschulte2013/hill/f8/DIM2
Objective Value
FEs
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100
10000
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−2
0
2
4
holtschulte2013/hill/f8/DIM20
Objective Value
FEs
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1e+02
1e+04
1e+06
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holtschulte2013/hill/f8/DIM3
Objective Value
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2
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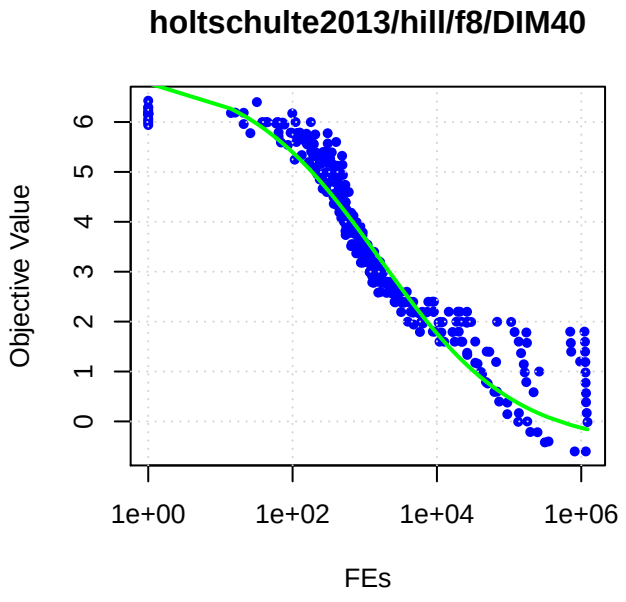
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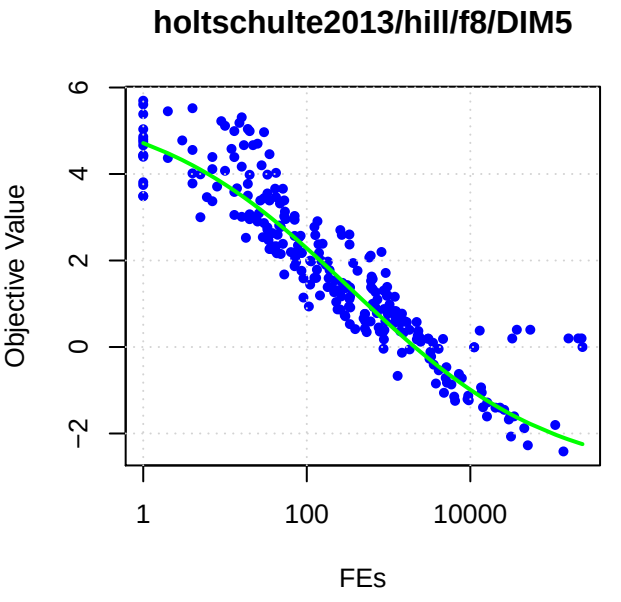
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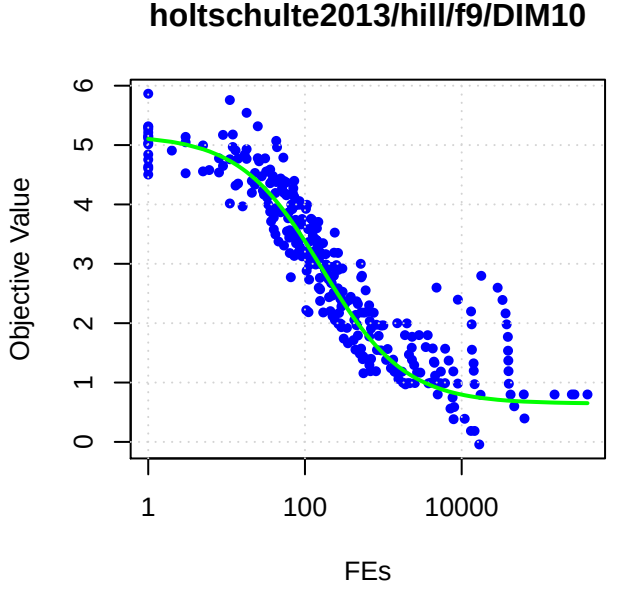
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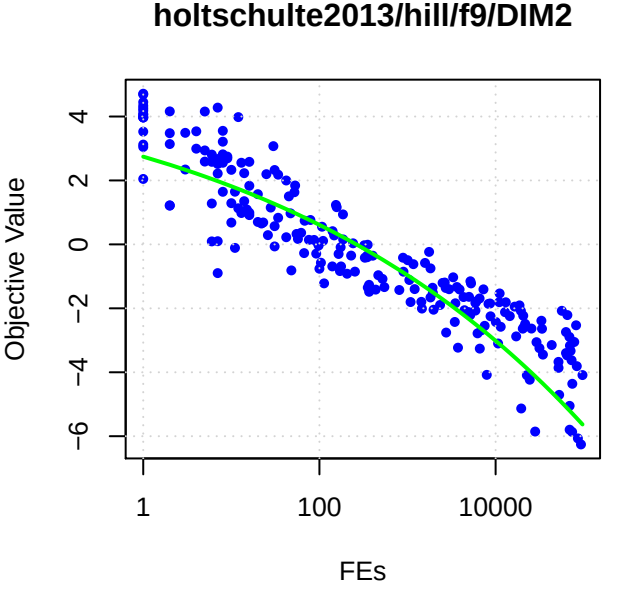
FEs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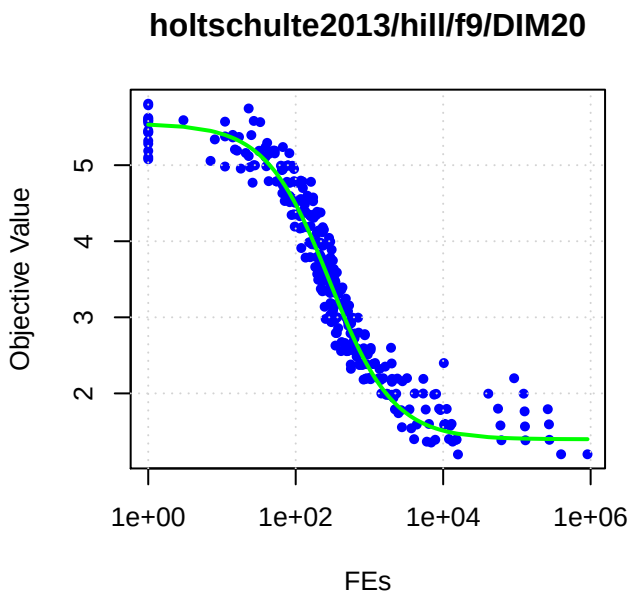
10000
FEs


holtschulte2013/hill/f9/DIM20
Objective Value
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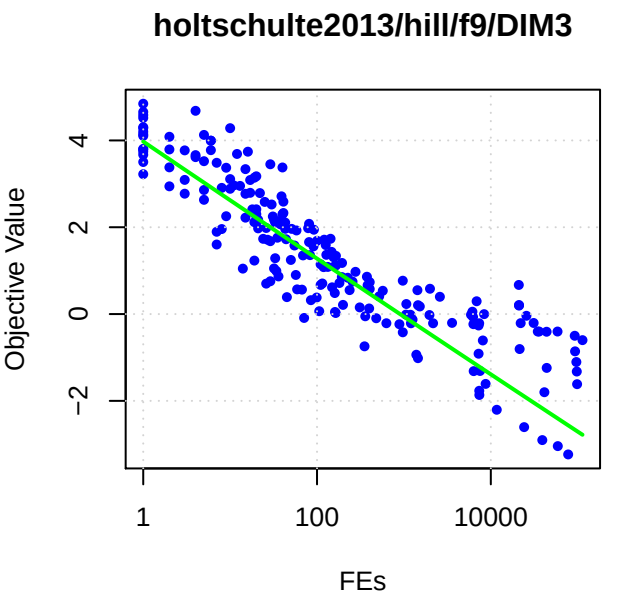
1e+02
1e+04
1e+06
FEs


holtschulte2013/hill/f9/DIM3
Objective Value
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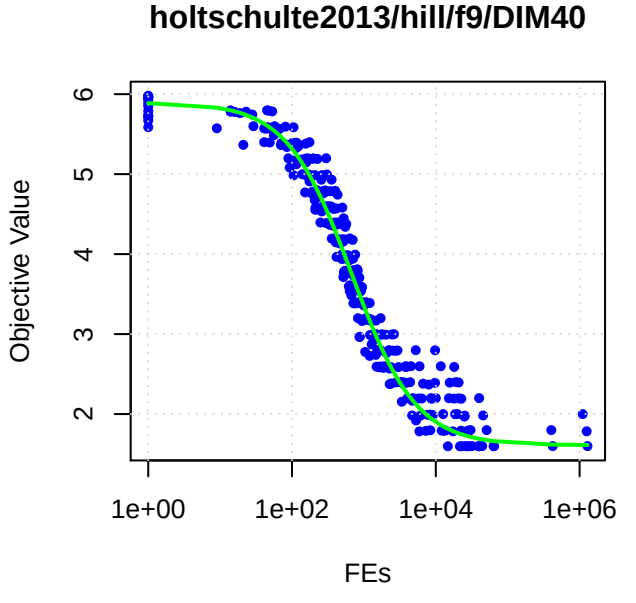
1
100
10000
FEs


holtschulte2013/hill/f9/DIM40
Objective Value
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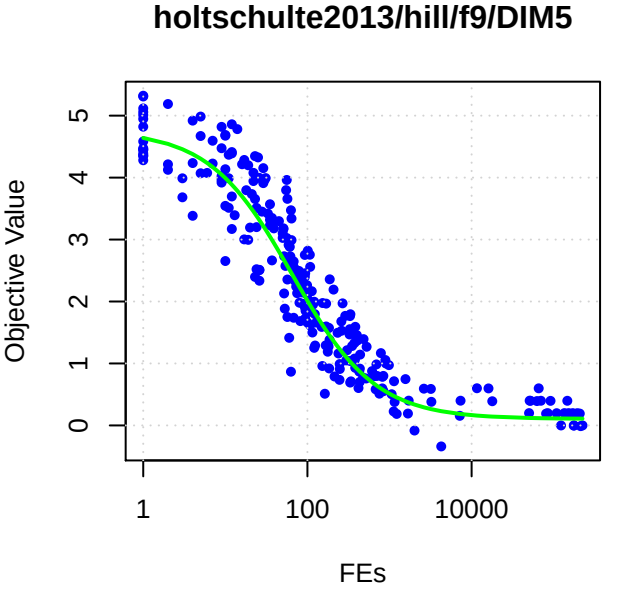
1e+06
FEs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Objective Value
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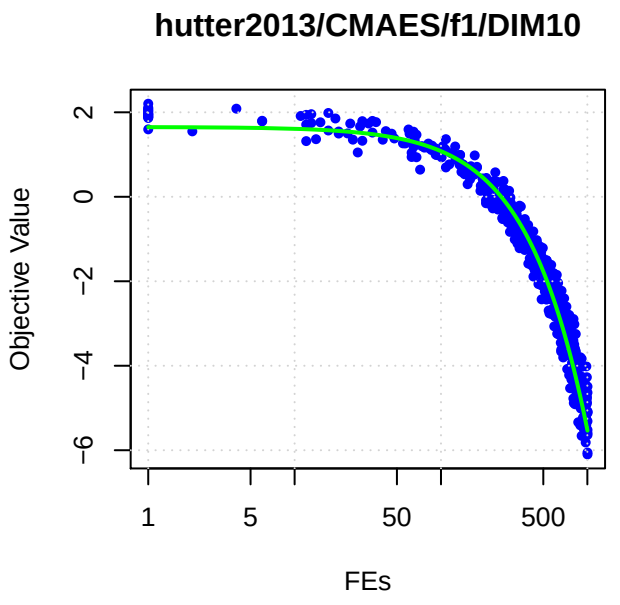
FEs


hutter2013/CMAES/f1/DIM10
Objective Value
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50
500
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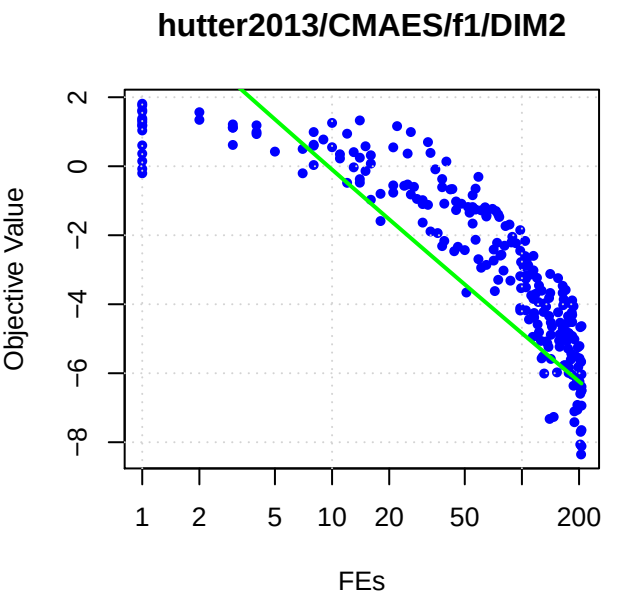
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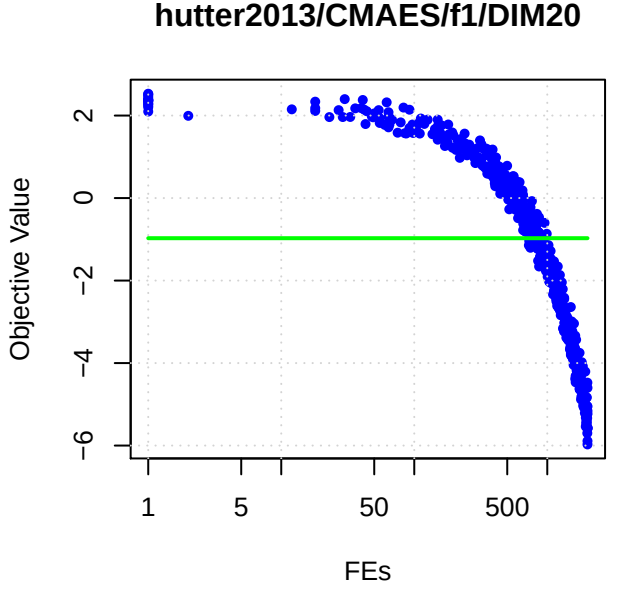
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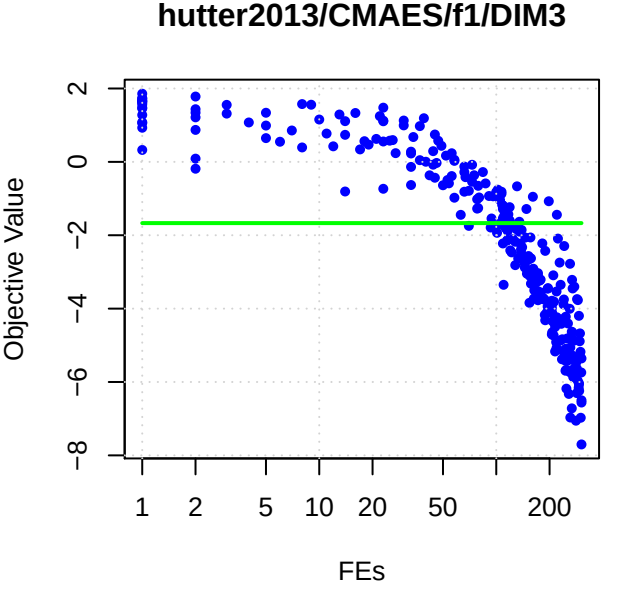
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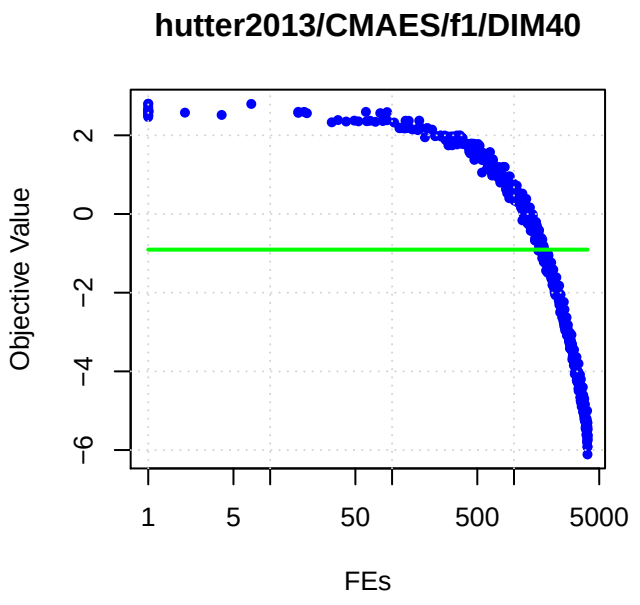
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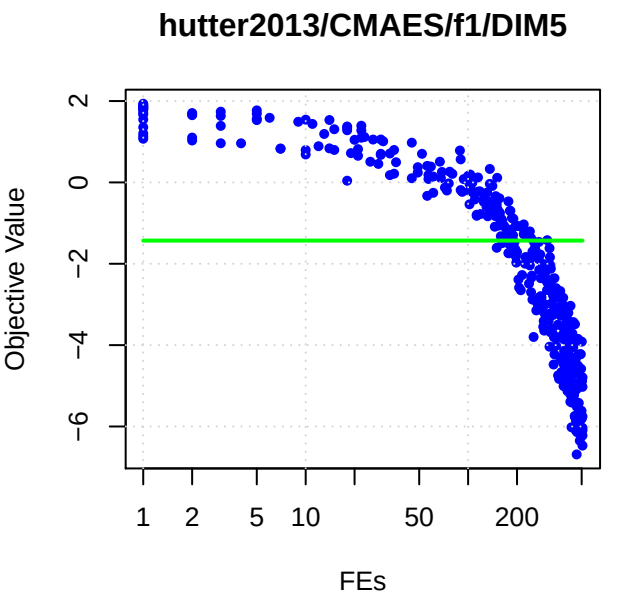
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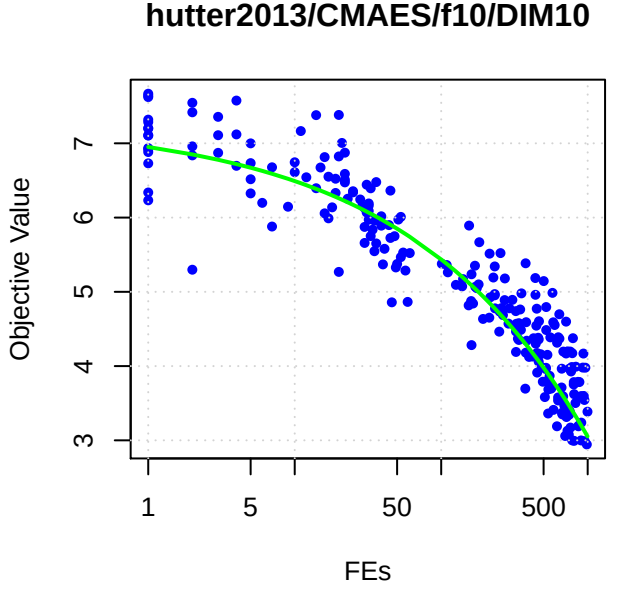
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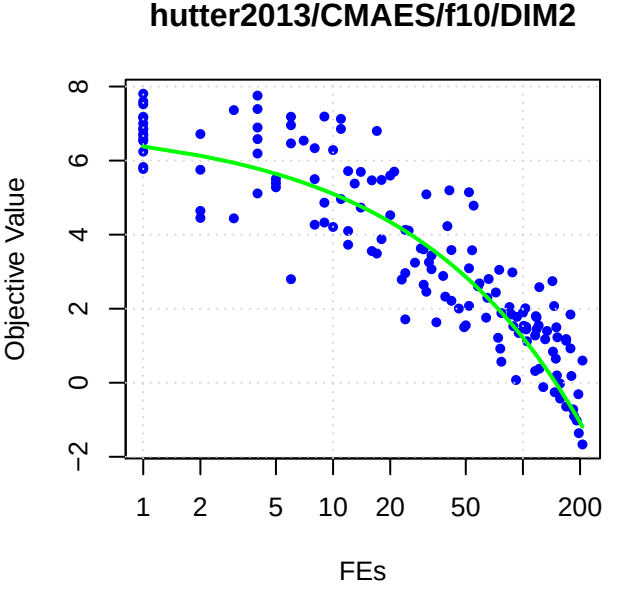
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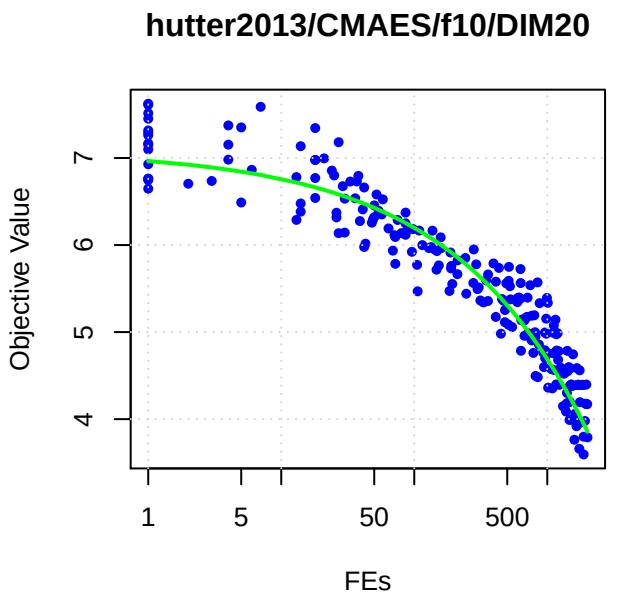
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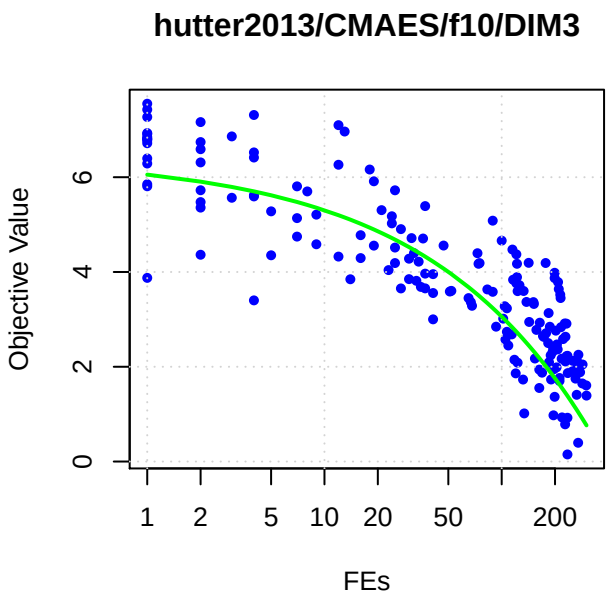
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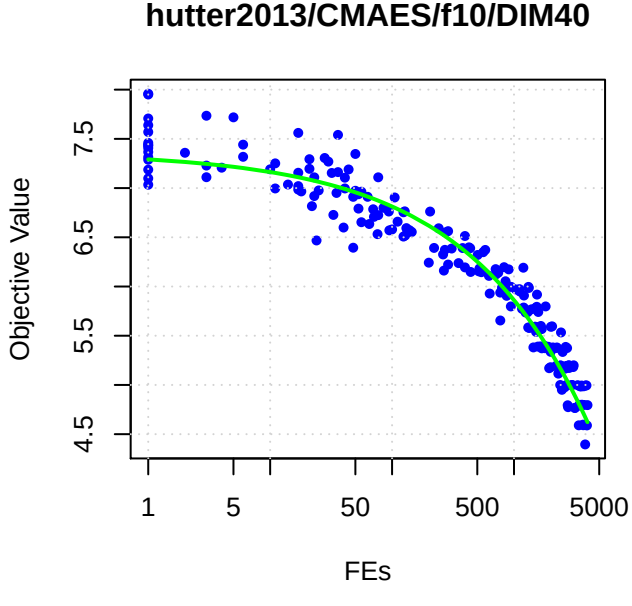
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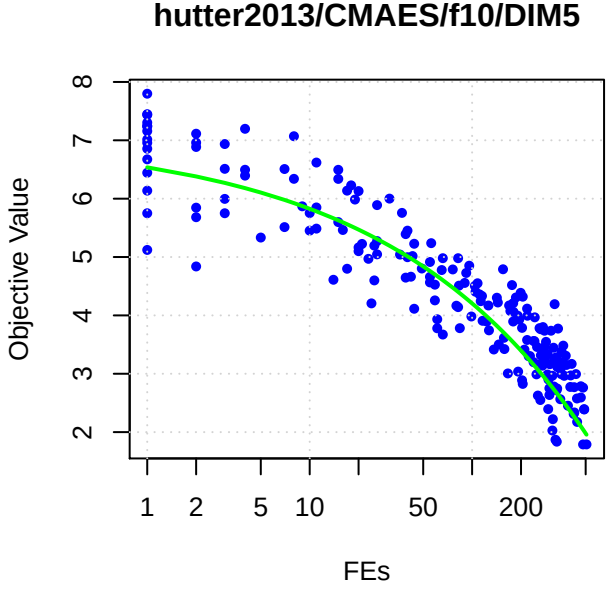
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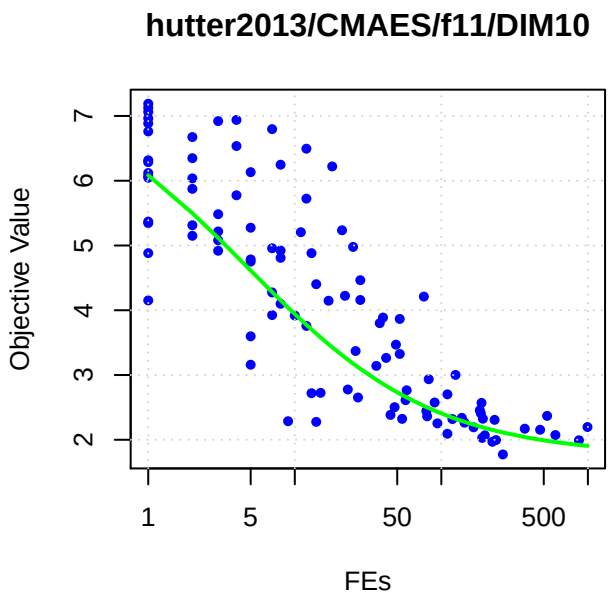
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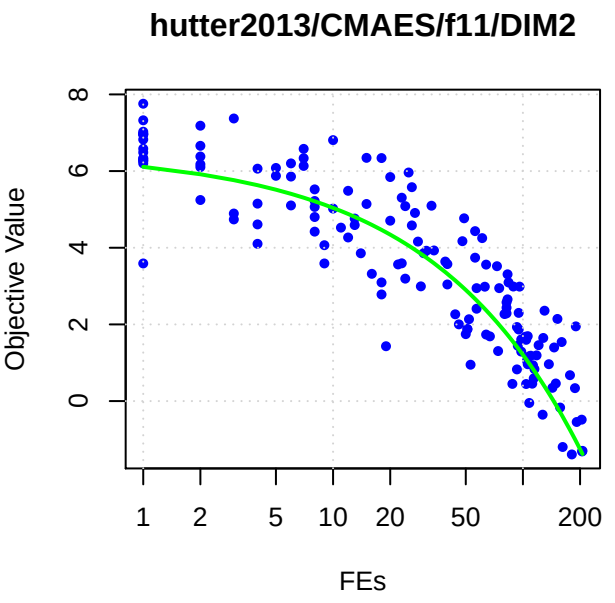
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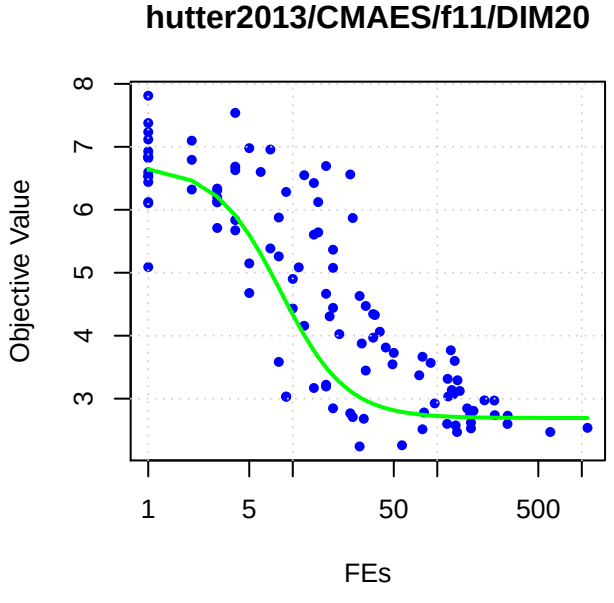
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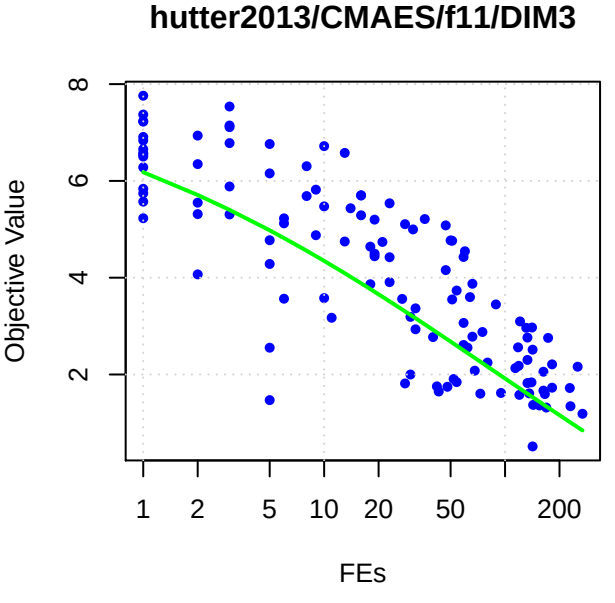
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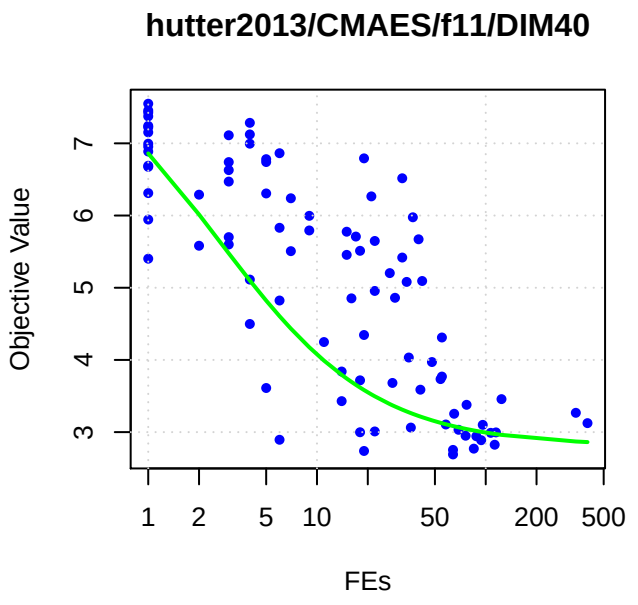
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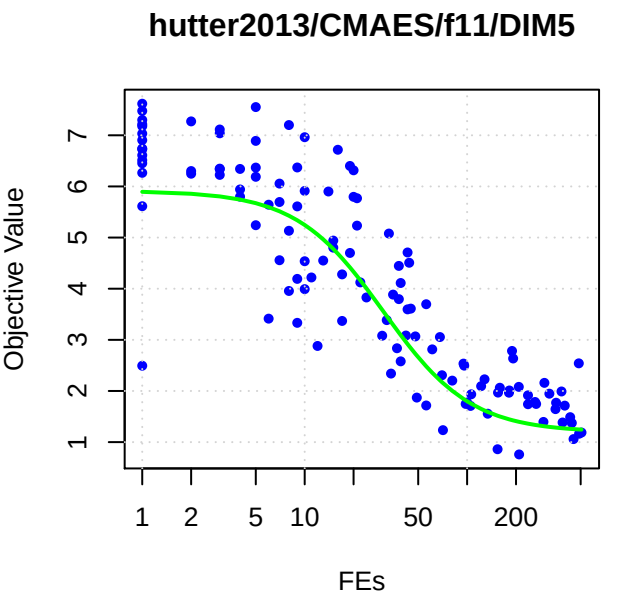
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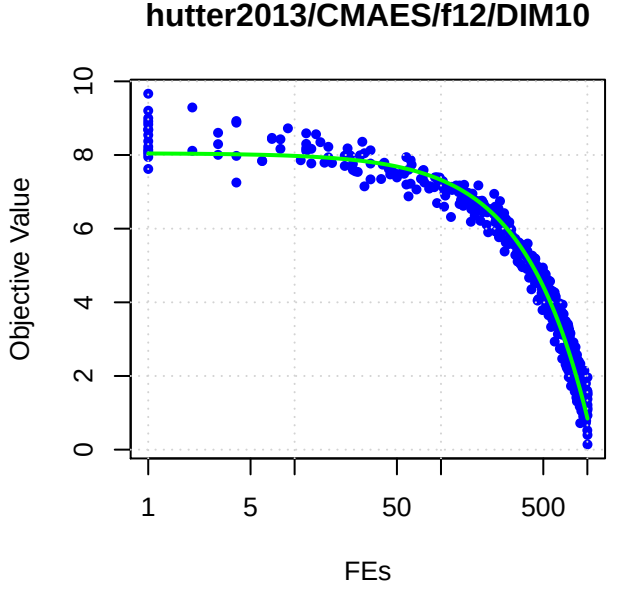
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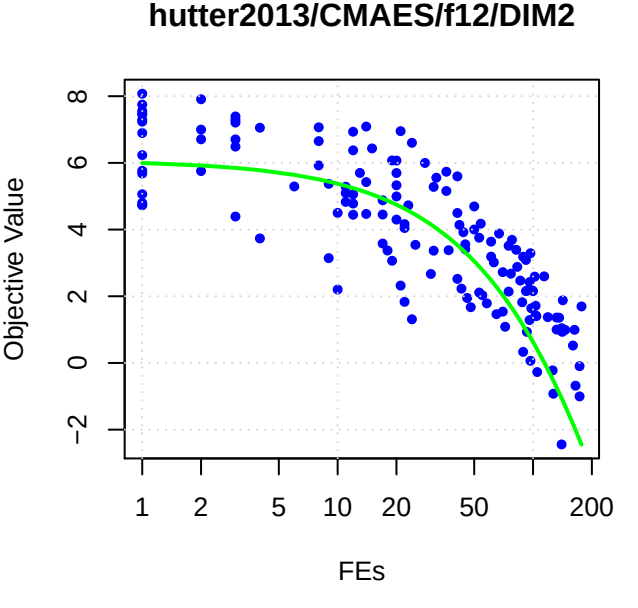
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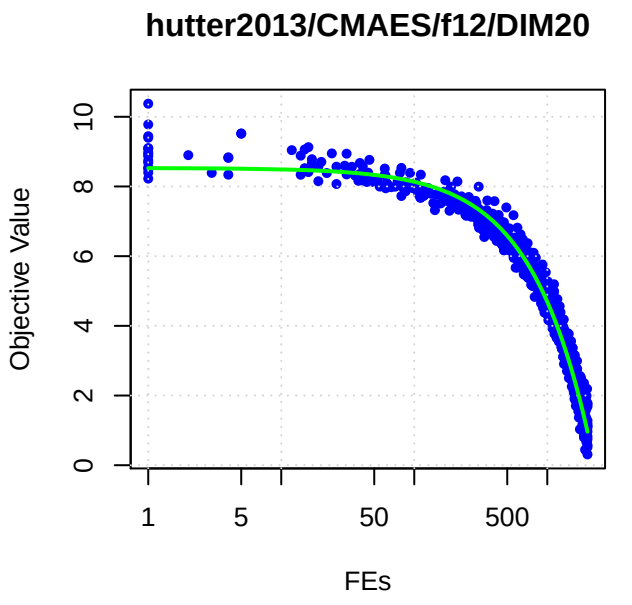
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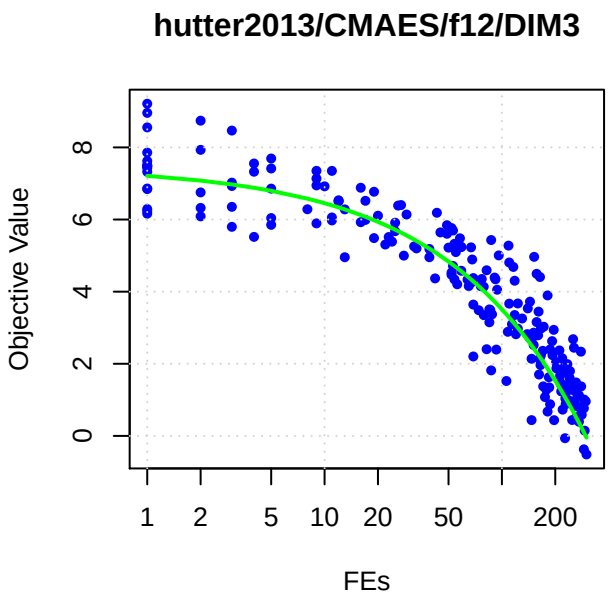
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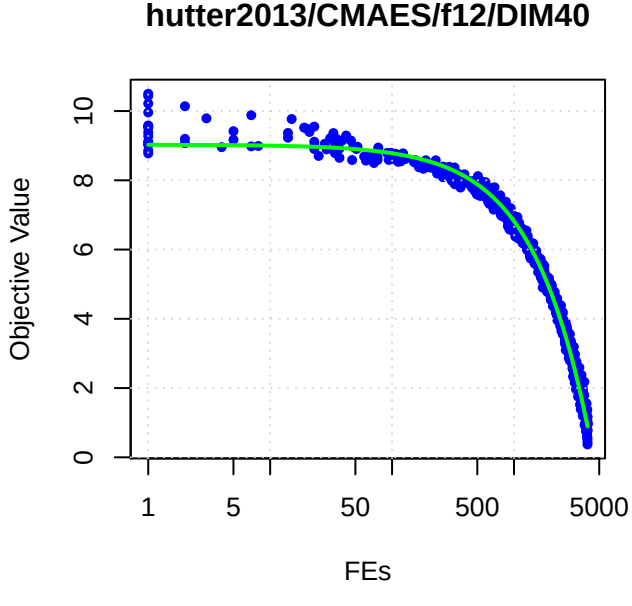
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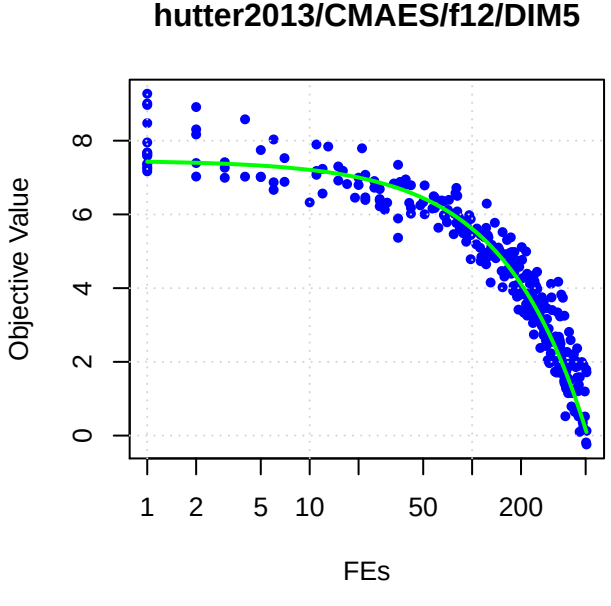
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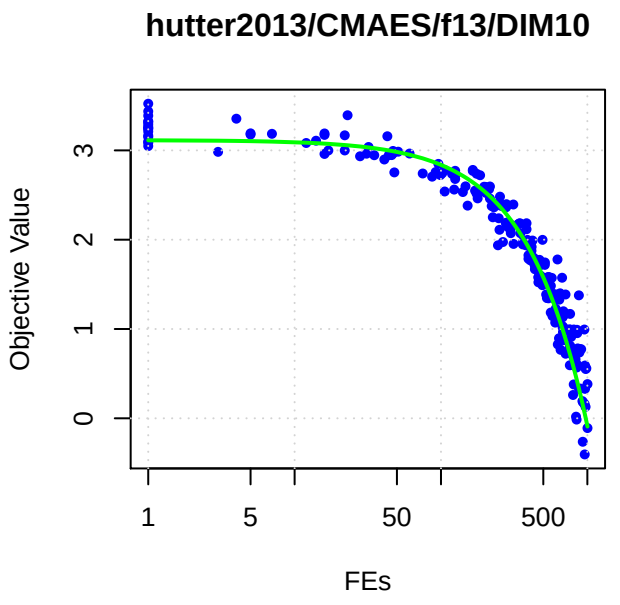
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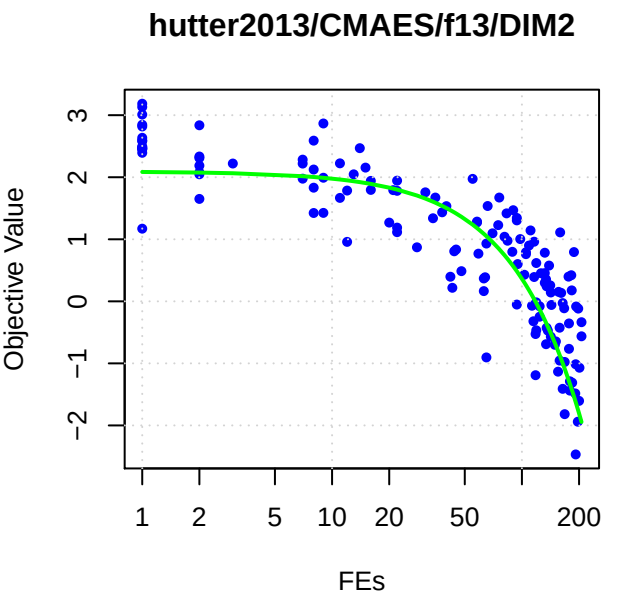
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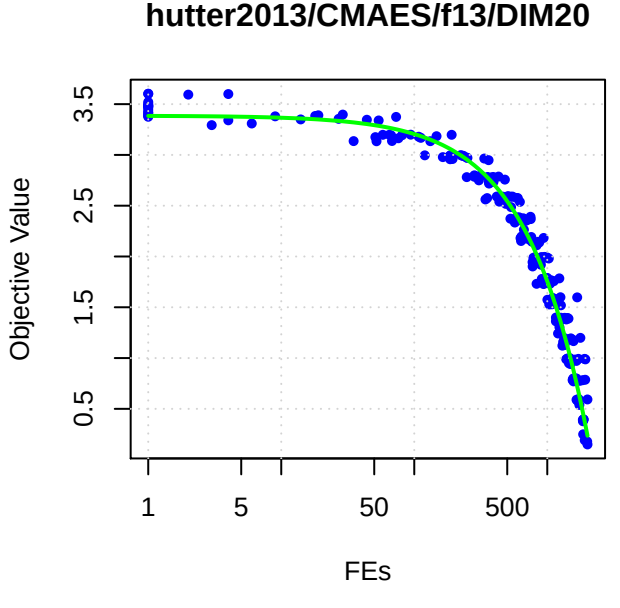
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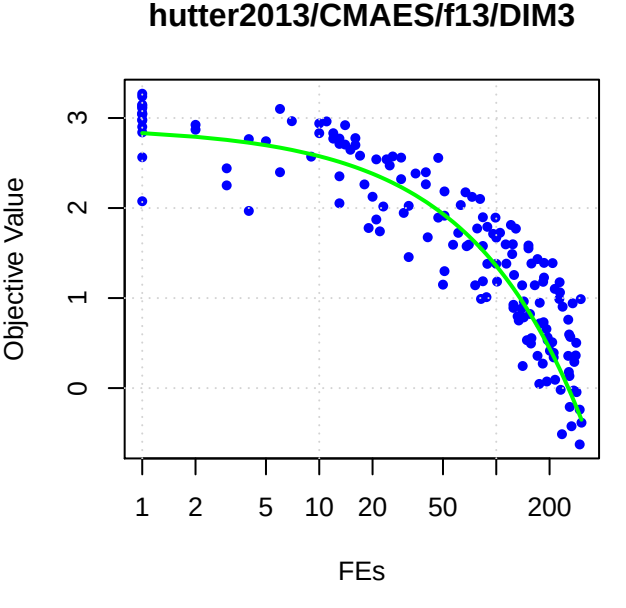
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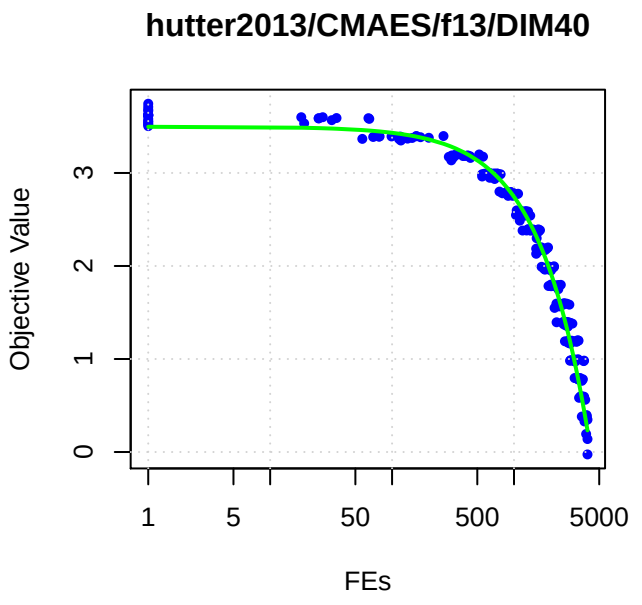
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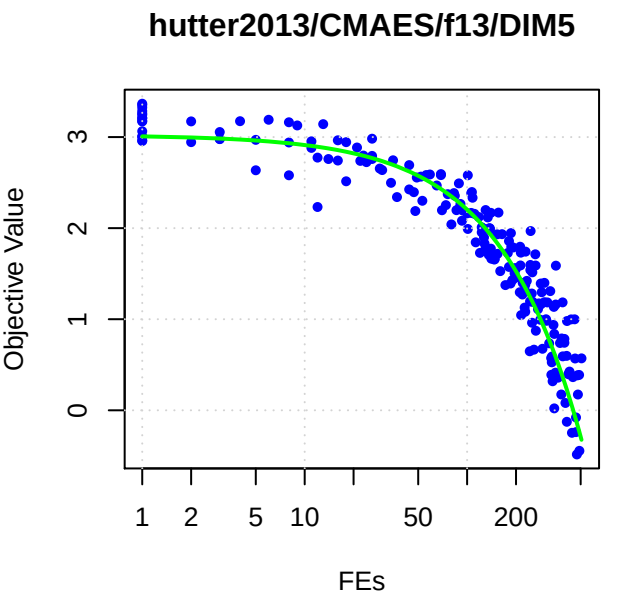
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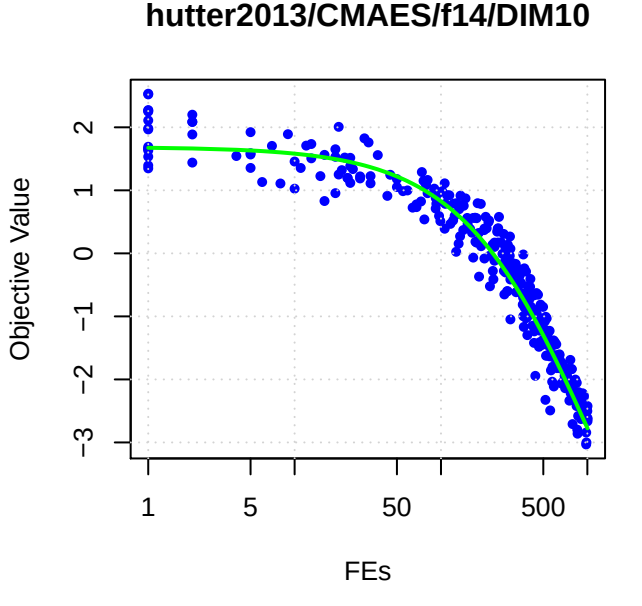
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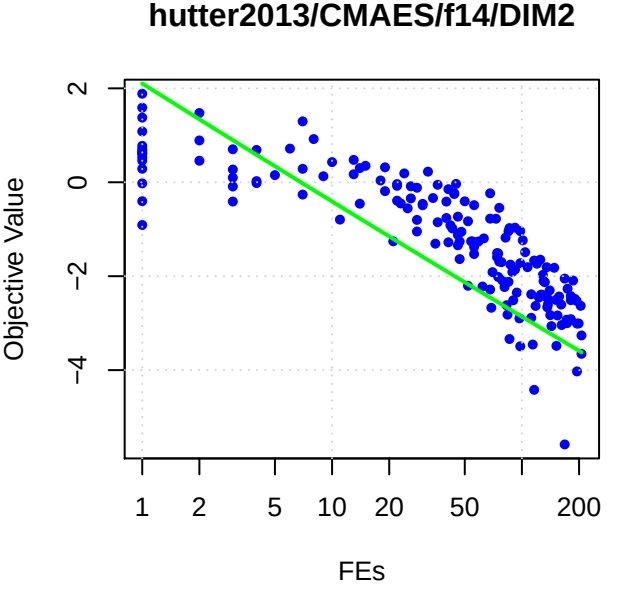
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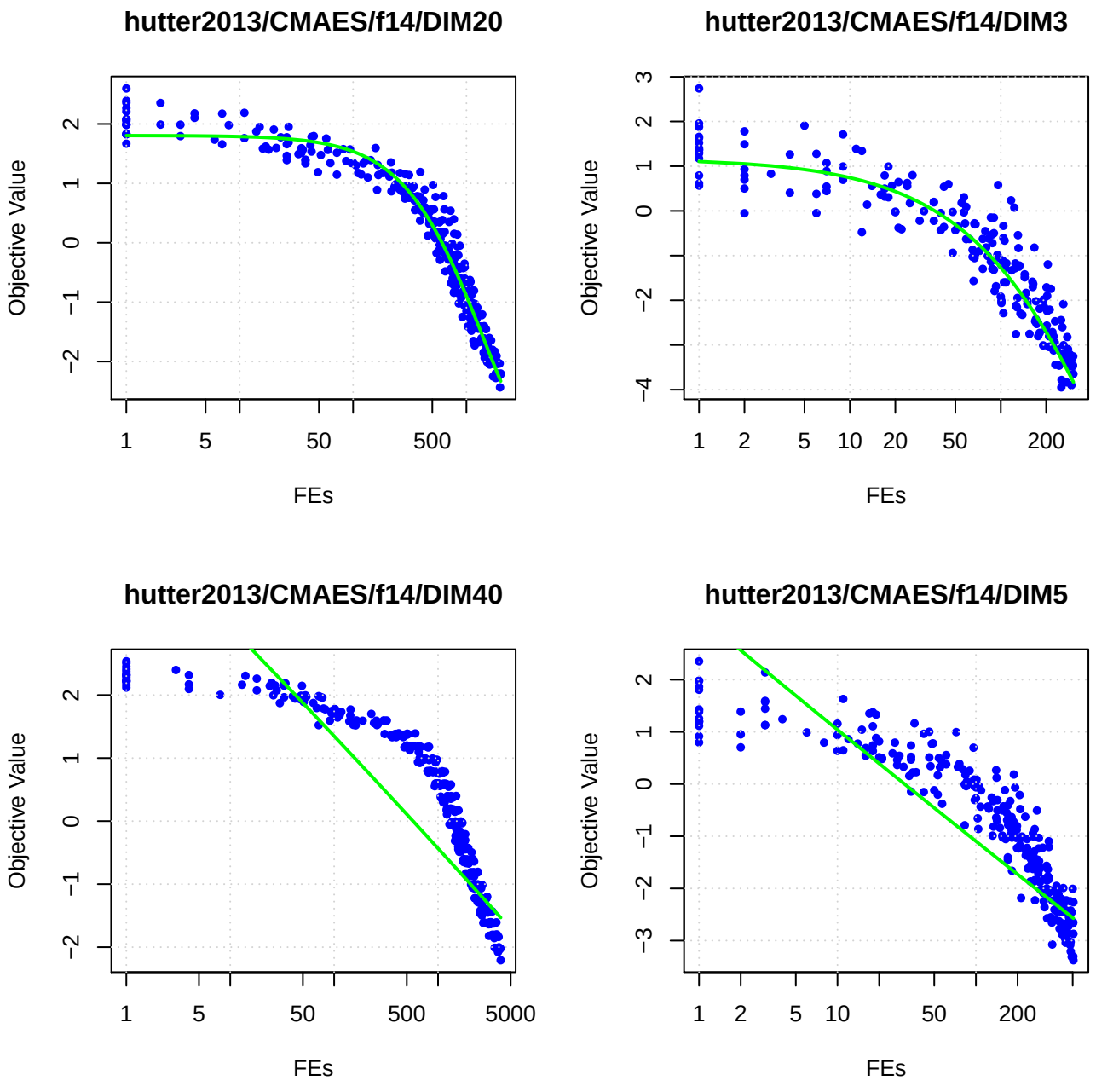
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Objective Value
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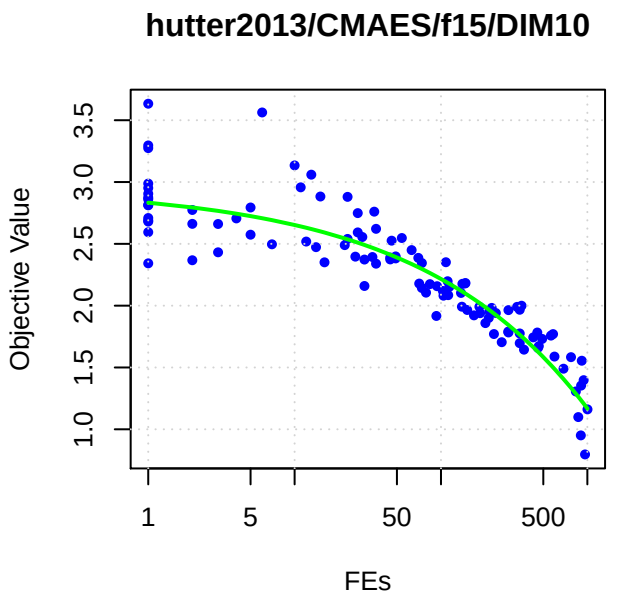
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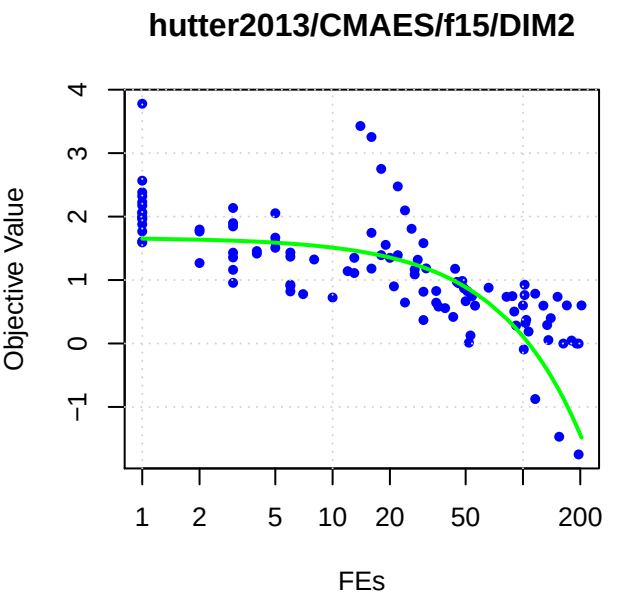
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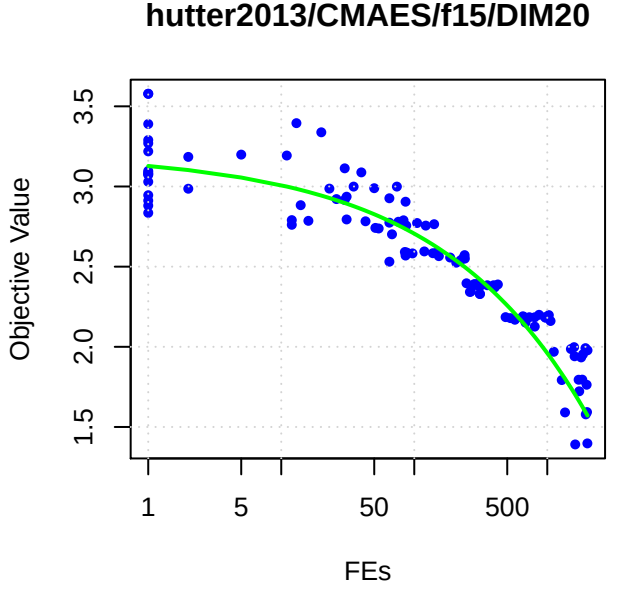
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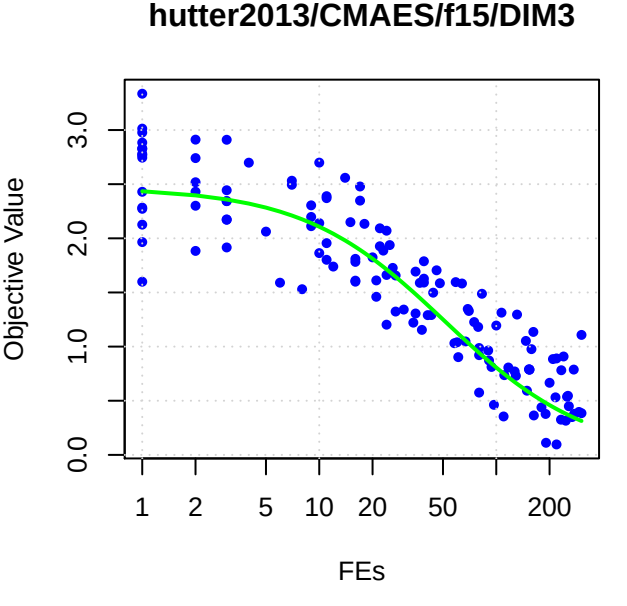
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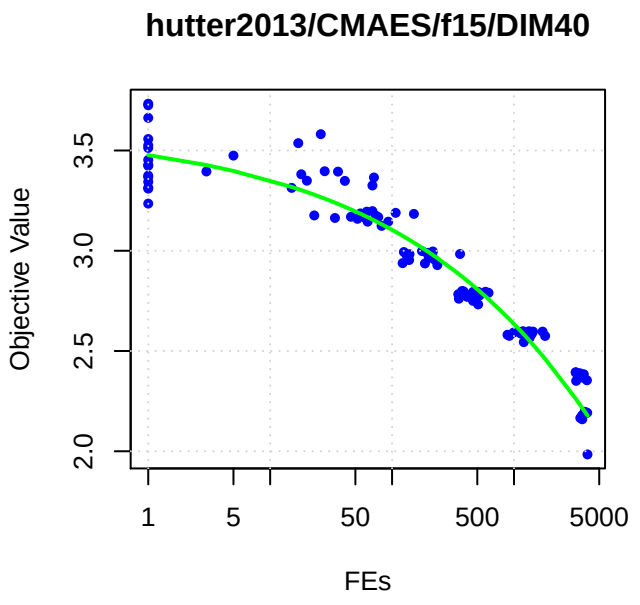
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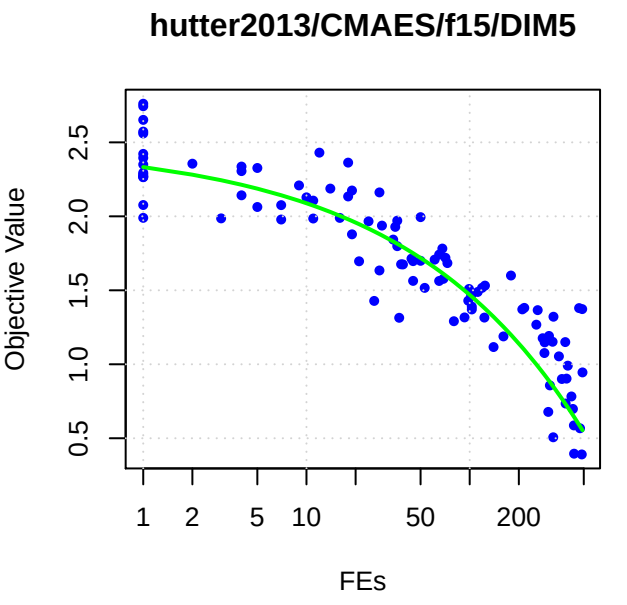
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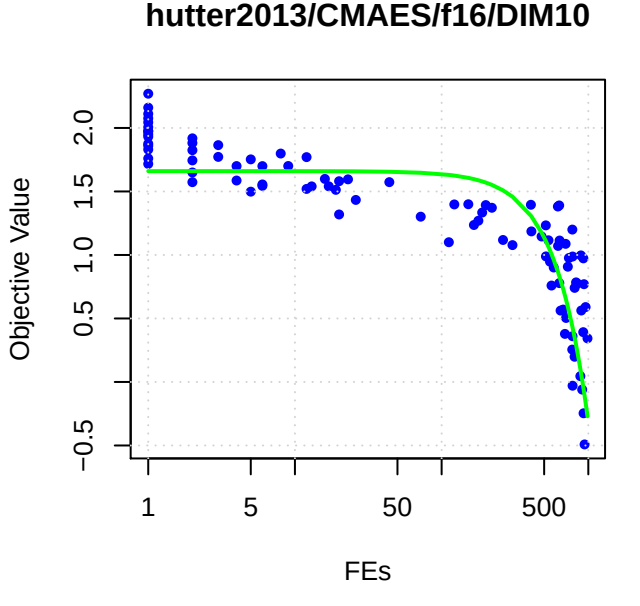
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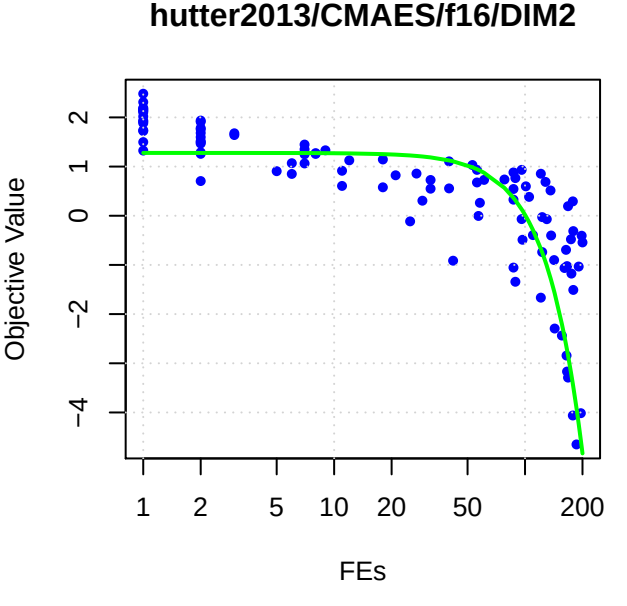
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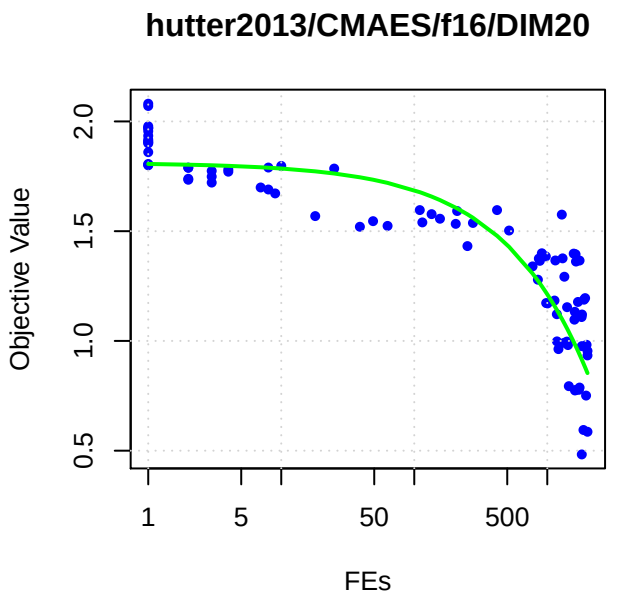
FEs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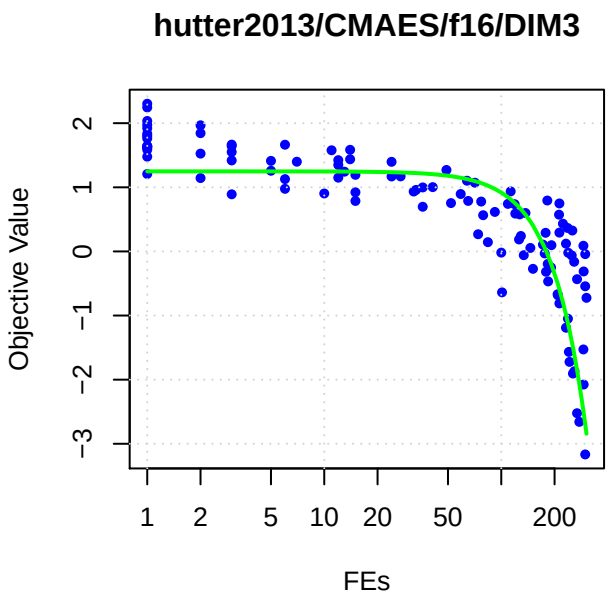
FEs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−1
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1
2
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2
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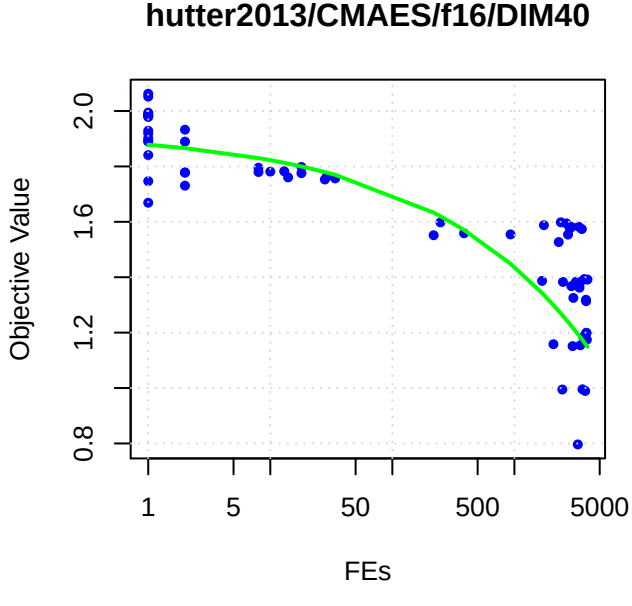
FEs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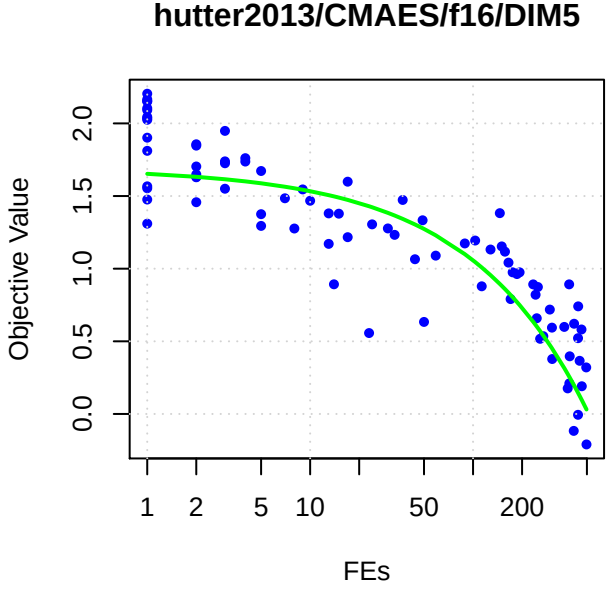
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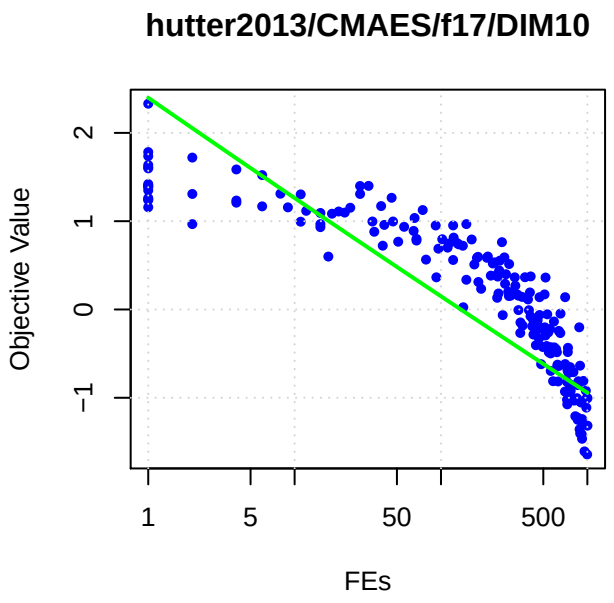
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1
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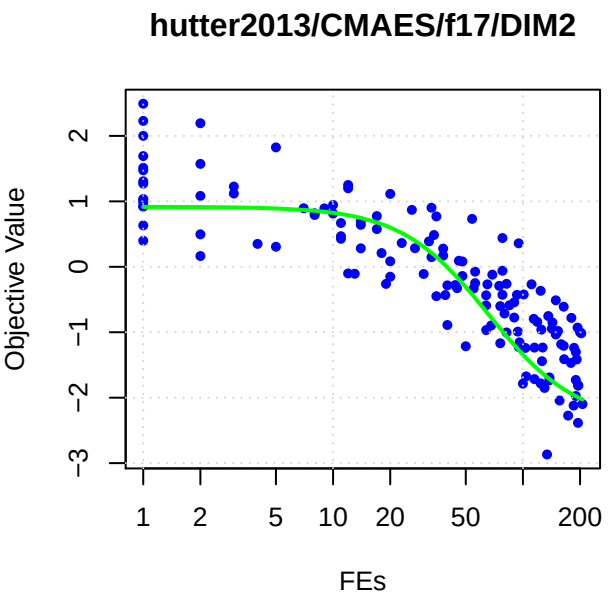
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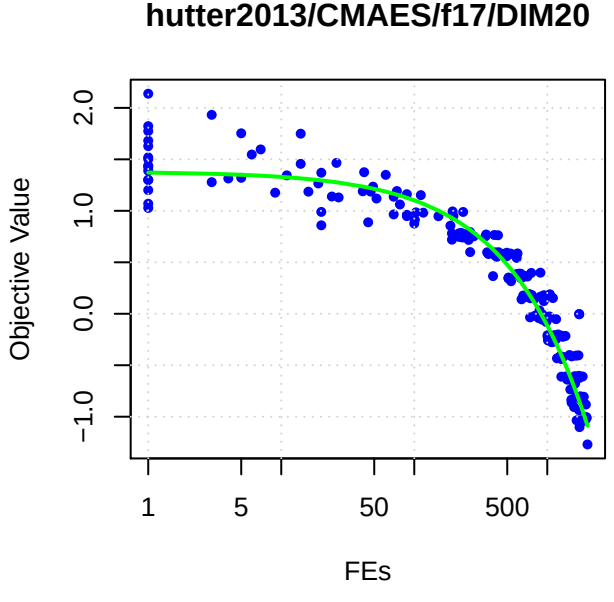
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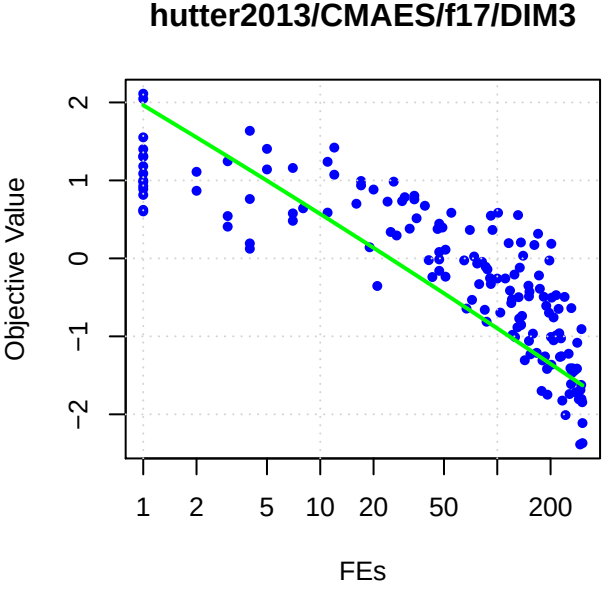
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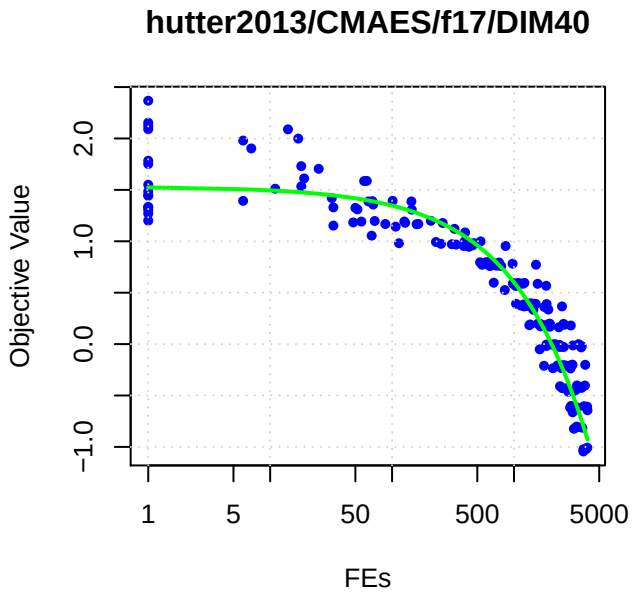
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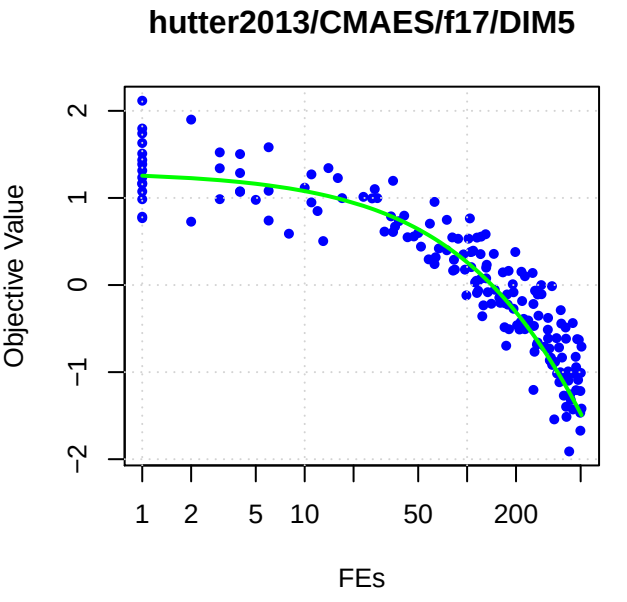
FEs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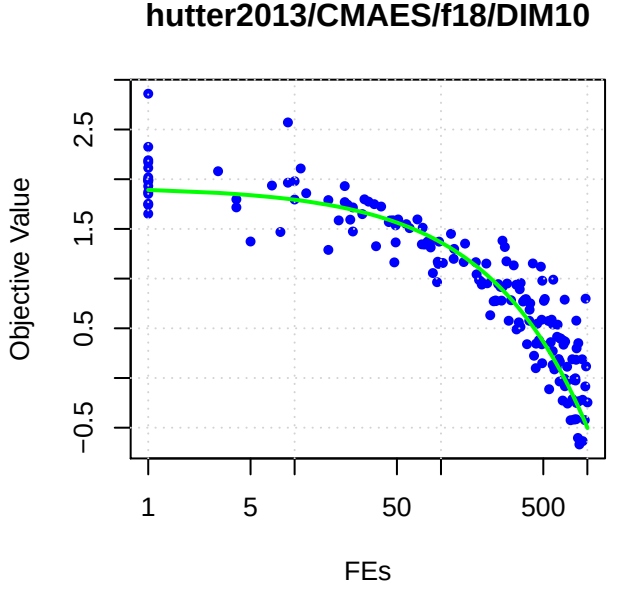
FEs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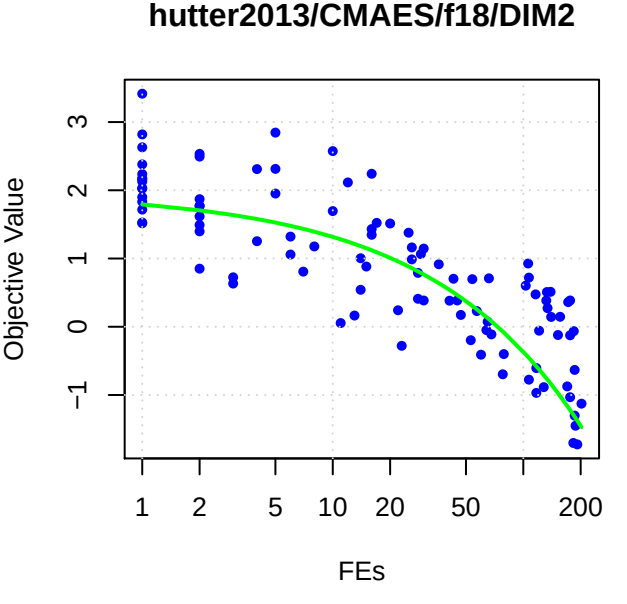
FEs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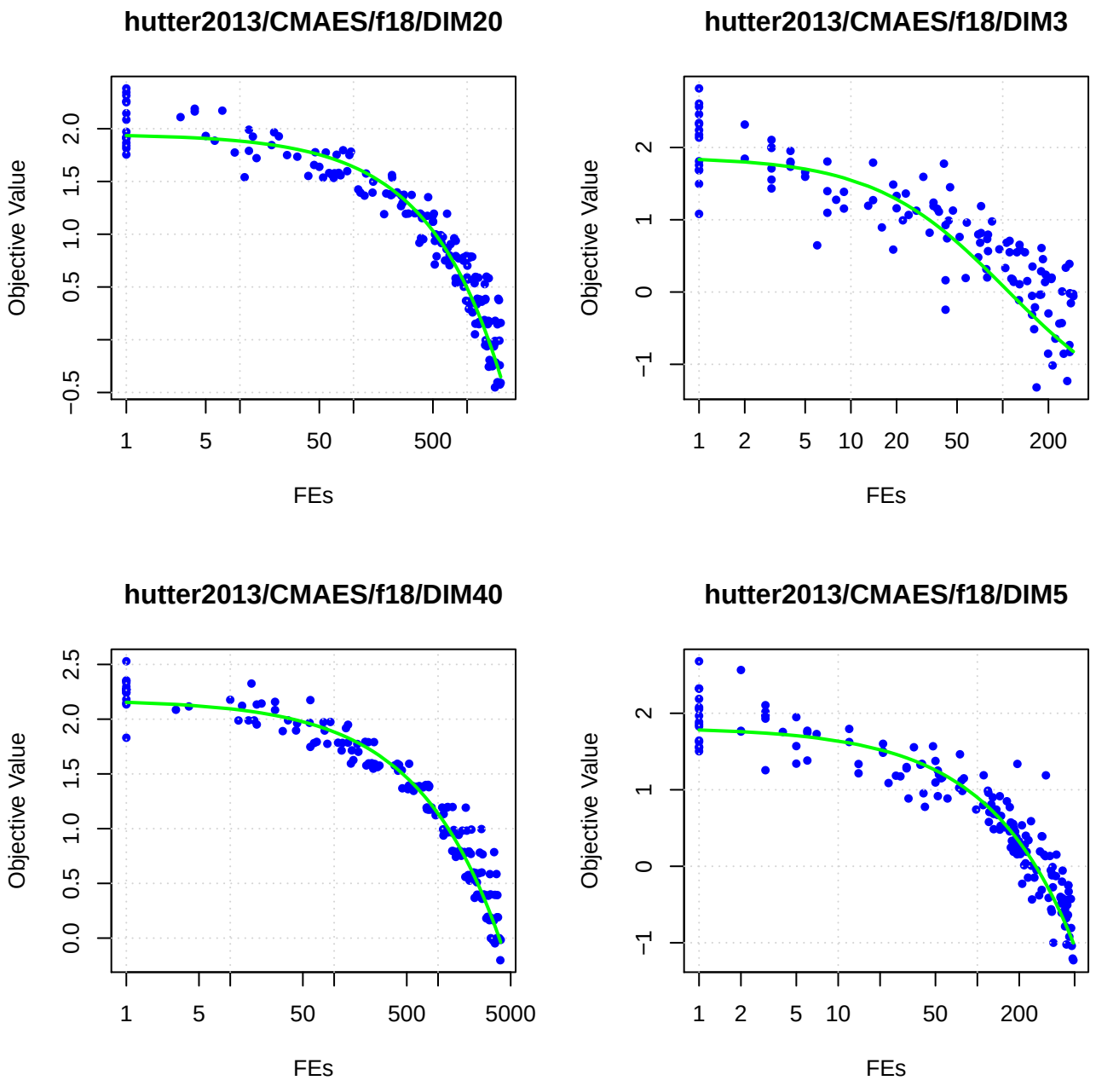
FEs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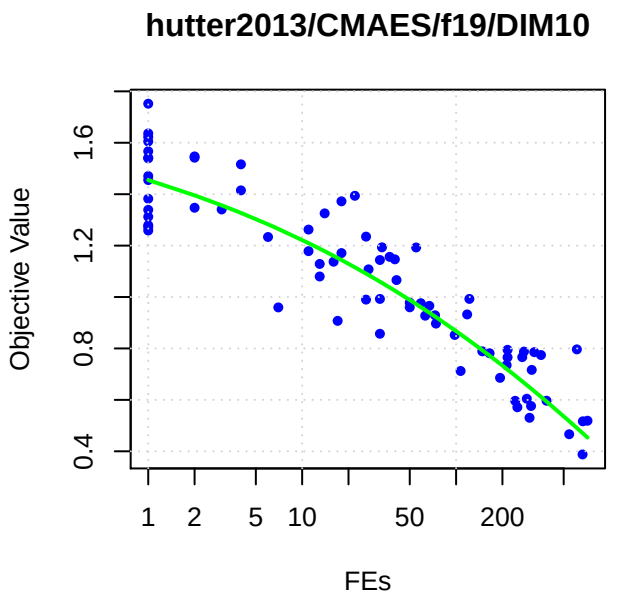
hutter2013/CMAES/f18/DIM3
Objective Value
FEs
hutter2013/CMAES/f18/DIM40
Objective Value
FEs
hutter2013/CMAES/f18/DIM5
Objective Value
FEs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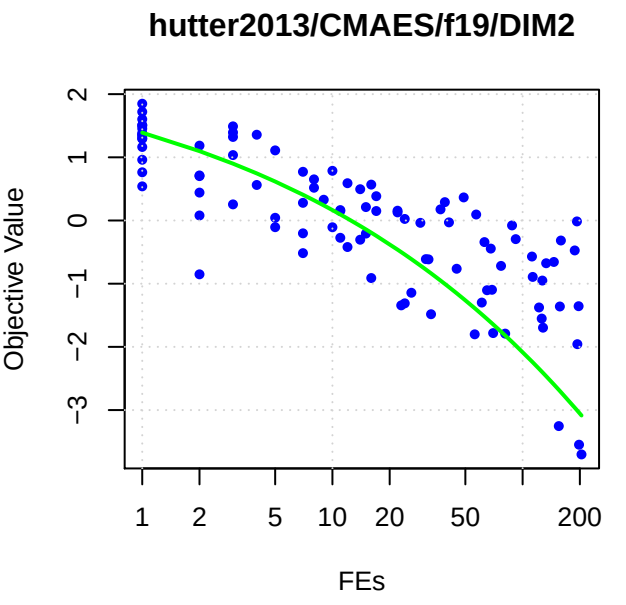
FEs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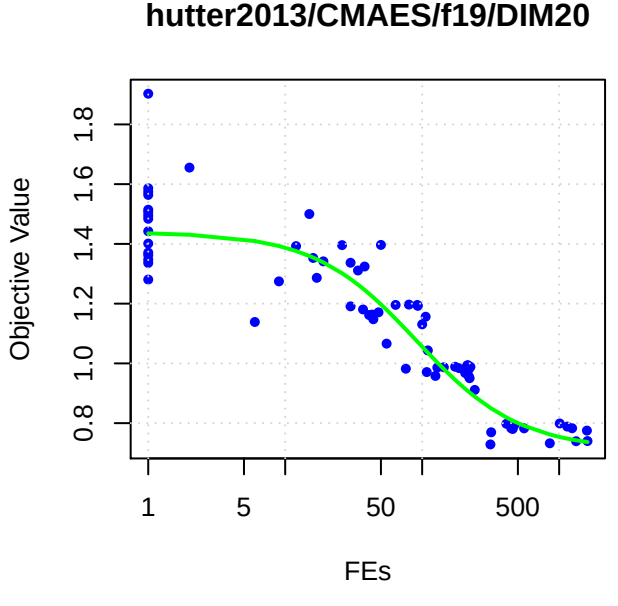
FEs


hutter2013/CMAES/f19/DIM20
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1
5
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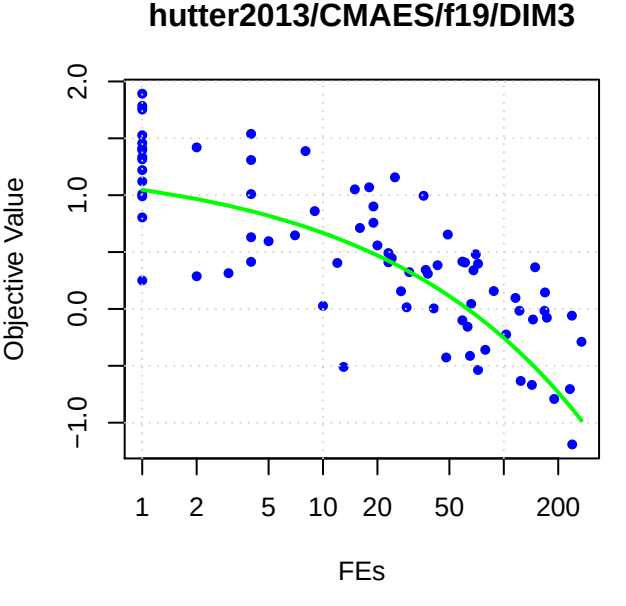
500
FEs


hutter2013/CMAES/f19/DIM3
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1.0
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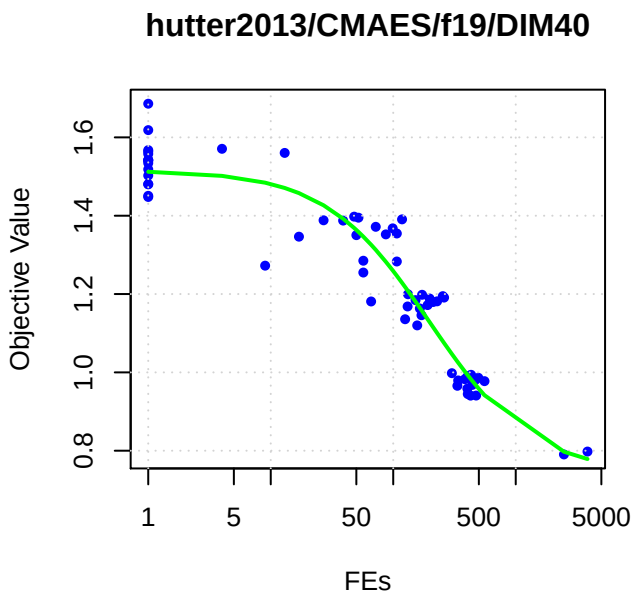
200
FEs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1
5
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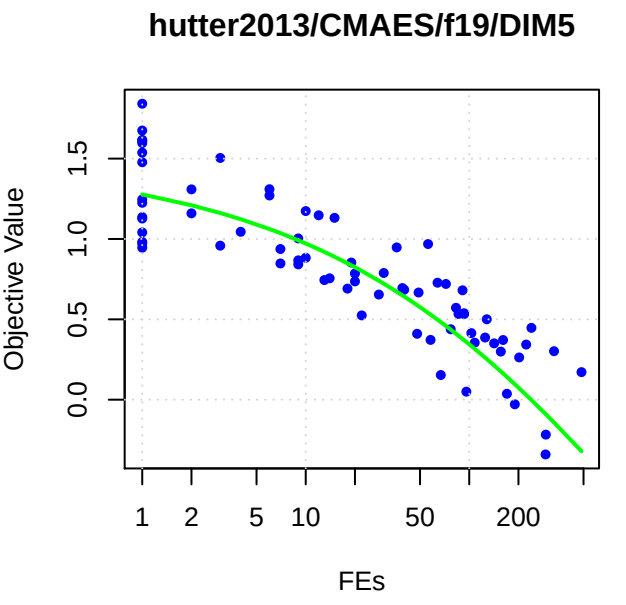
500
5000
FEs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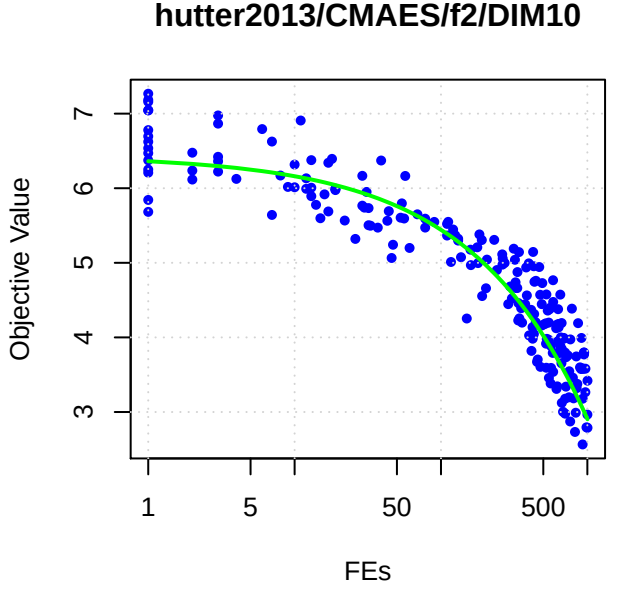
FEs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Objective Value
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5
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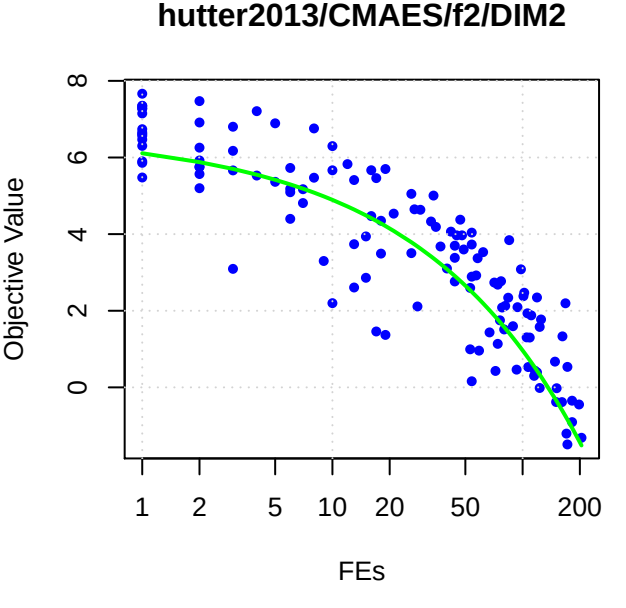
FEs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2
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20
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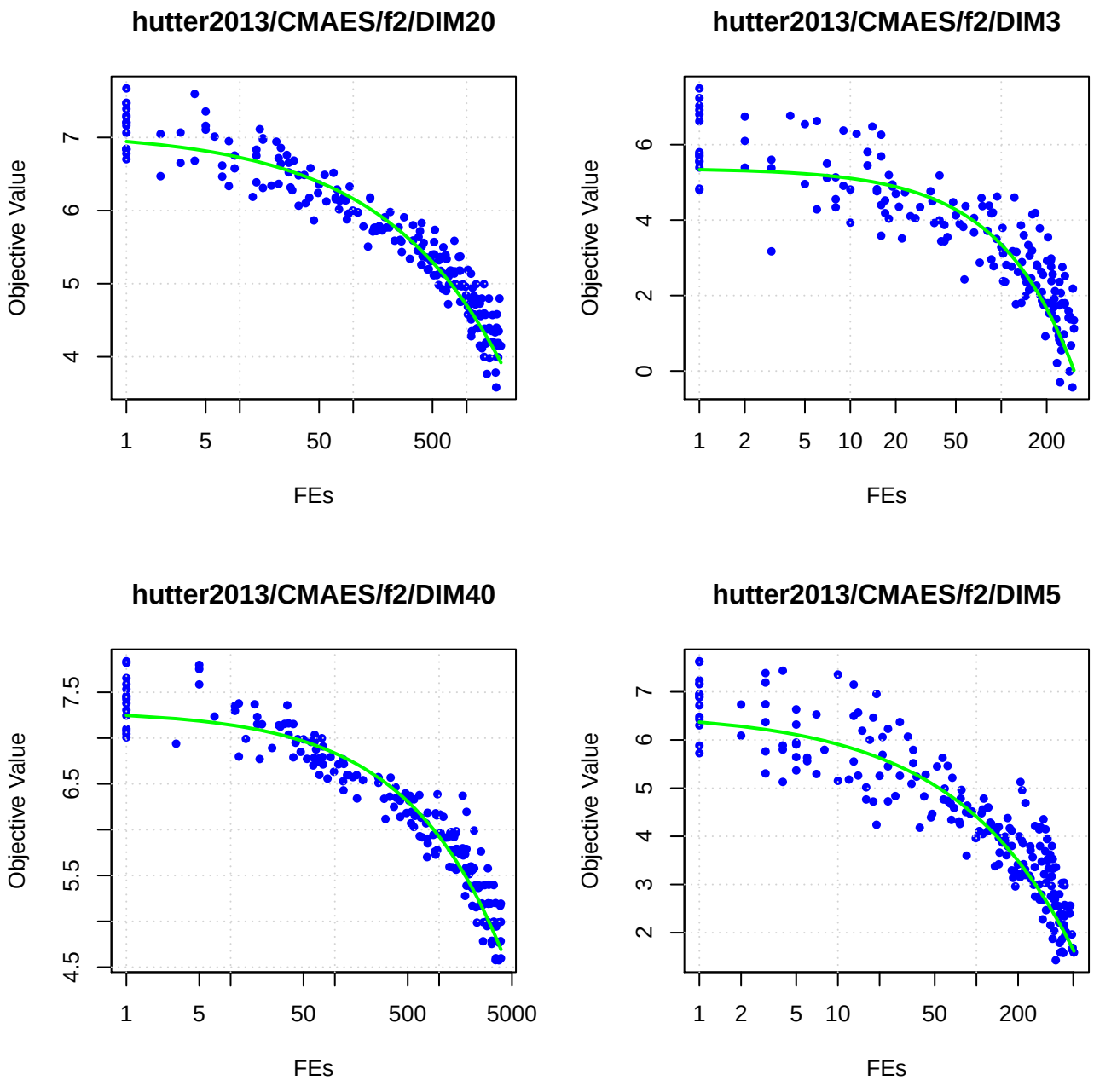
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Objective Value
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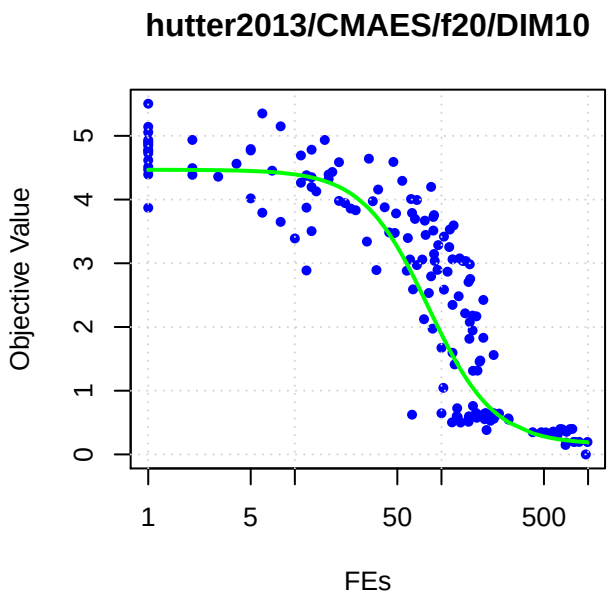
hutter2013/CMAES/f2/DIM3
Objective Value
FEs
hutter2013/CMAES/f2/DIM40
Objective Value
FEs
hutter2013/CMAES/f2/DIM5
Objective Value
FEs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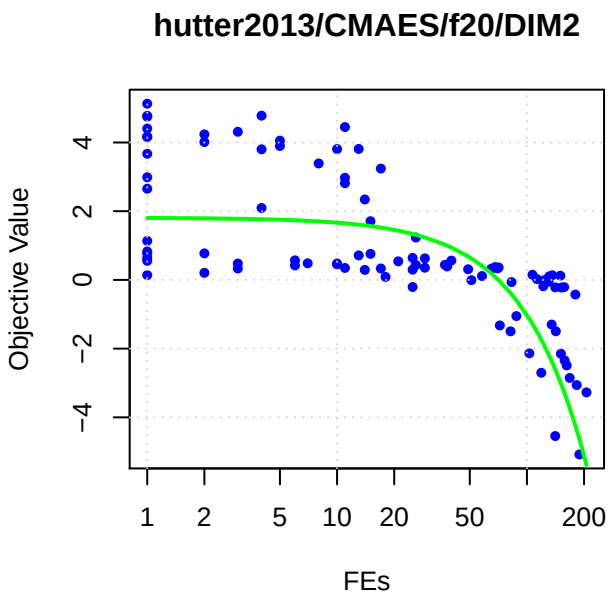
FEs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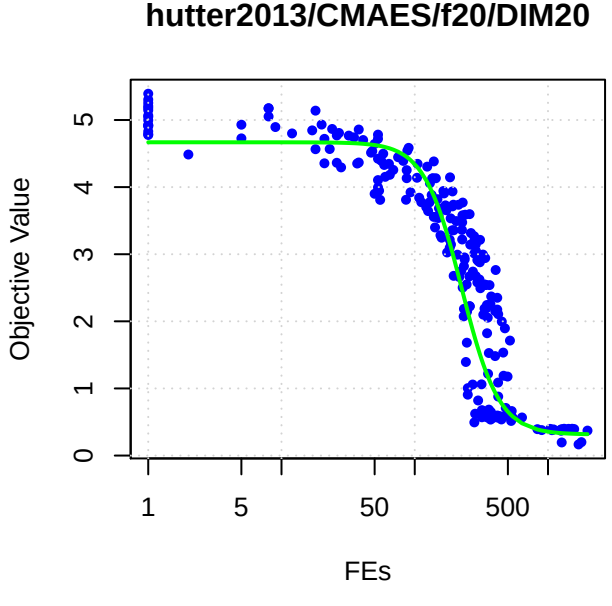
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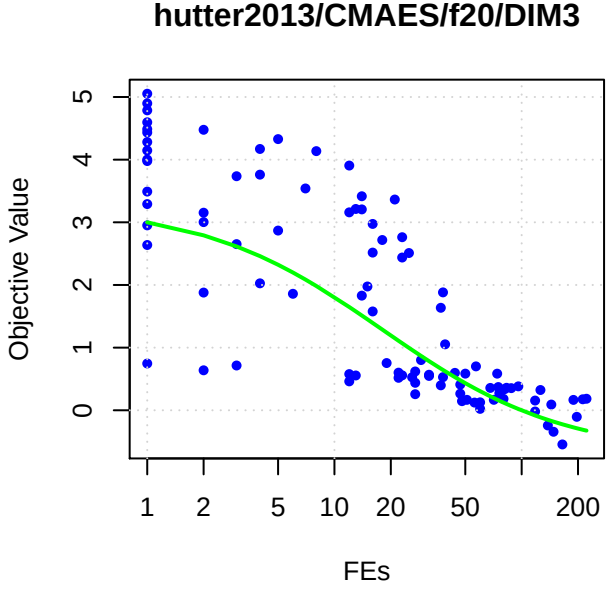
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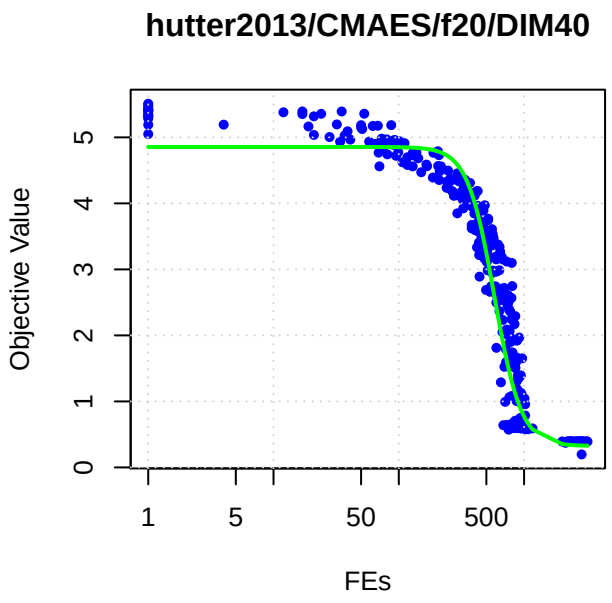
FEs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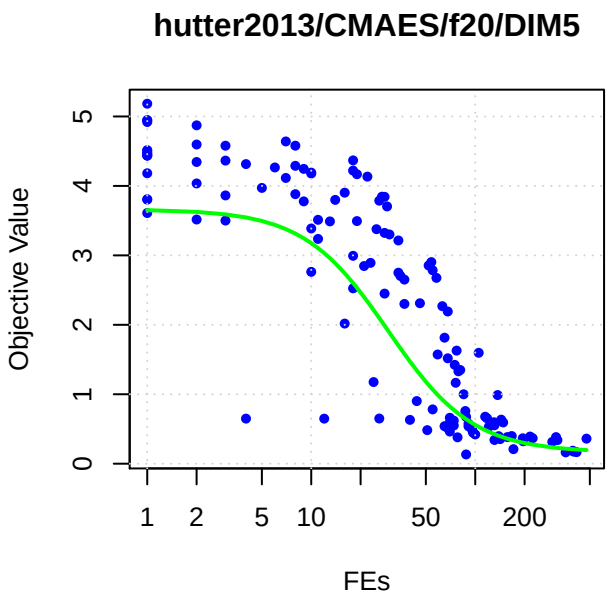
FEs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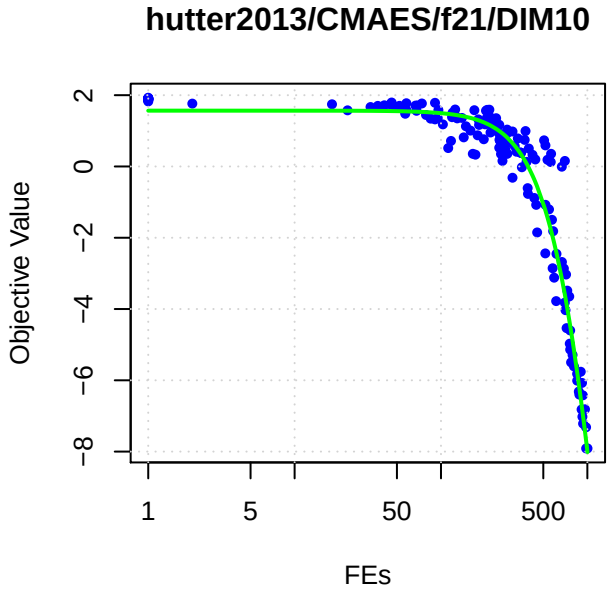
FEs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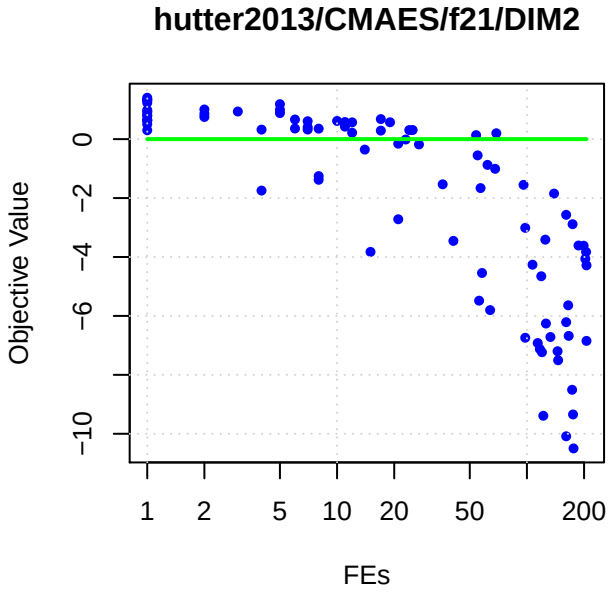
FEs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20
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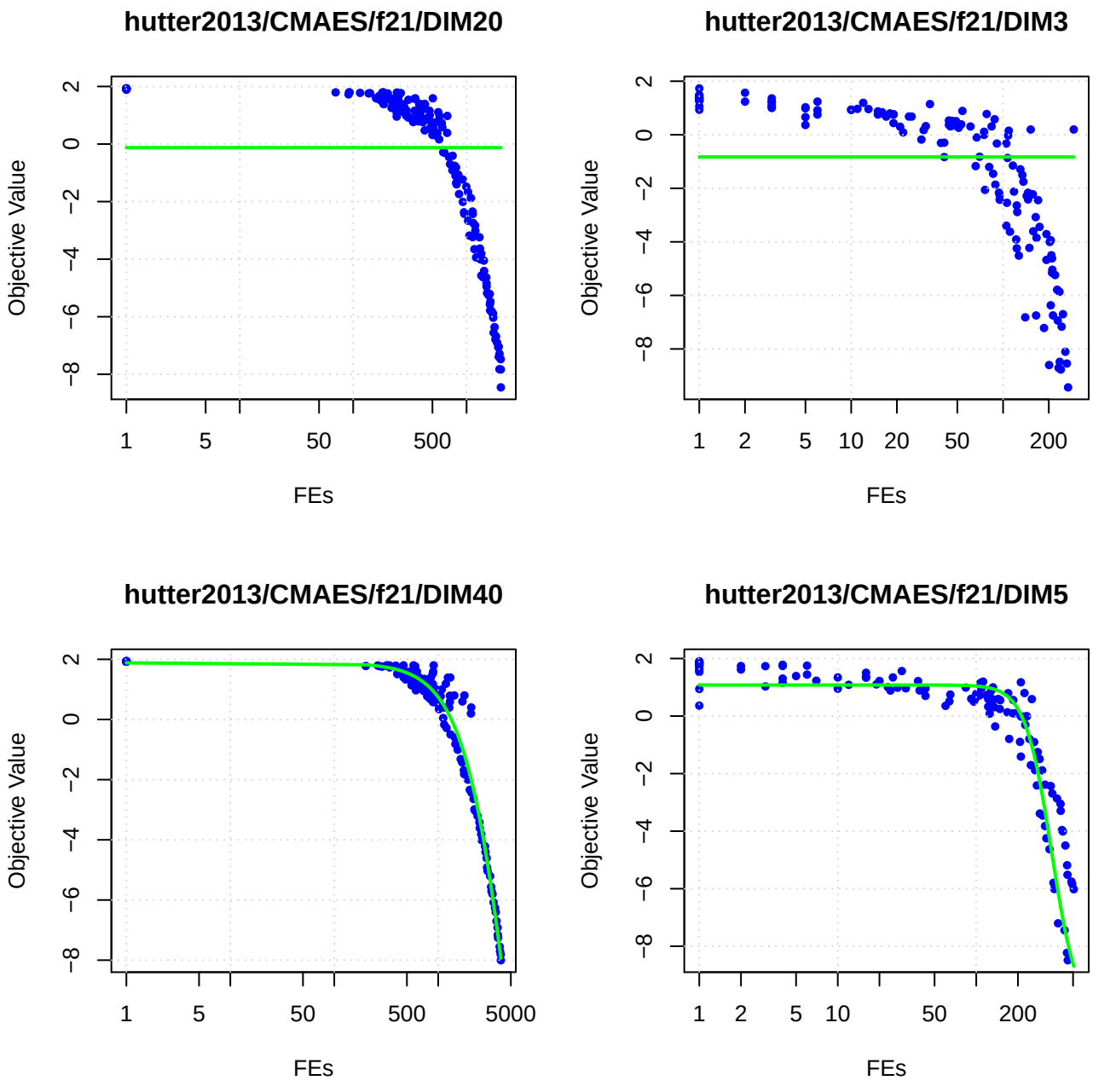
200
FEs


hutter2013/CMAES/f21/DIM20
hutter2013/CMAES/f21/DIM3
hutter2013/CMAES/f21/DIM40
hutter2013/CMAES/f21/DIM5
Objective Value
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500
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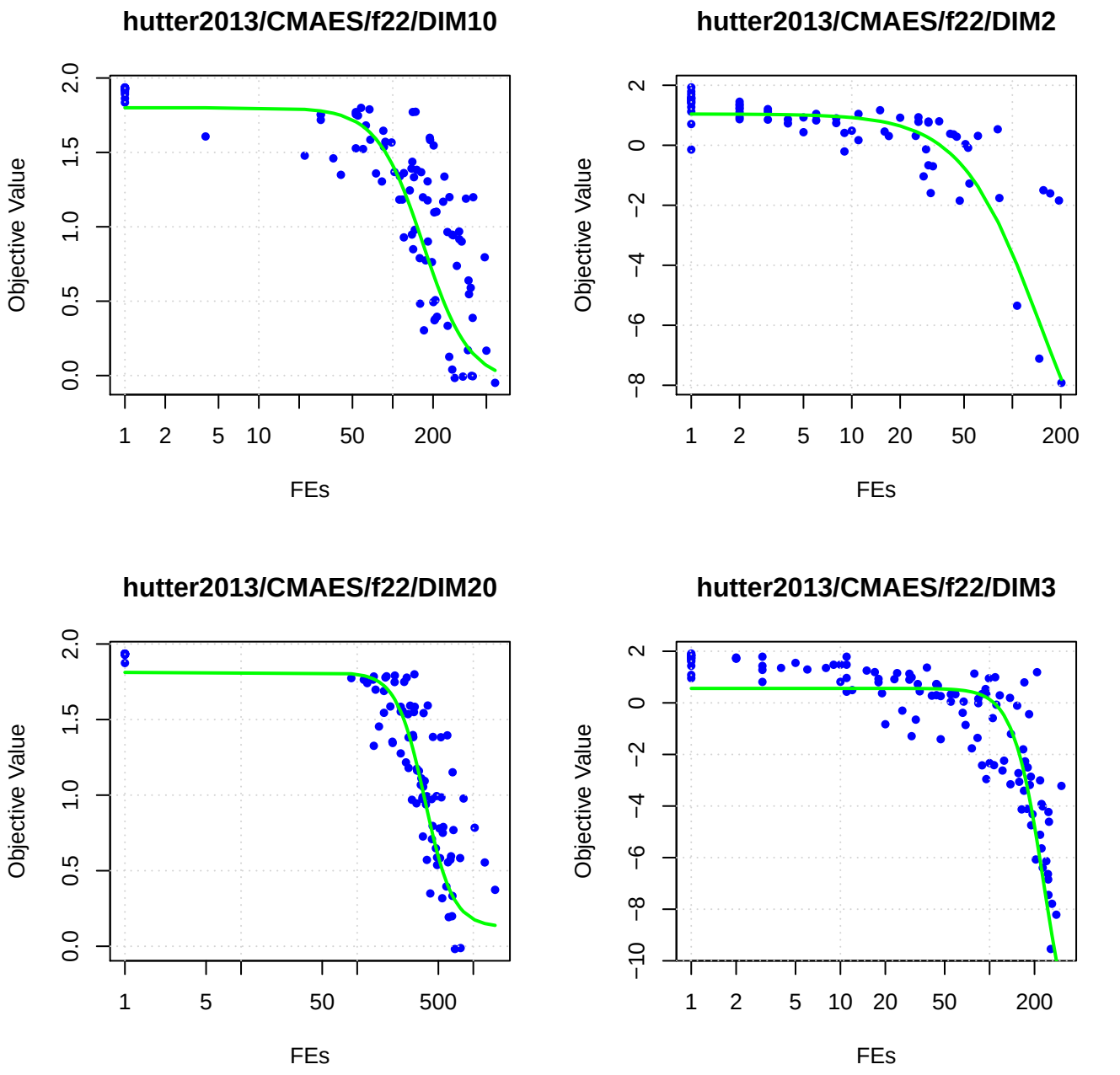
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FEs
hutter2013/CMAES/f22/DIM2
Objective Value
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−6
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5
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FEs
hutter2013/CMAES/f22/DIM20
Objective Value
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1.5
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FEs
hutter2013/CMAES/f22/DIM3
Objective Value
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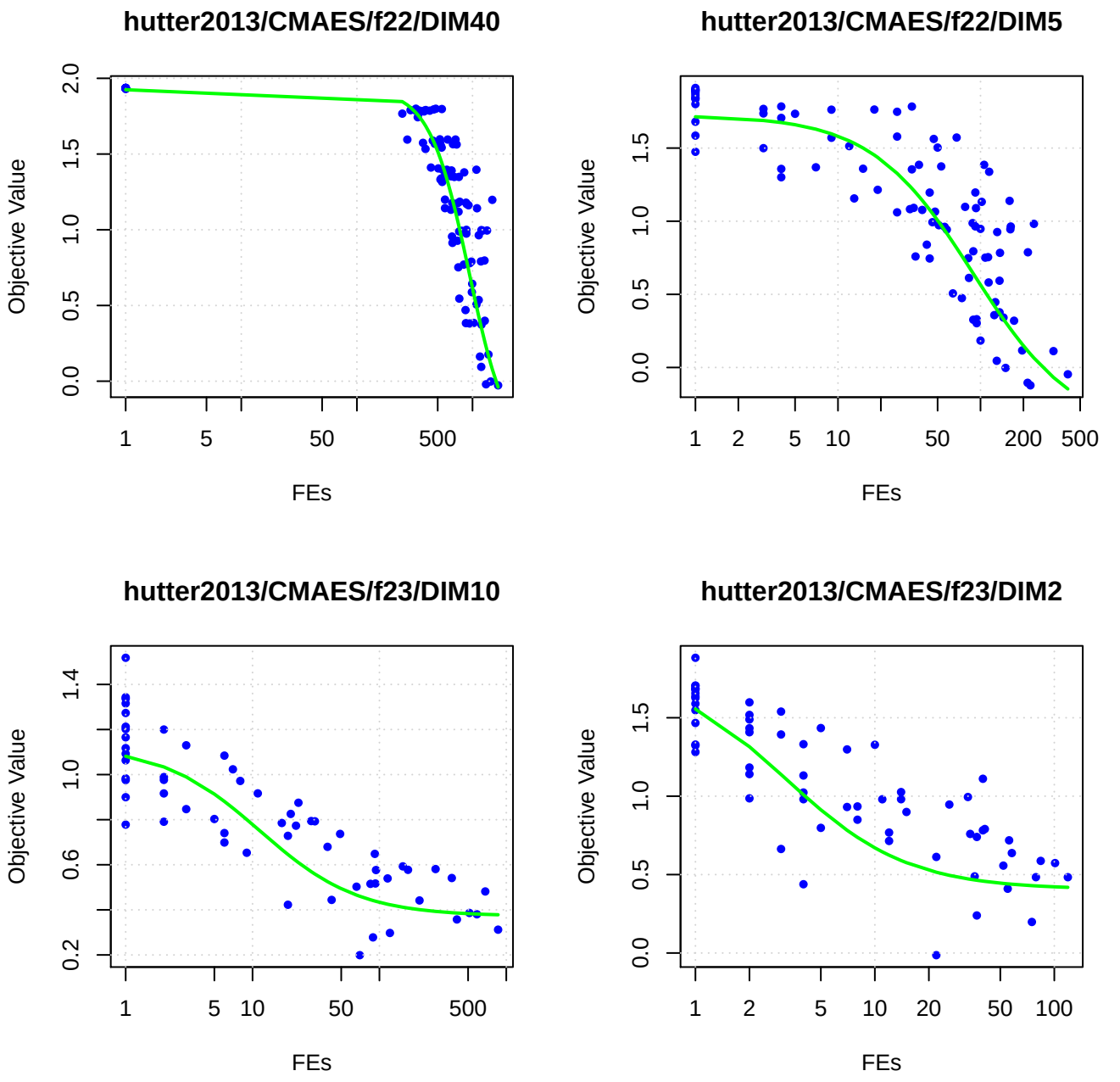
FEs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hutter2013/CMAES/f22/DIM5
Objective Value
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1.0
1.5
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200
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FEs
hutter2013/CMAES/f23/DIM10
Objective Value
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0.6
1.0
1.4
1
5
10
50
500
FEs
hutter2013/CMAES/f23/DIM2
Objective Value
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1.0
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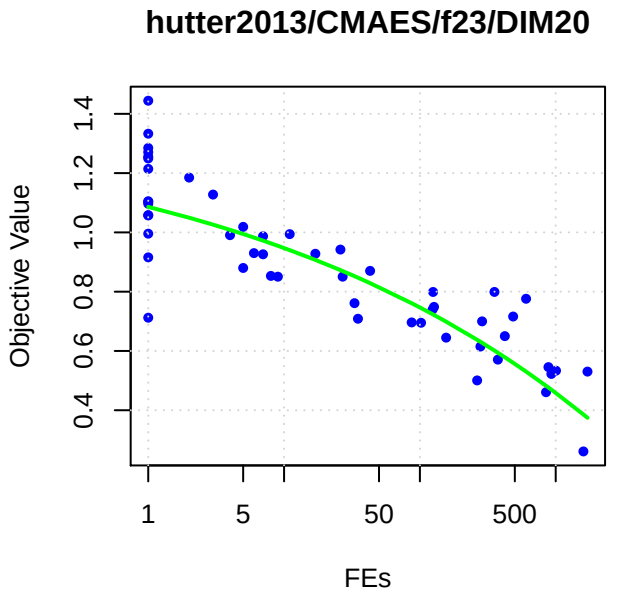
FEs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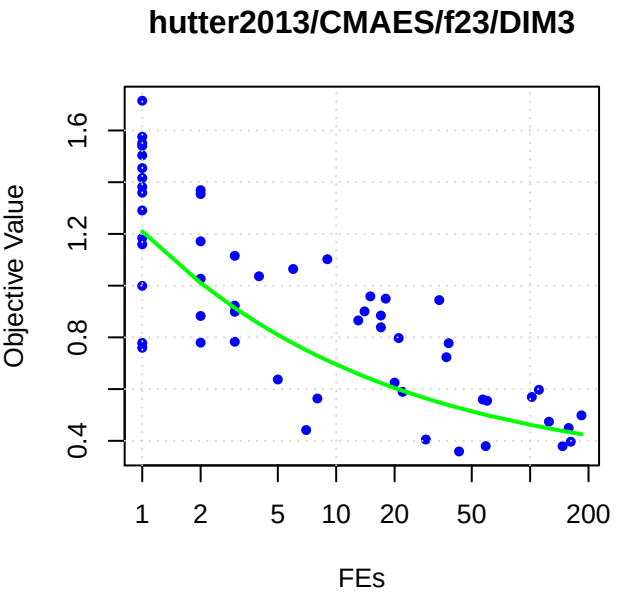
FEs


hutter2013/CMAES/f23/DIM3
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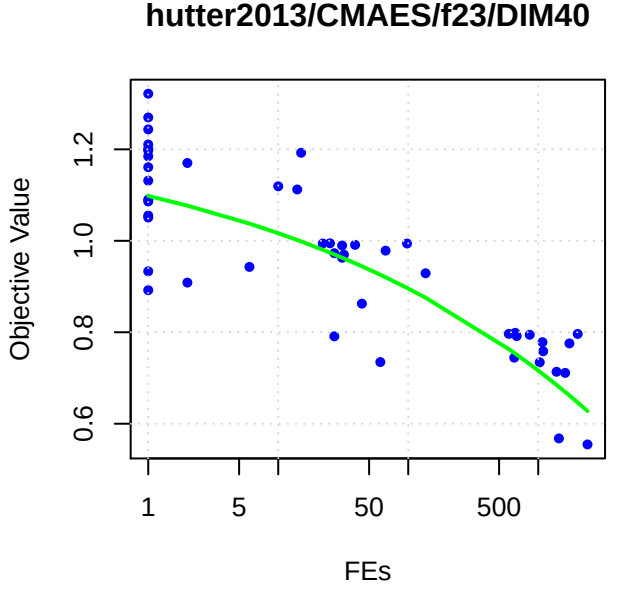
FEs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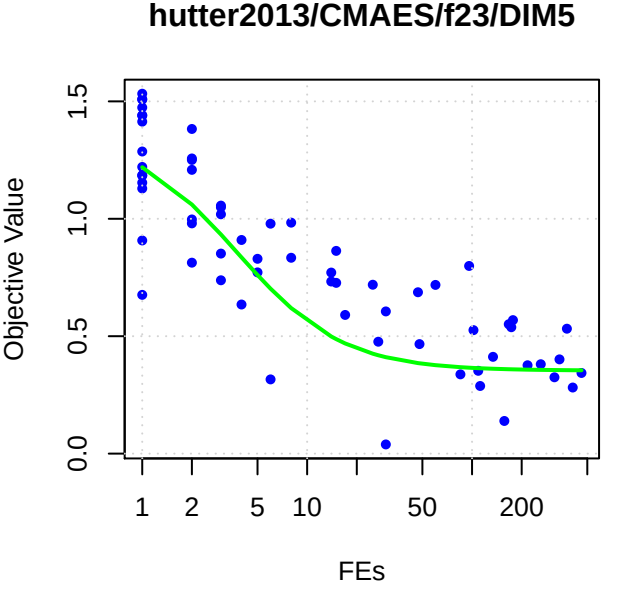
FEs


hutter2013/CMAES/f23/DIM5
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1.5
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5
10
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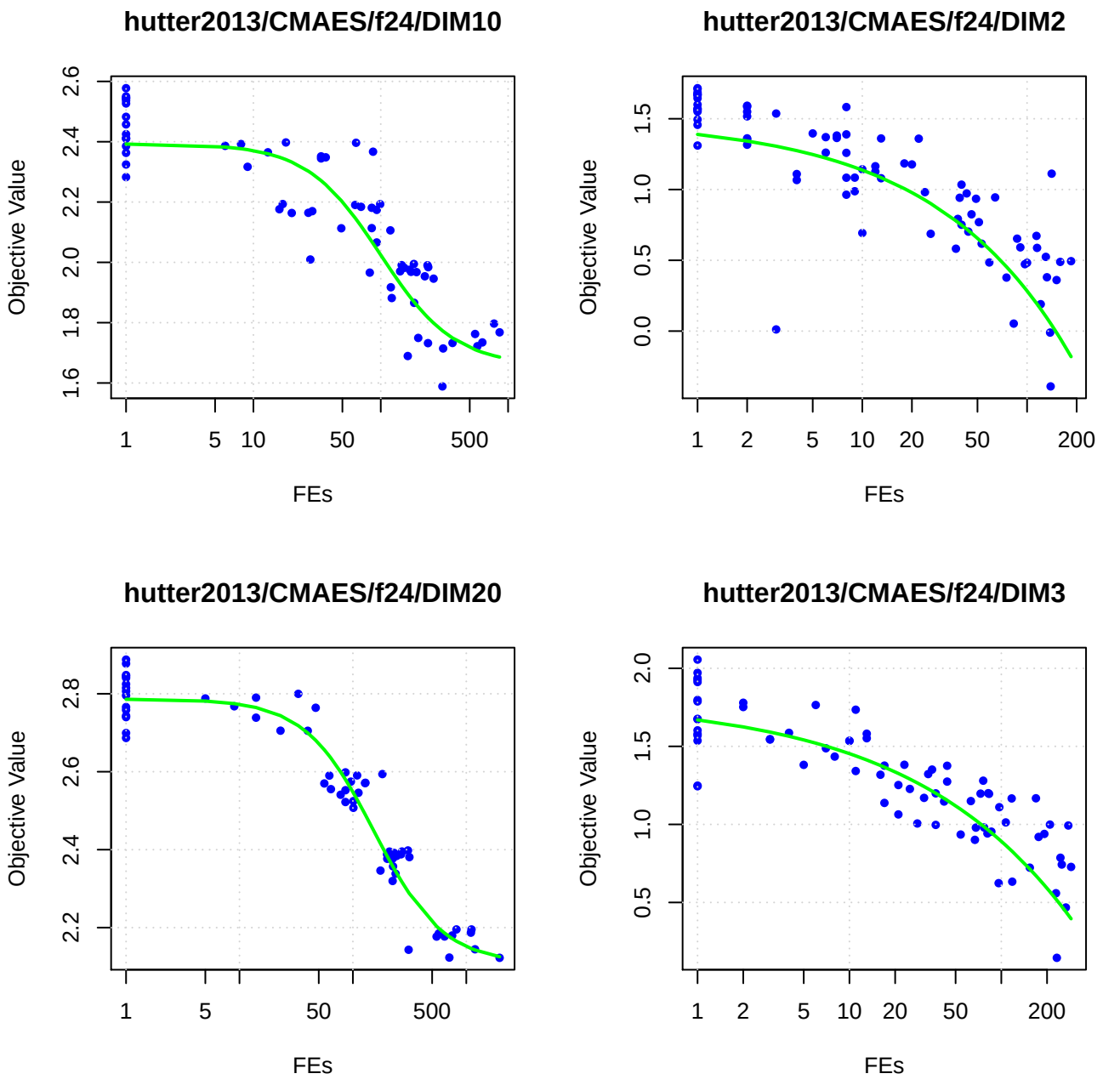
200
FEs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hutter2013/CMAES/f24/DIM2
Objective Value
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Objective Value
FEs
hutter2013/CMAES/f24/DIM3
Objective Value
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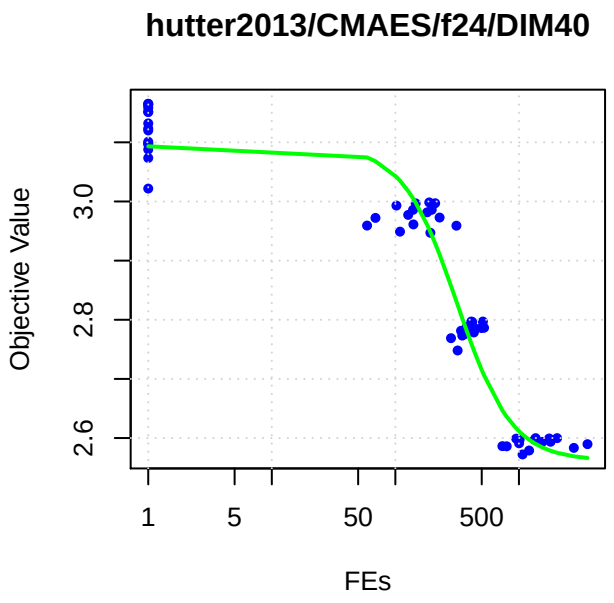
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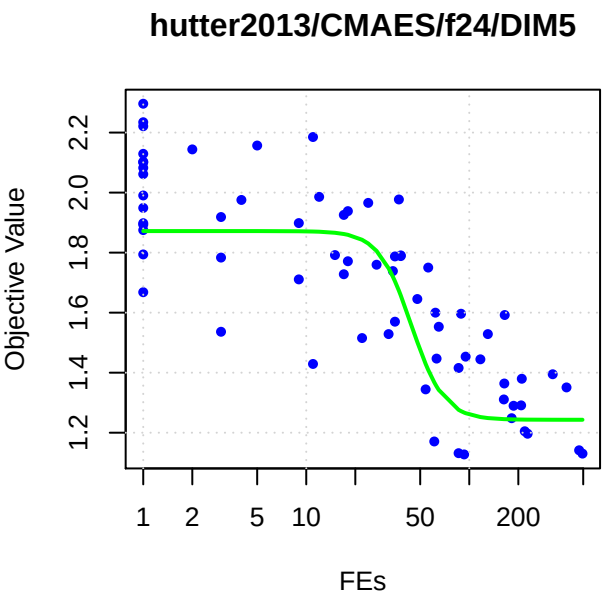
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1.6
1.8
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2.2
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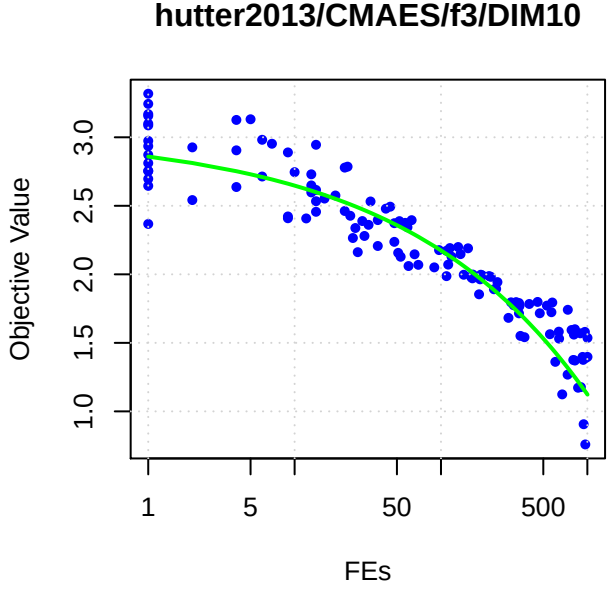
10
50
200
FEs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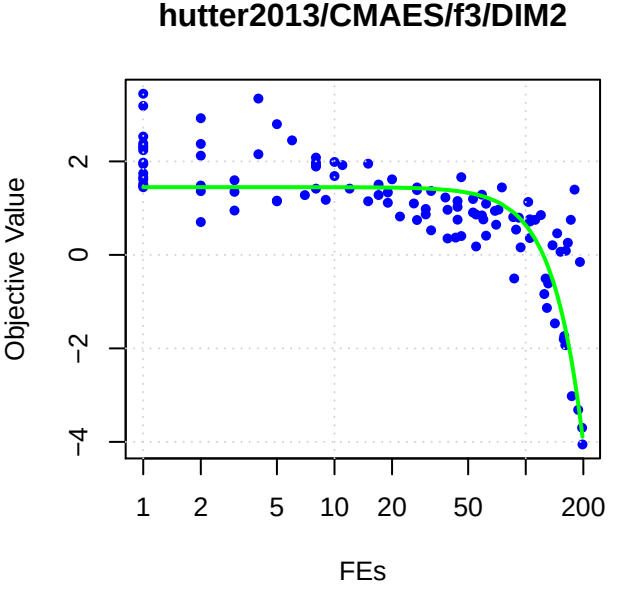
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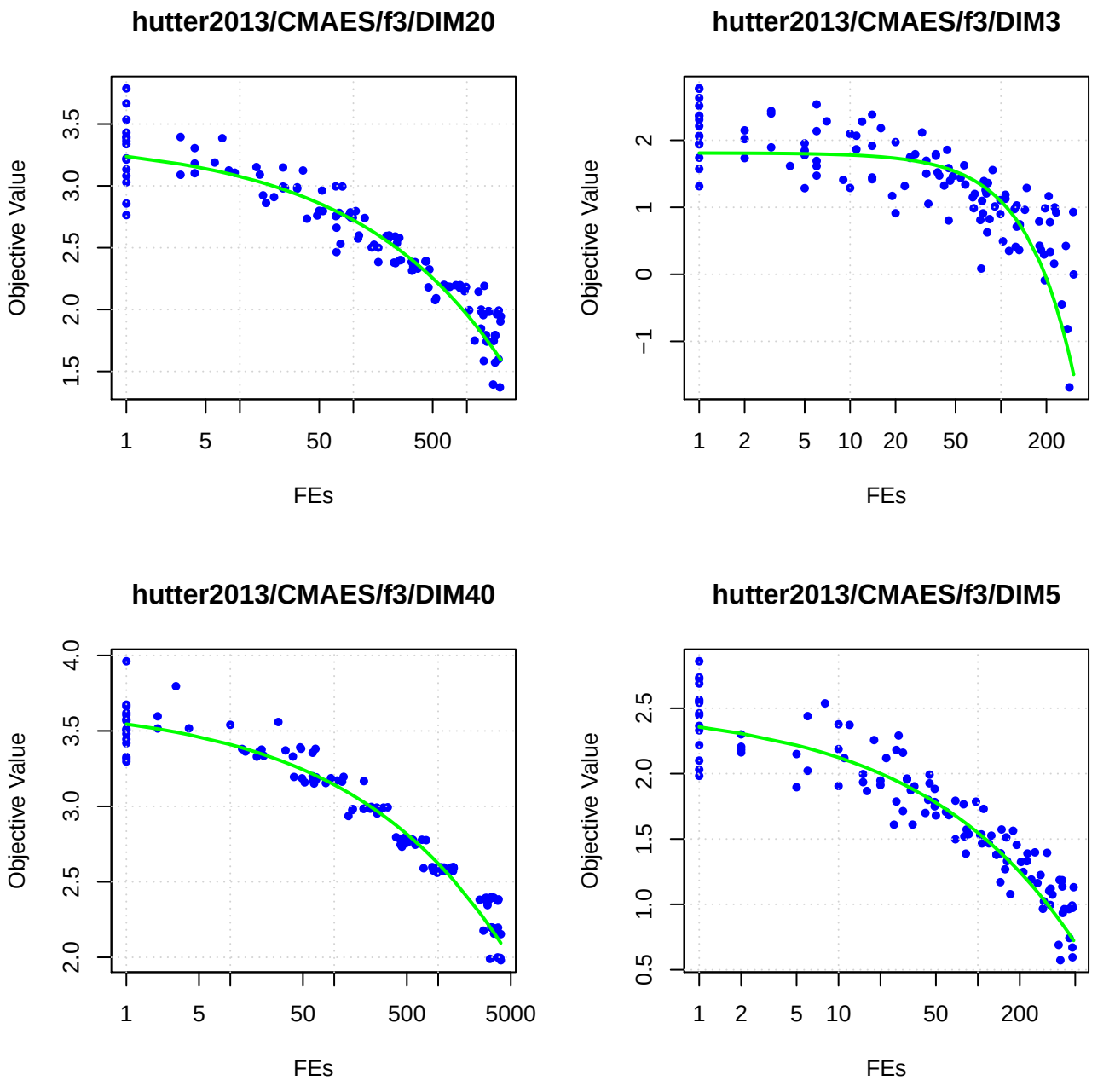
FEs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2.5
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1
5
50
500
FEs
hutter2013/CMAES/f3/DIM3
Objective Value
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1
2
1
2
5
10
20
50
200
FEs
hutter2013/CMAES/f3/DIM40
Objective Value
2.0
2.5
3.0
3.5
4.0
1
5
50
500
5000
FEs
hutter2013/CMAES/f3/DIM5
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2.0
2.5
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10
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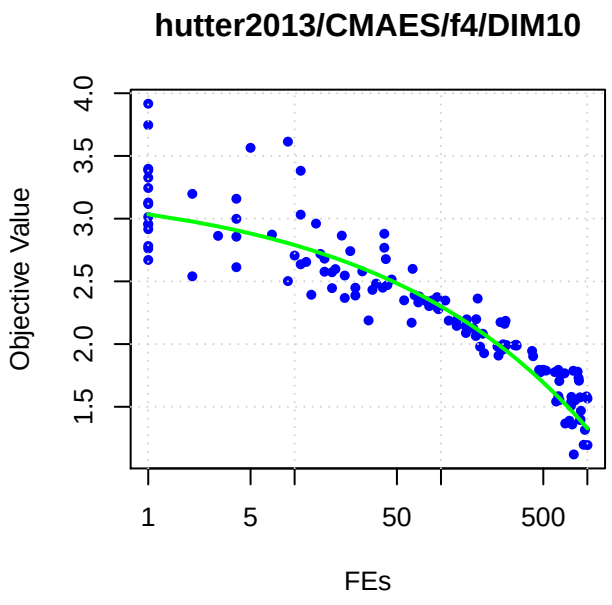
FEs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2.5
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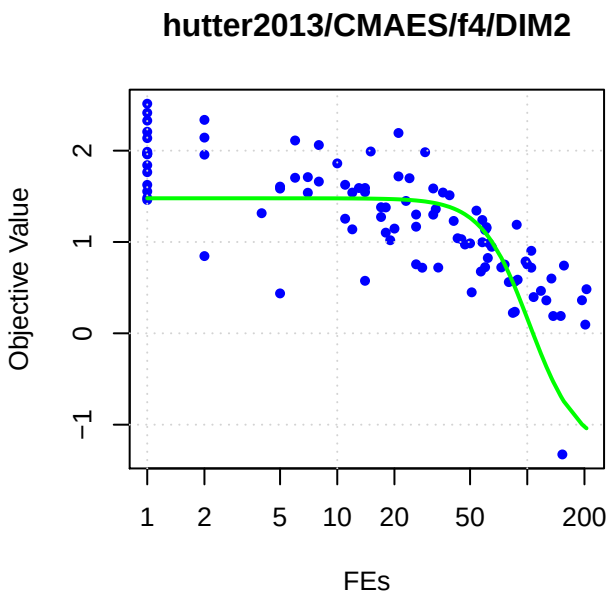
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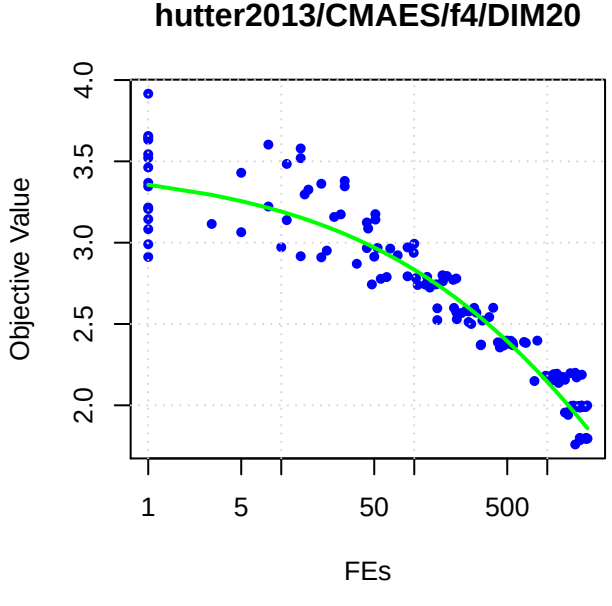
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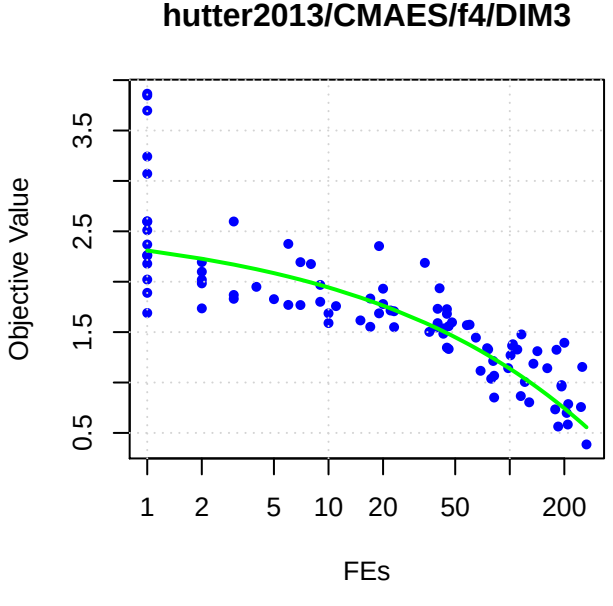
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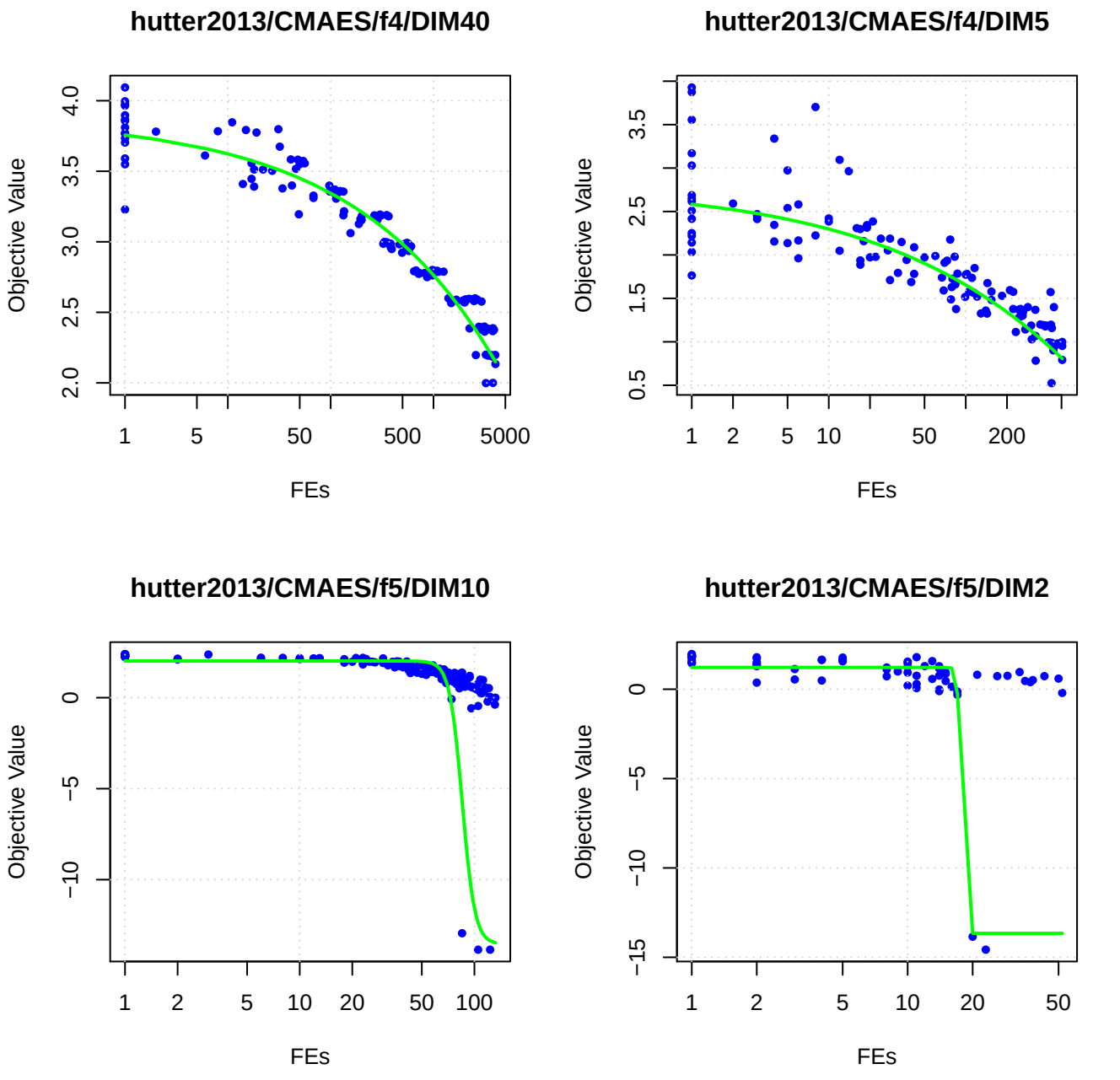
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2.0
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FEs
hutter2013/CMAES/f4/DIM5
Objective Value
3.5
2.5
1.5
0.5
1
2
5
10
50
200
FEs
hutter2013/CMAES/f5/DIM10
Objective Value
0
−5
−10
1
2
5
10
20
50
100
FEs
hutter2013/CMAES/f5/DIM2
Objective Value
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−10
−15
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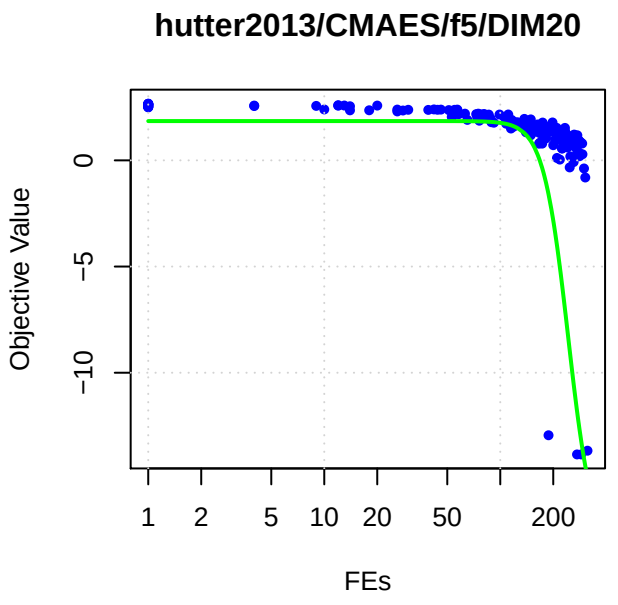
10
20
50
FEs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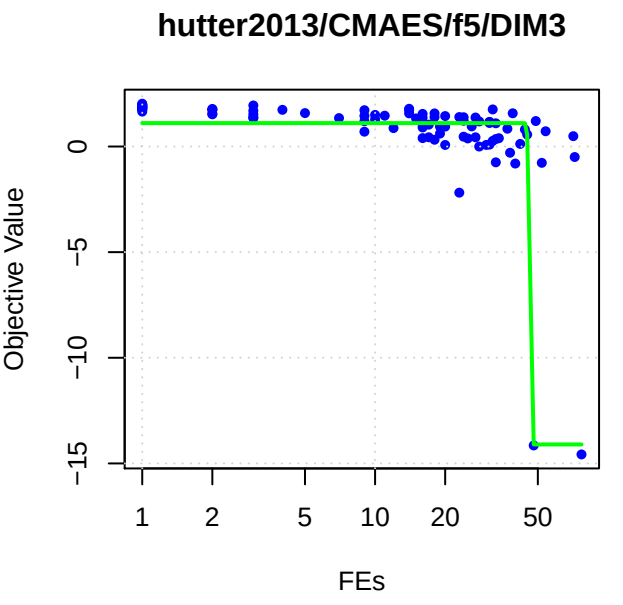
200
FEs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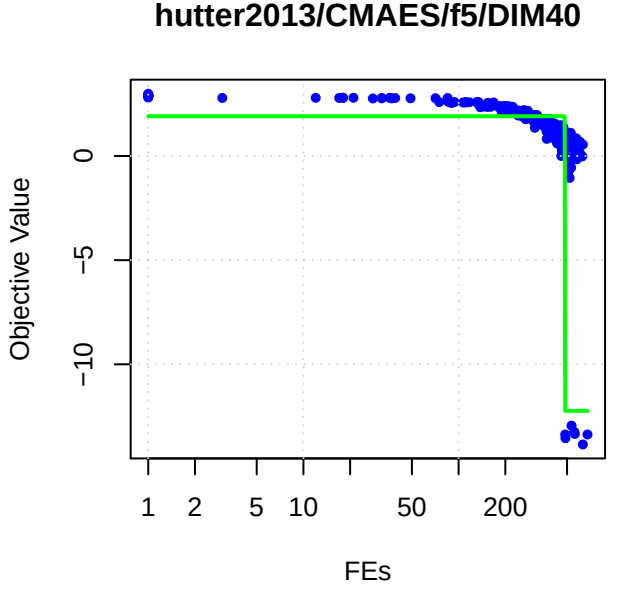
FEs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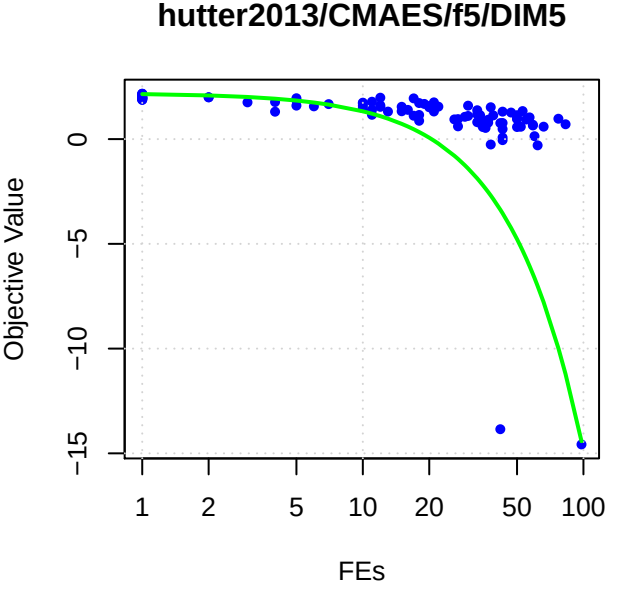
FEs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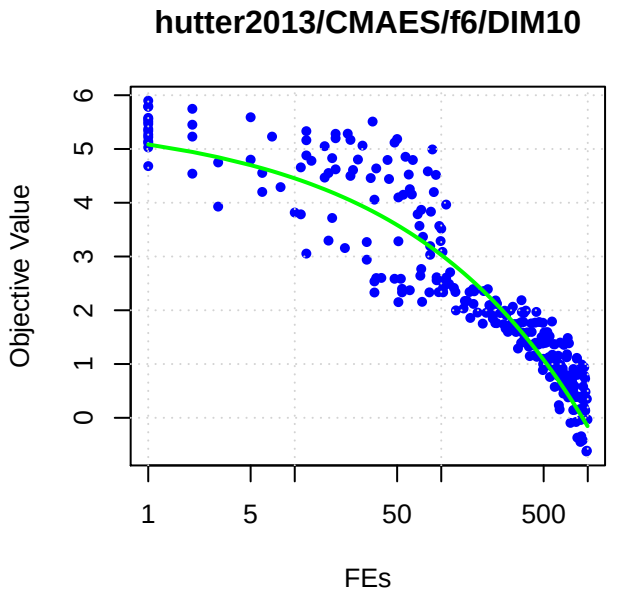
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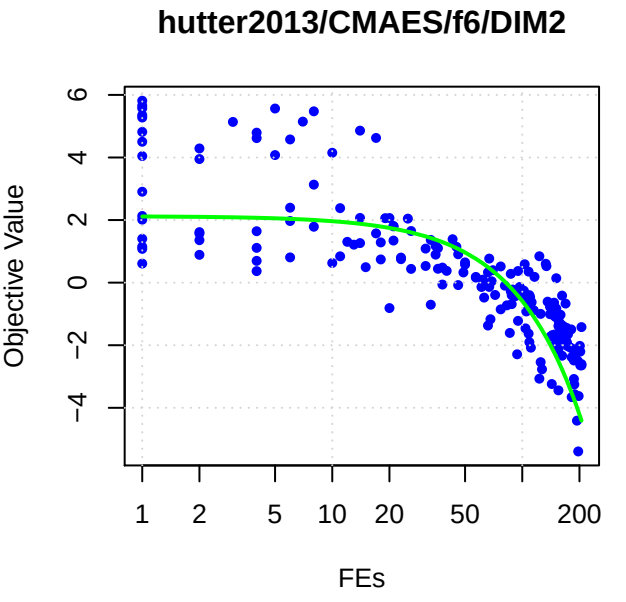
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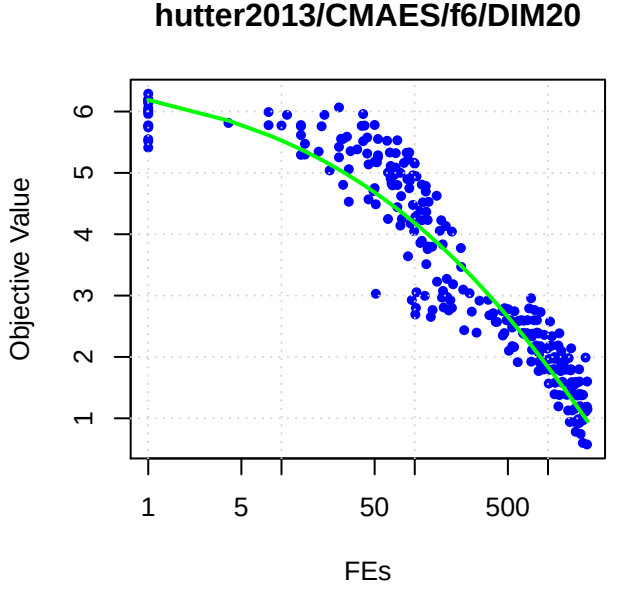
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Objective Value
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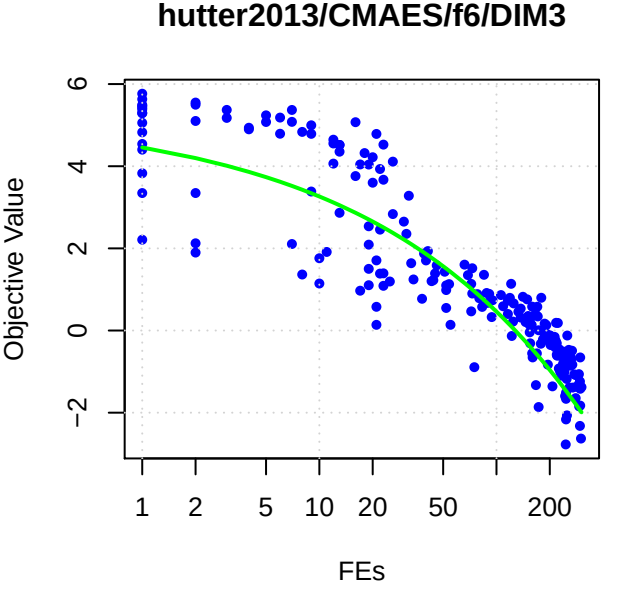
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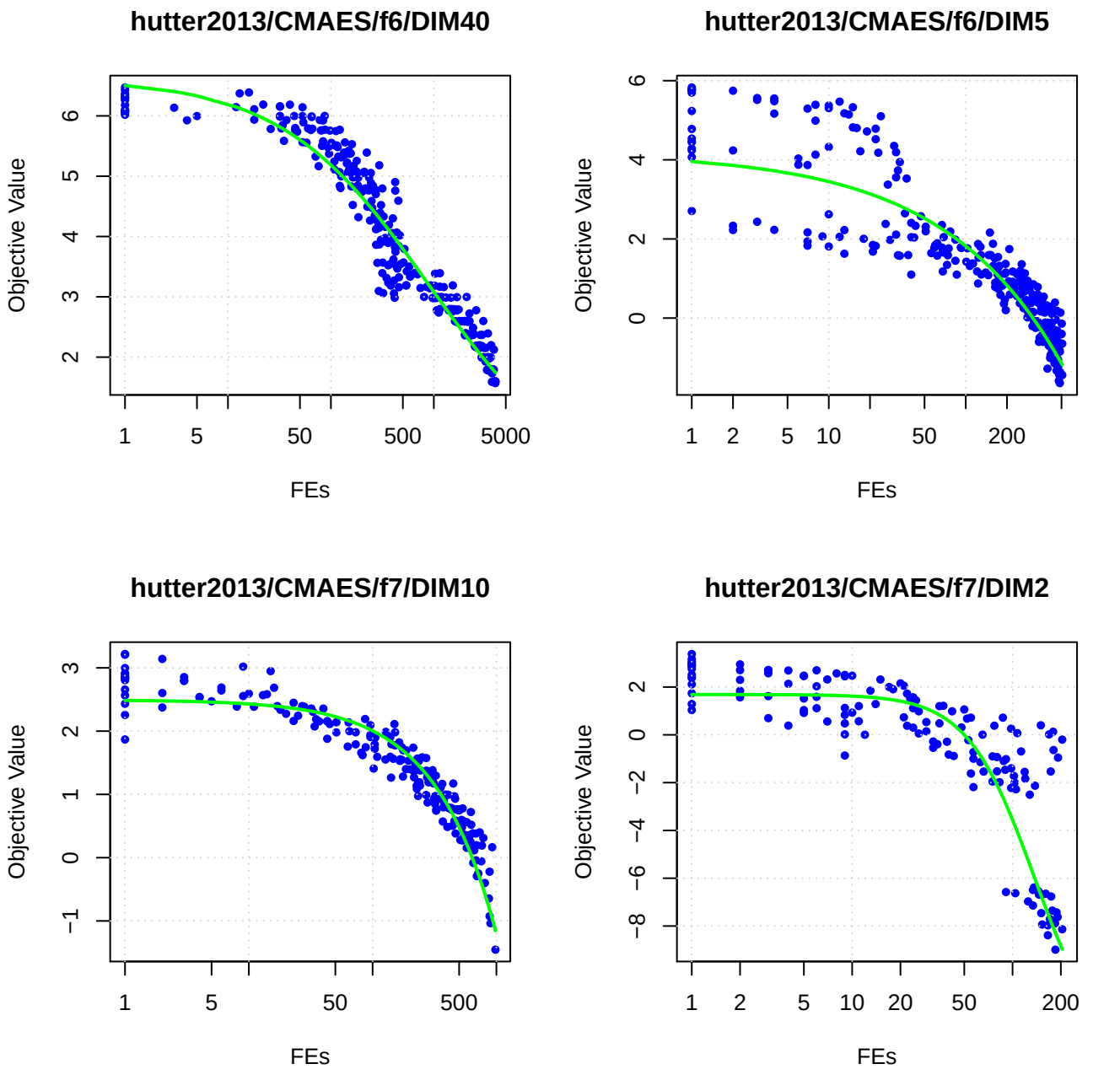
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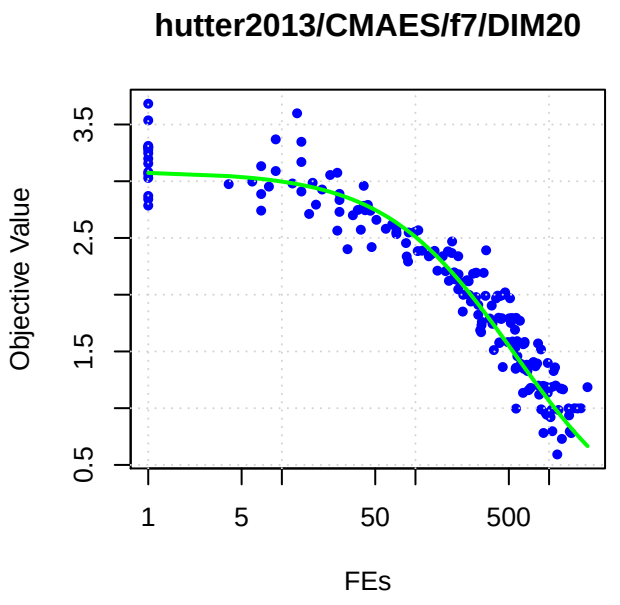
Objective Value
FEs
hutter2013/CMAES/f7/DIM2
Objective Value
FEs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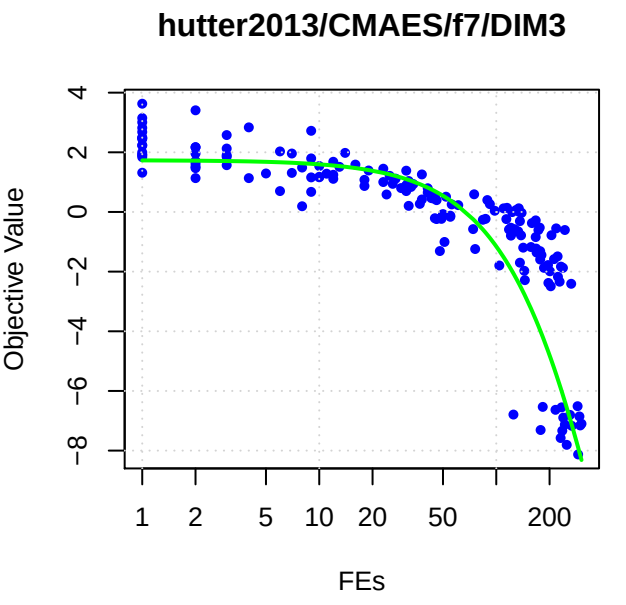
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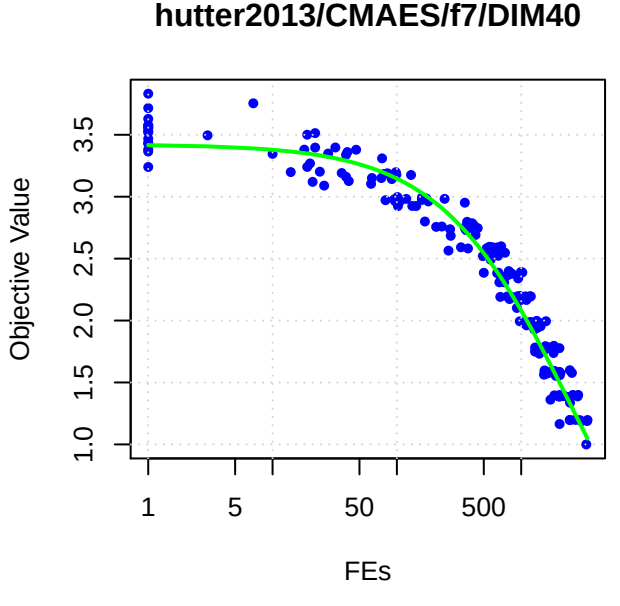
FEs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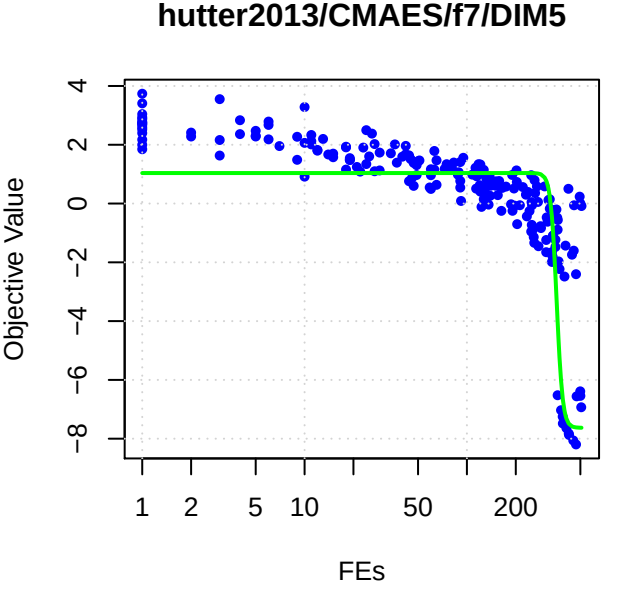
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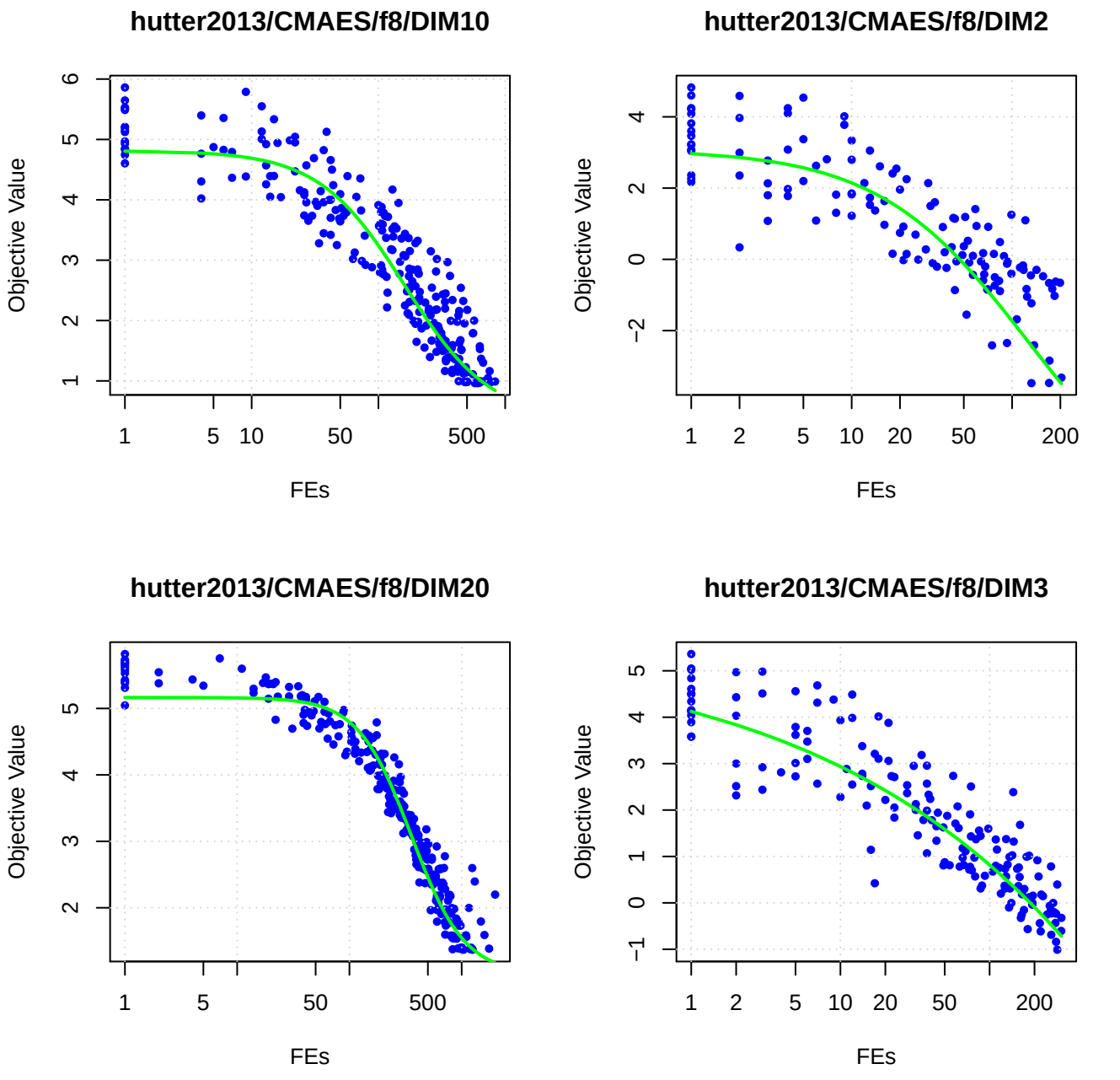
FEs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Objective Value
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2
5
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2
4
hutter2013/CMAES/f8/DIM20
Objective Value
FEs
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2
3
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hutter2013/CMAES/f8/DIM3
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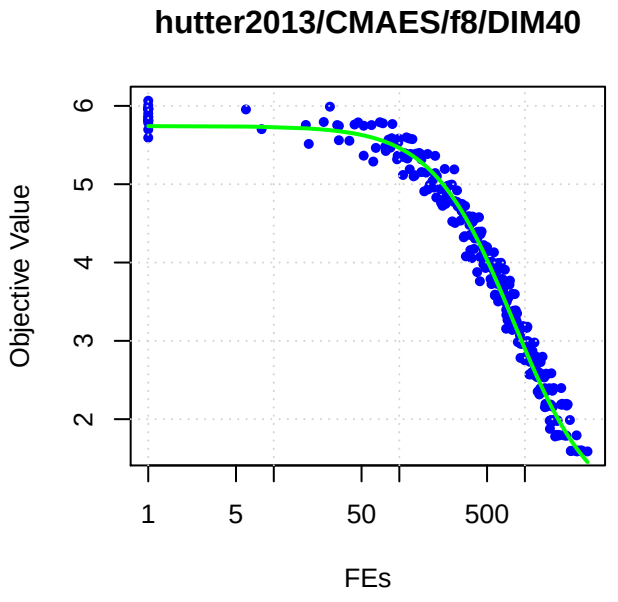
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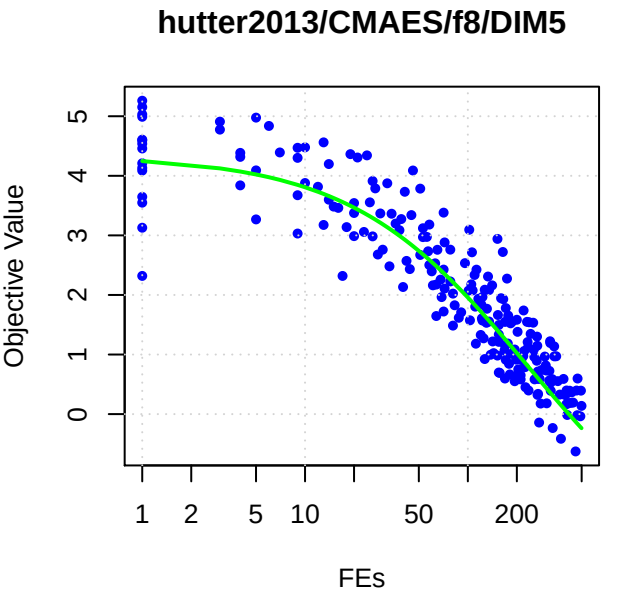
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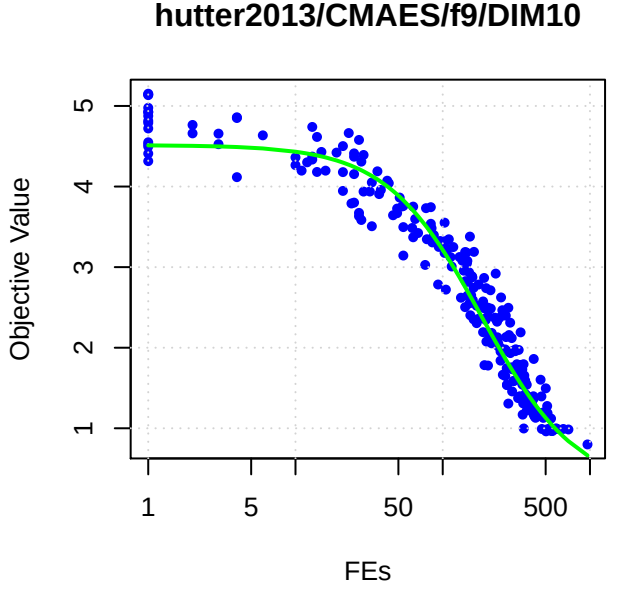
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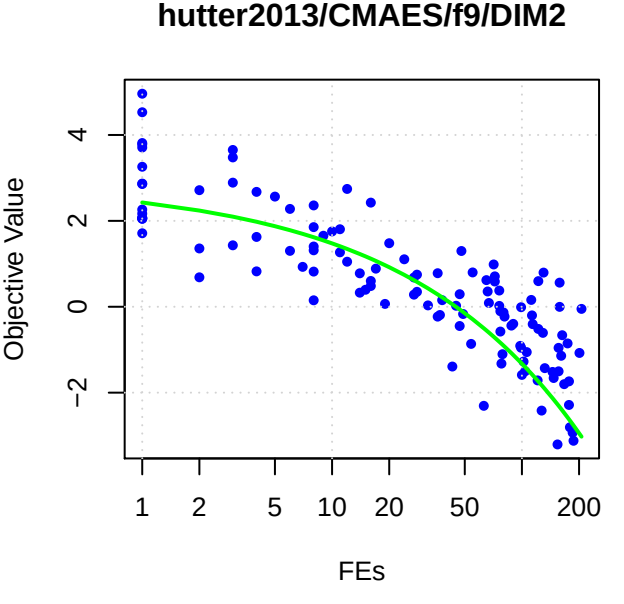
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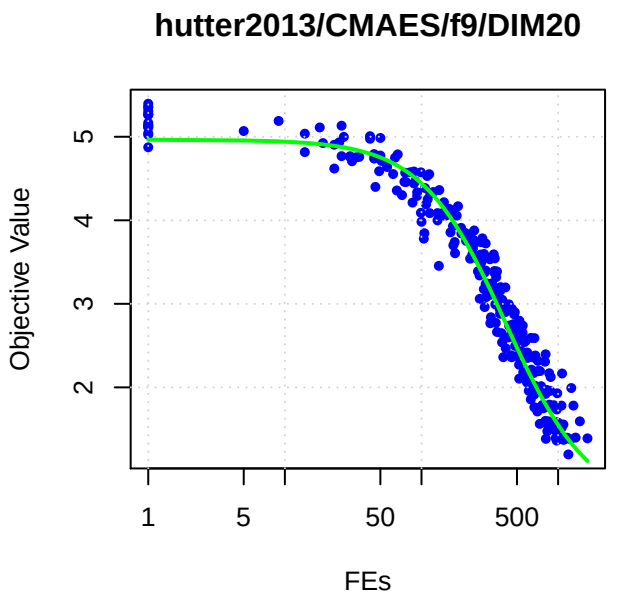
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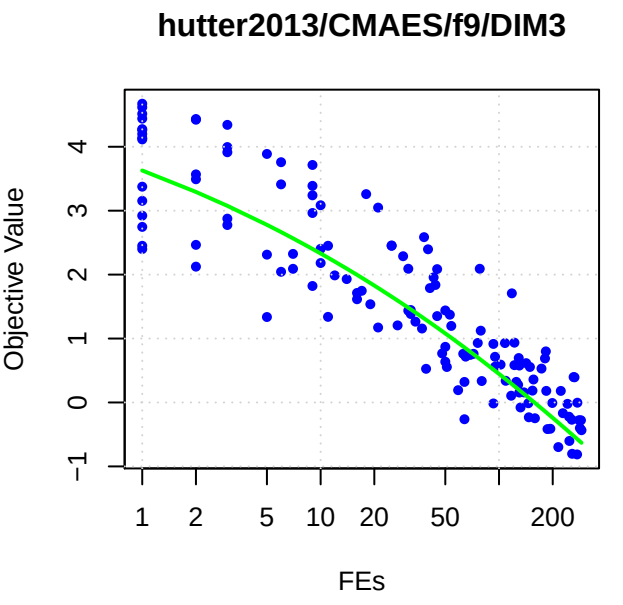
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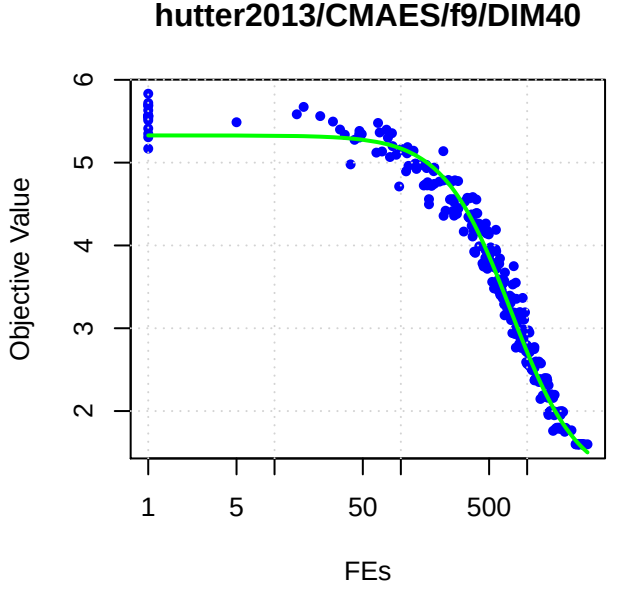
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Objective Value
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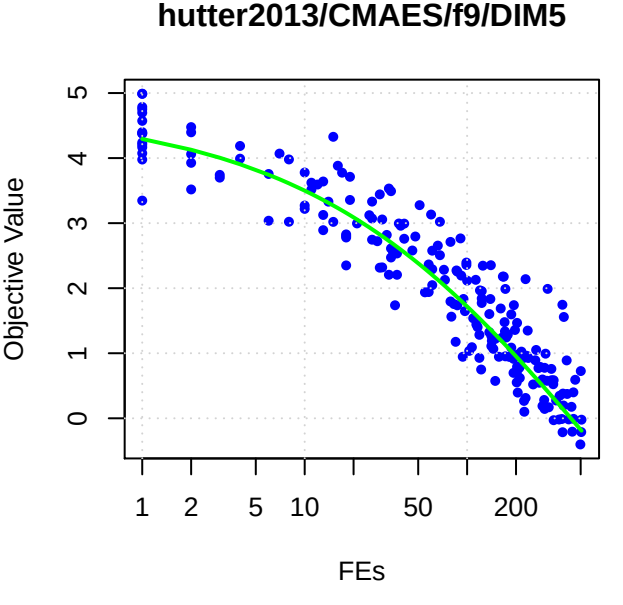
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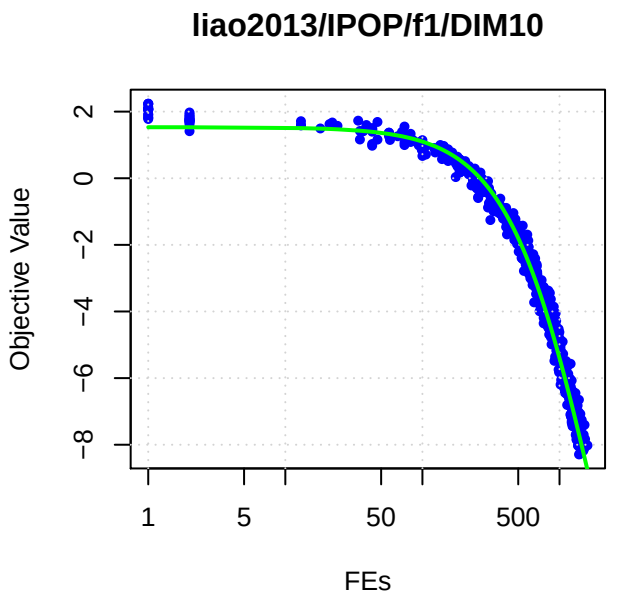
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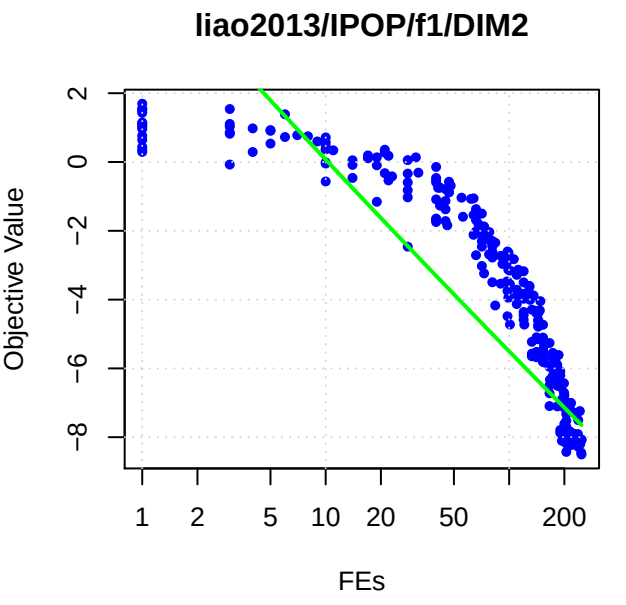
FEs


liao2013/IPOP/f1/DIM2
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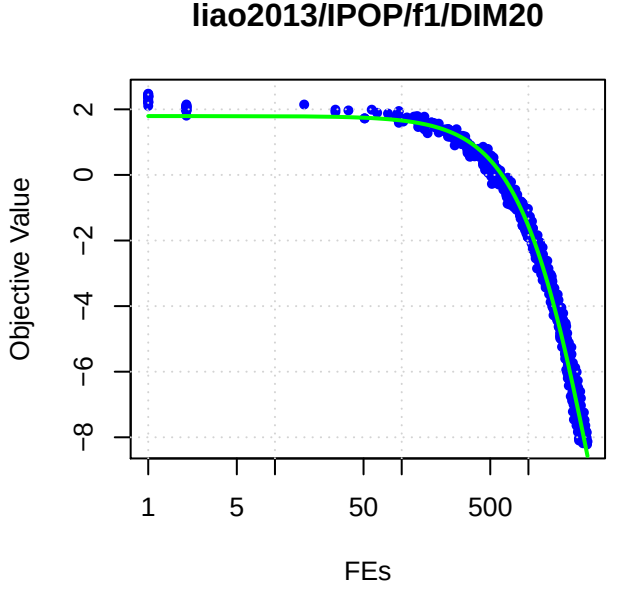
200
FEs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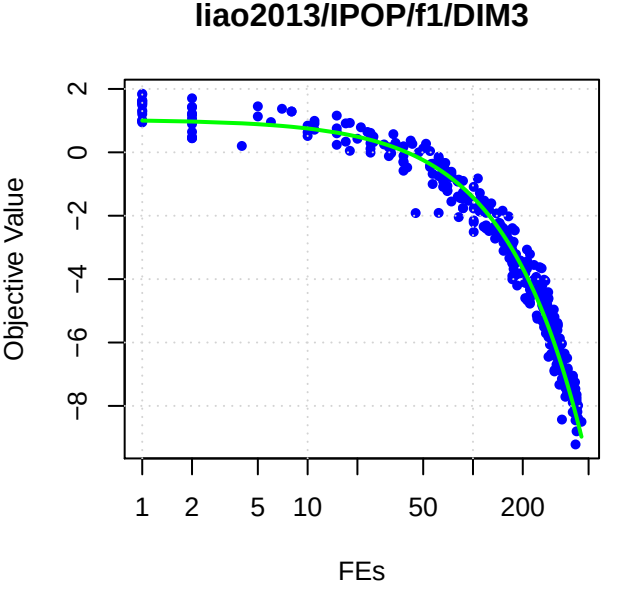
liao2013/IPOP/f1/DIM3
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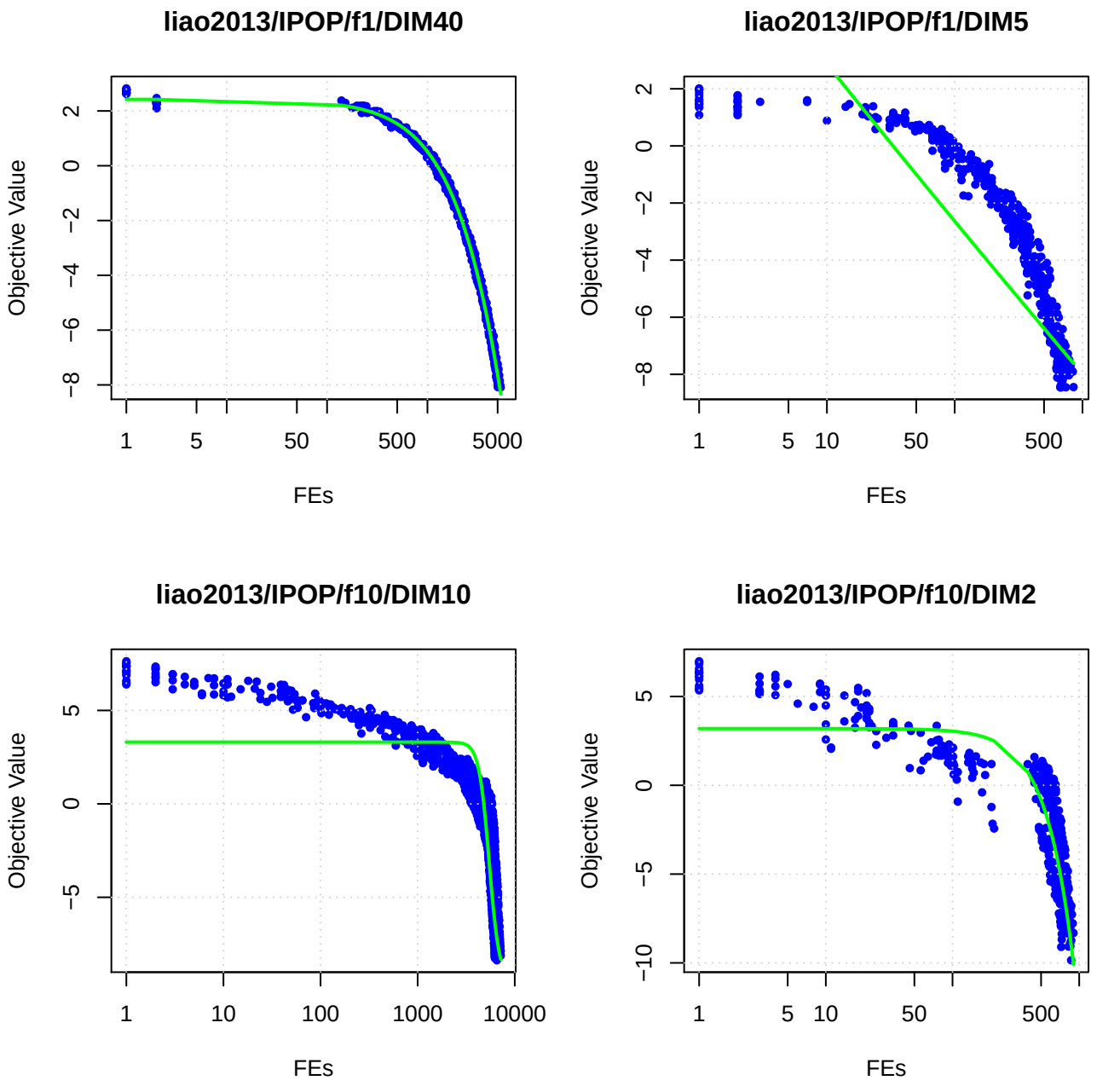
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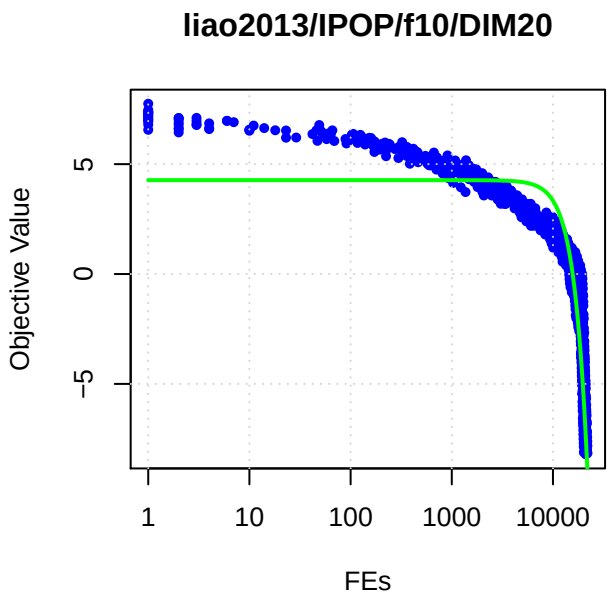
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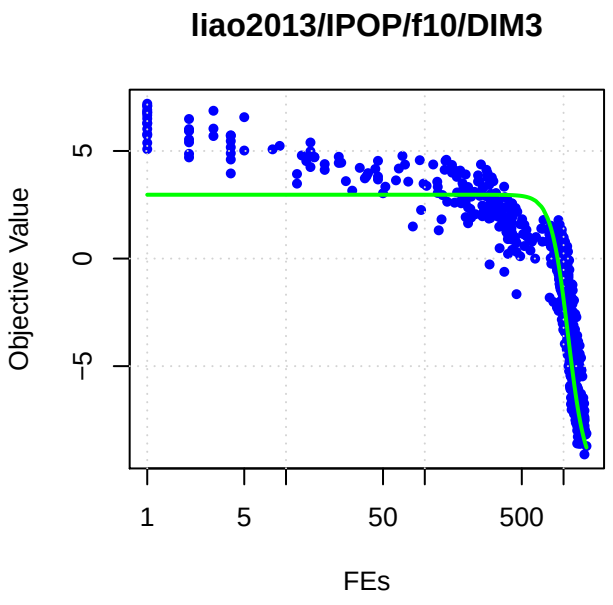
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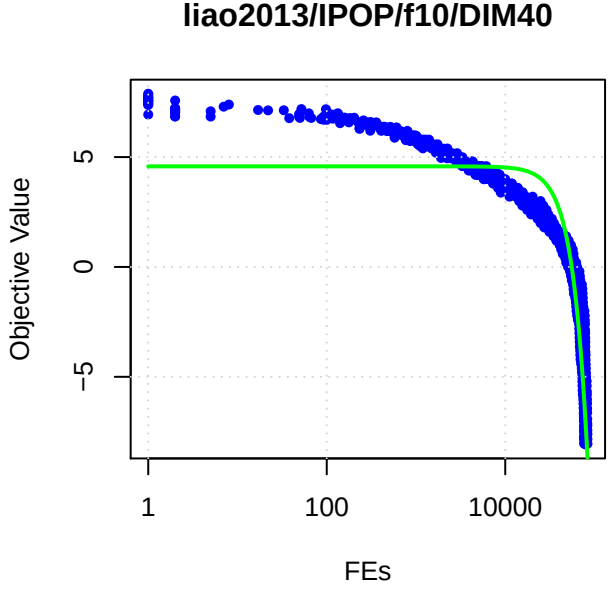
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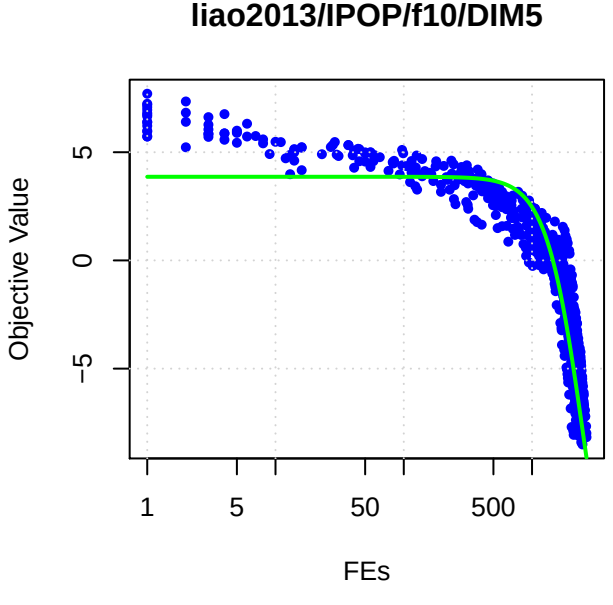
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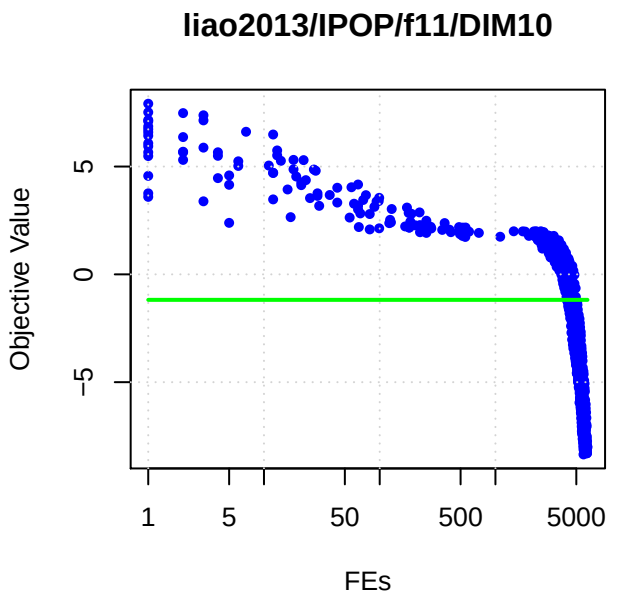
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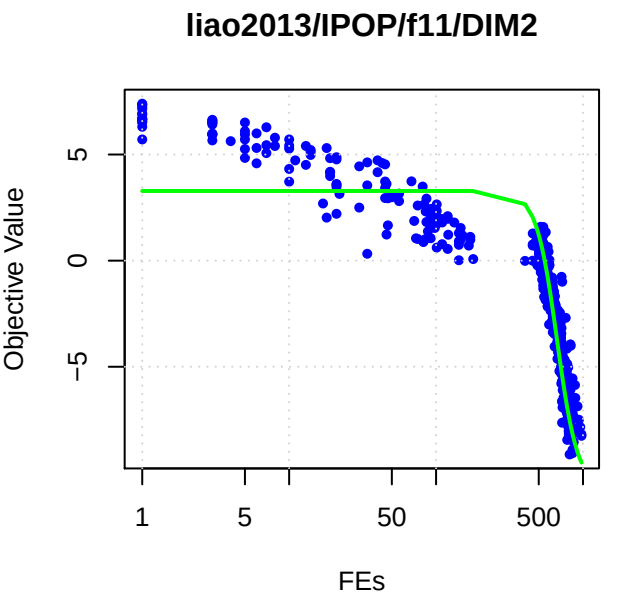
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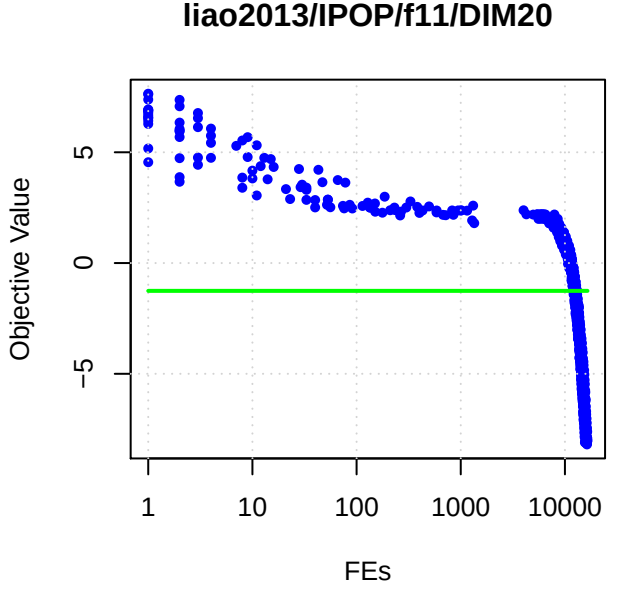
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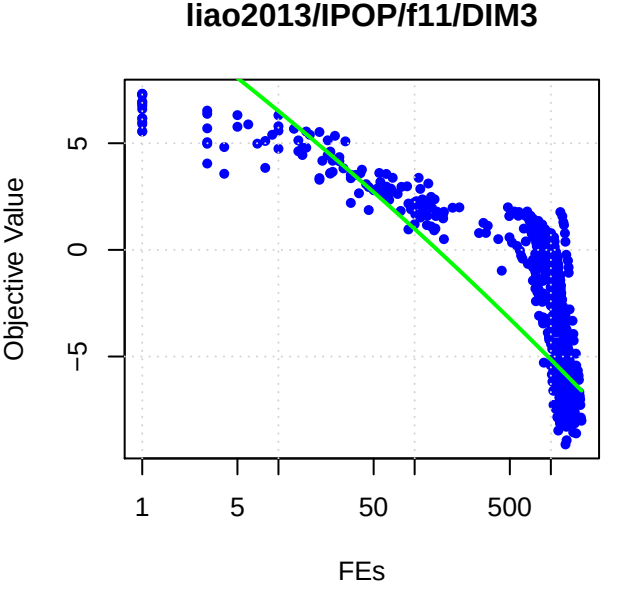
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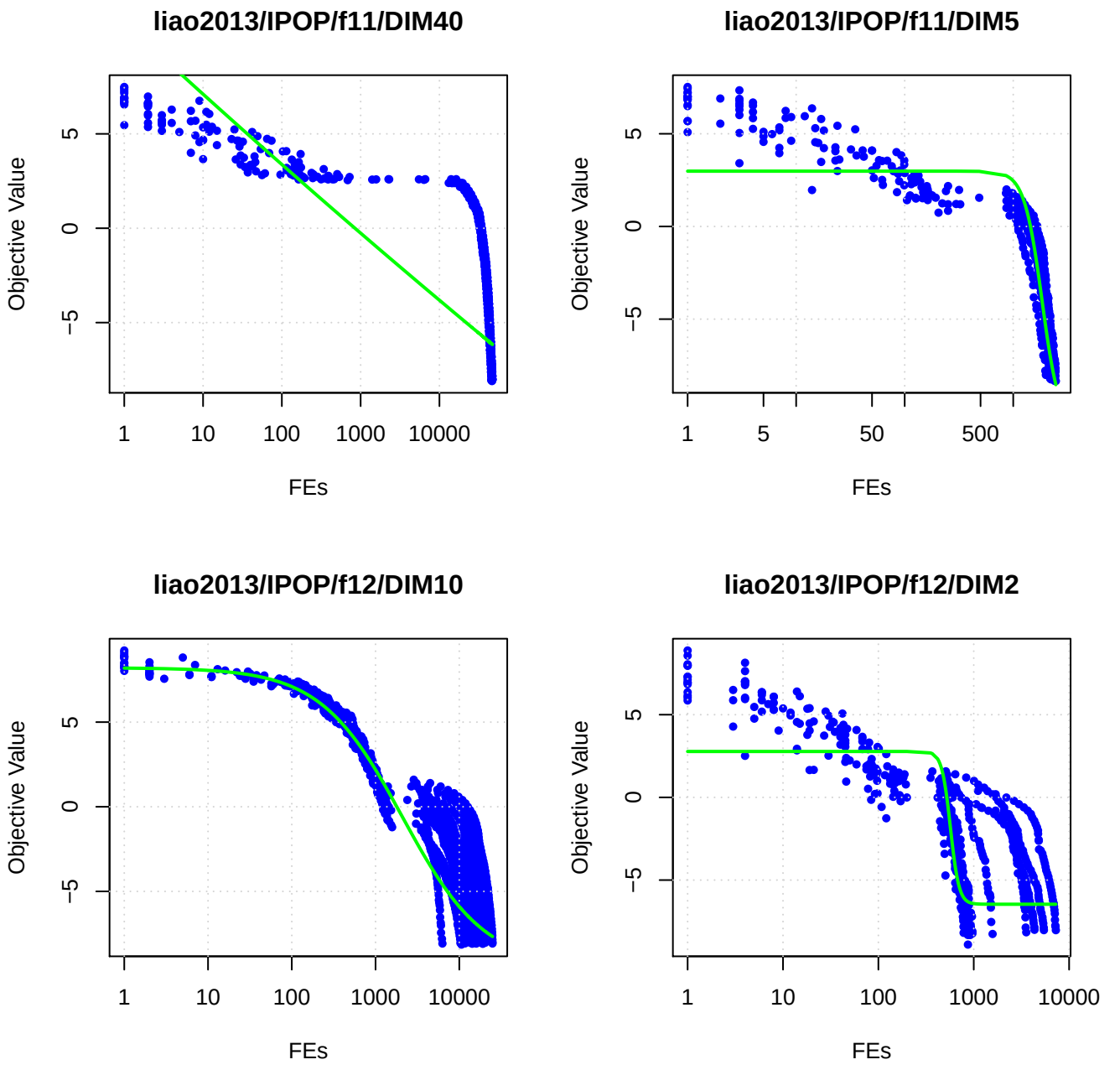
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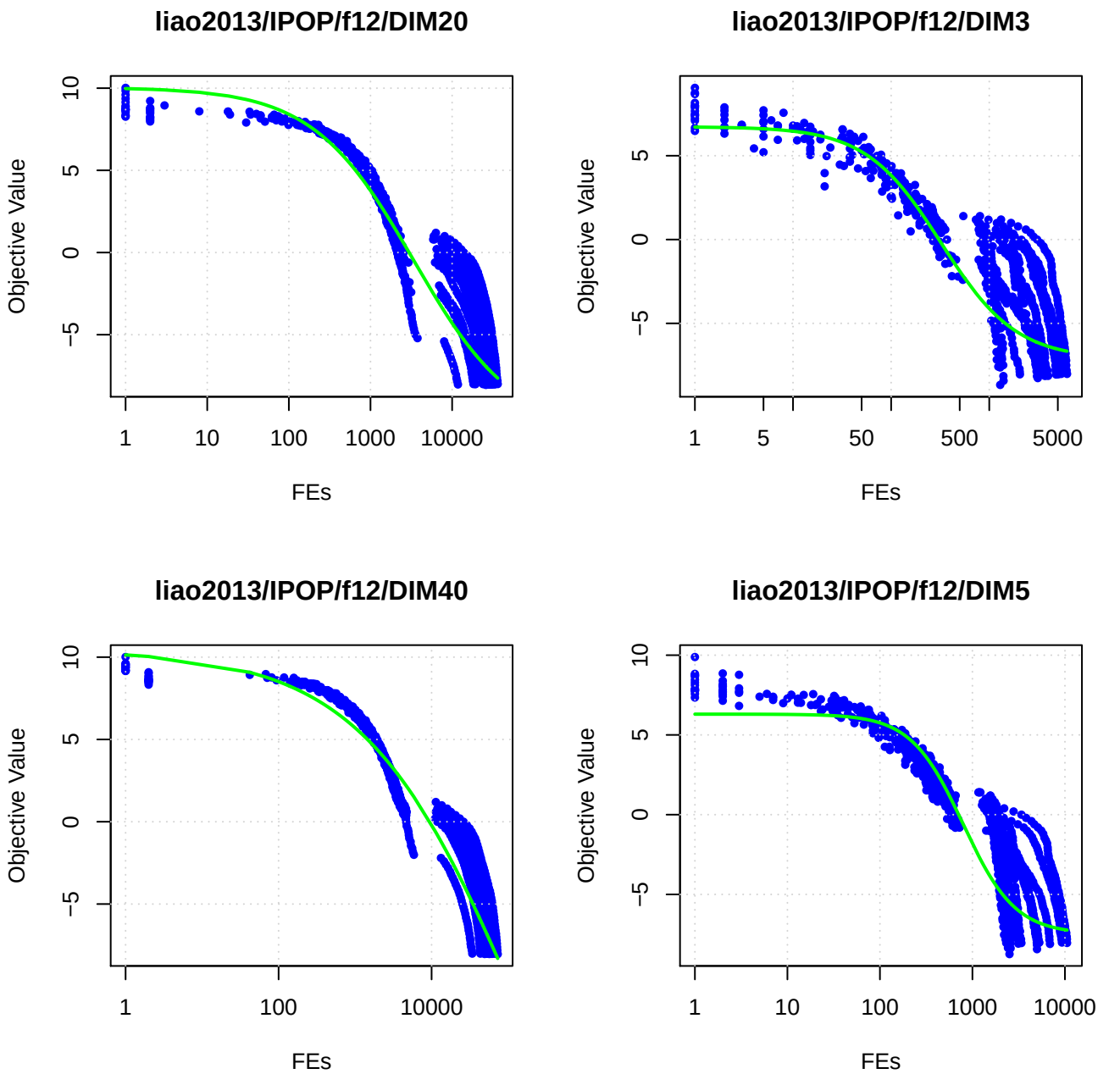
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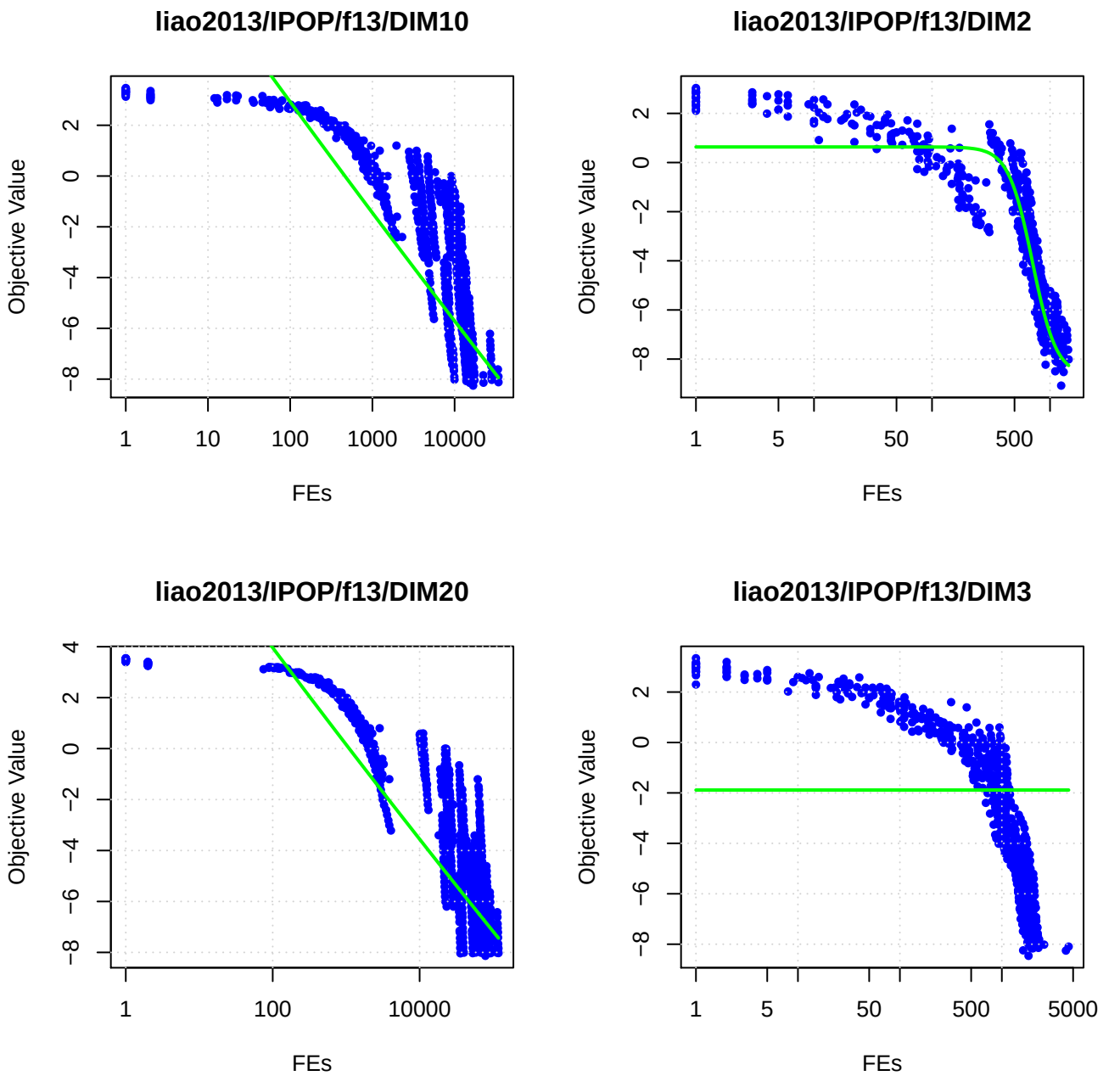
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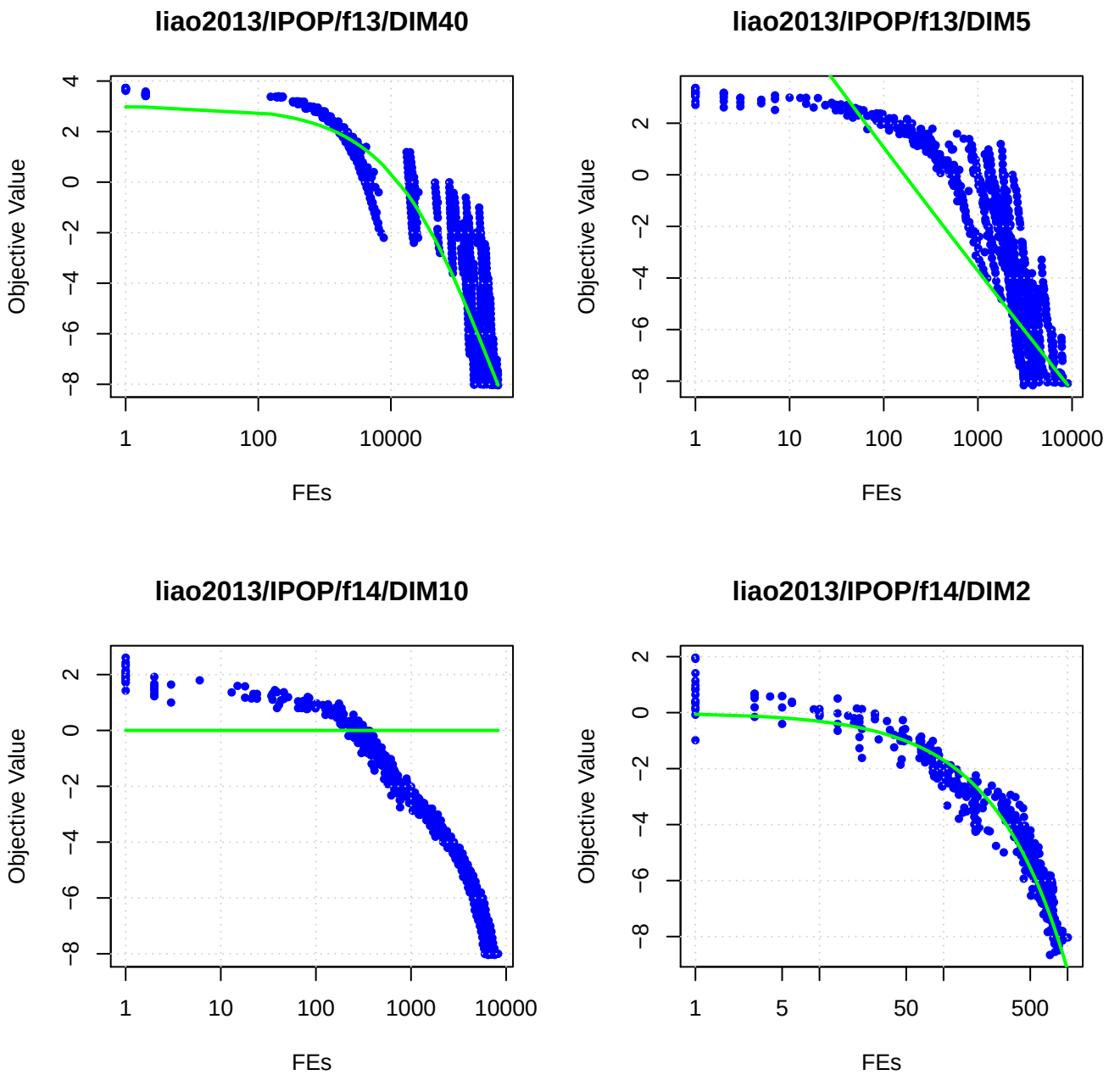
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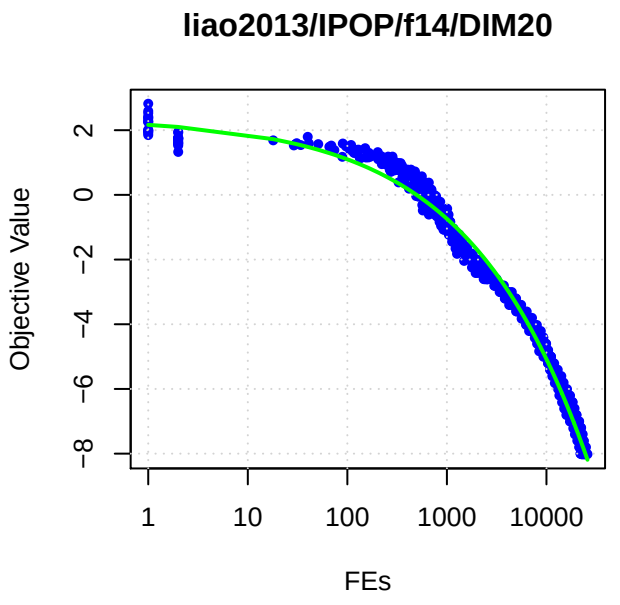
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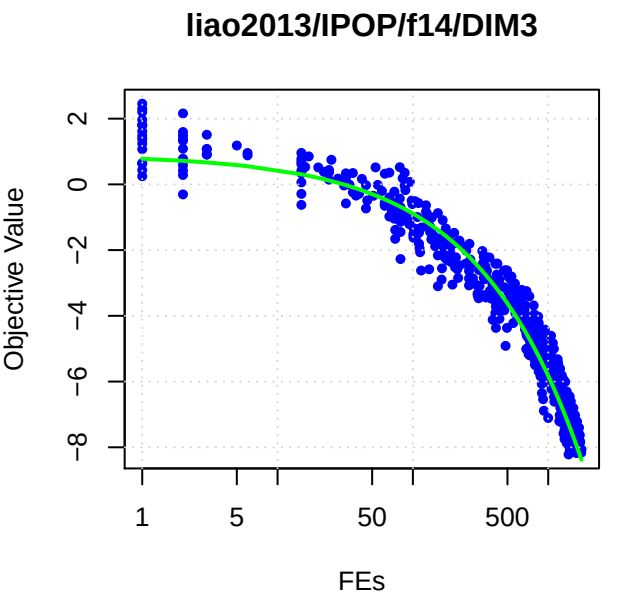
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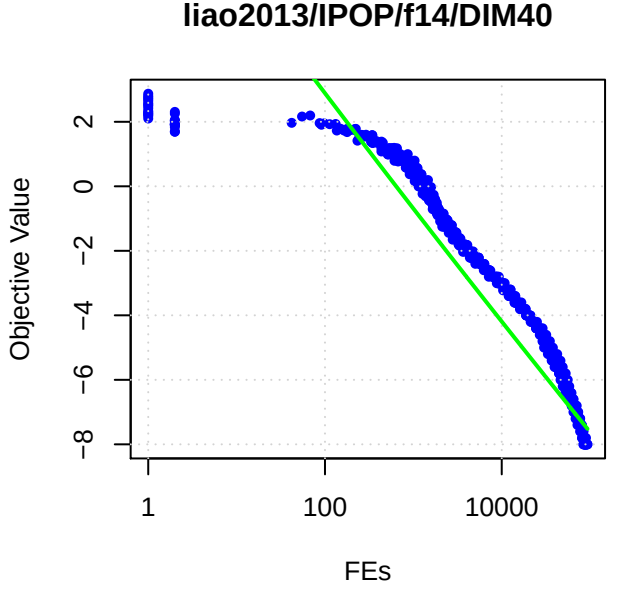
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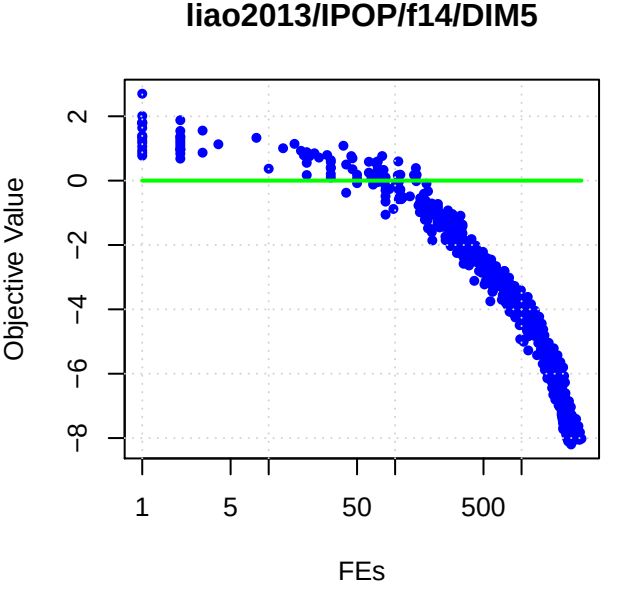
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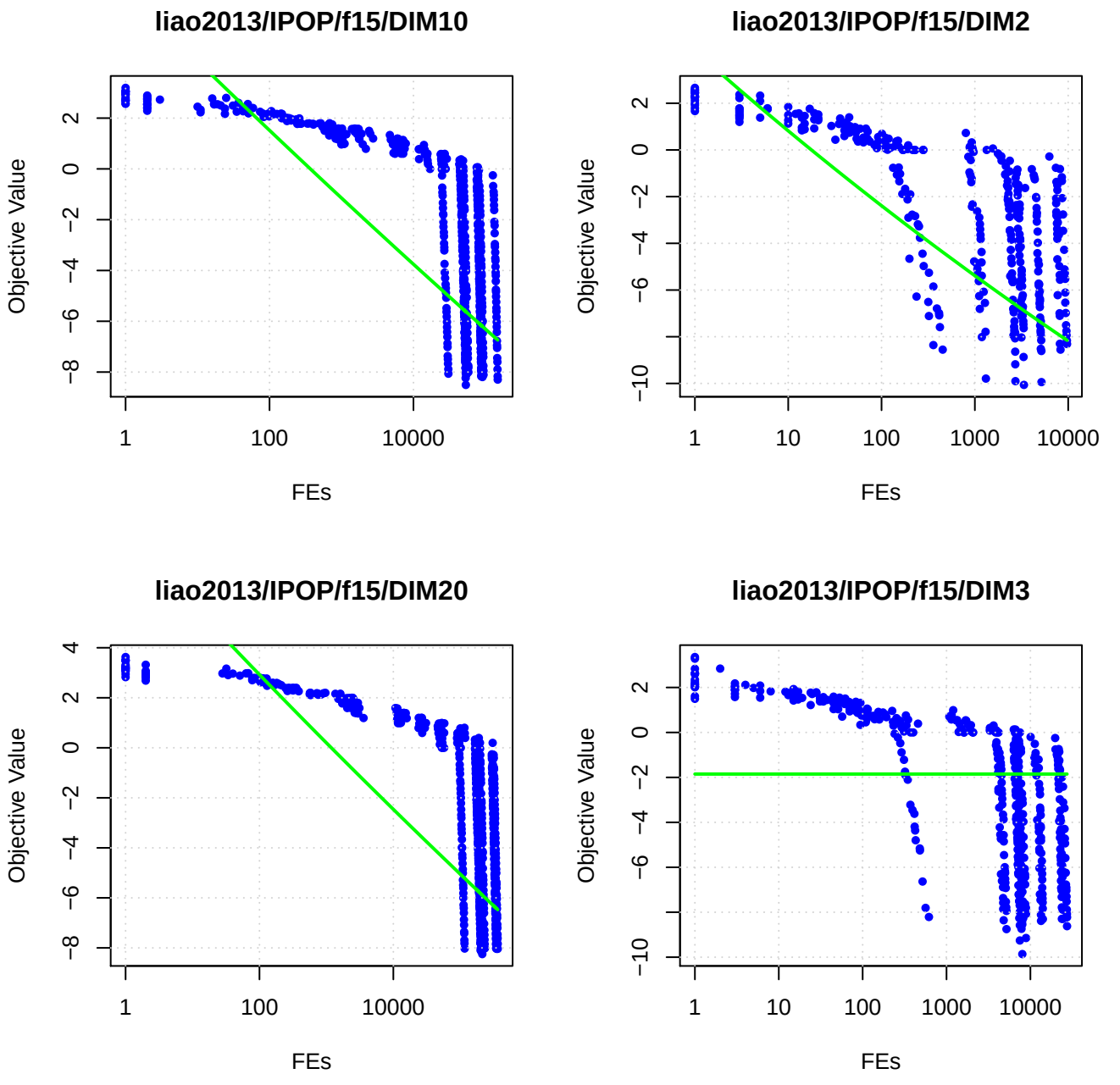
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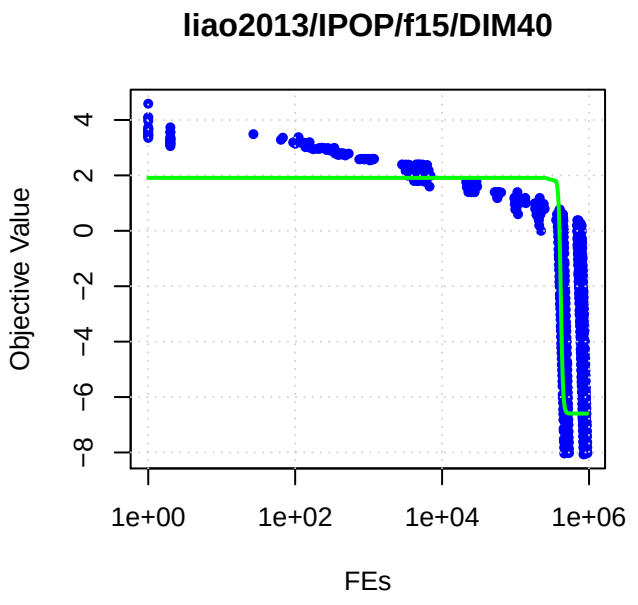
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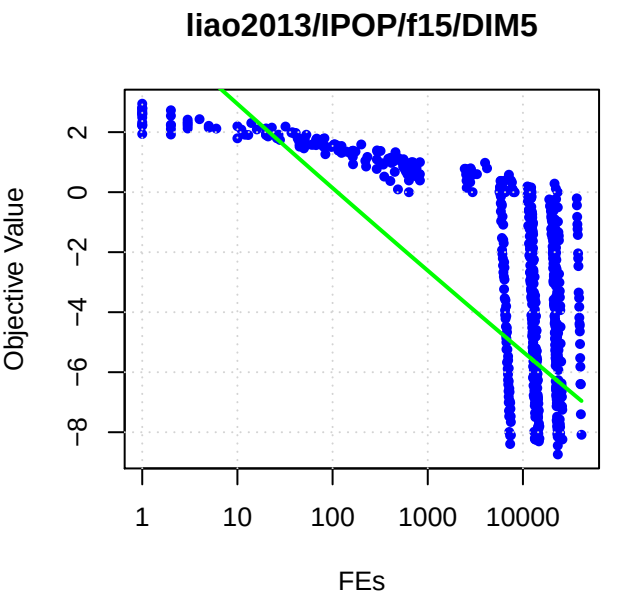
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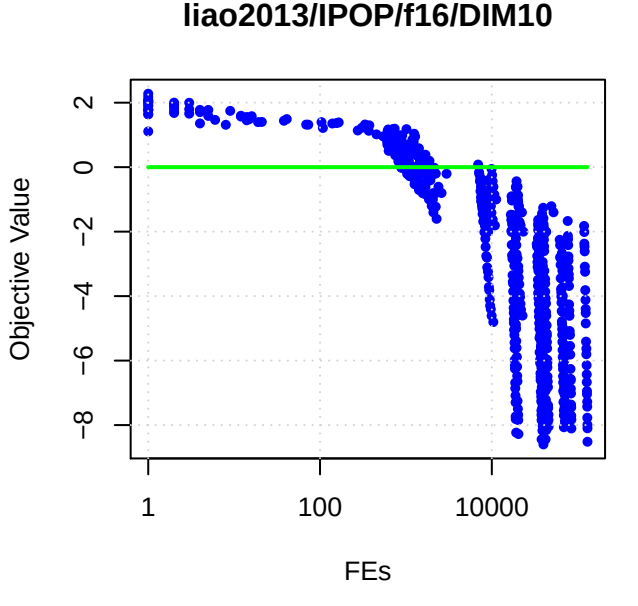
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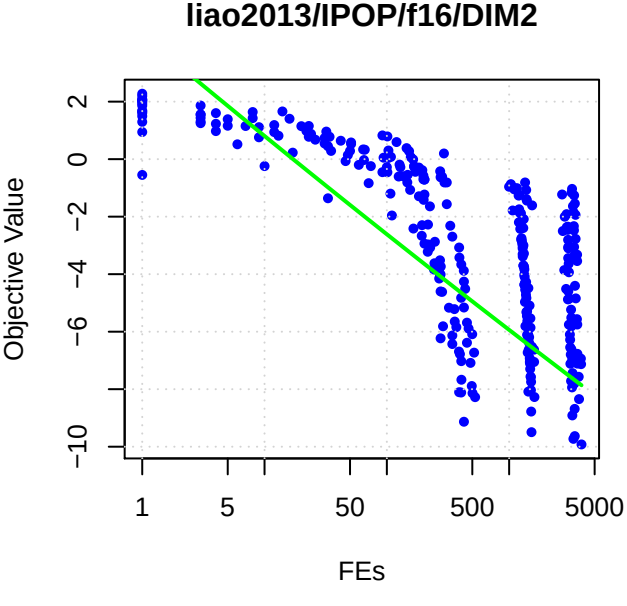
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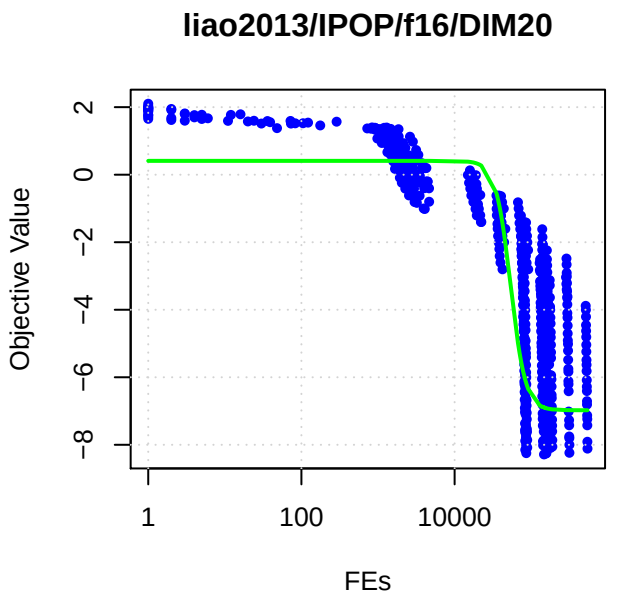
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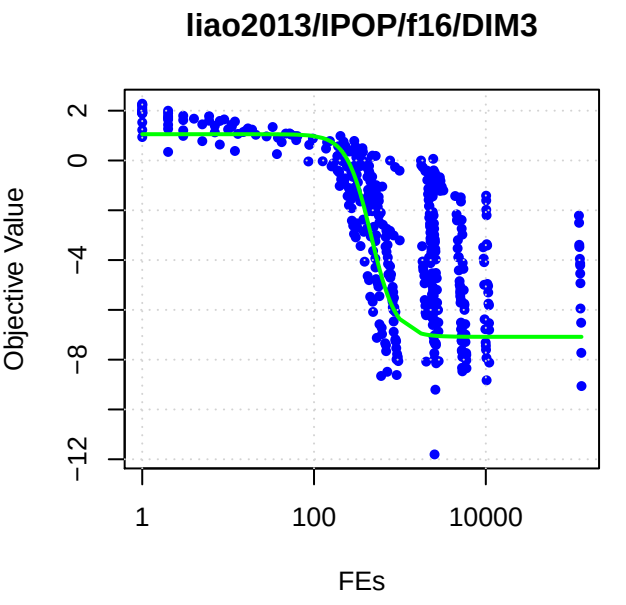
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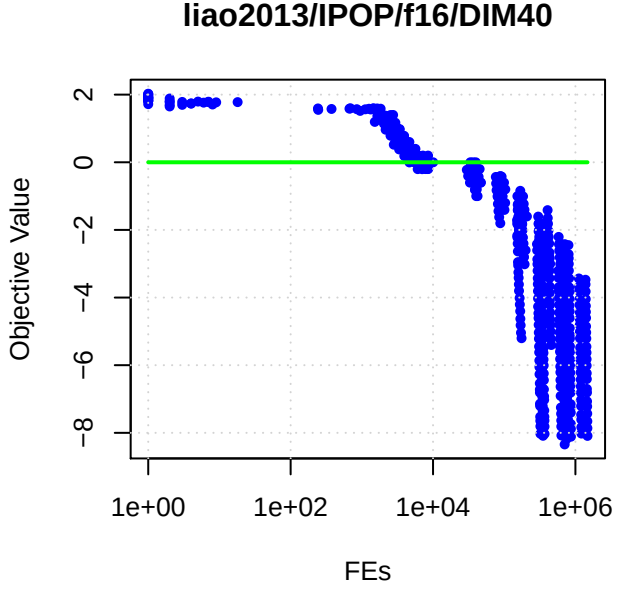
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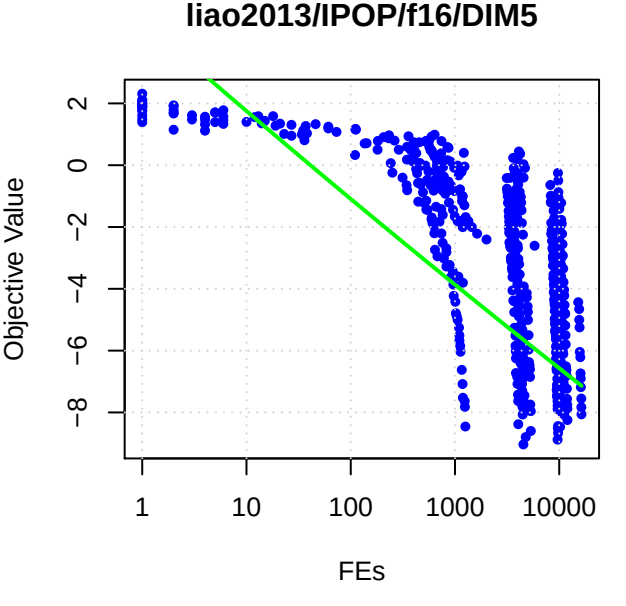
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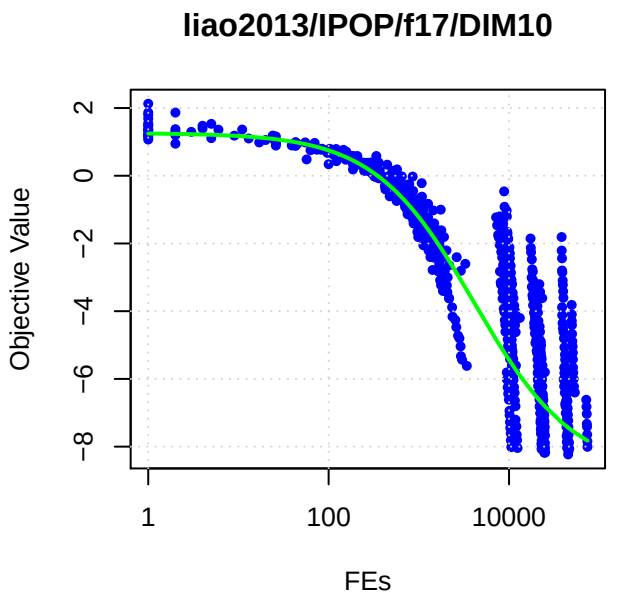
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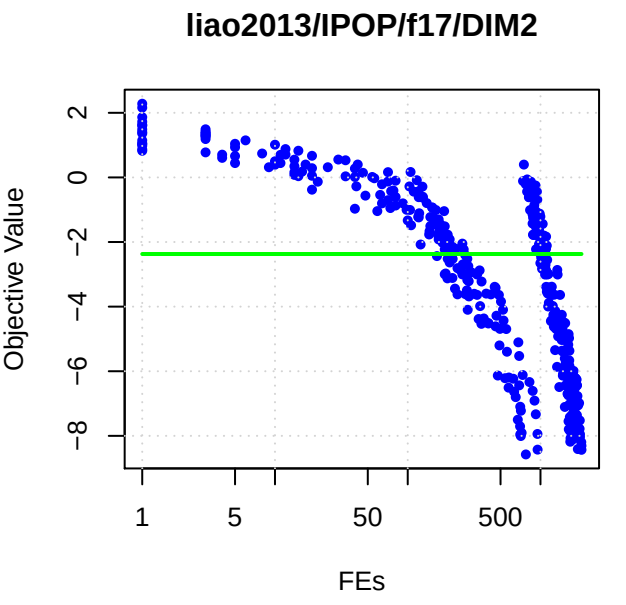
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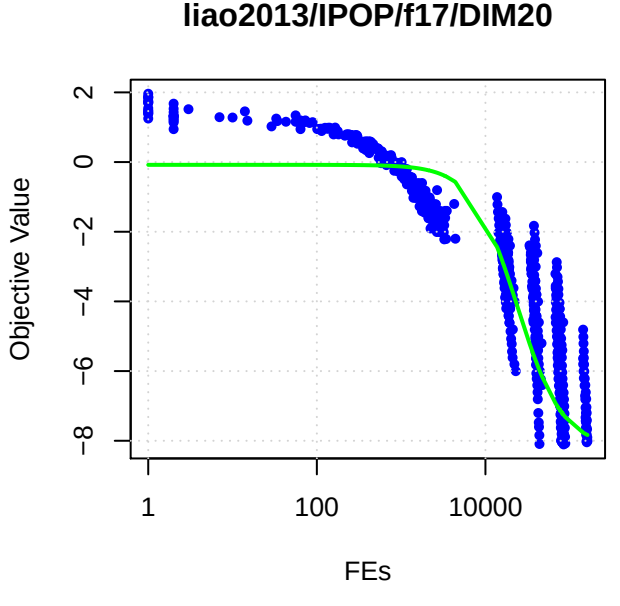
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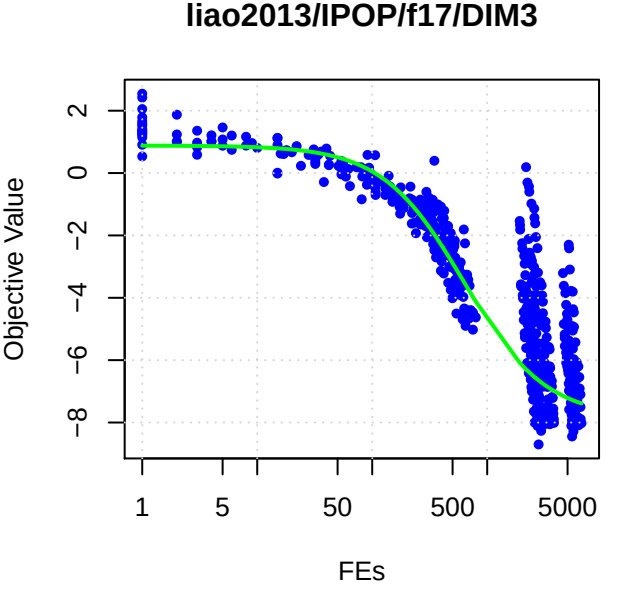
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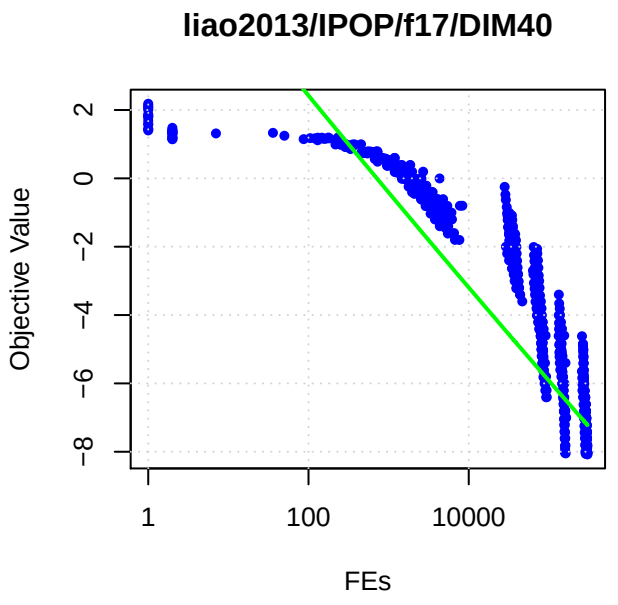
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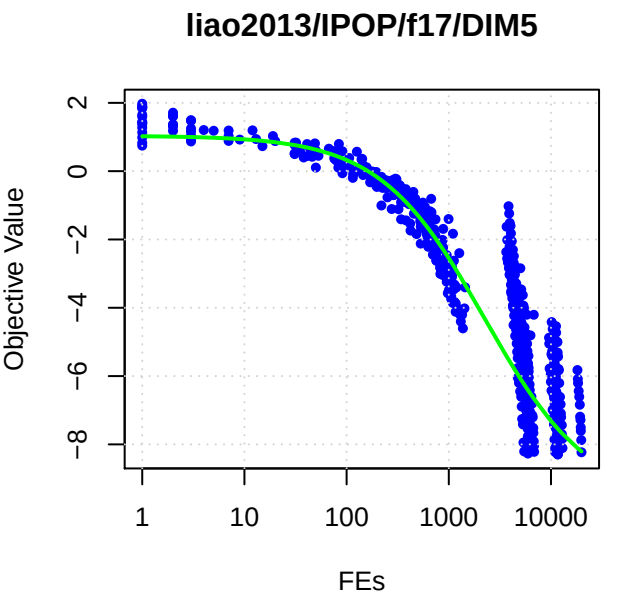
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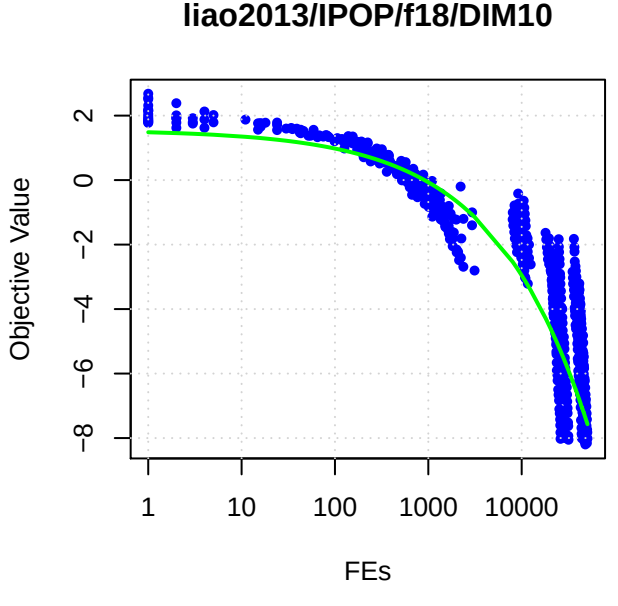
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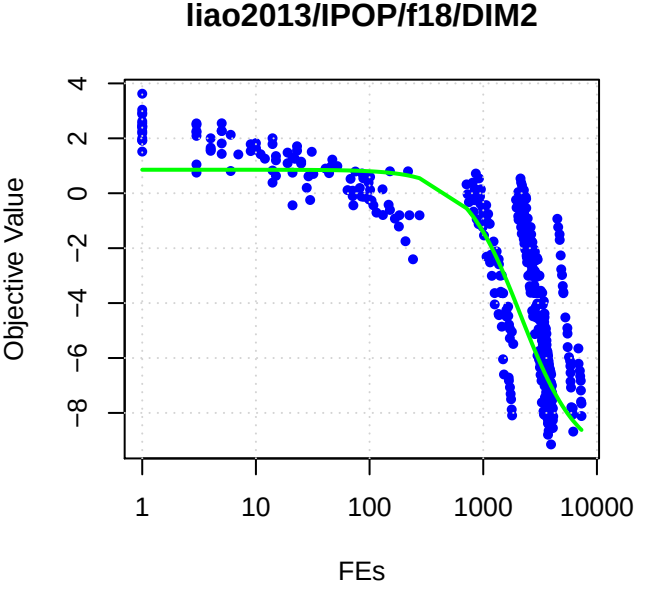
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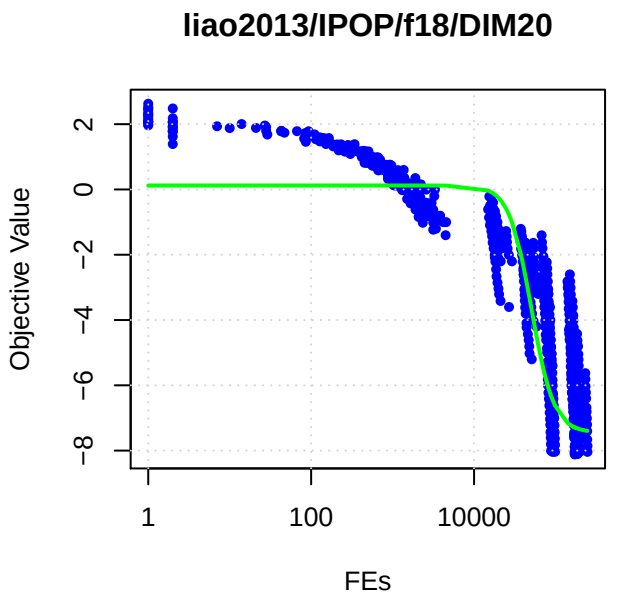
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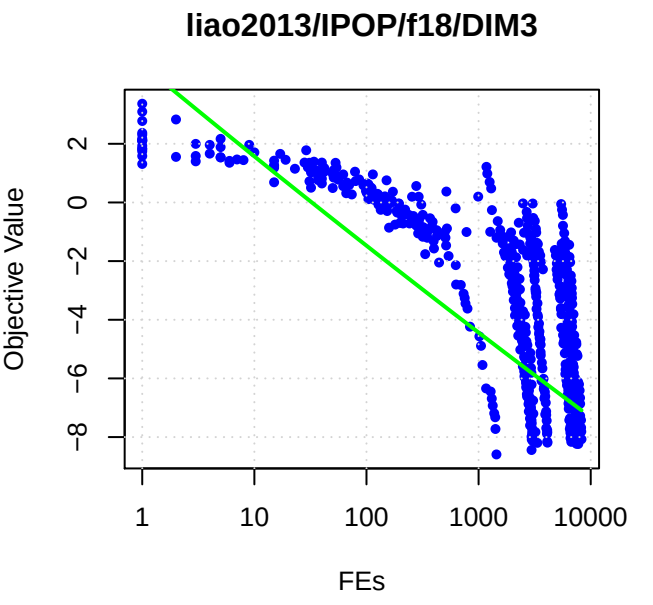
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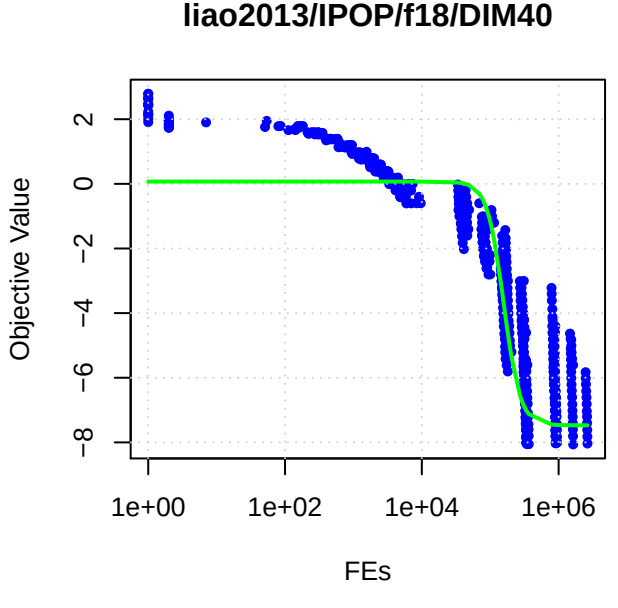
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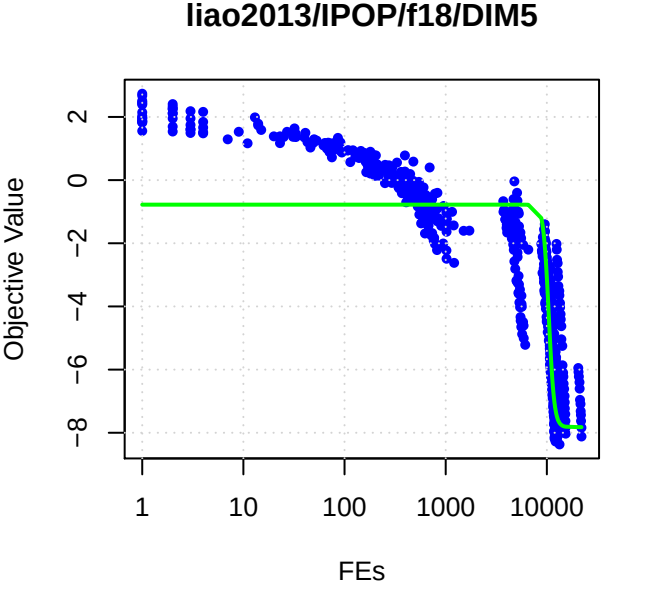
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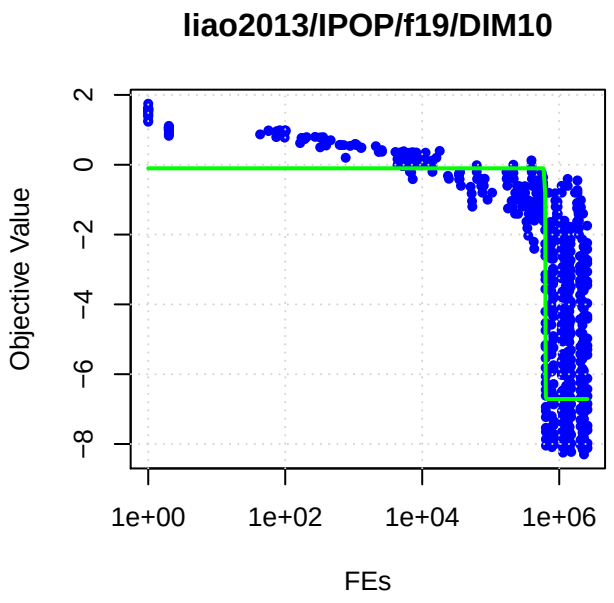
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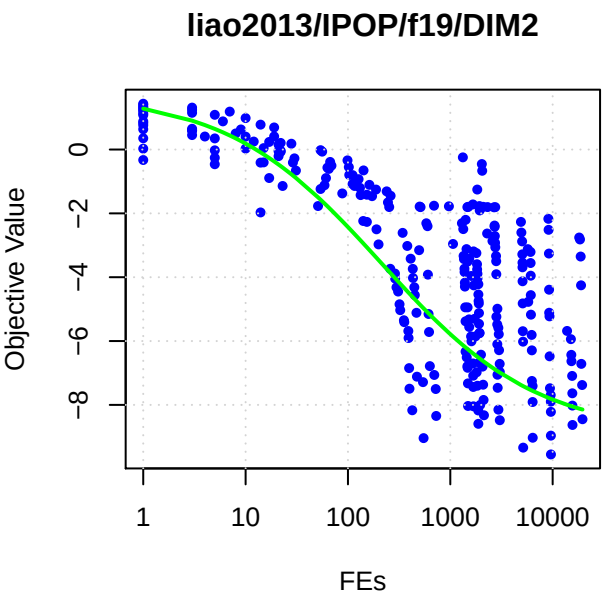
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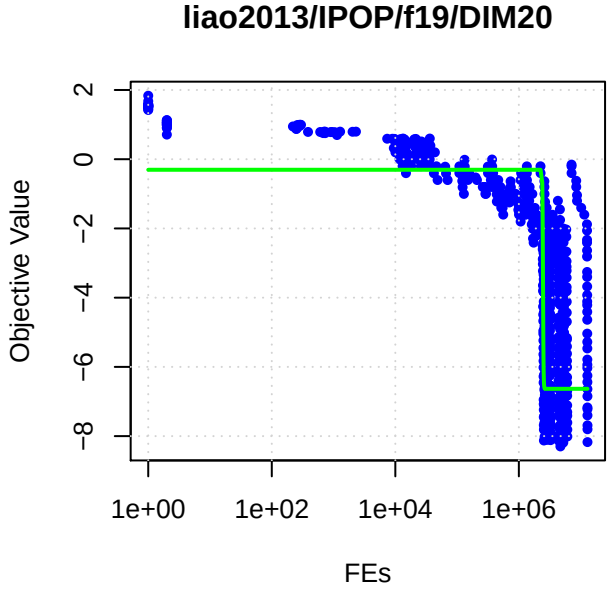
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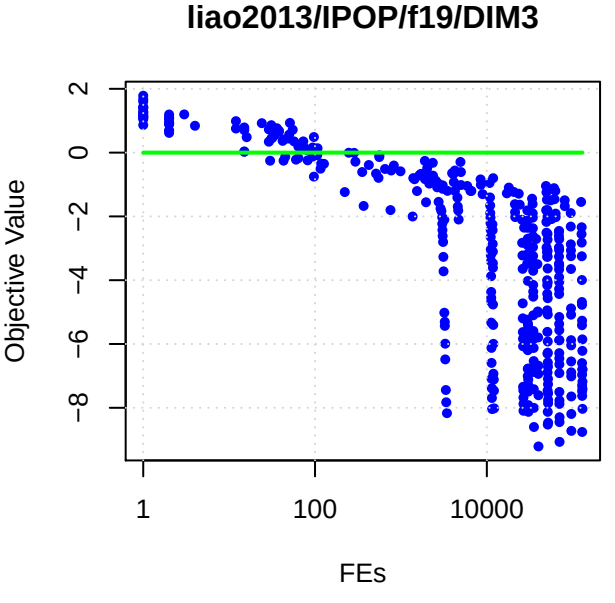
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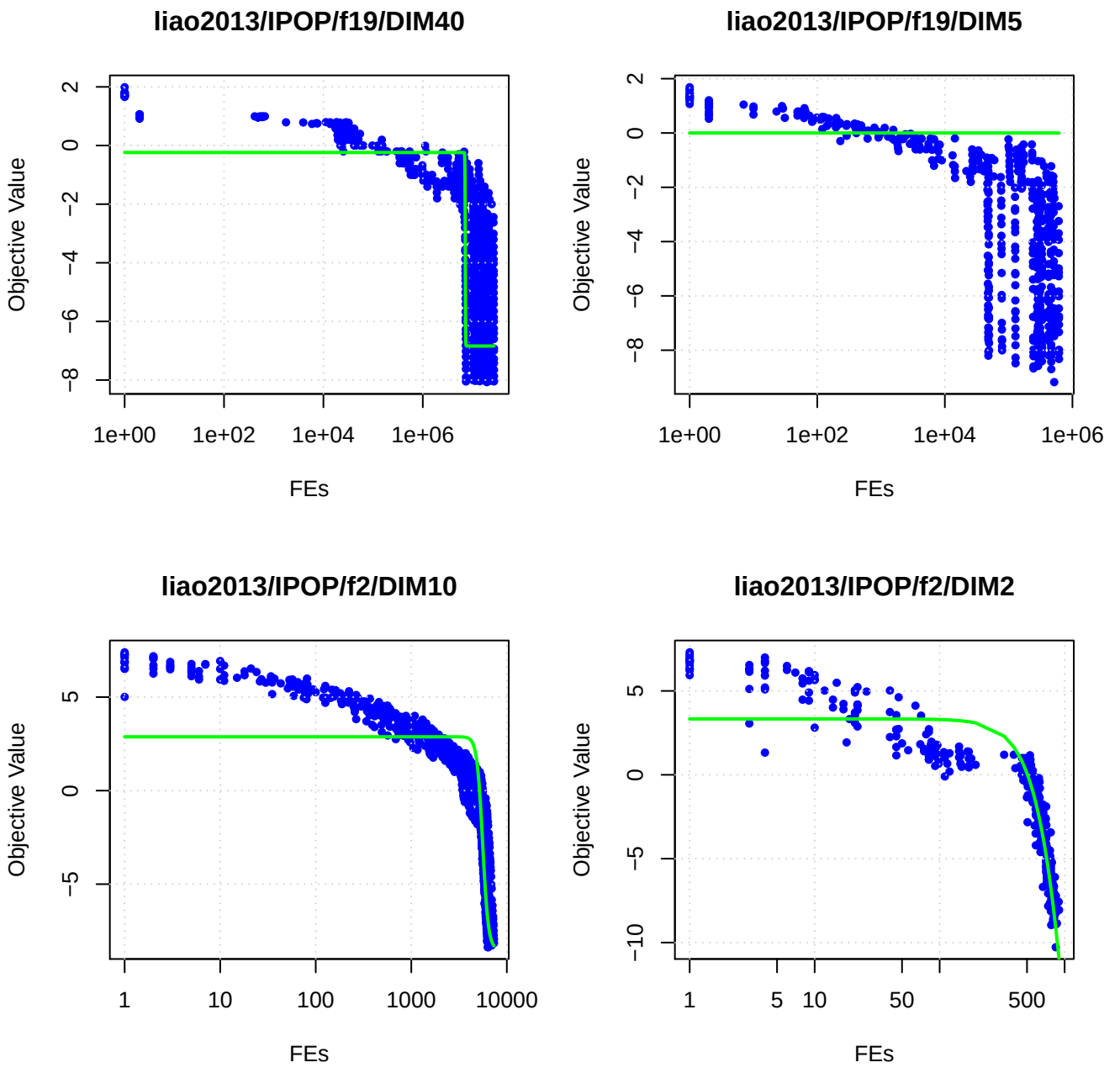
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liao2013/IPOP/f19/DIM5
Objective Value
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FEs
liao2013/IPOP/f2/DIM10
Objective Value
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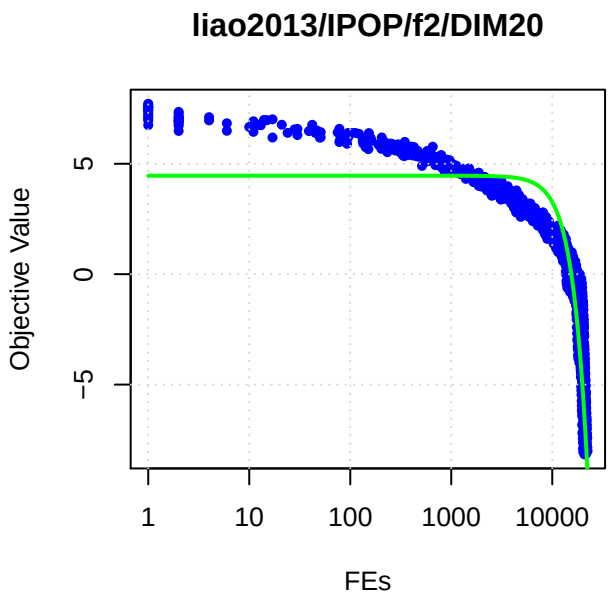
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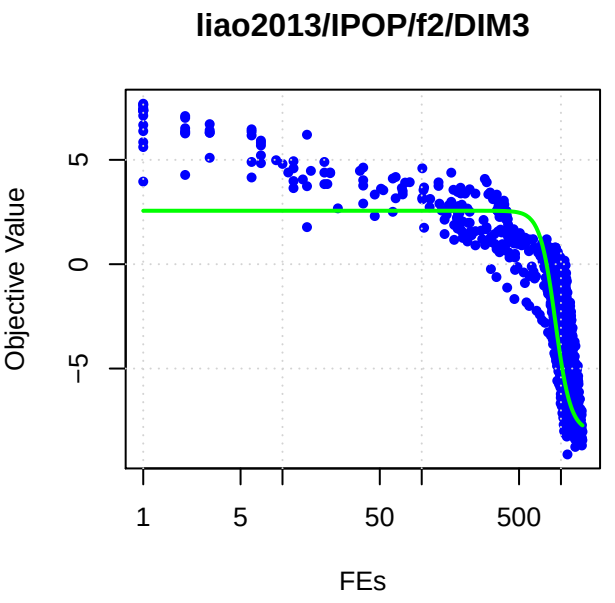
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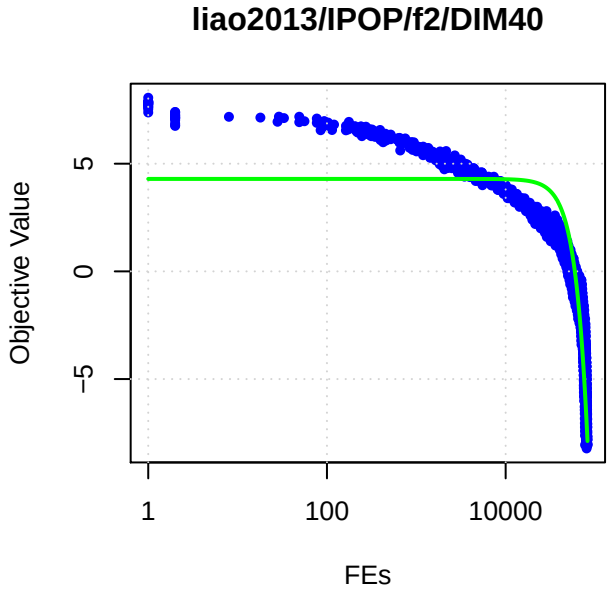
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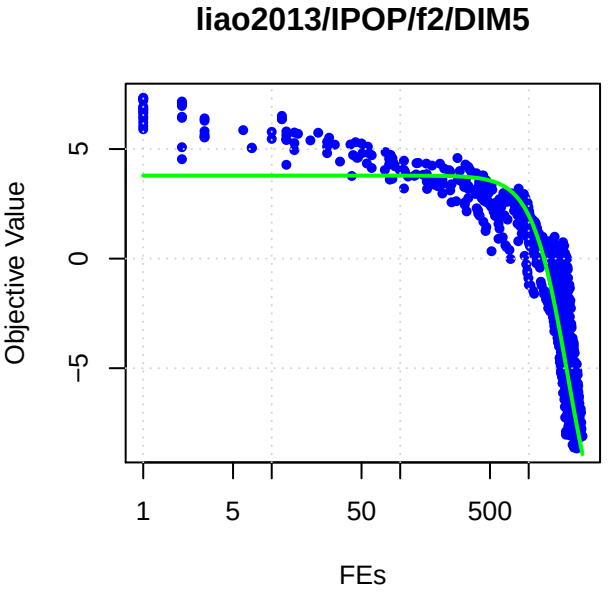
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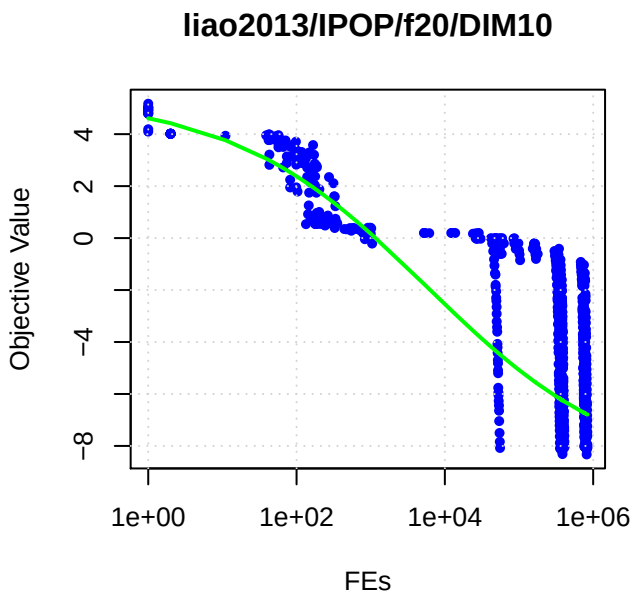
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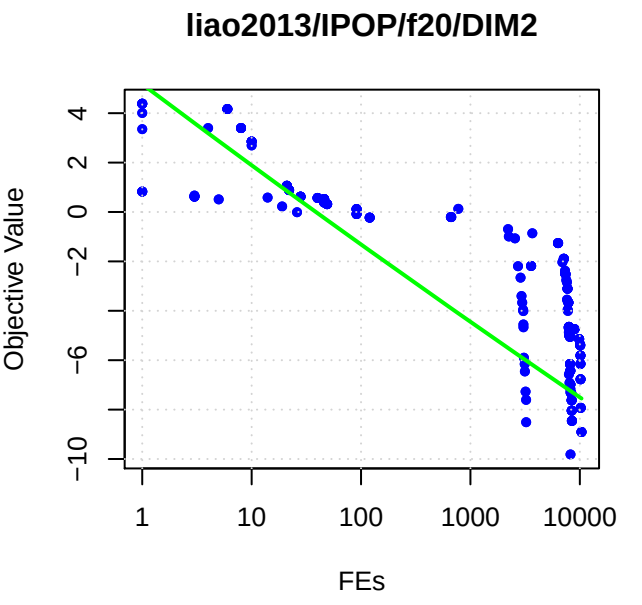
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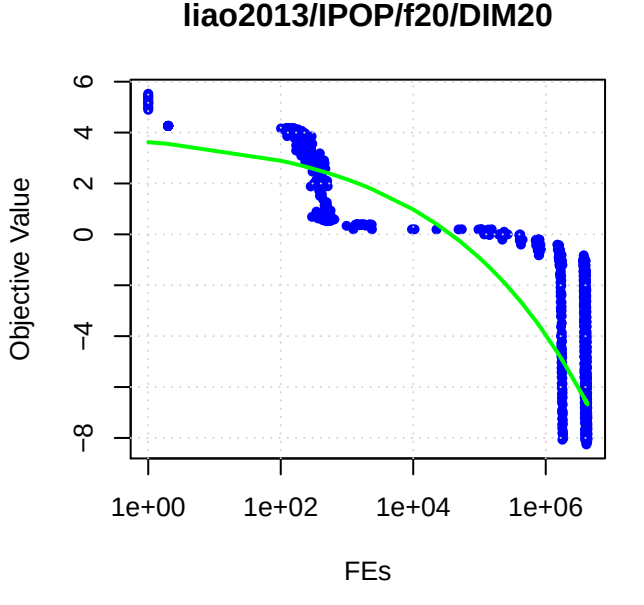
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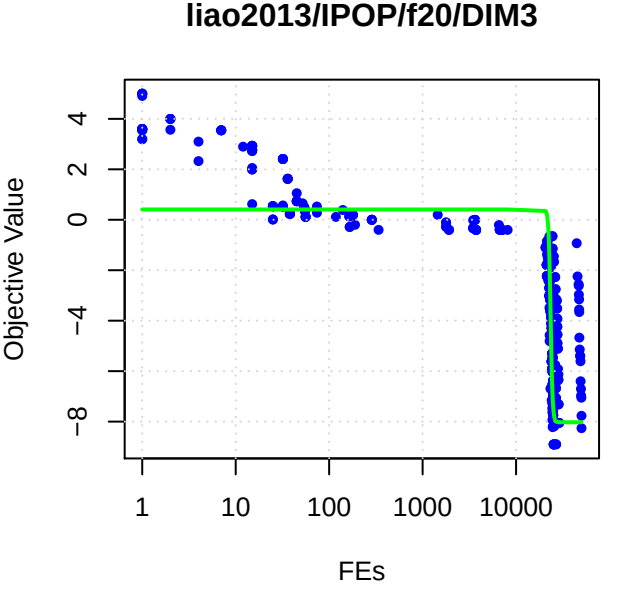
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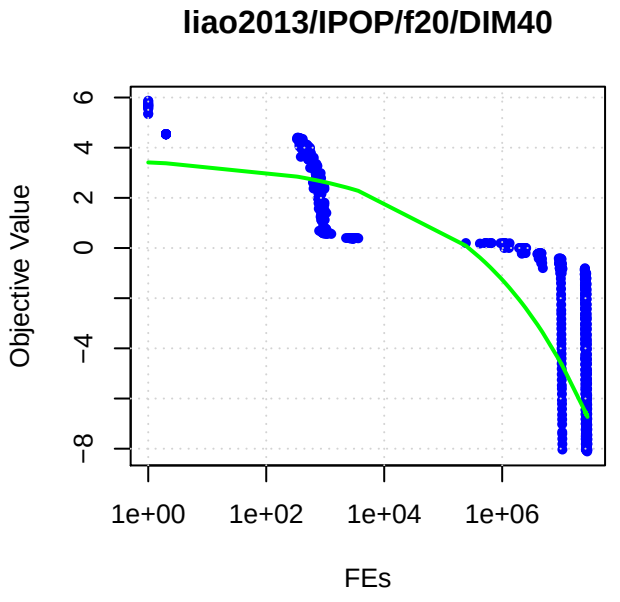
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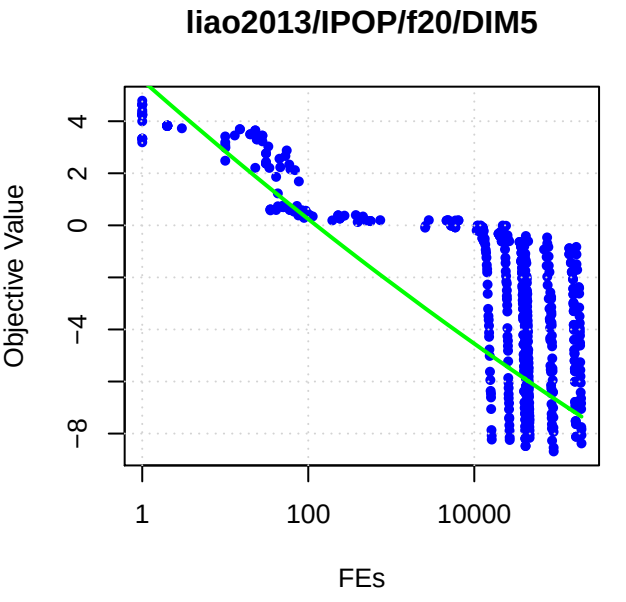
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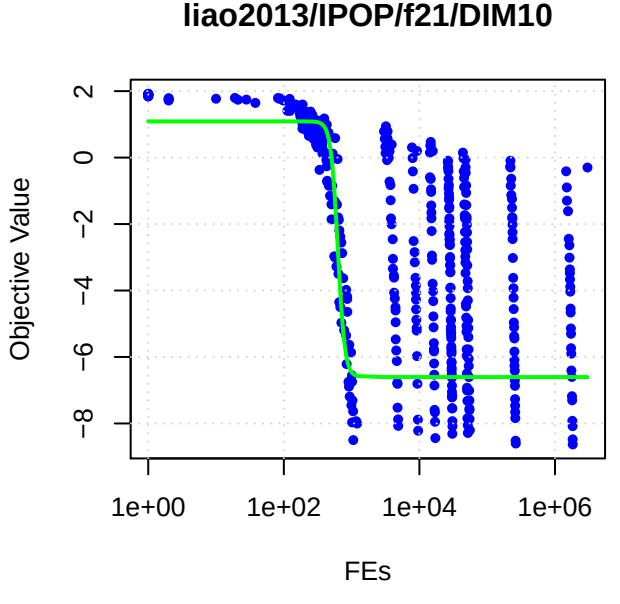
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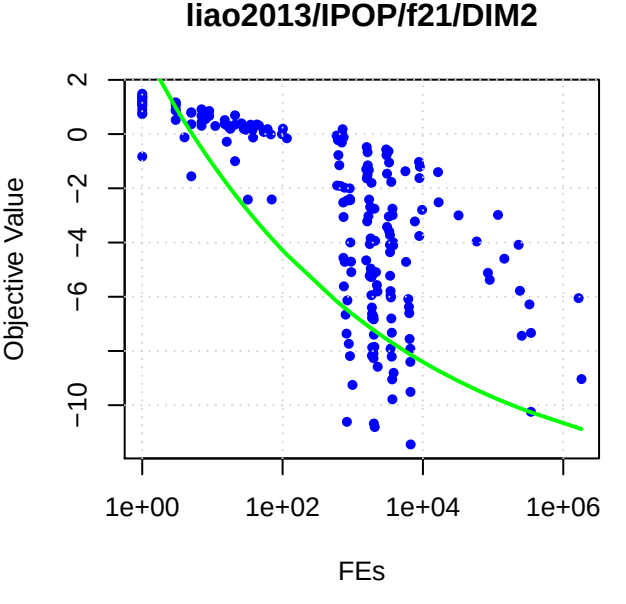
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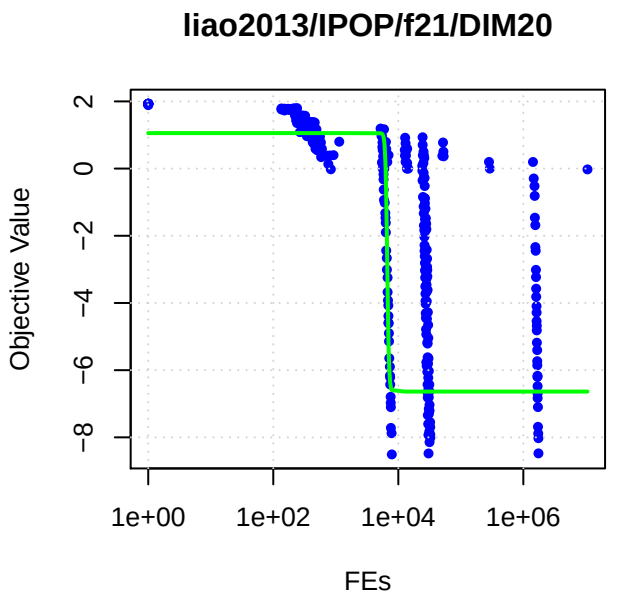
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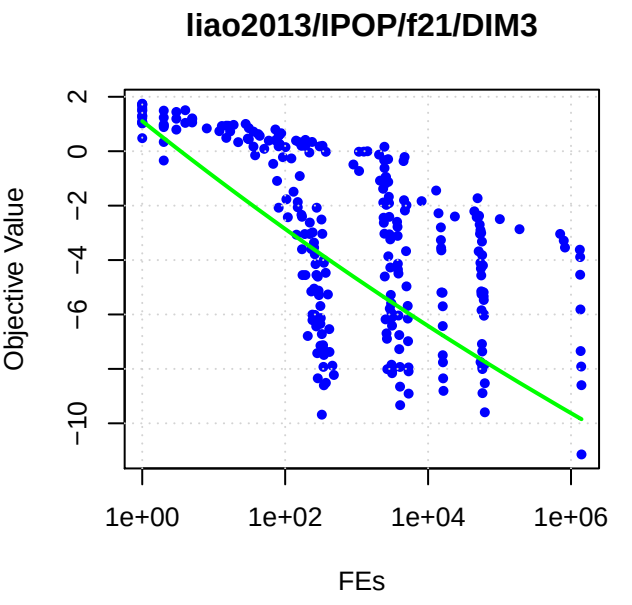
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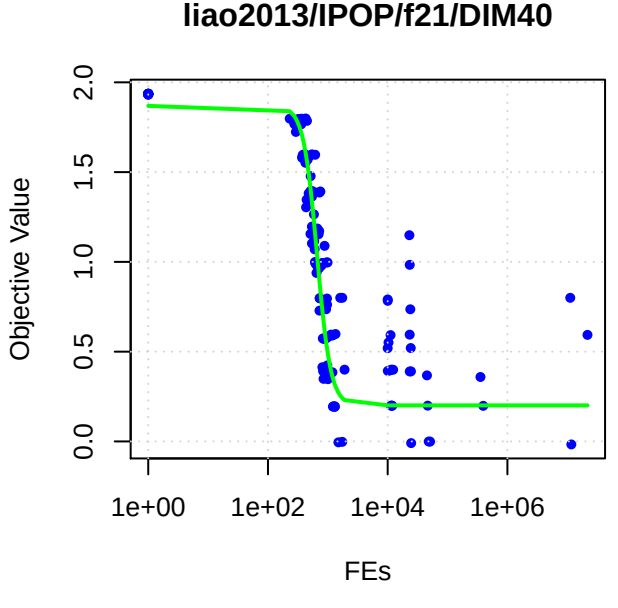
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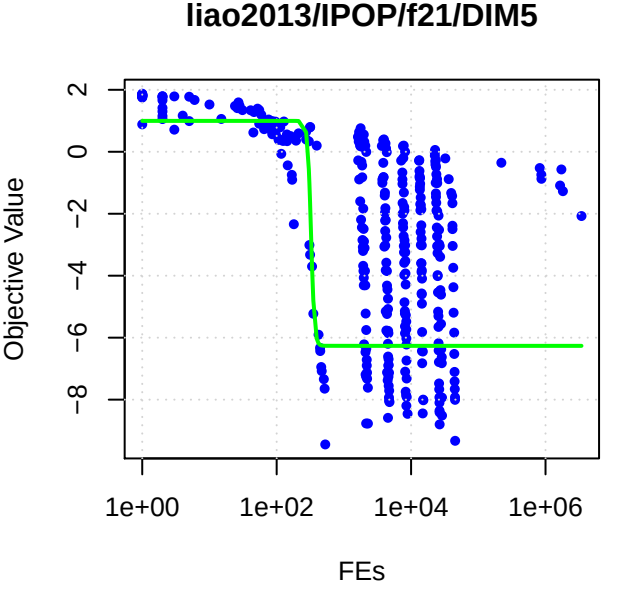
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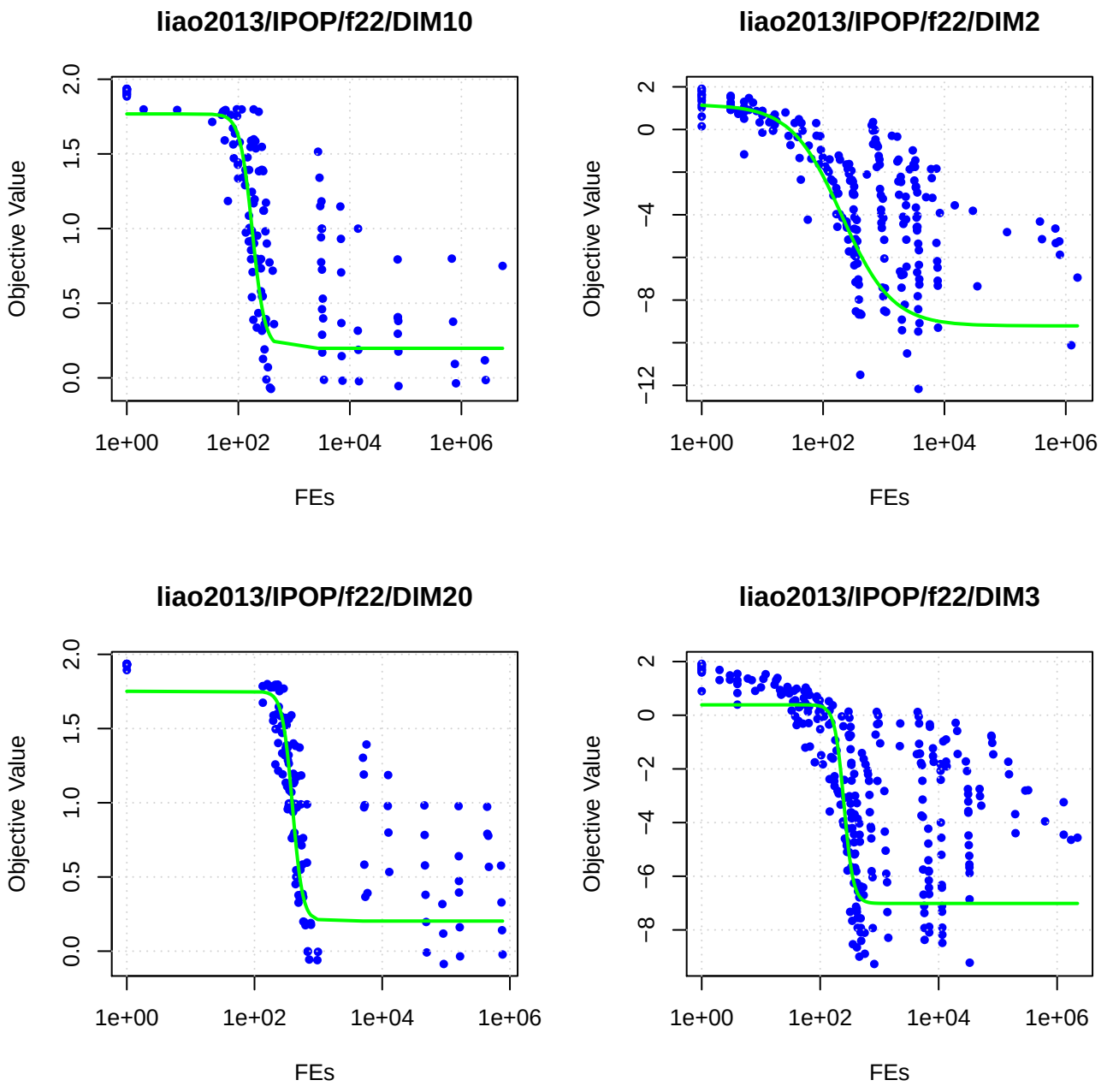
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Objective Value
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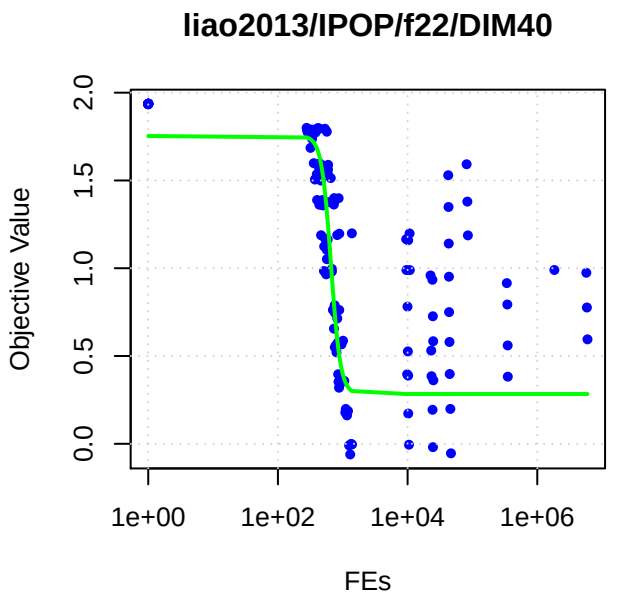
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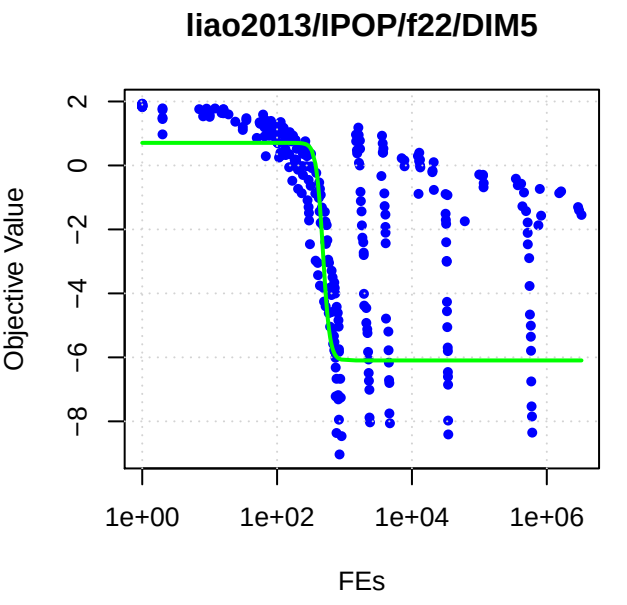
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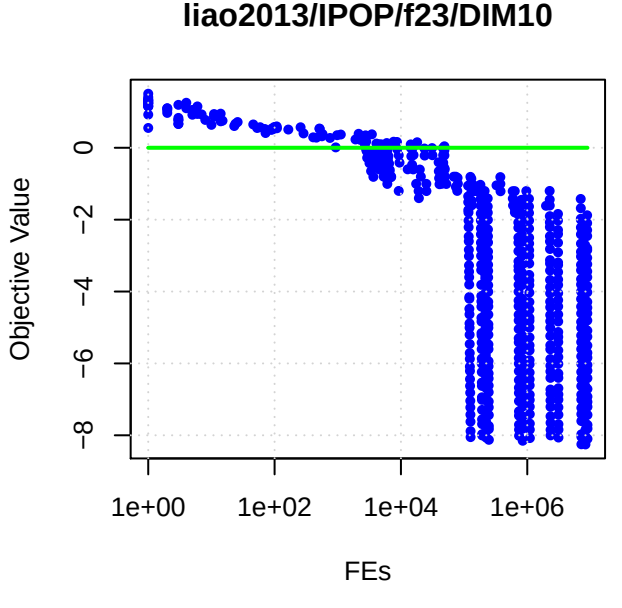
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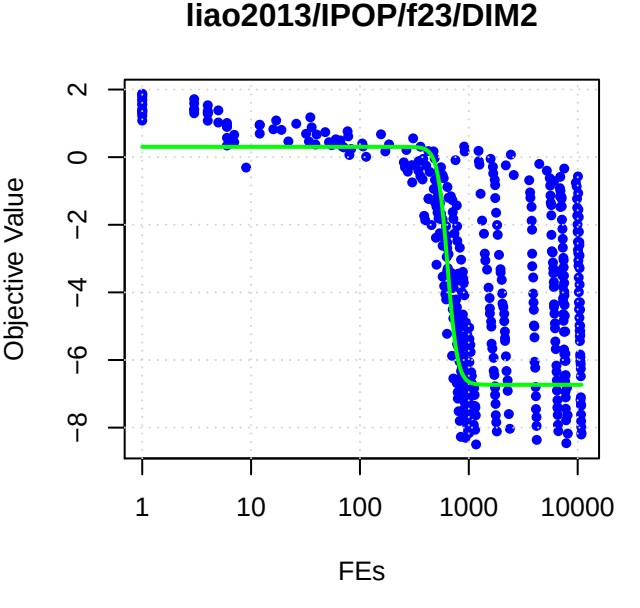
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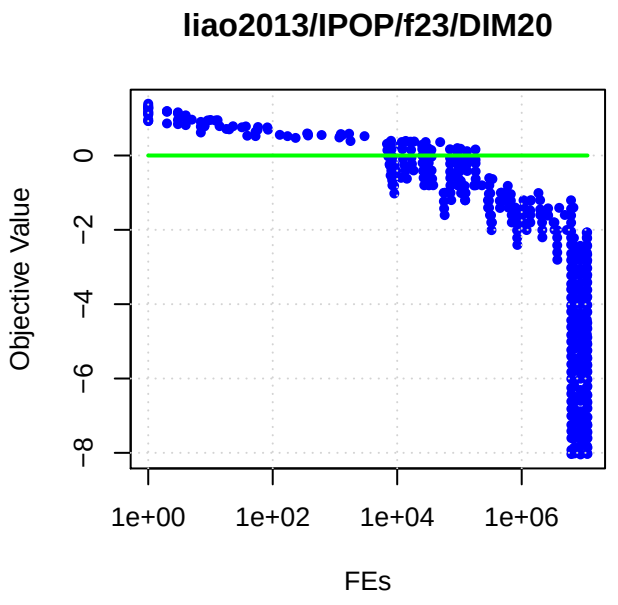
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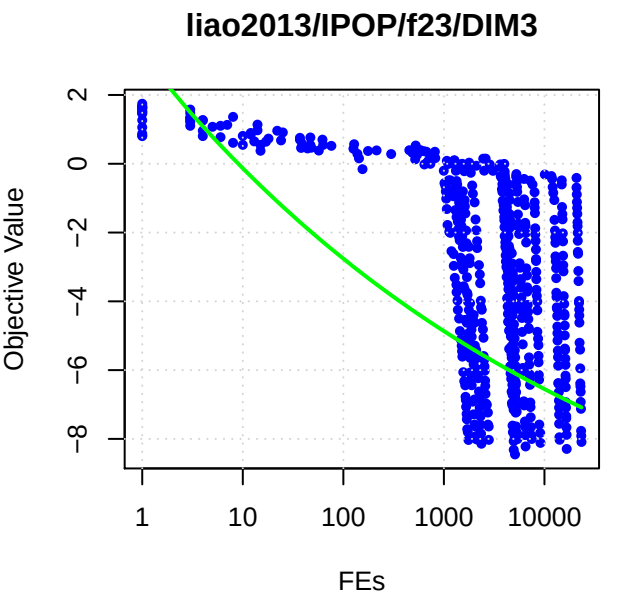
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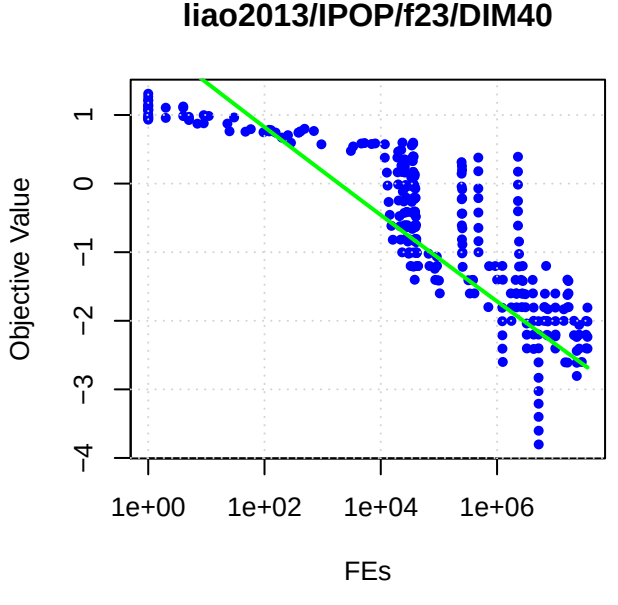
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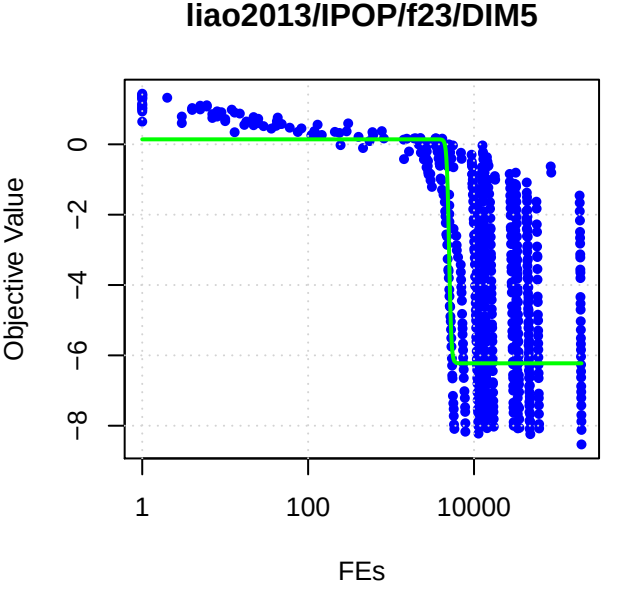
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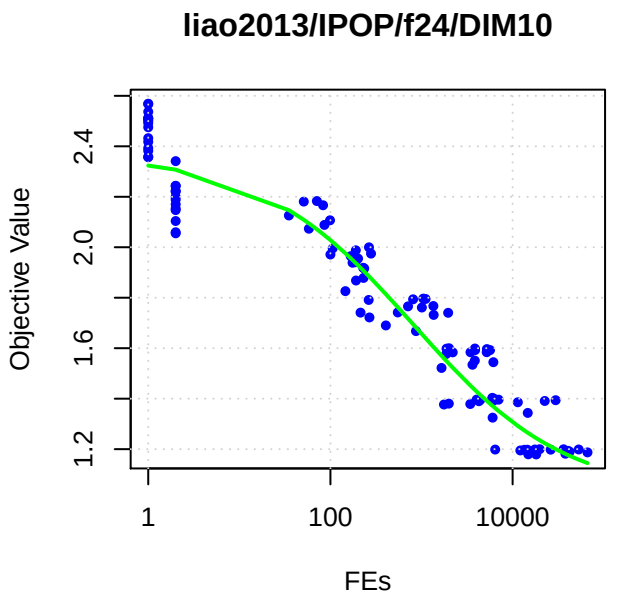
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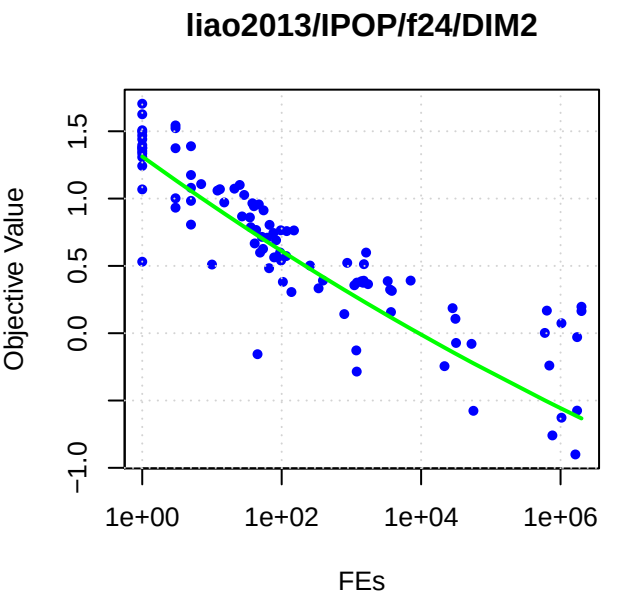
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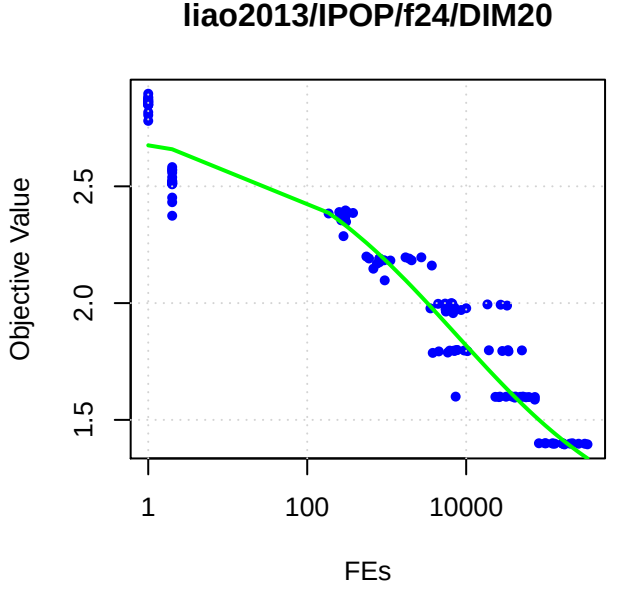
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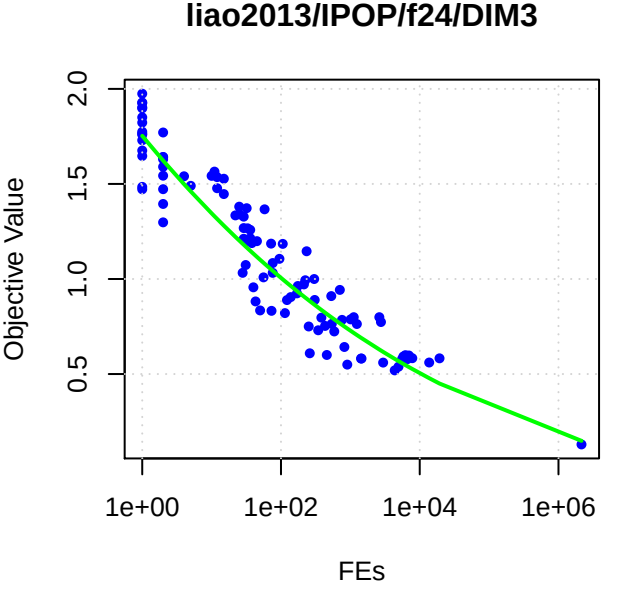
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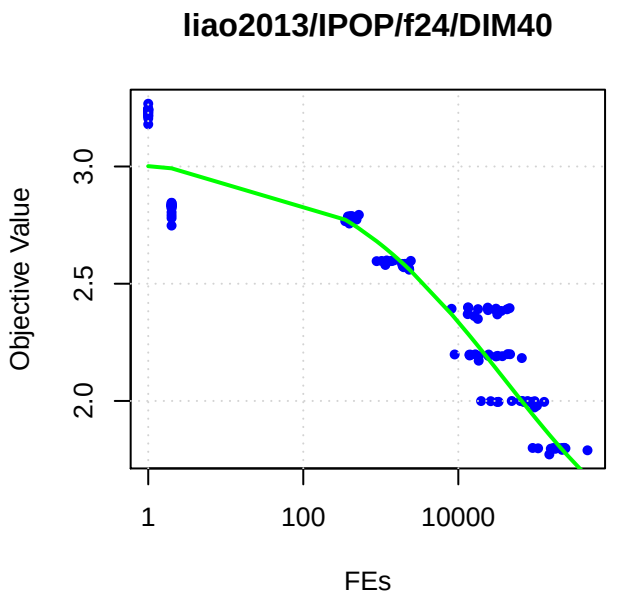
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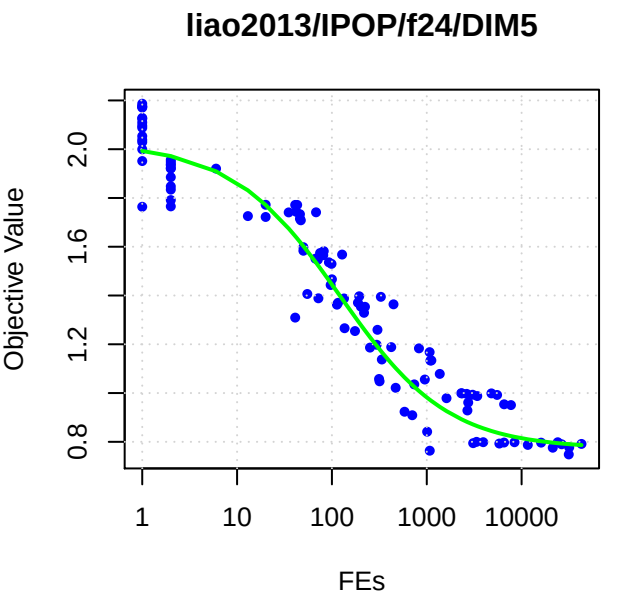
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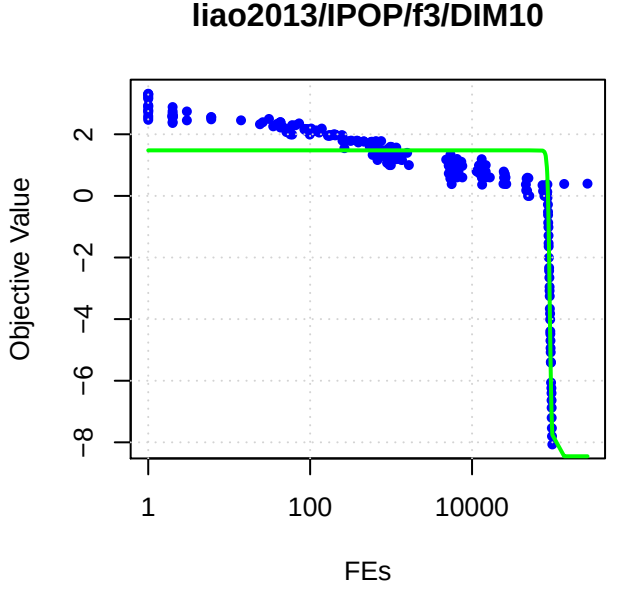
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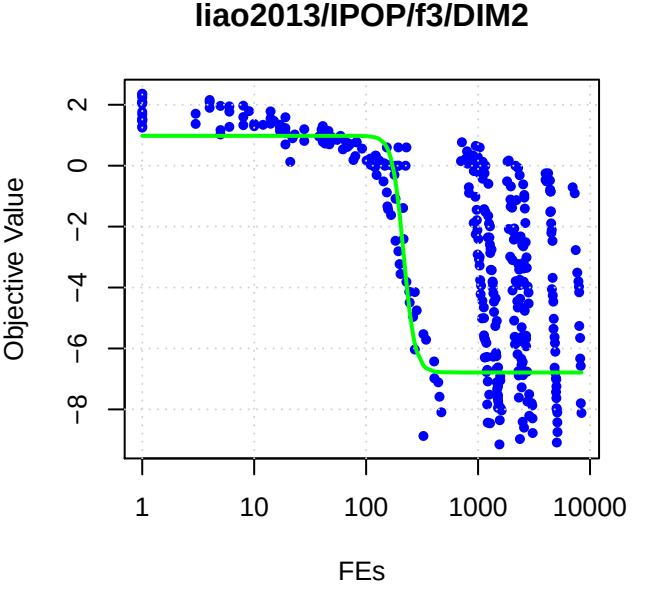
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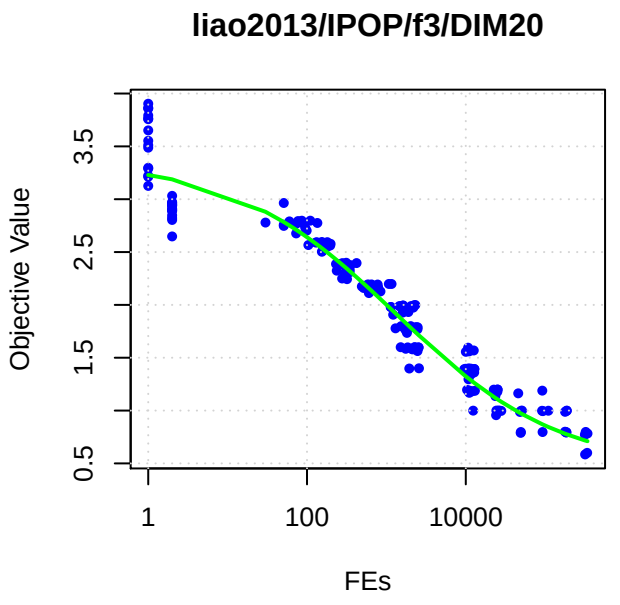
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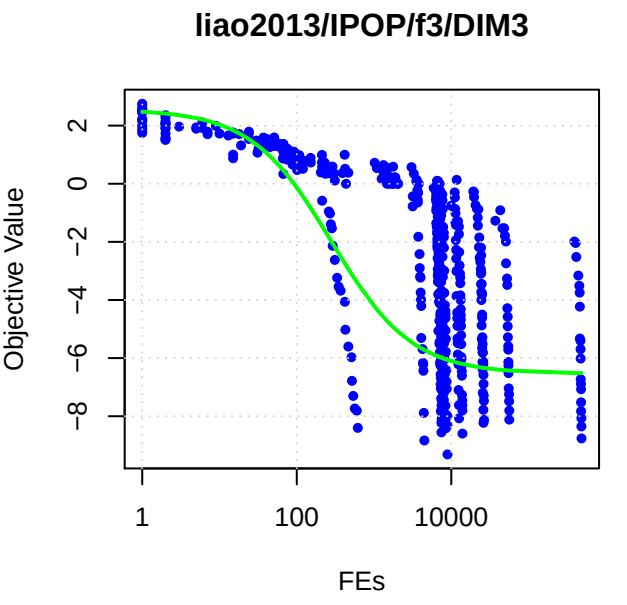
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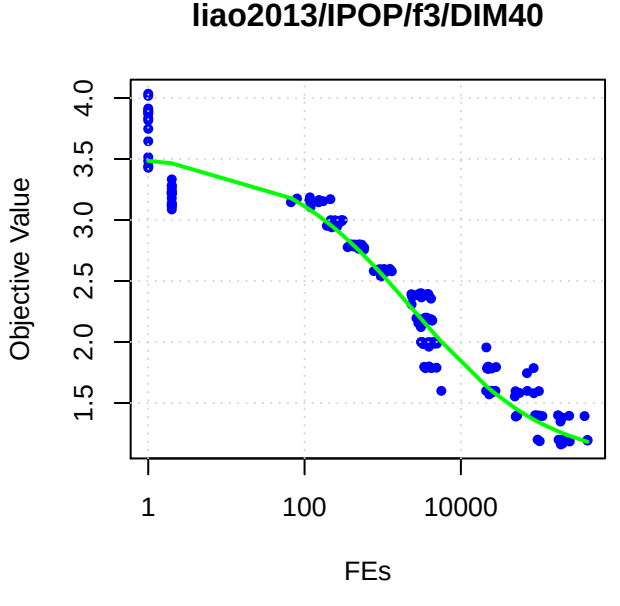
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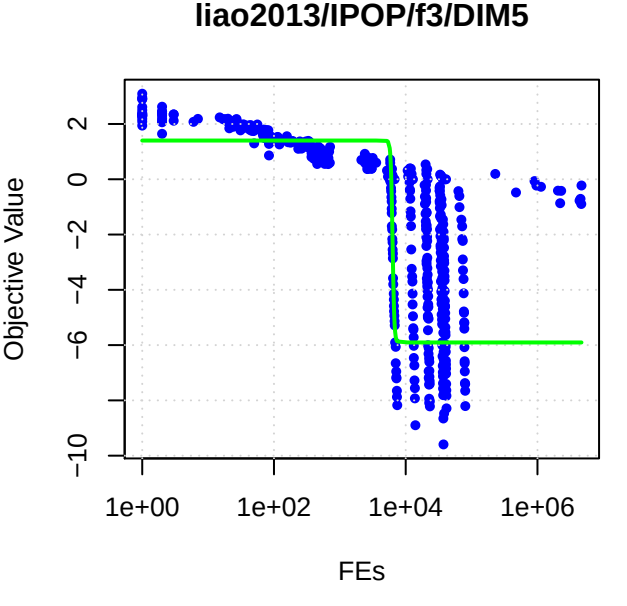
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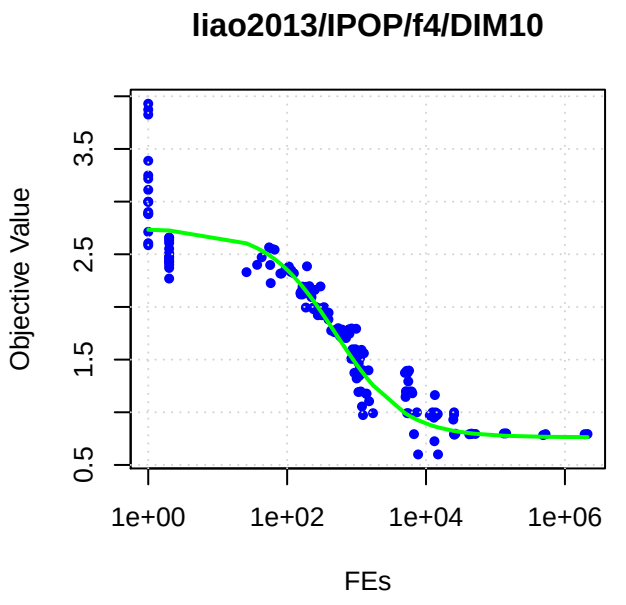
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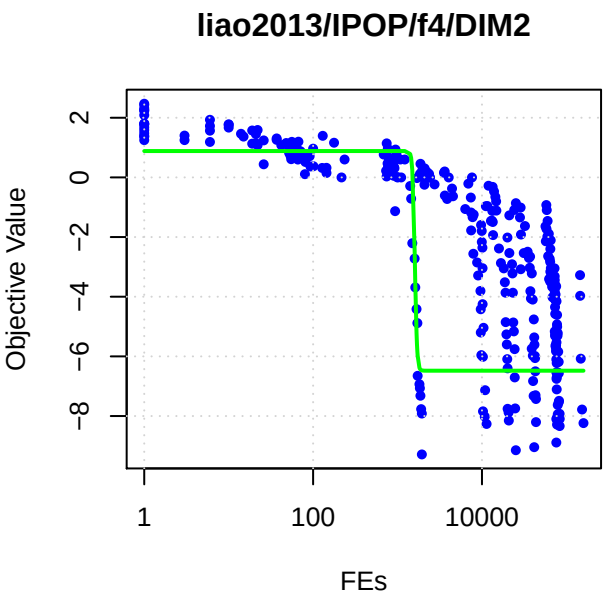
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Objective Value
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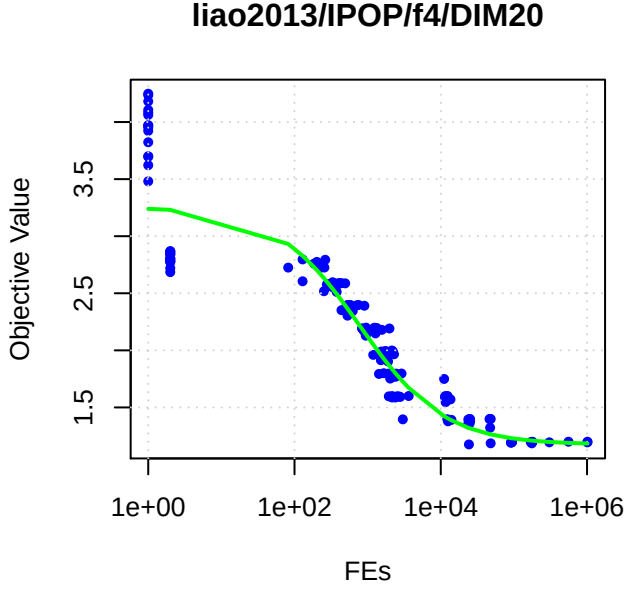
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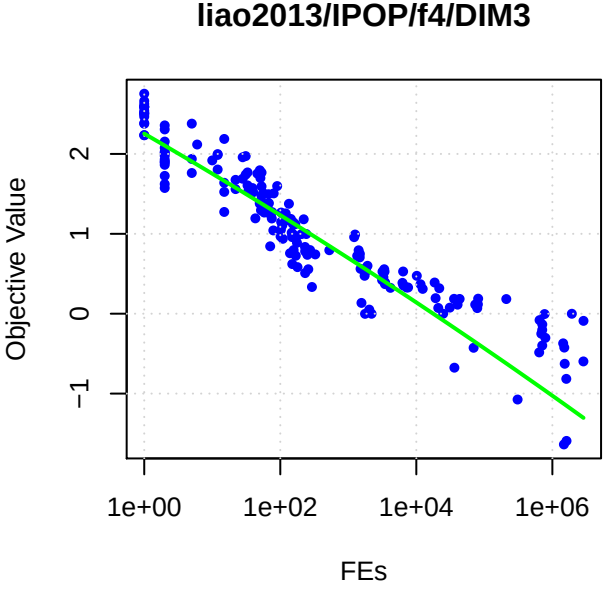
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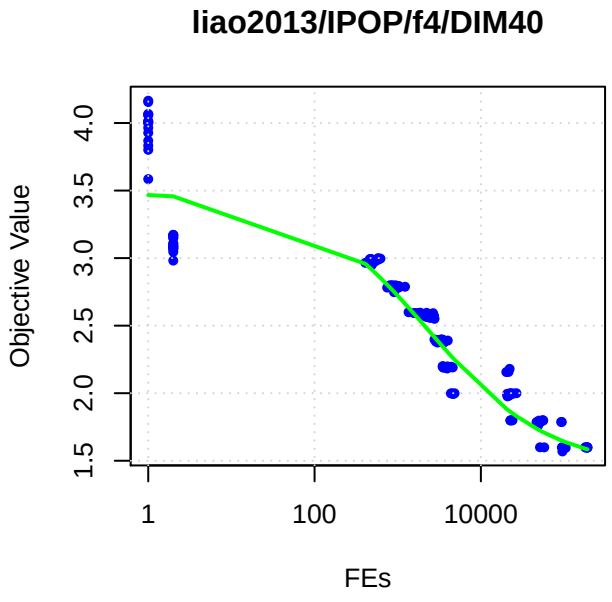
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100
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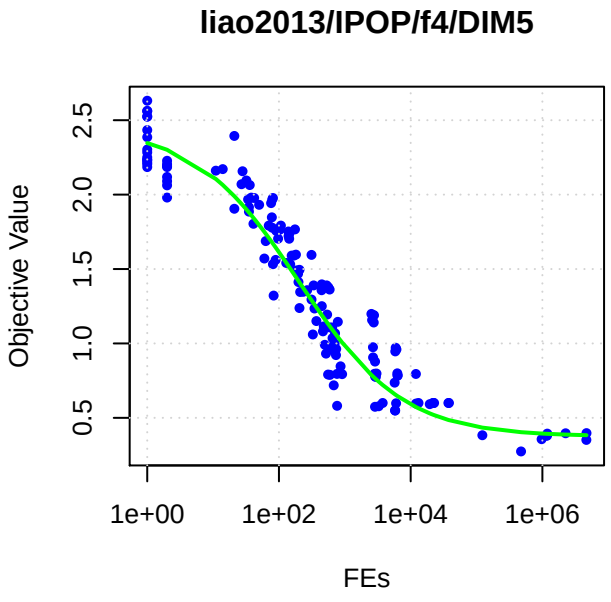
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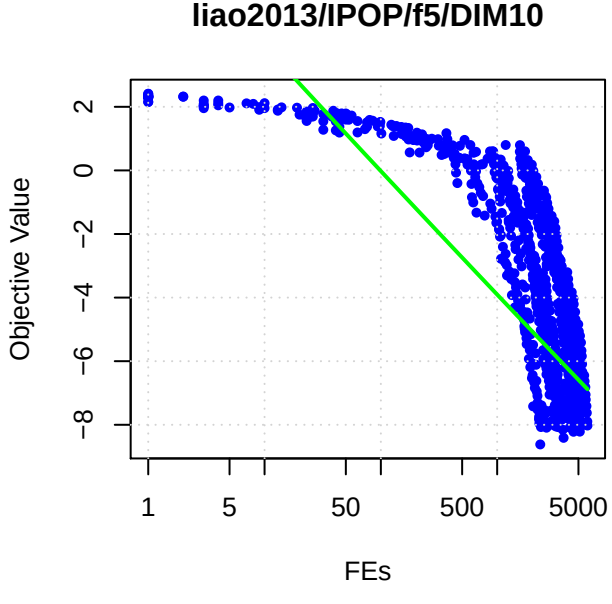
1e+06
FEs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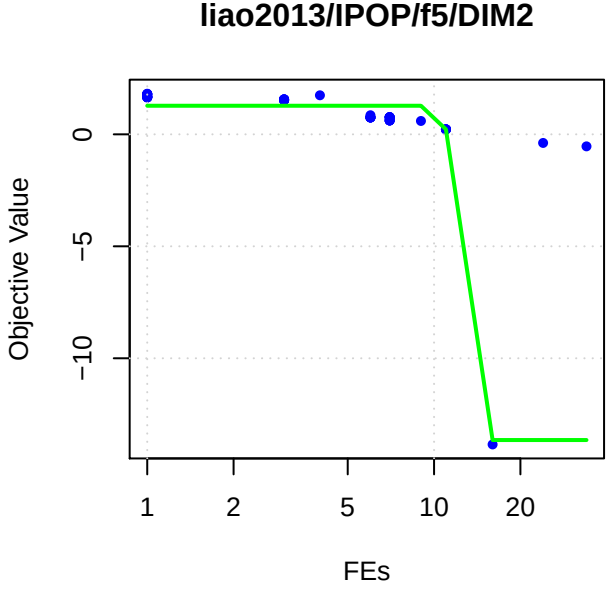
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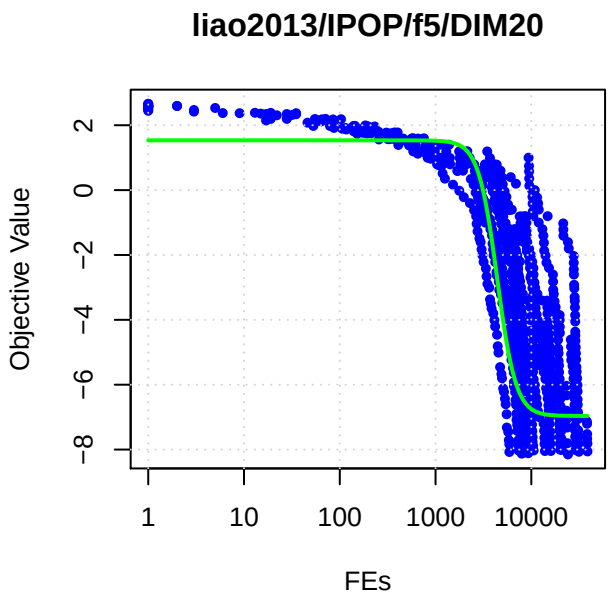
FEs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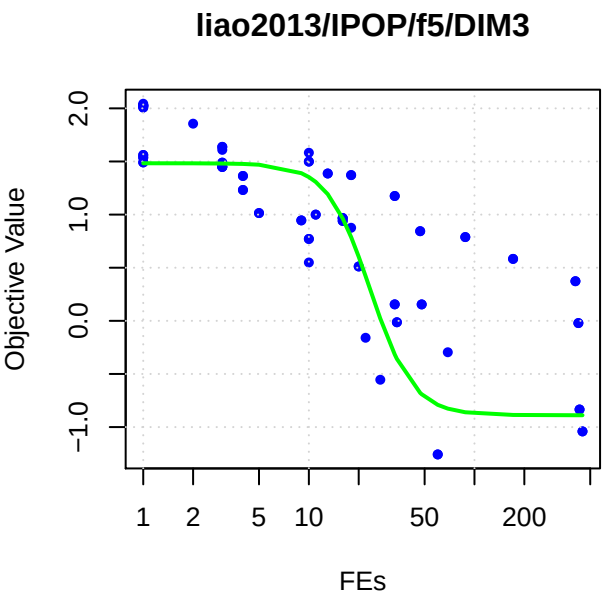
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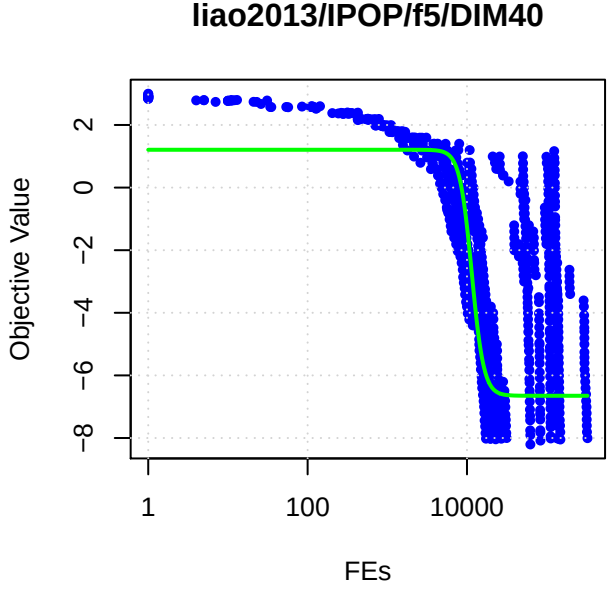
FEs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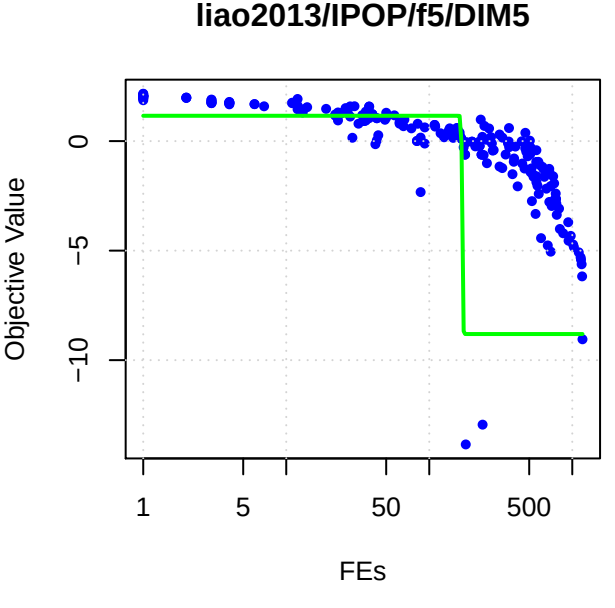
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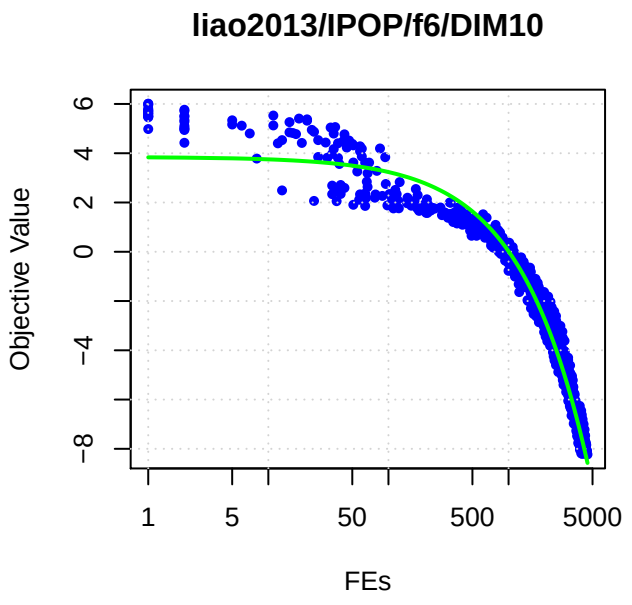
FEs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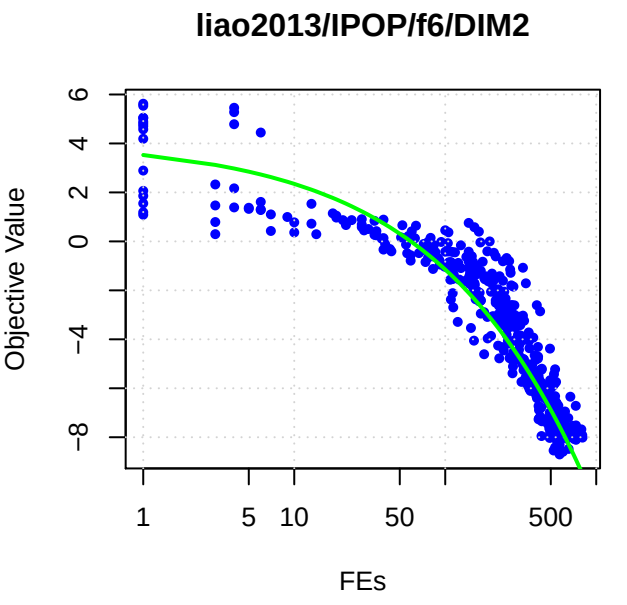
FEs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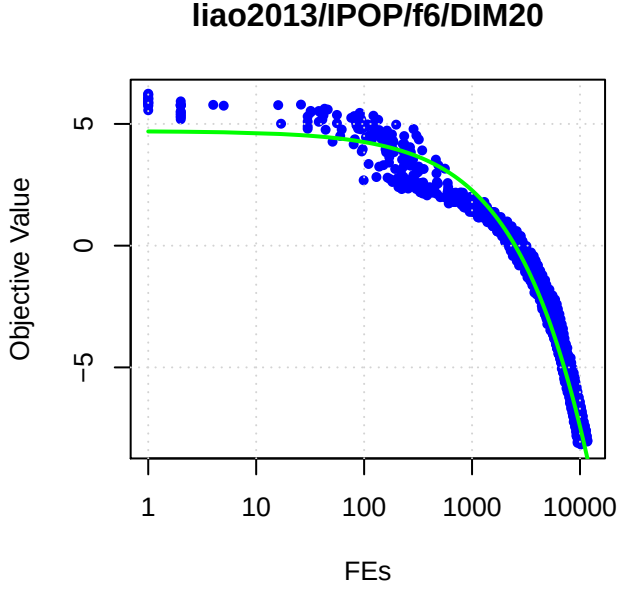
FEs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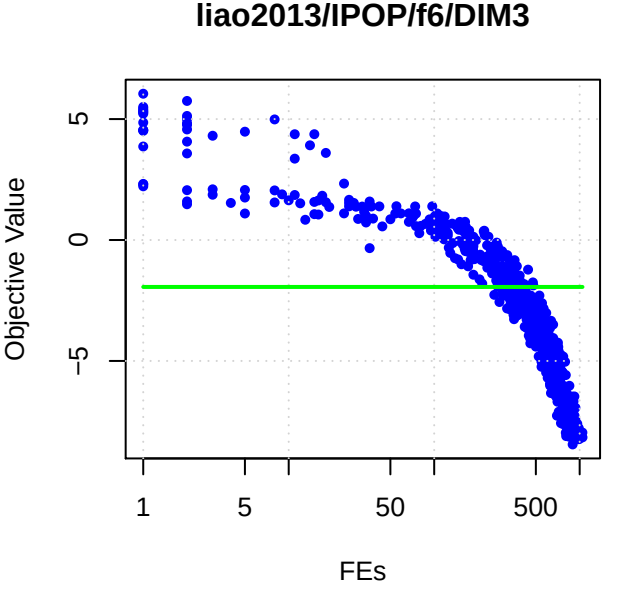
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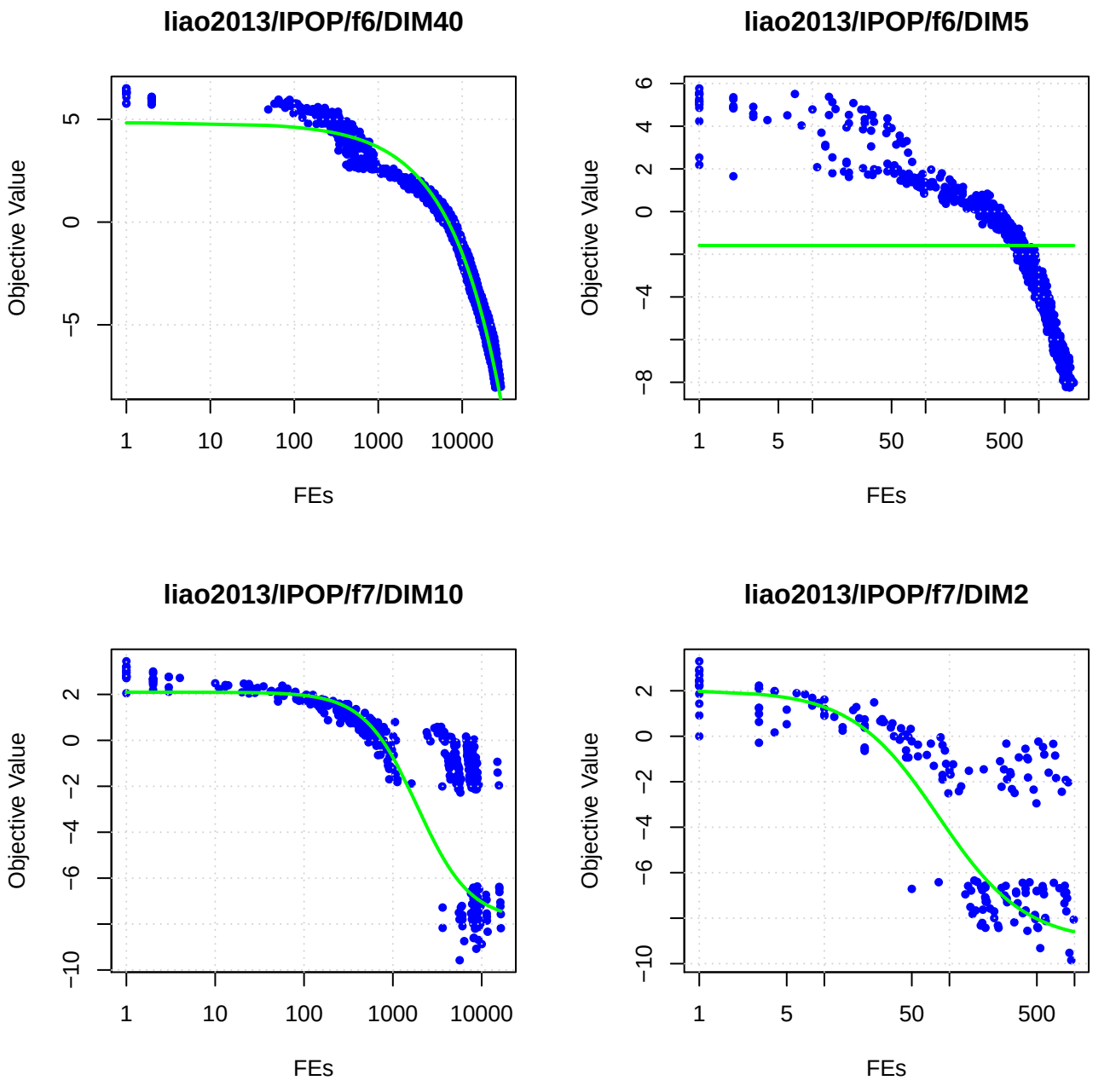
FEs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Objective Value
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1
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100
1000
10000
FEs
liao2013/IPOP/f6/DIM5
Objective Value
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4
2
0
−4
−8
1
5
50
500
FEs
liao2013/IPOP/f7/DIM10
Objective Value
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−4
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−10
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100
1000
10000
FEs
liao2013/IPOP/f7/DIM2
Objective Value
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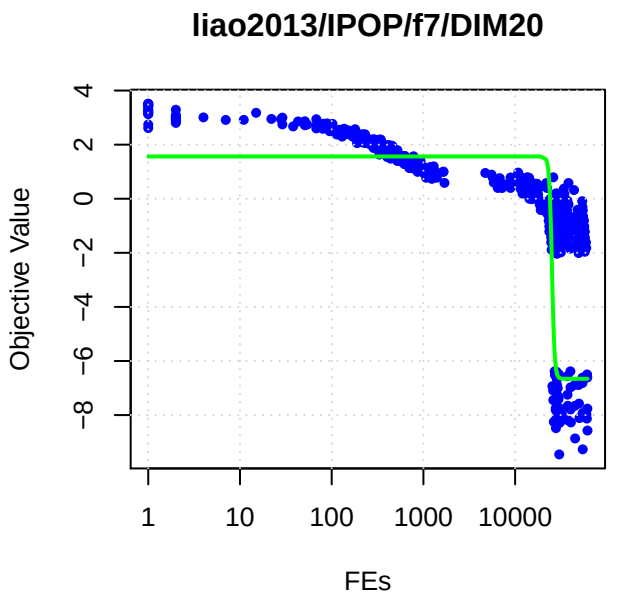
500
FEs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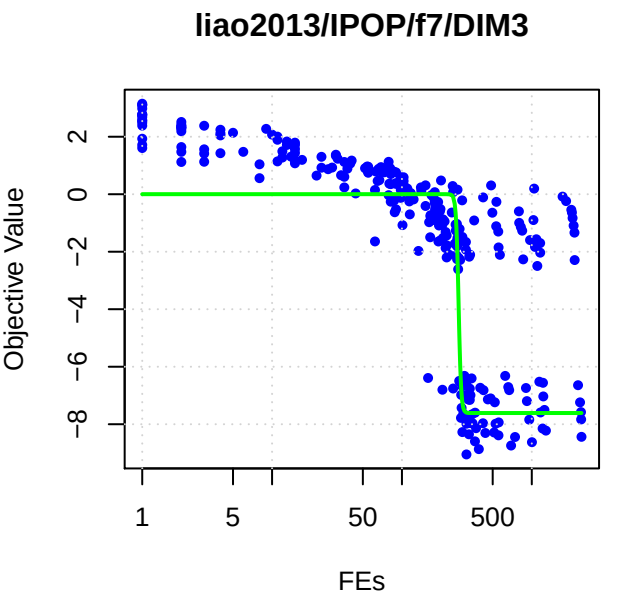
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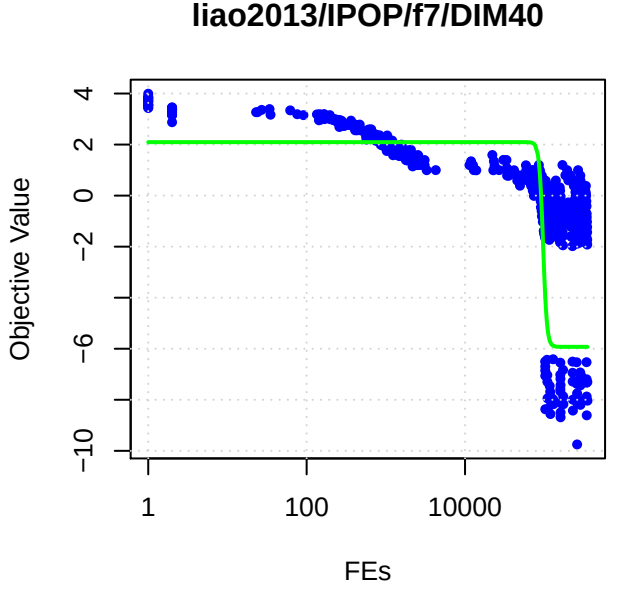
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Objective Value
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10000
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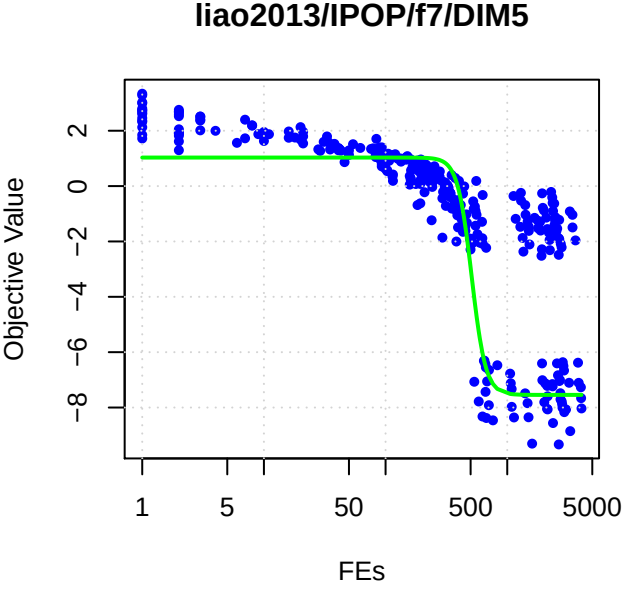
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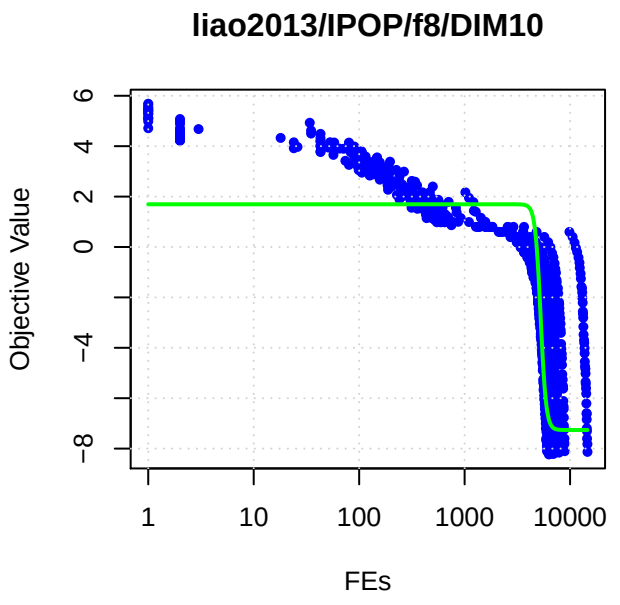
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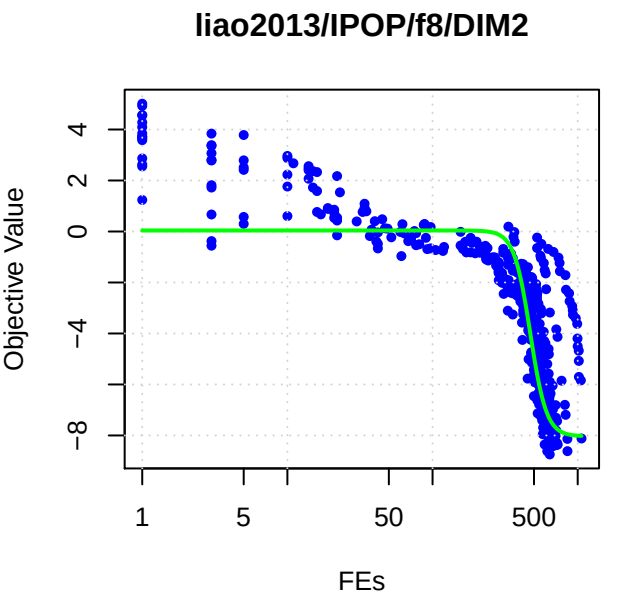
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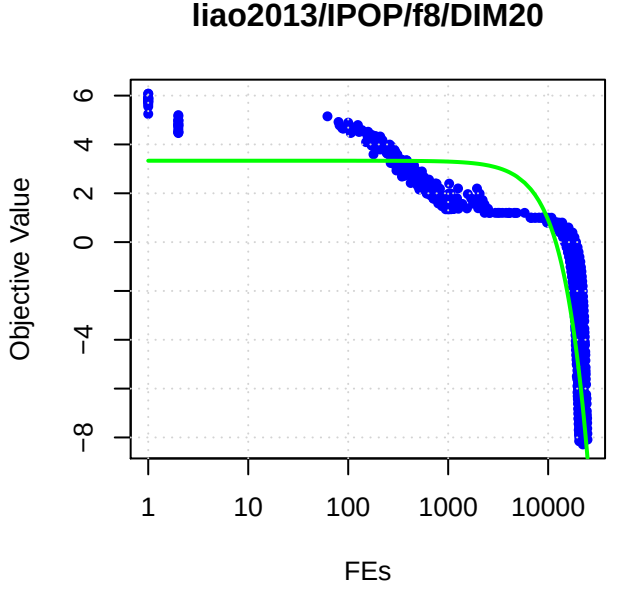
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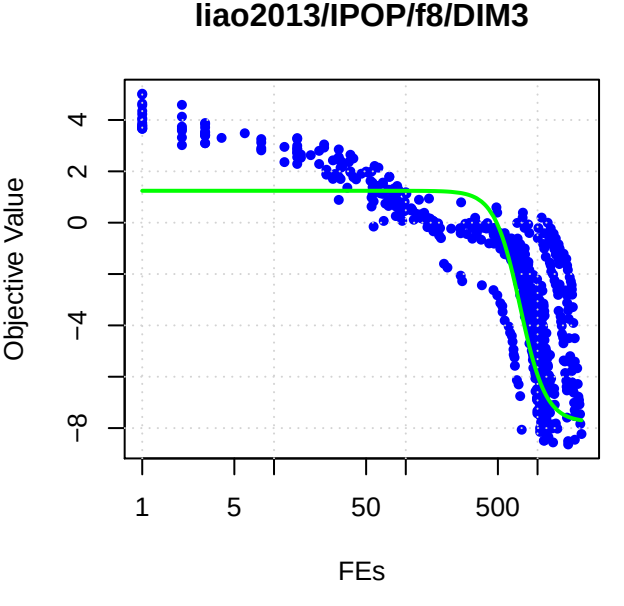
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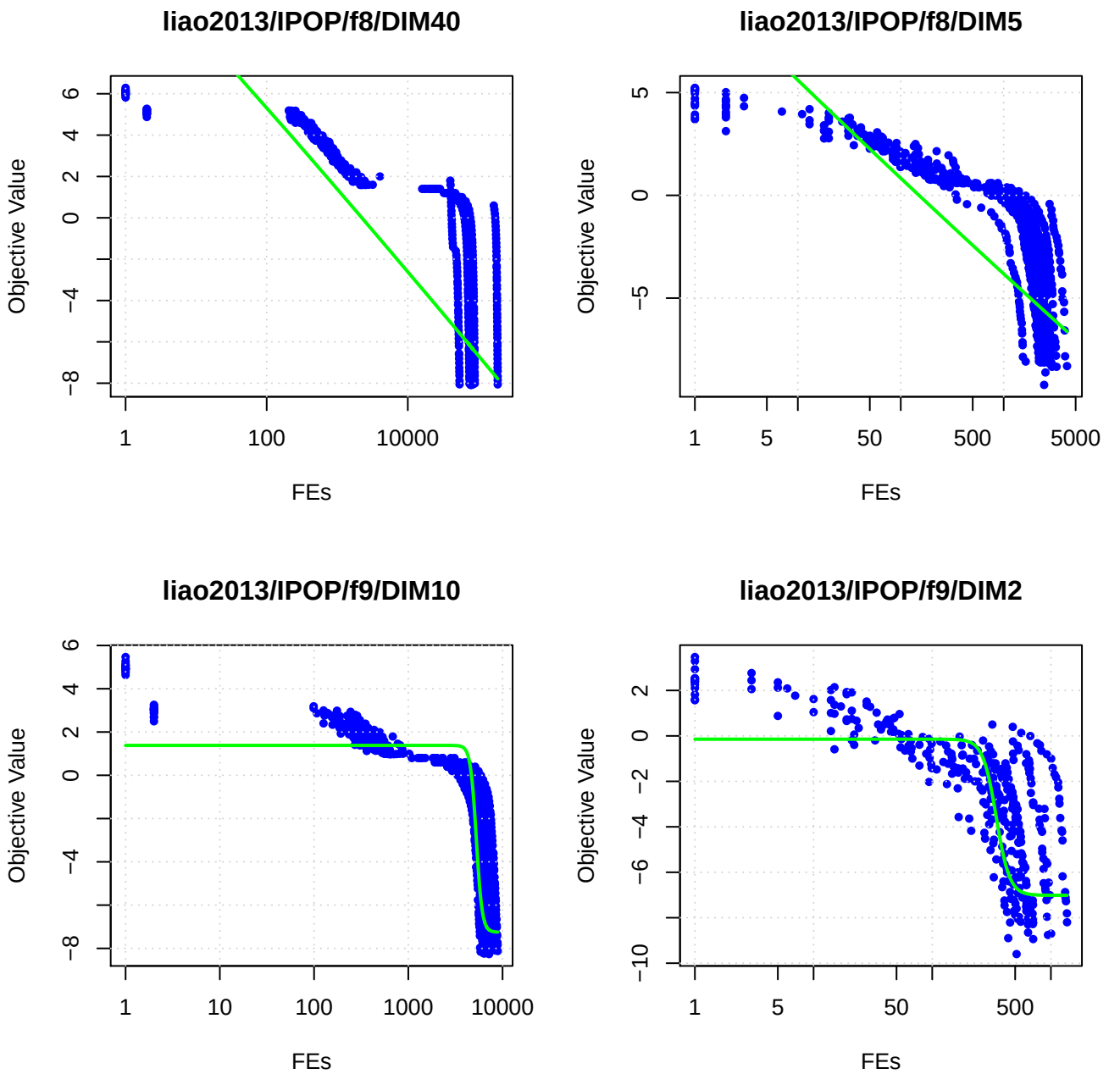
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Objective Value
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Objective Value
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Objective Value
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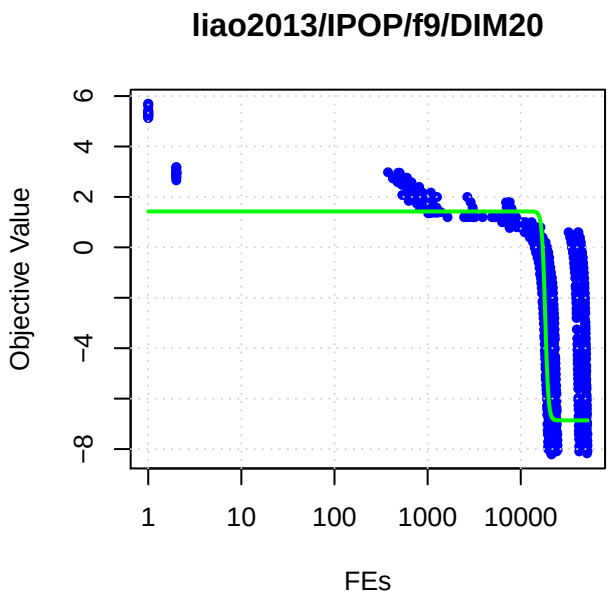
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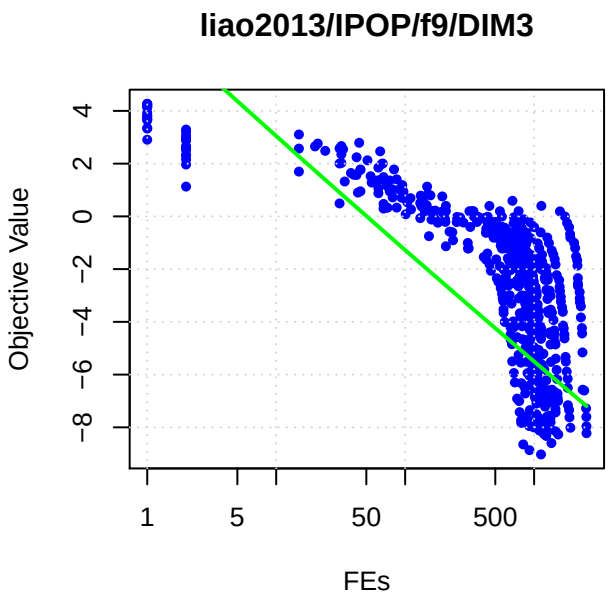
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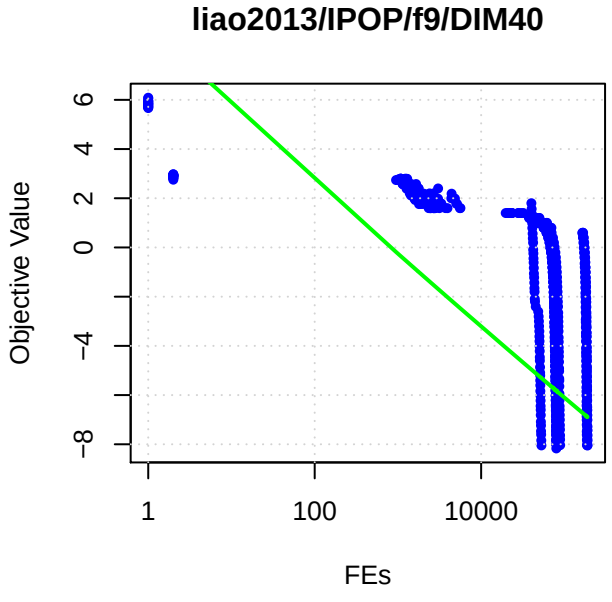
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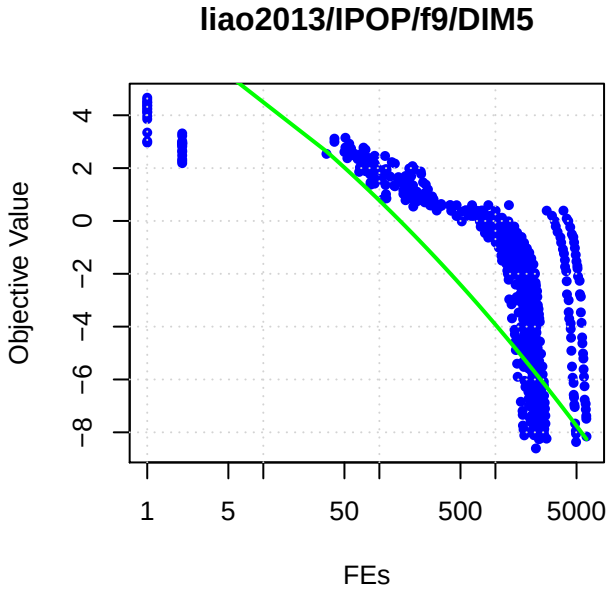
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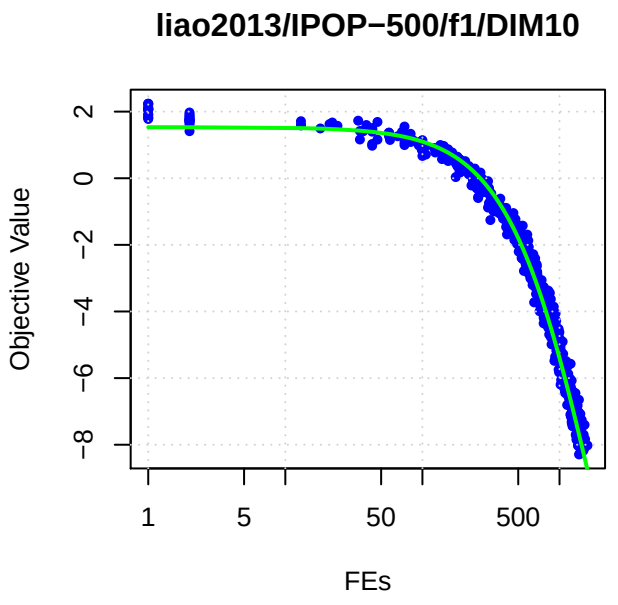
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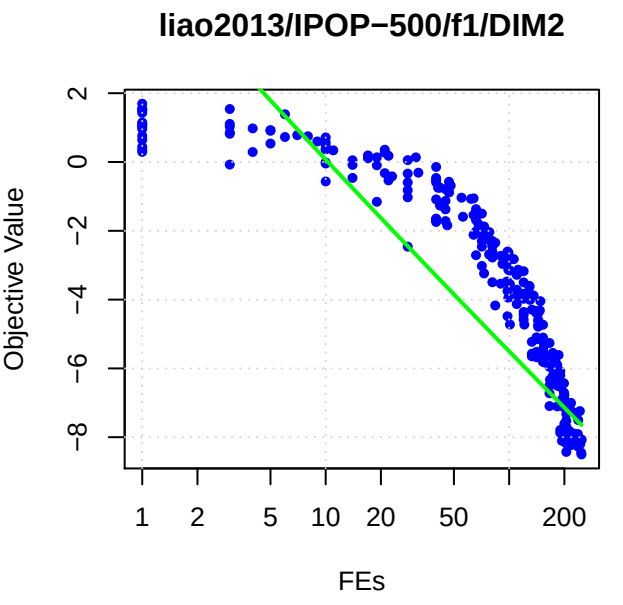
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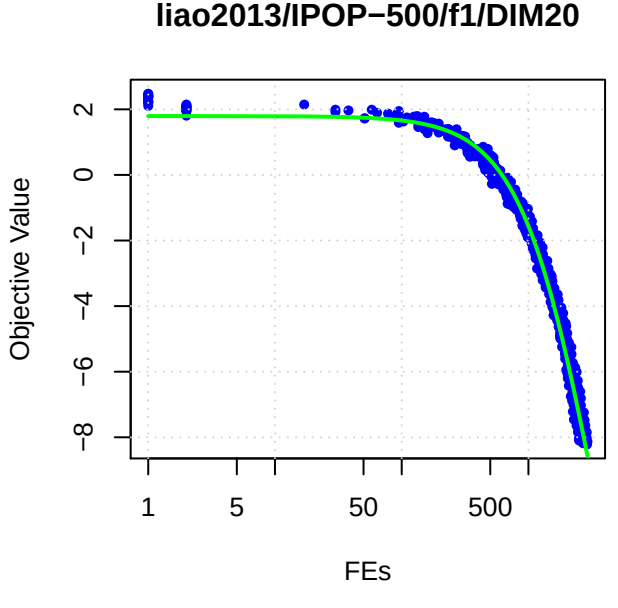
FEs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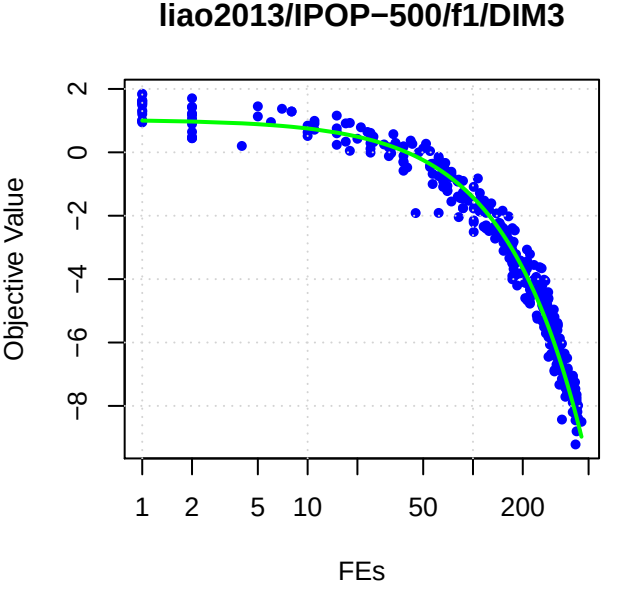
FEs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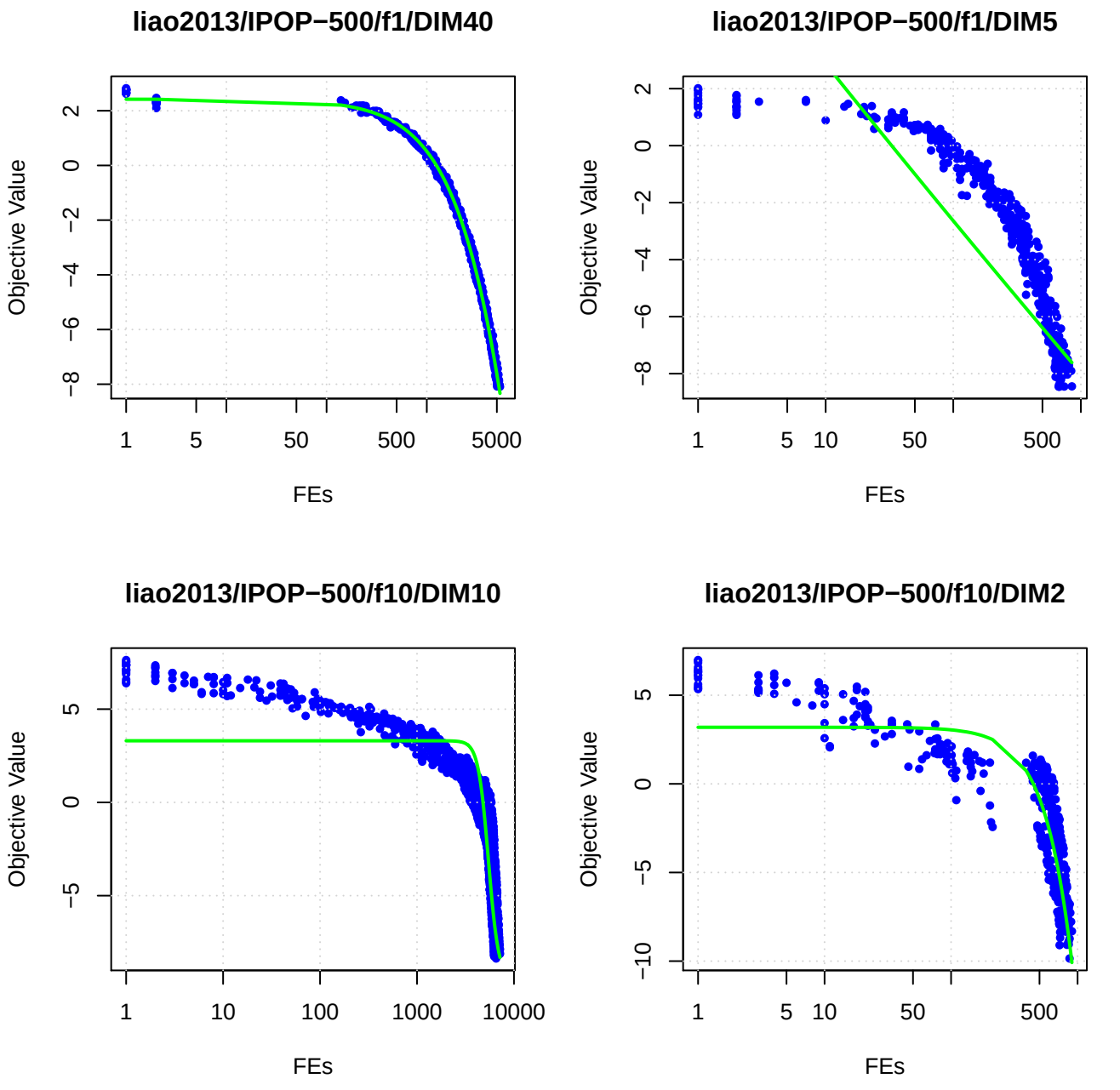
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Objective Value
FEs
liao2013/IPOP−500/f10/DIM2
Objective Value
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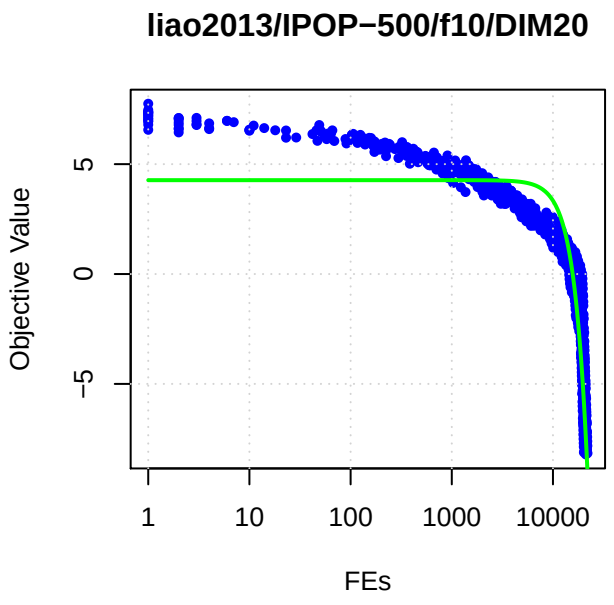
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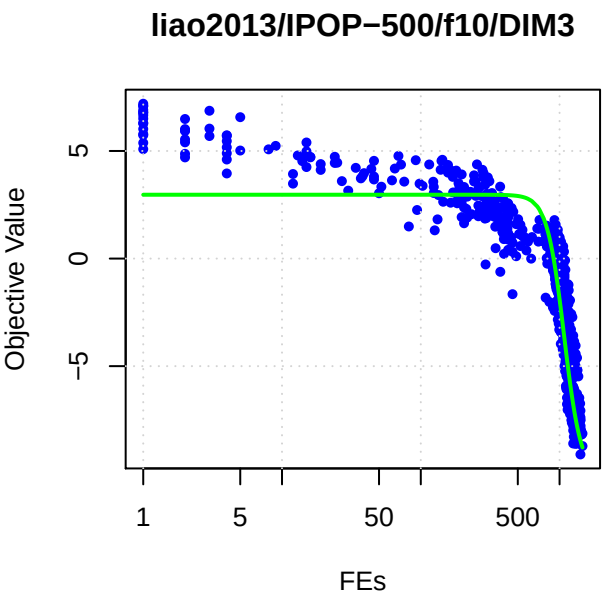
FEs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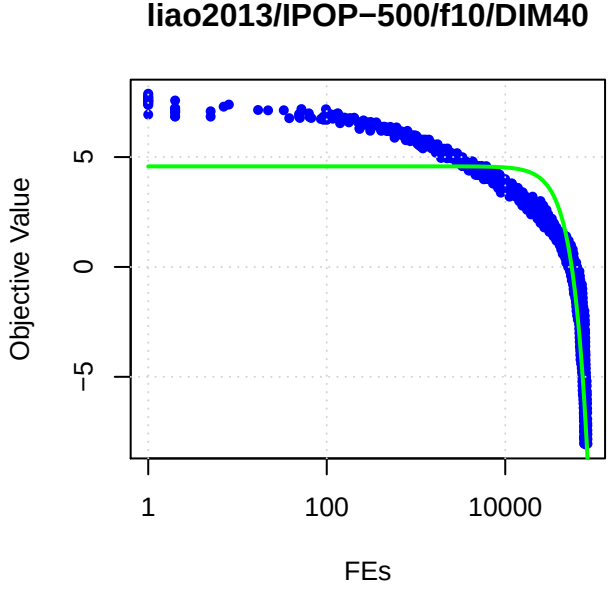
FEs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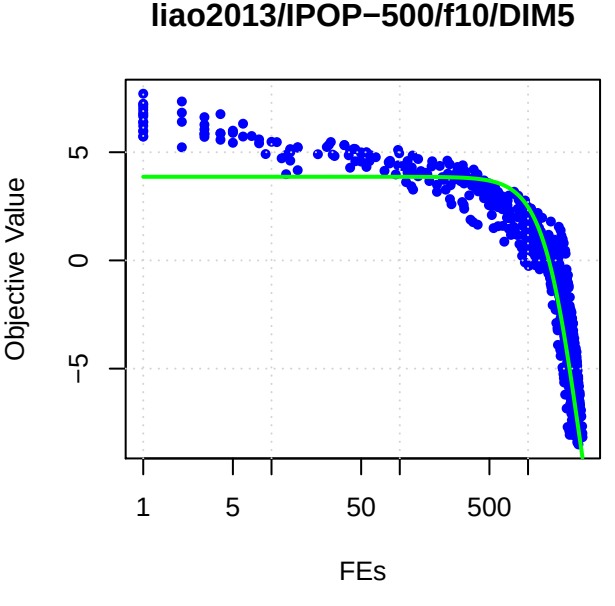
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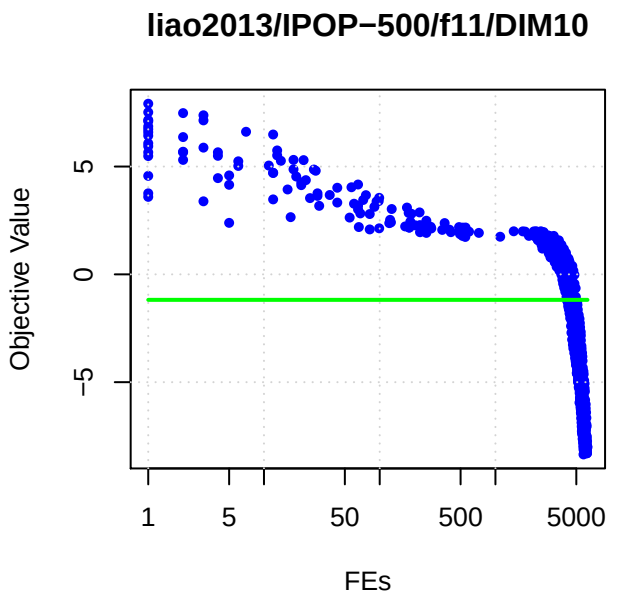
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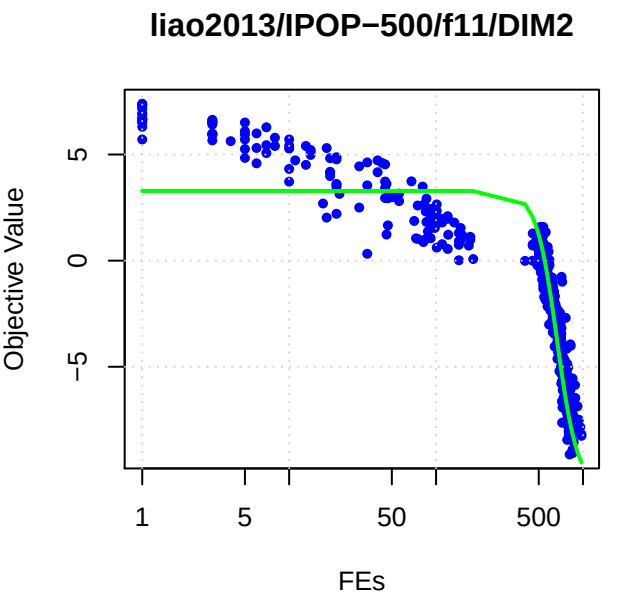
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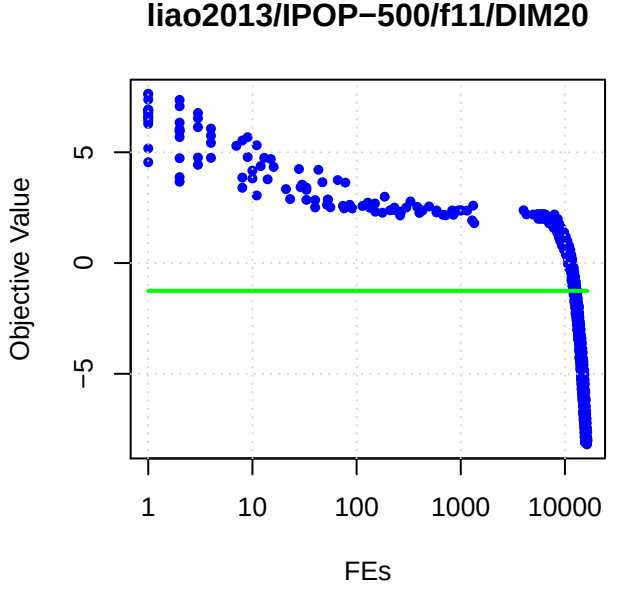
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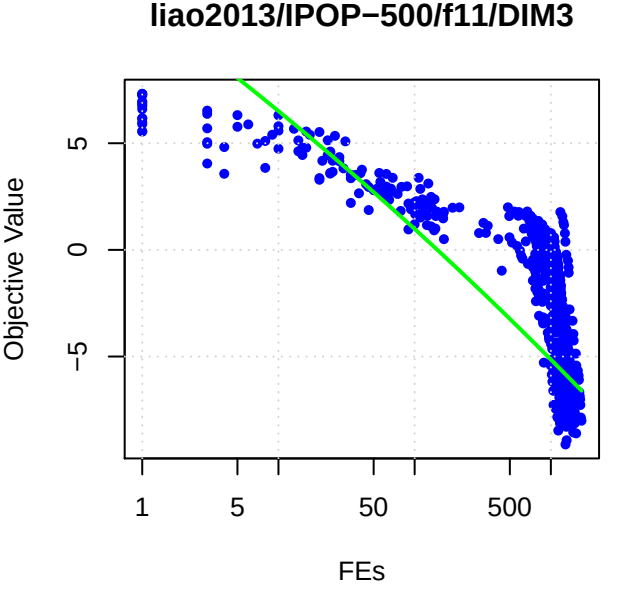
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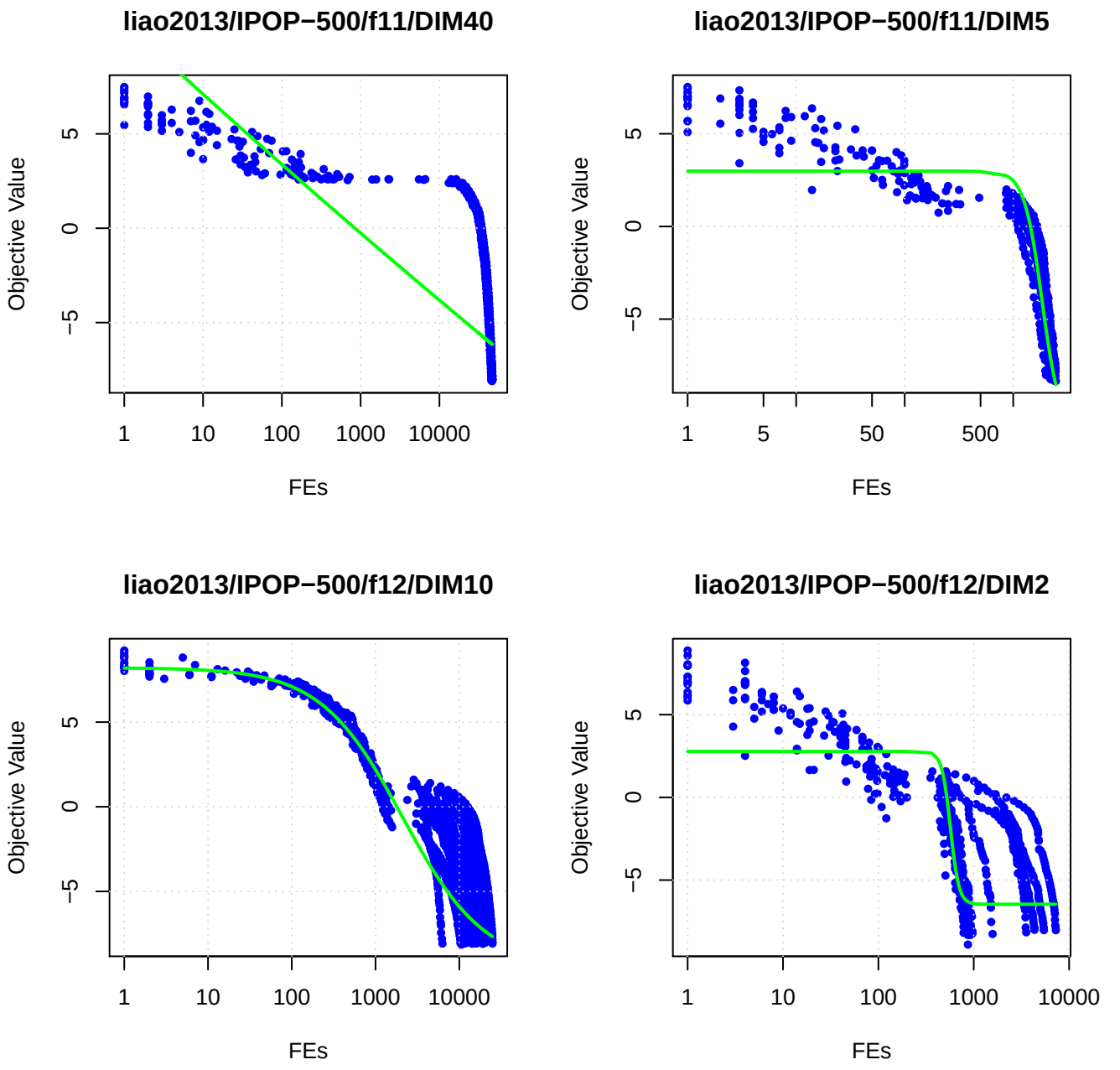
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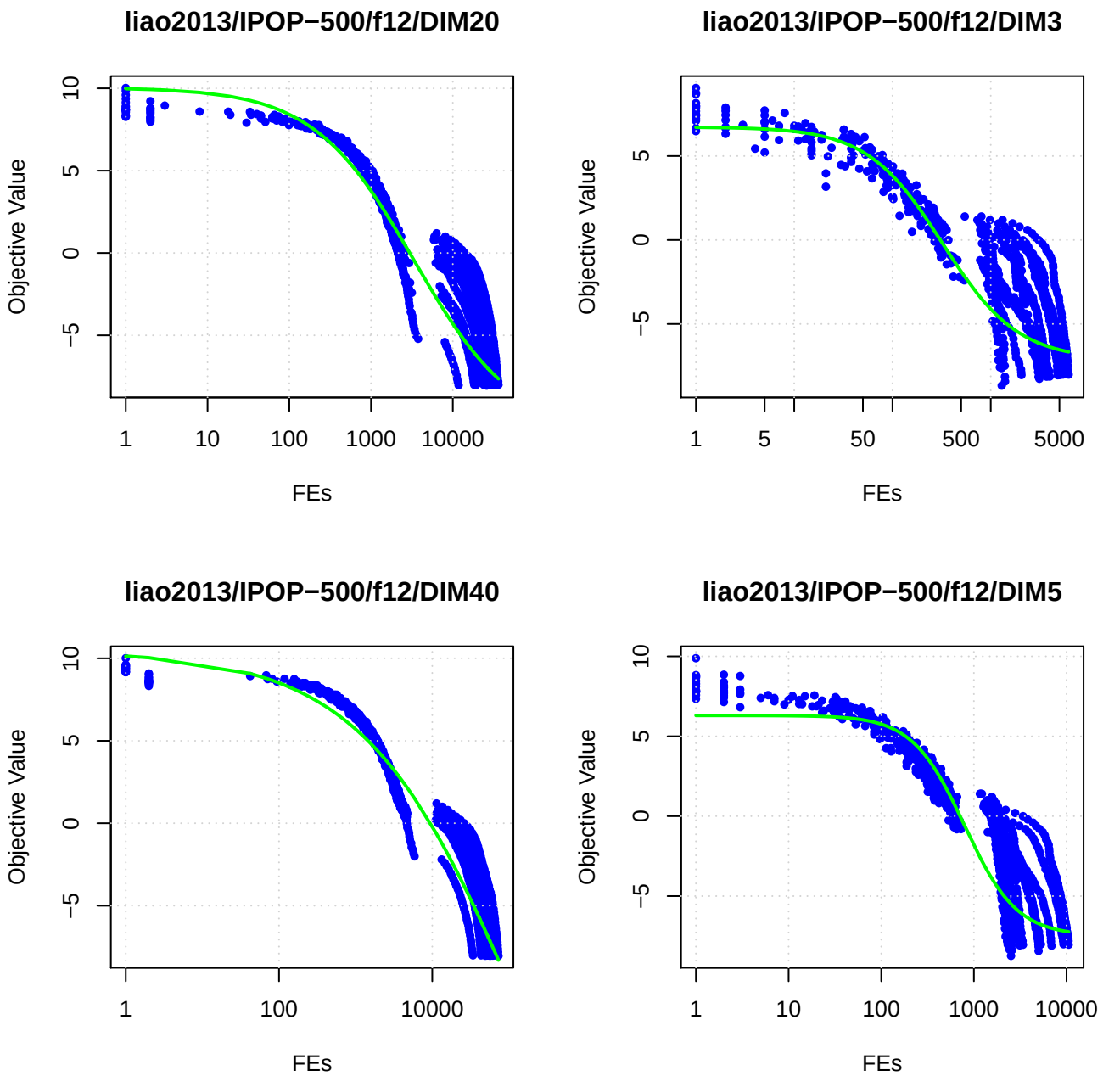
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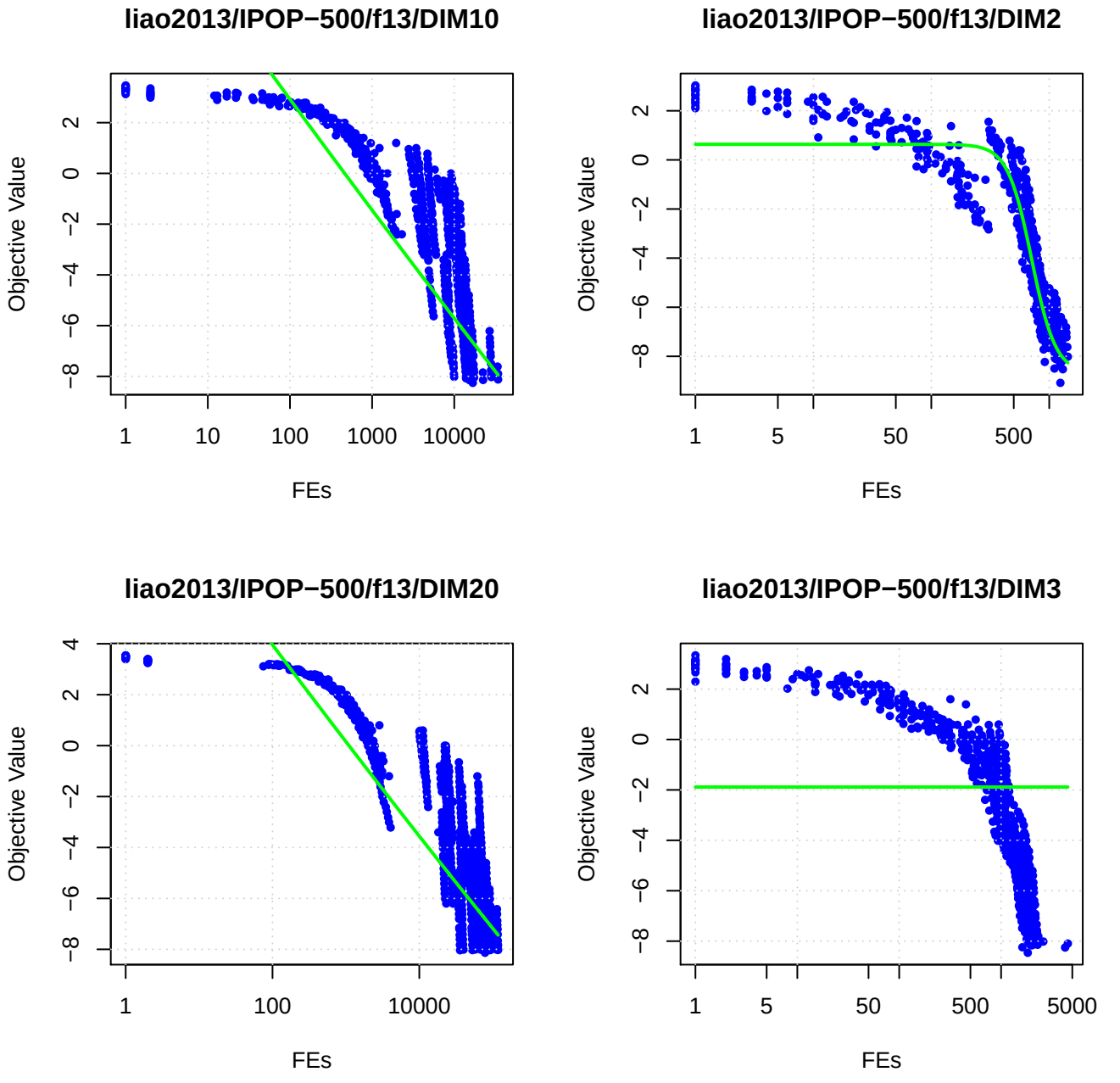
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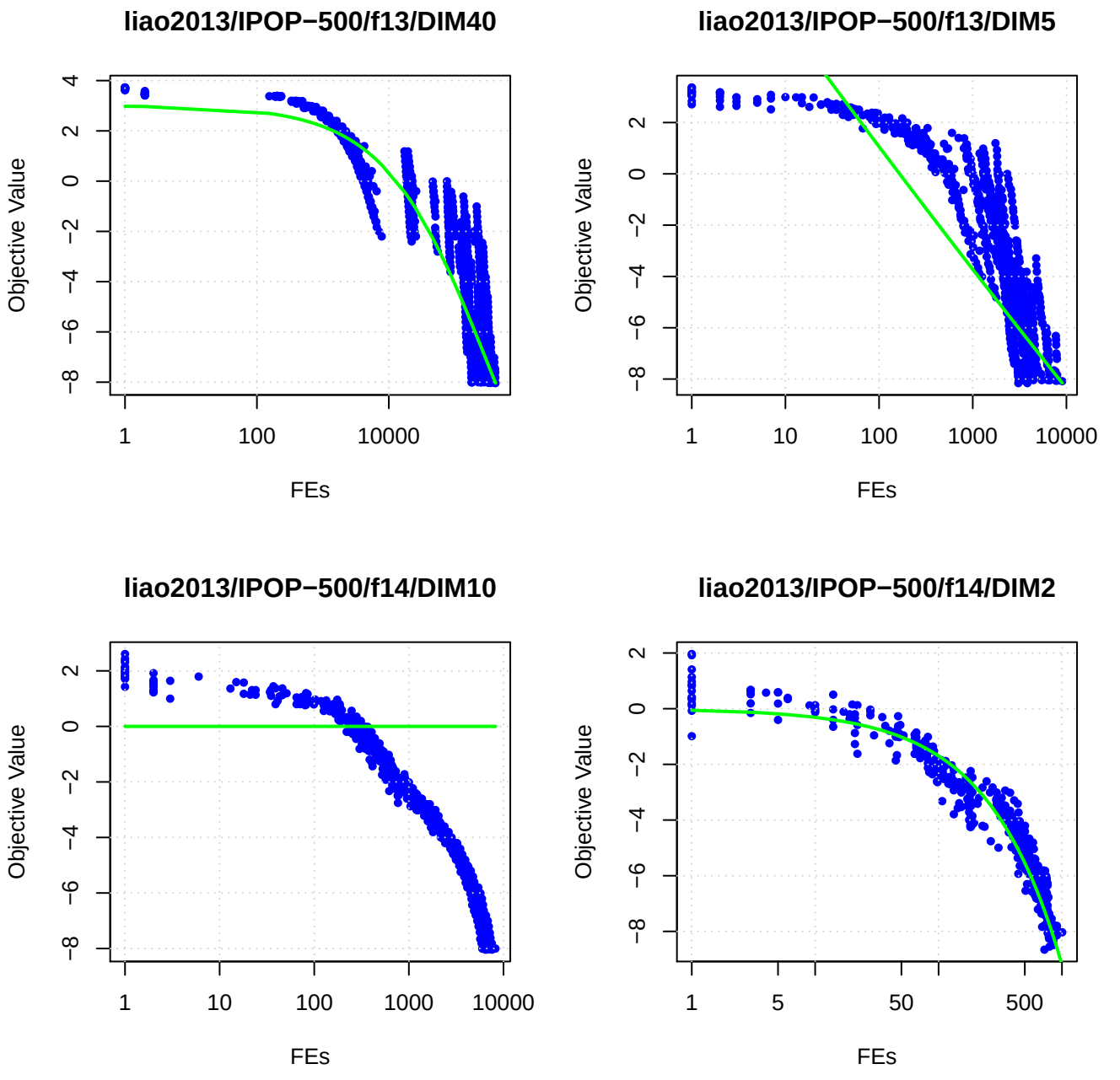
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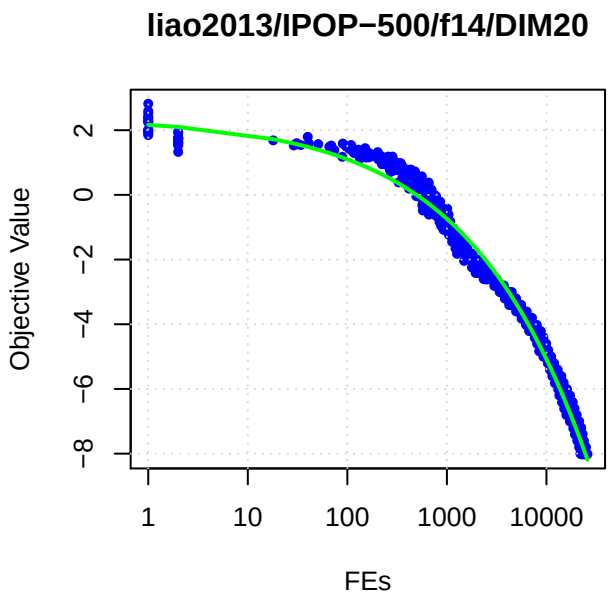
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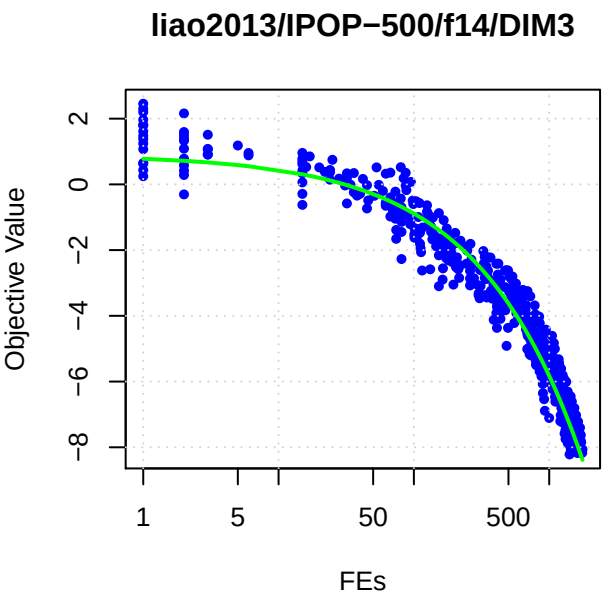
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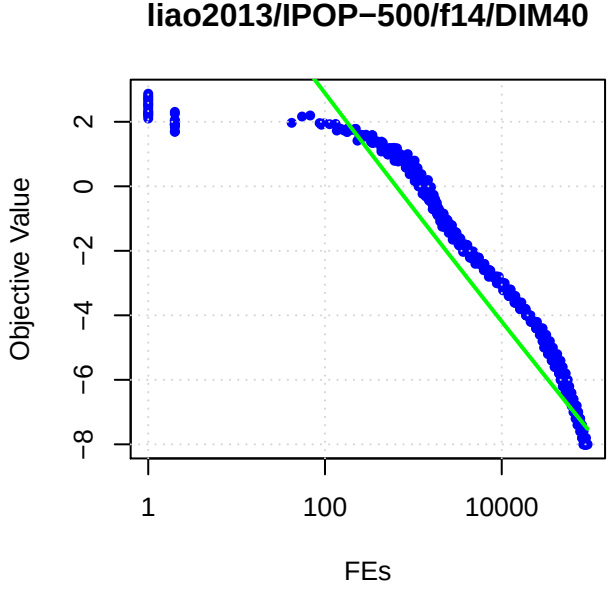
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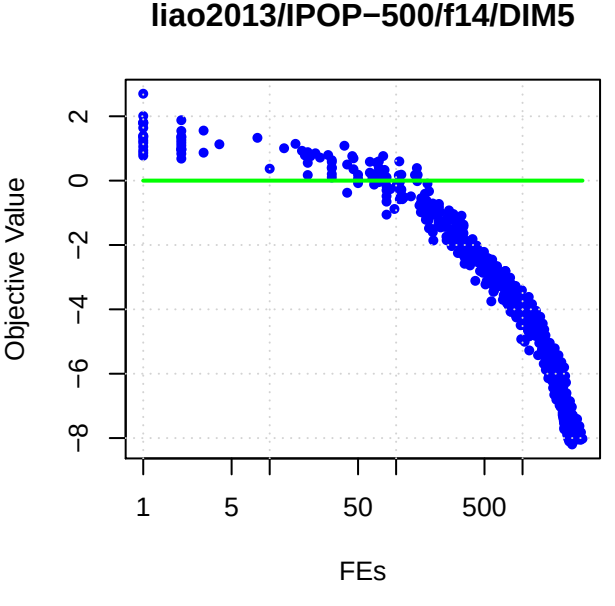
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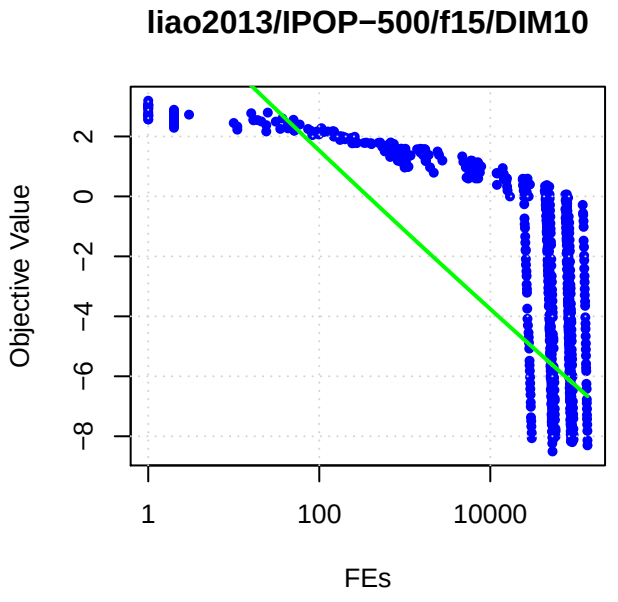
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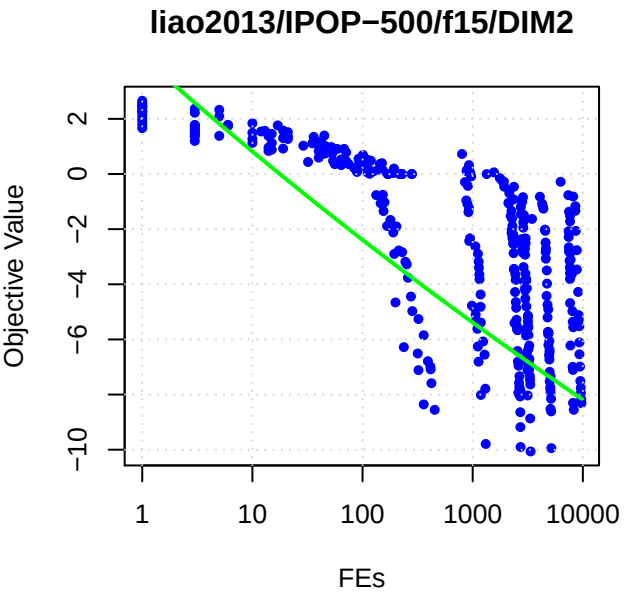
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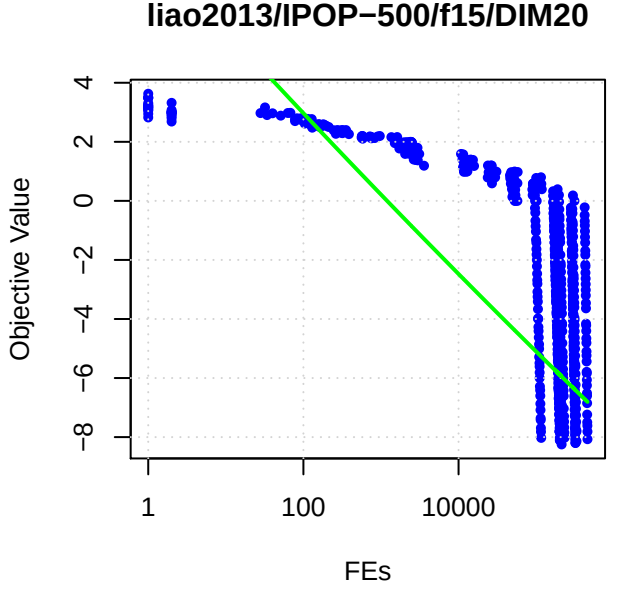
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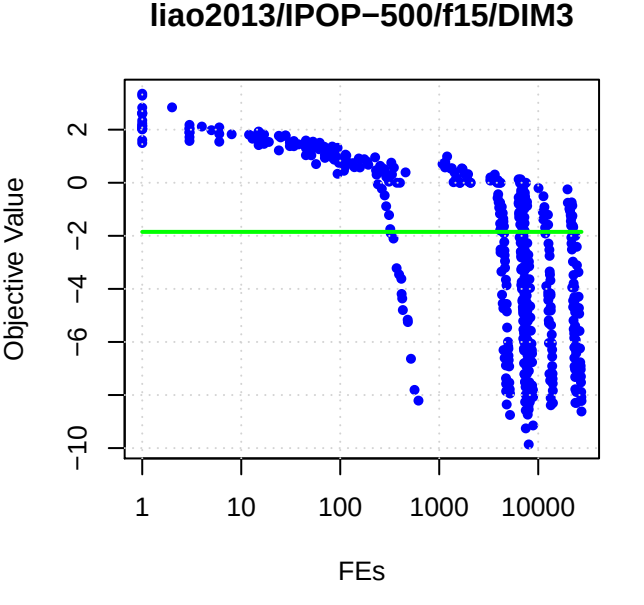
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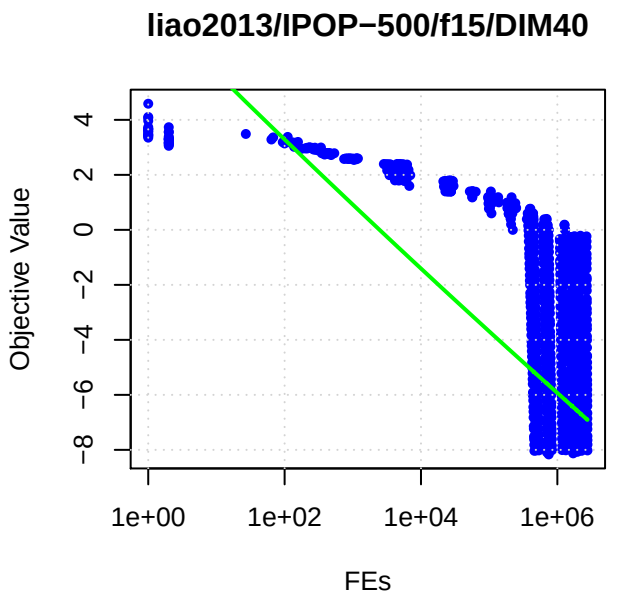
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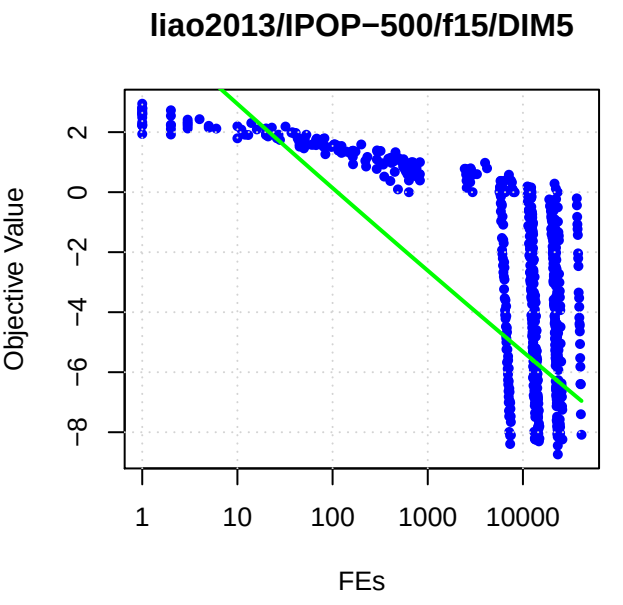
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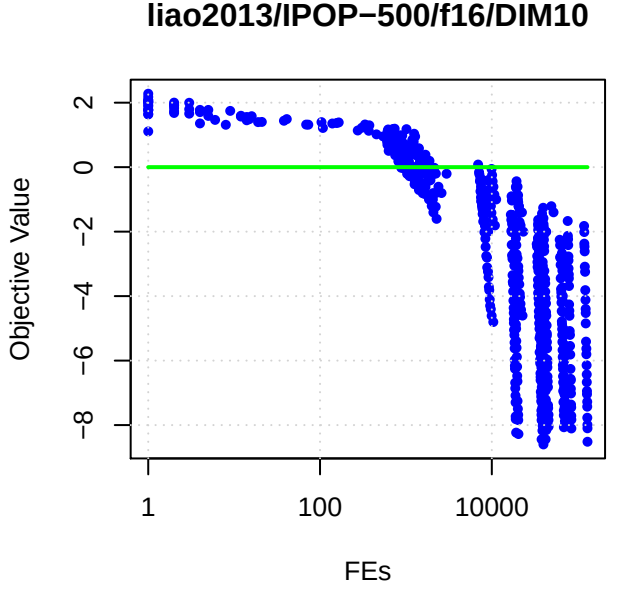
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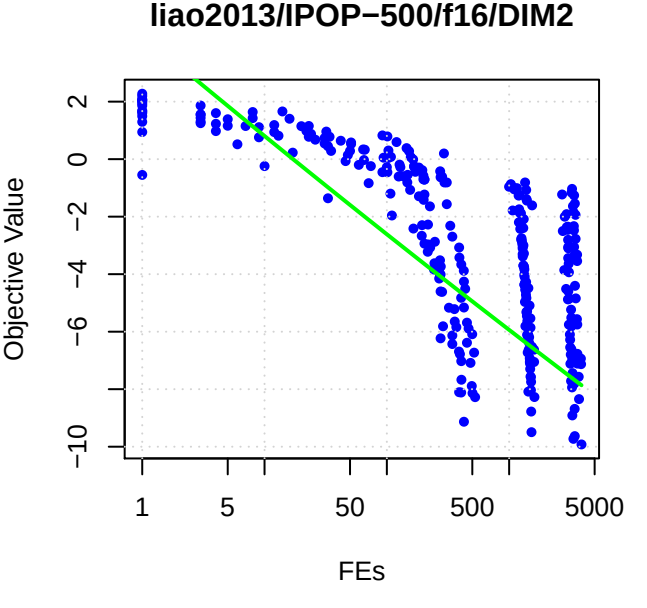
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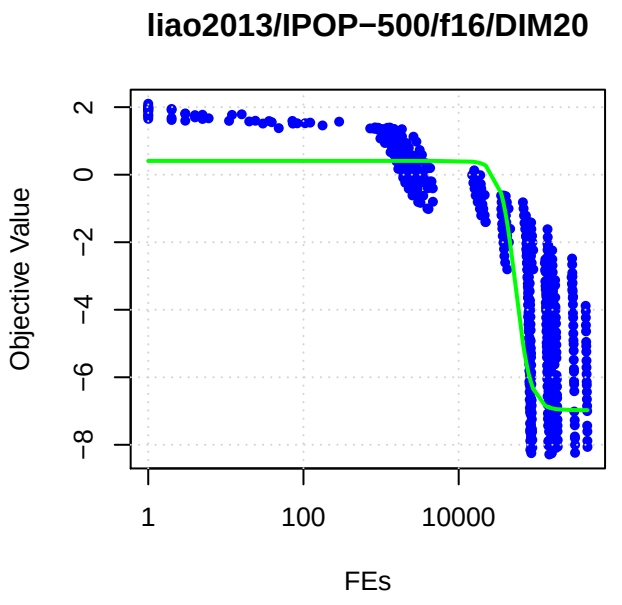
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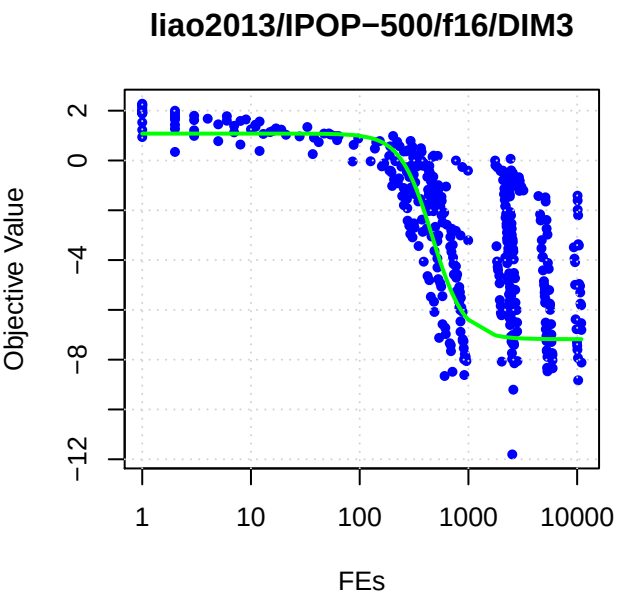
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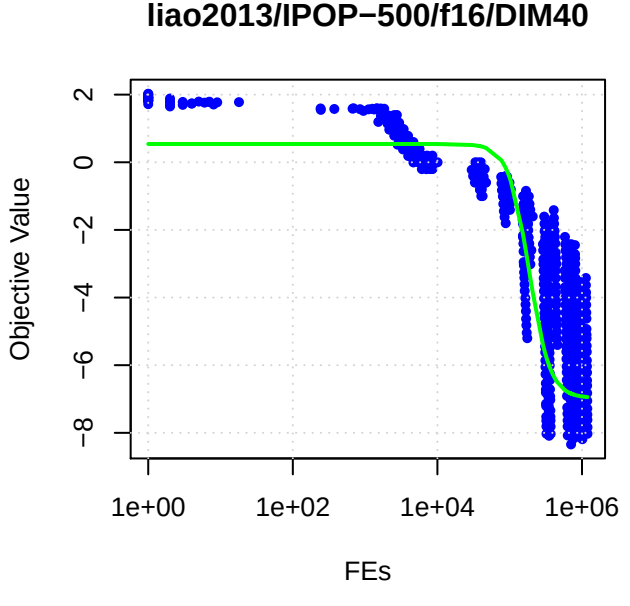
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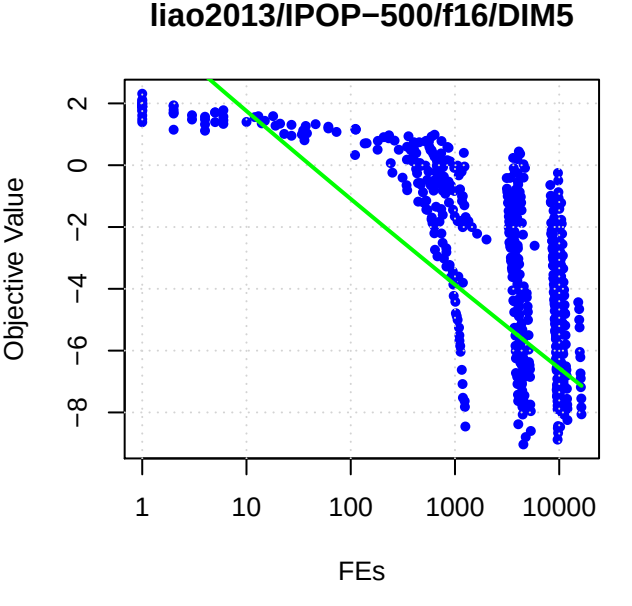
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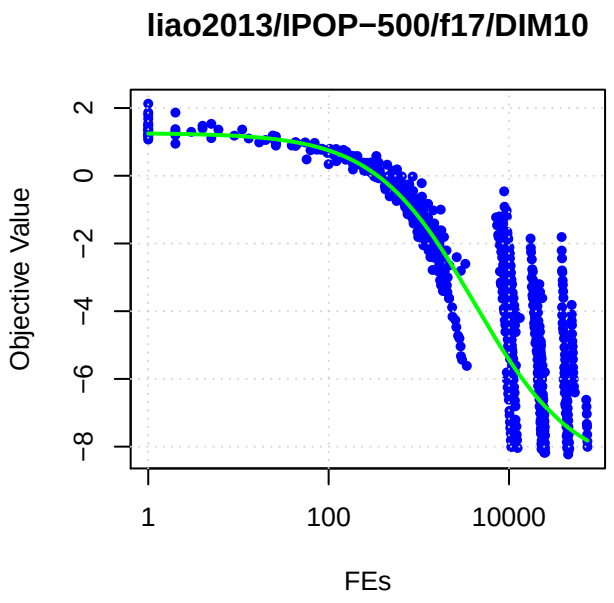
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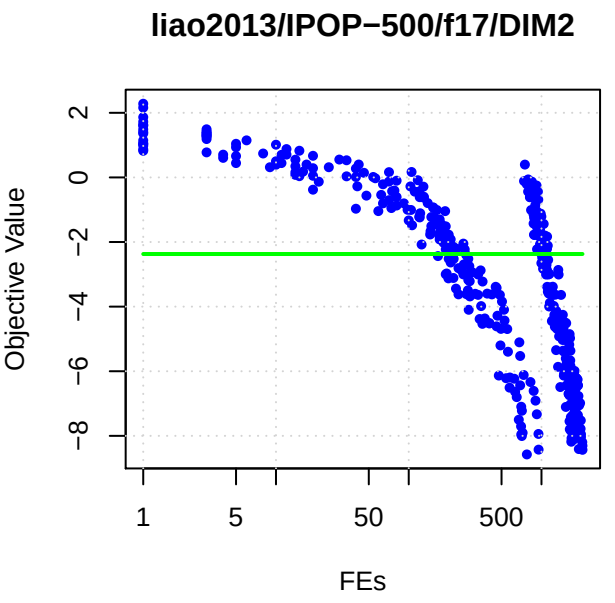
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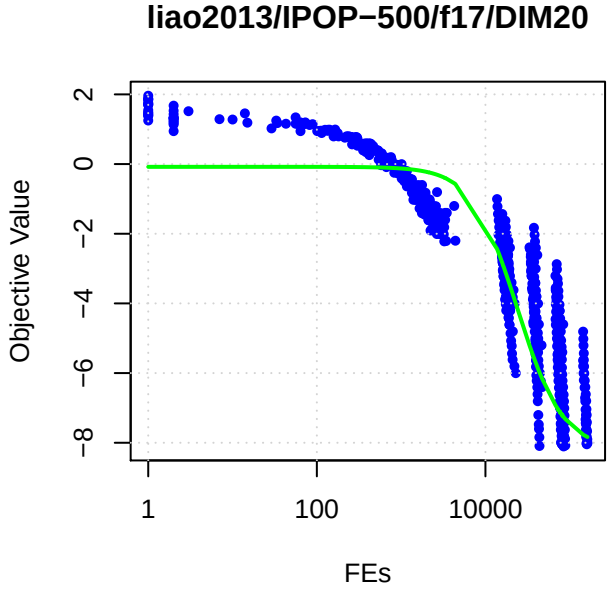
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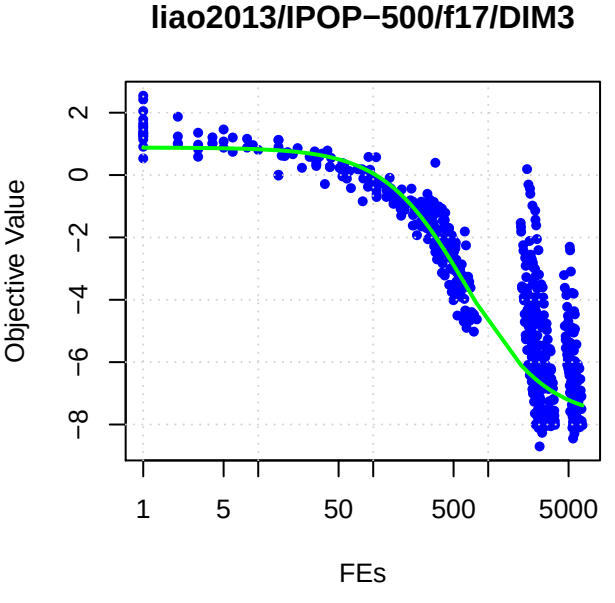
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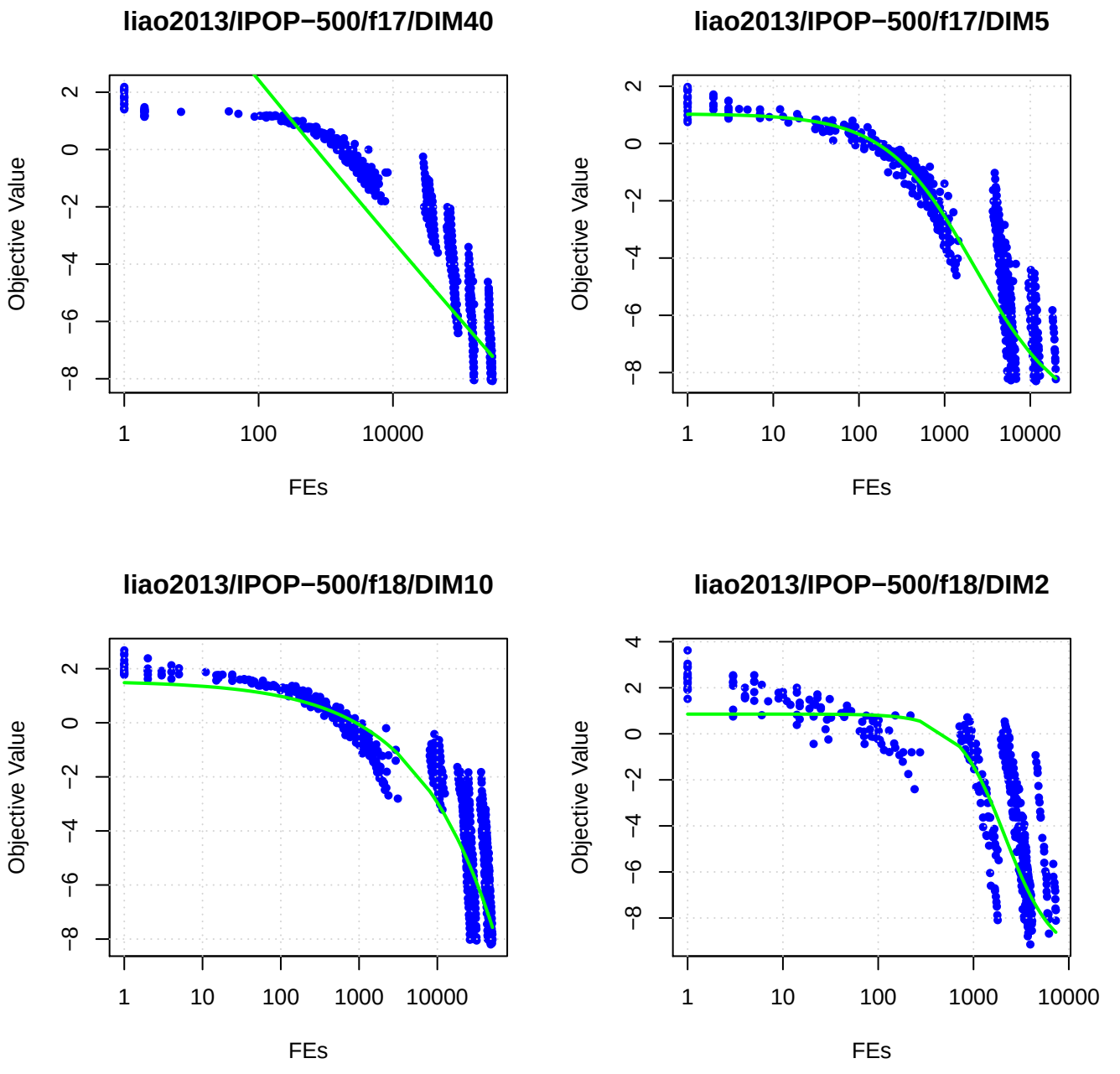
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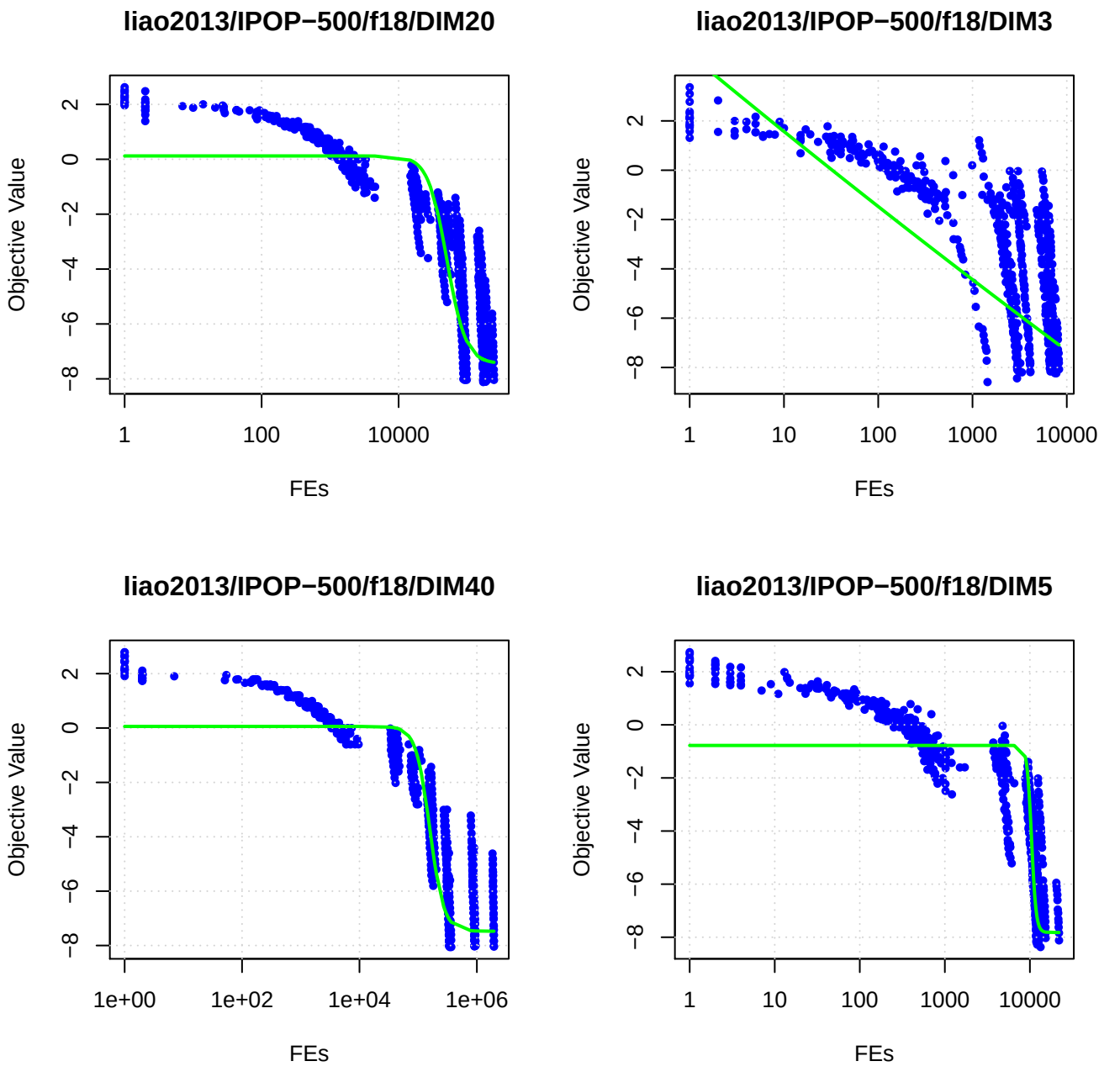
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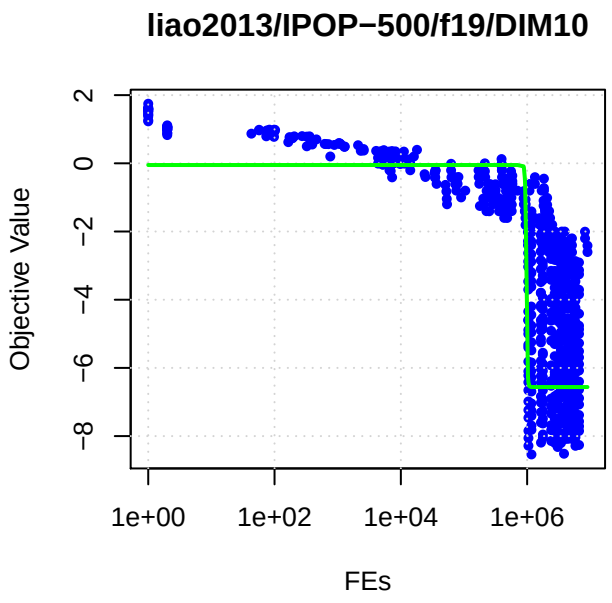
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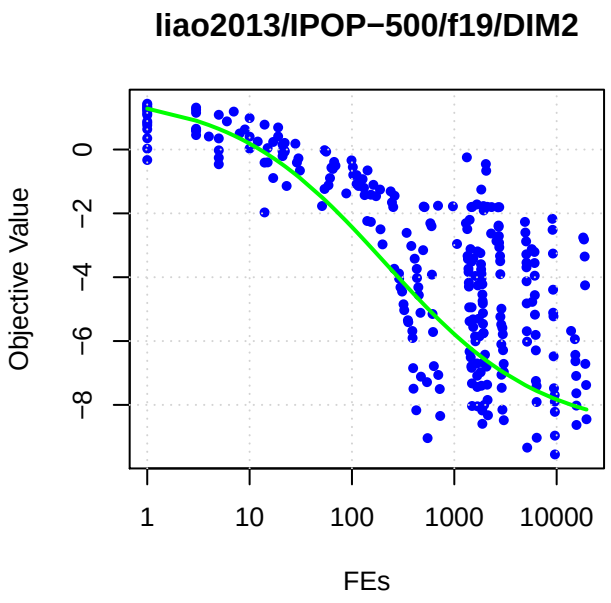
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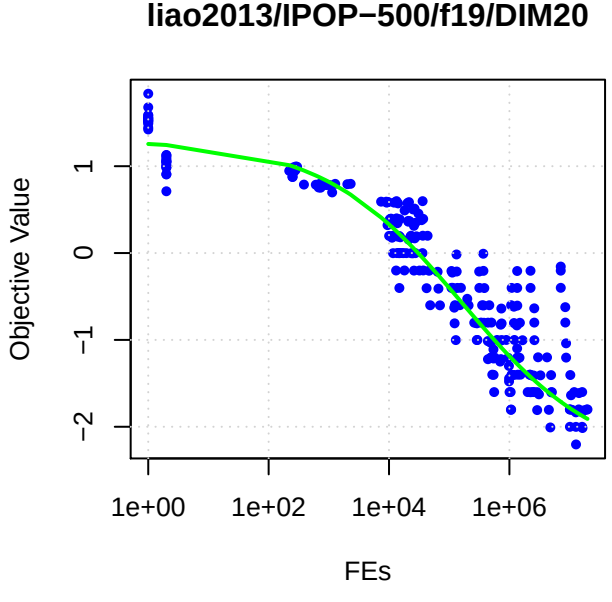
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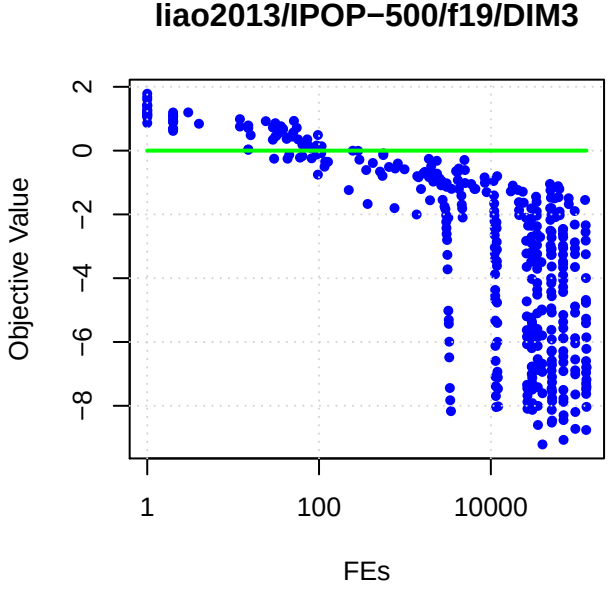
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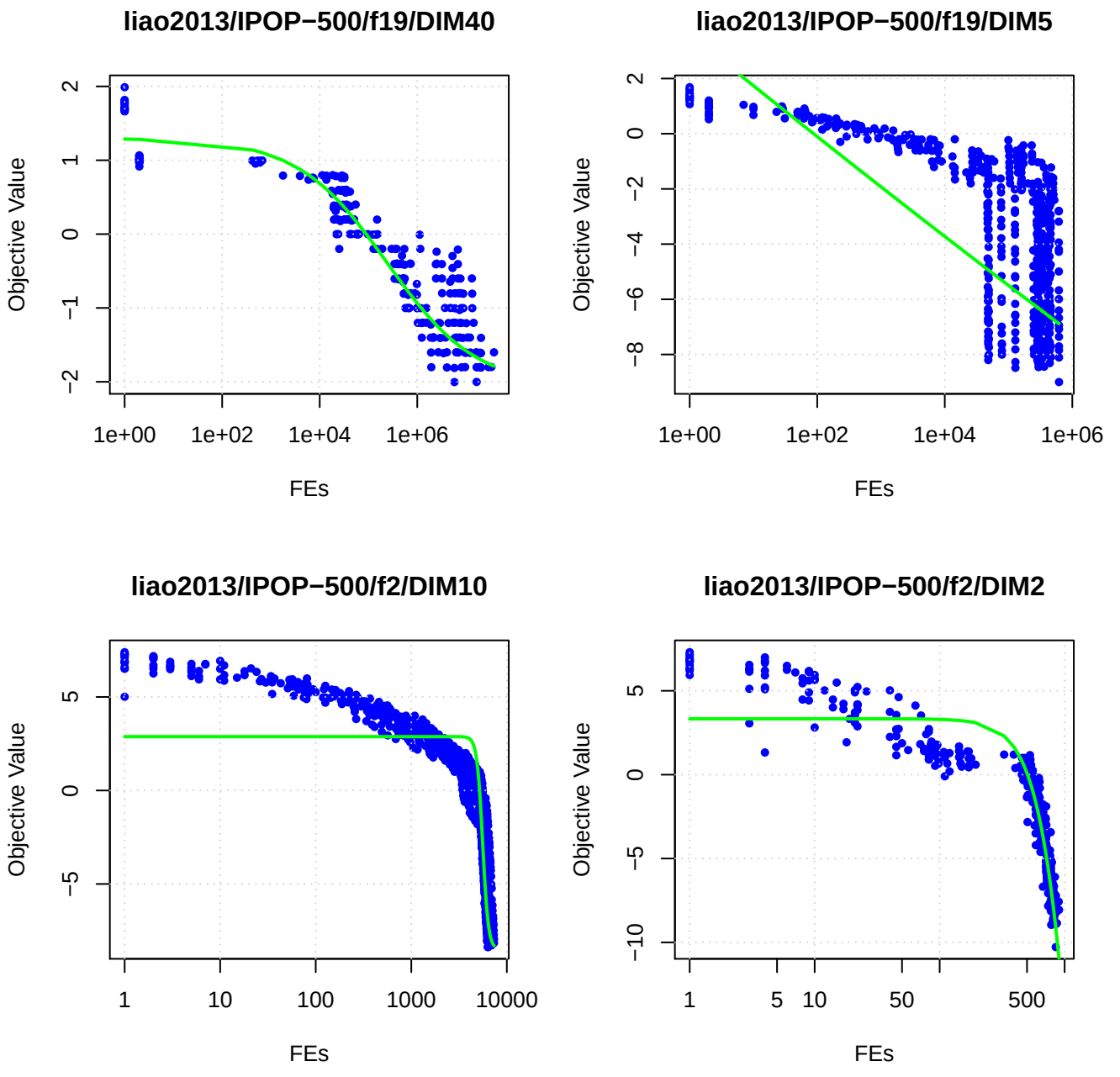
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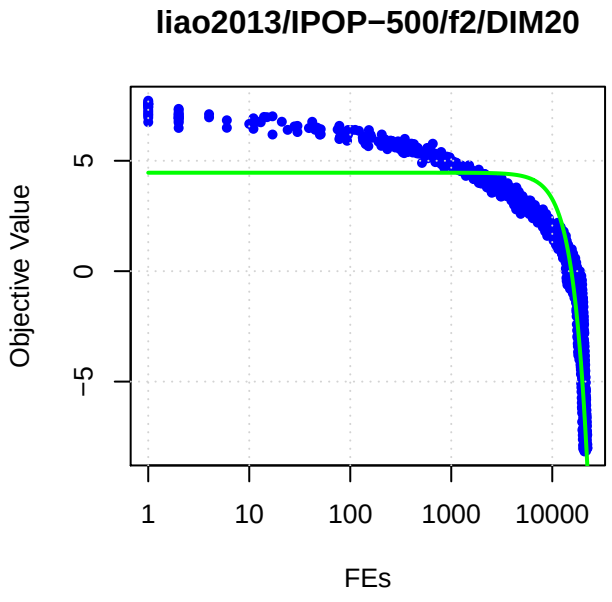
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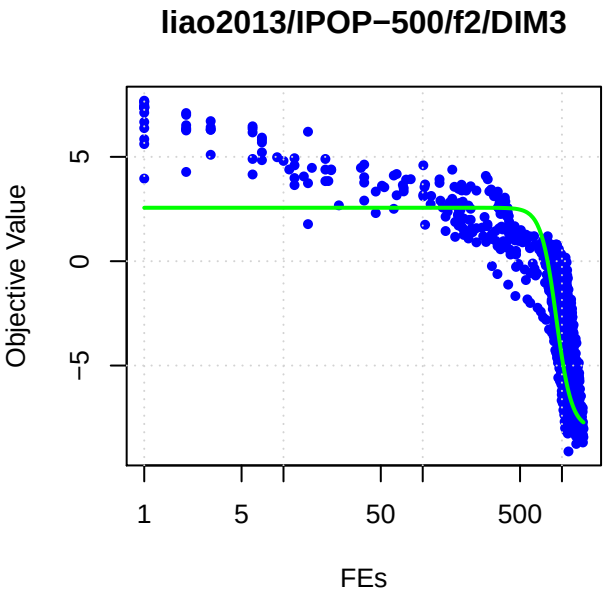
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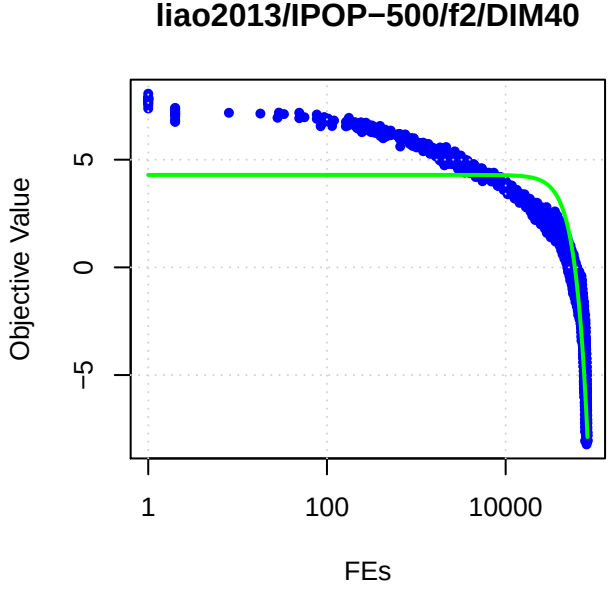
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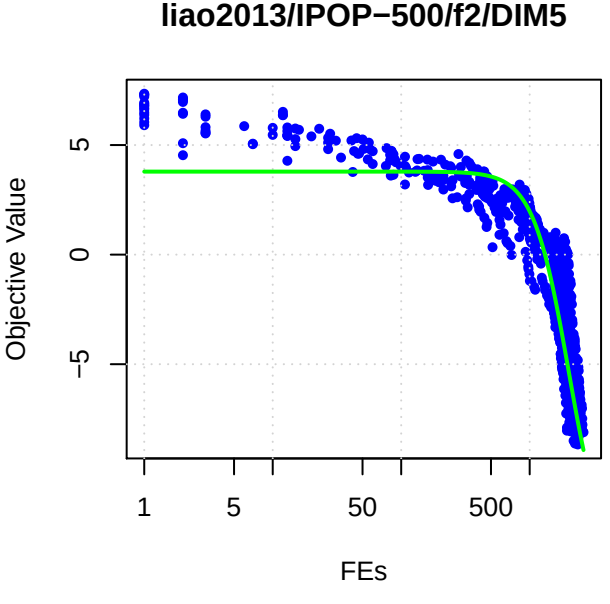
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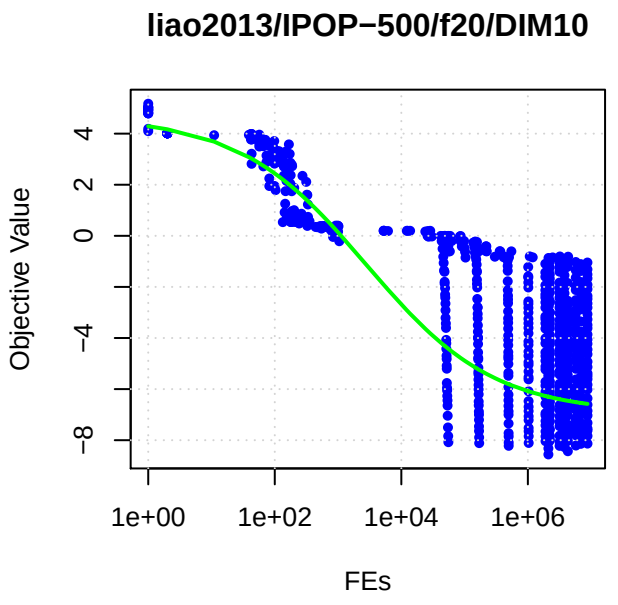
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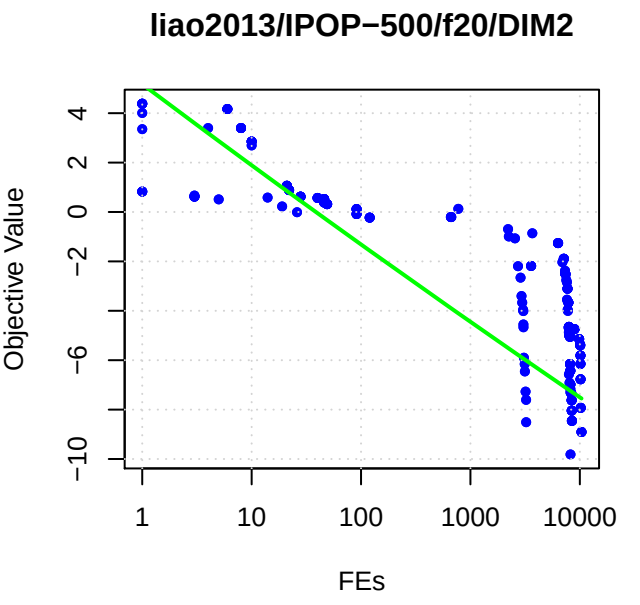
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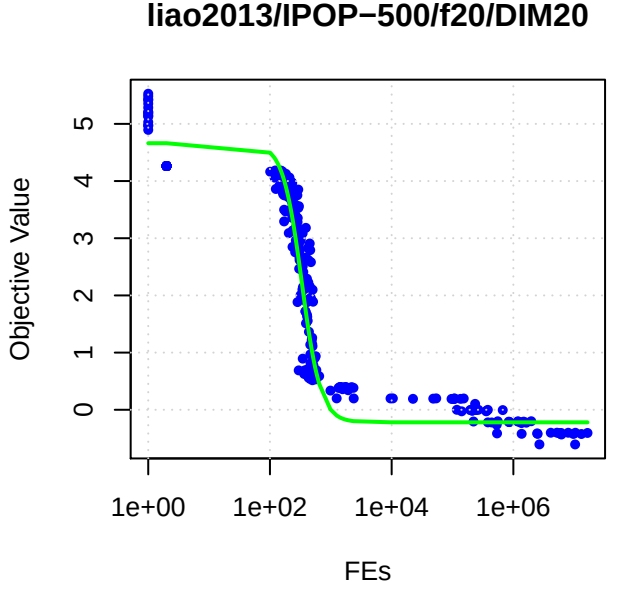
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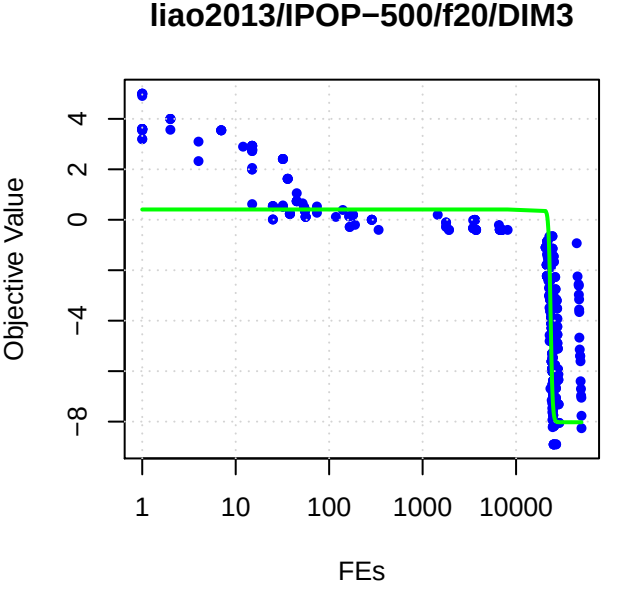
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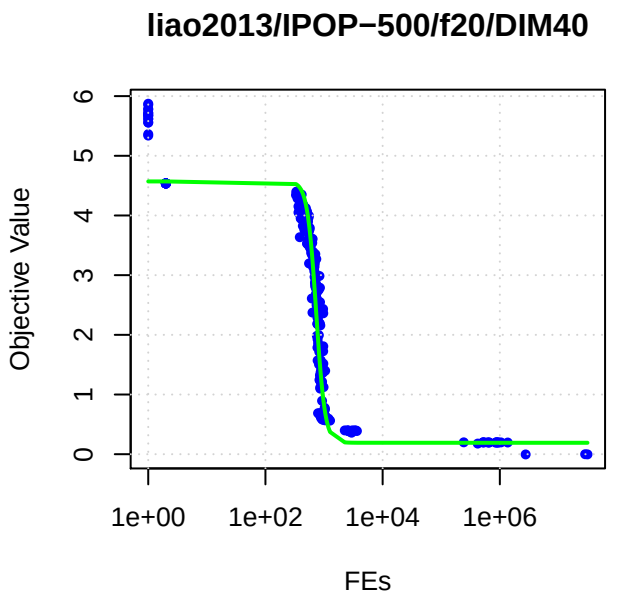
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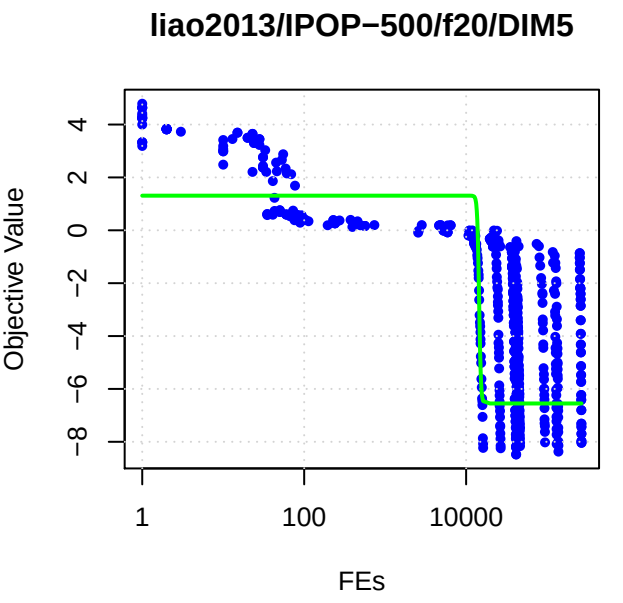
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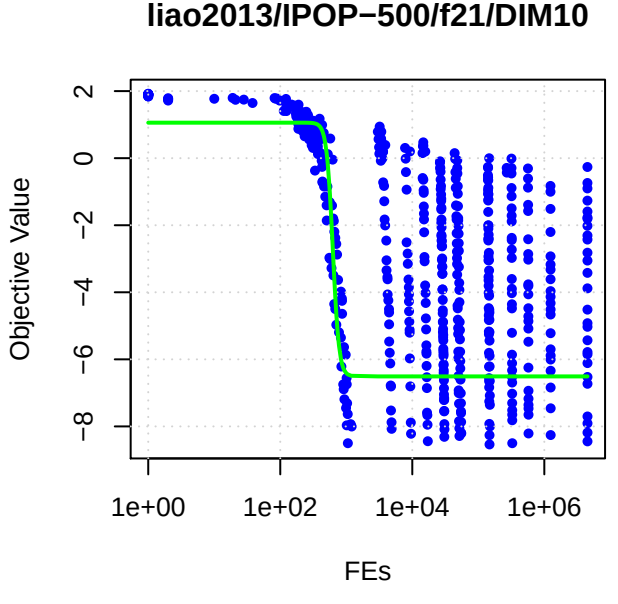
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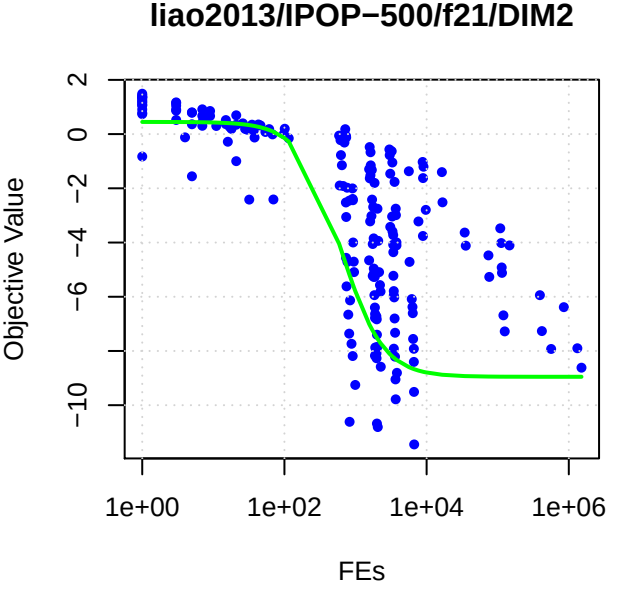
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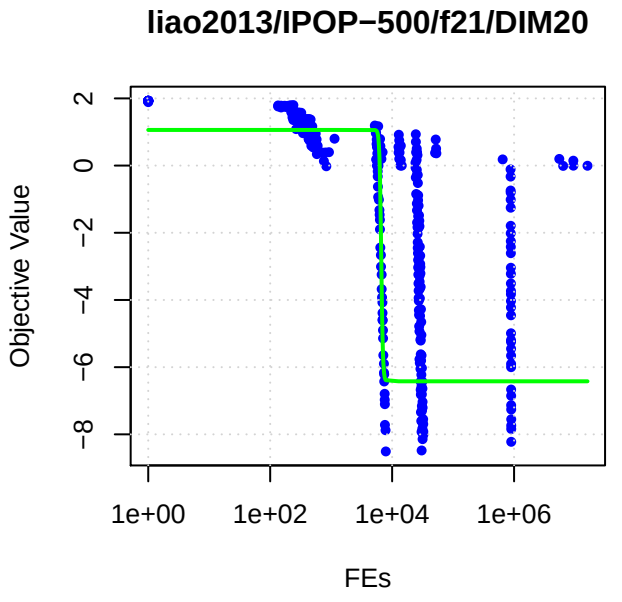
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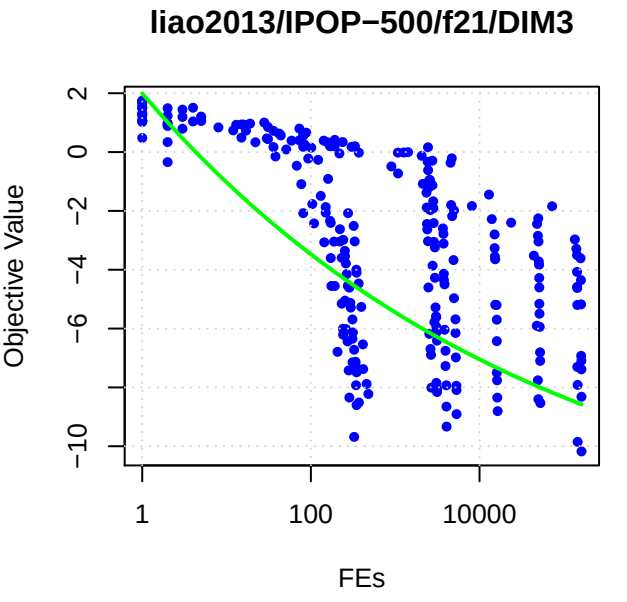
FEs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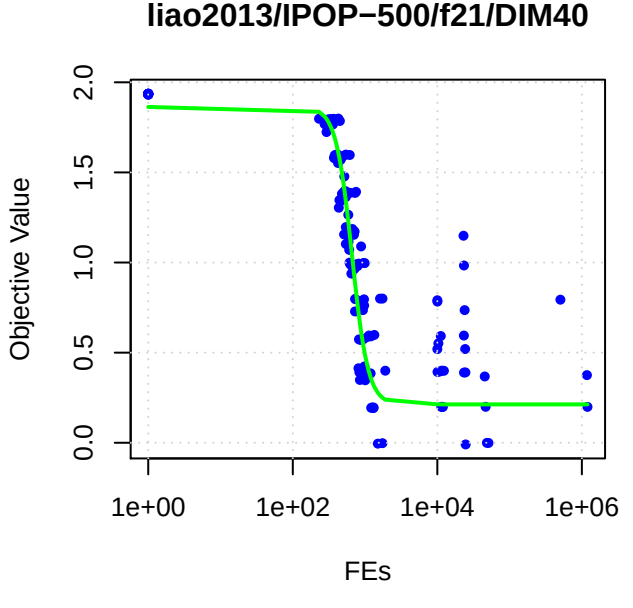
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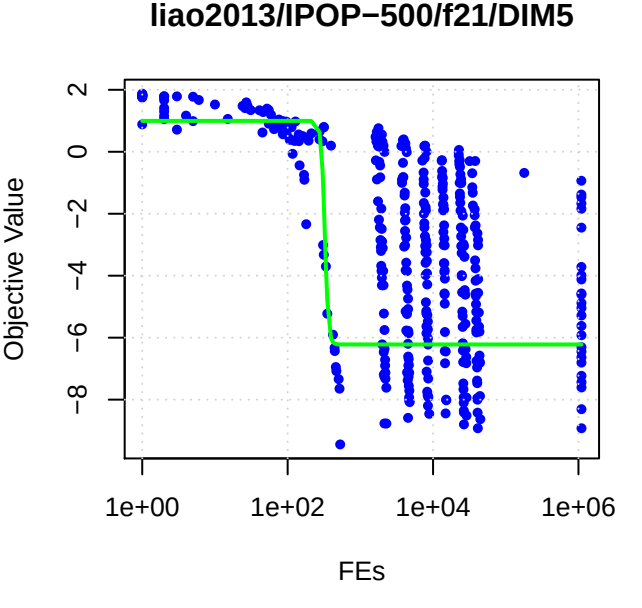
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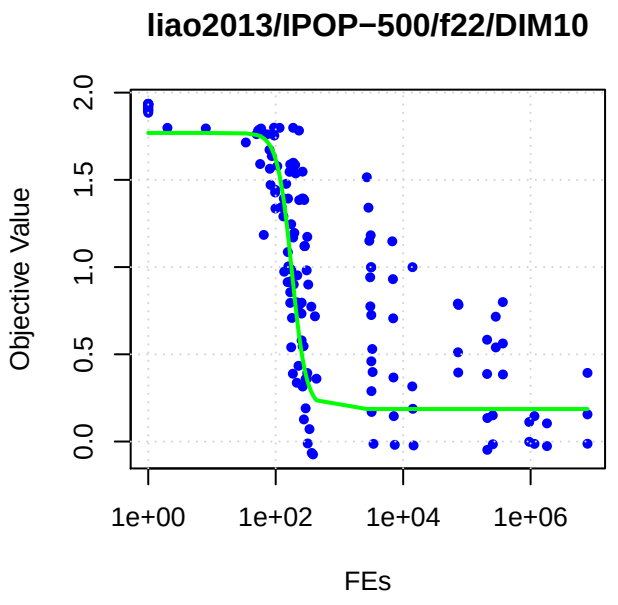
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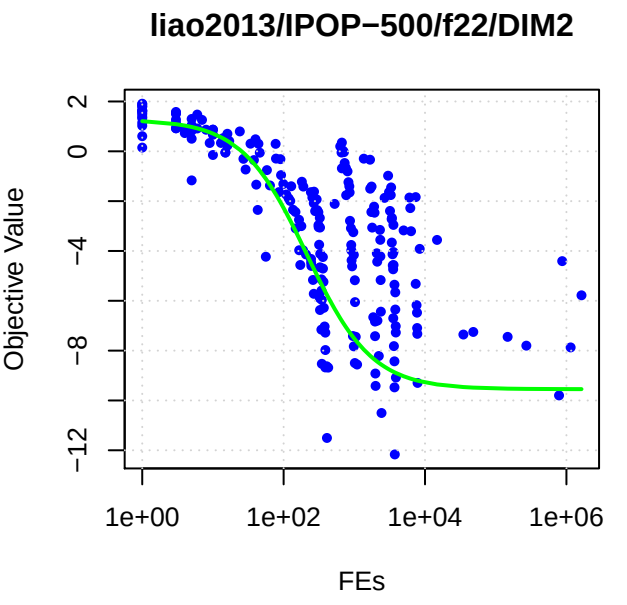
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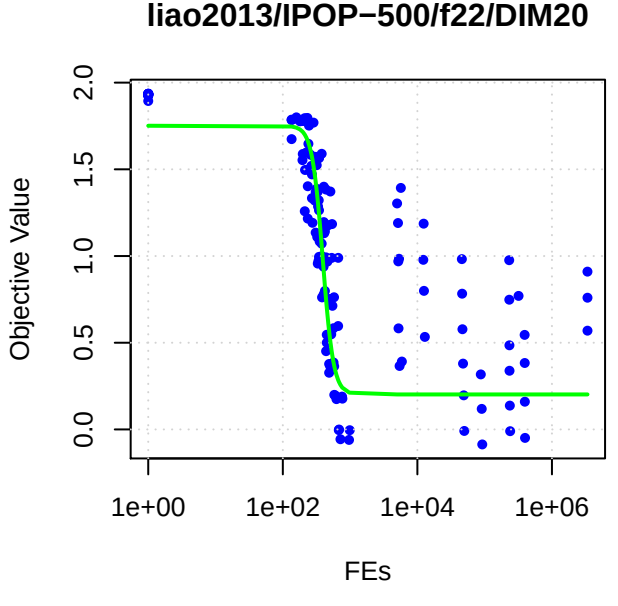
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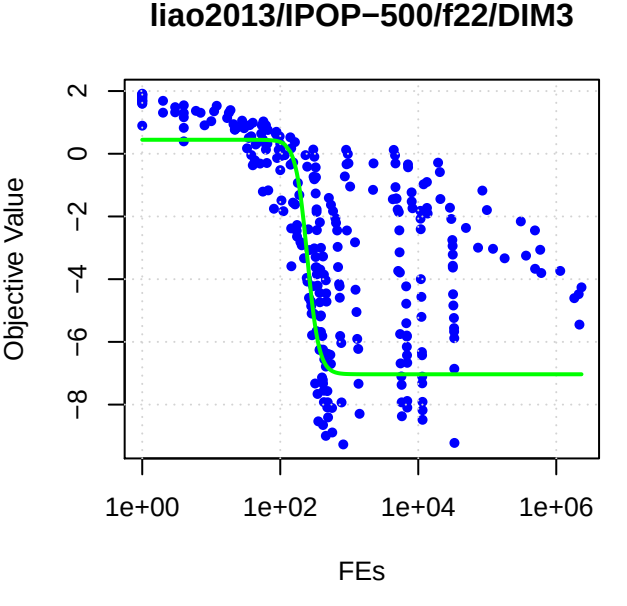
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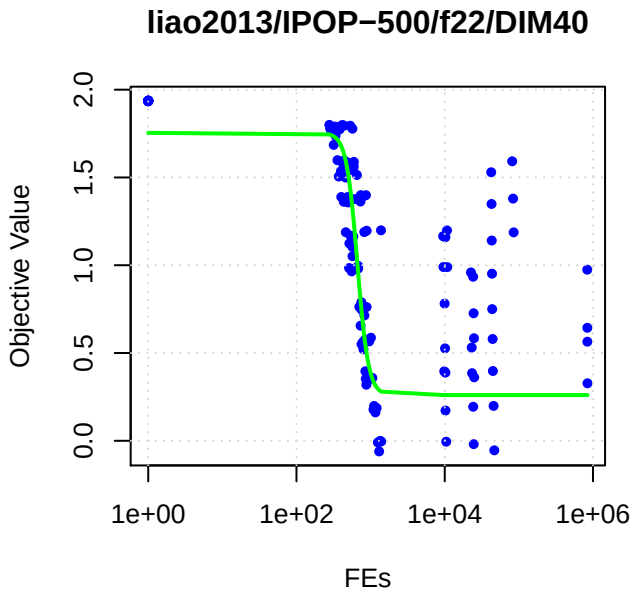
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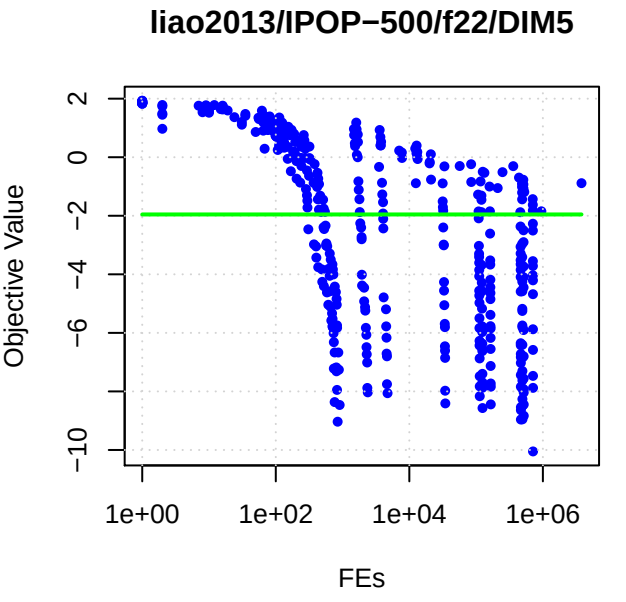
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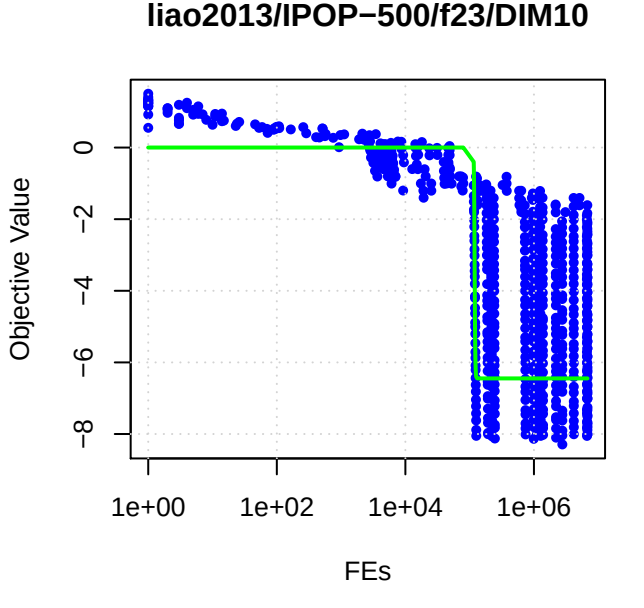
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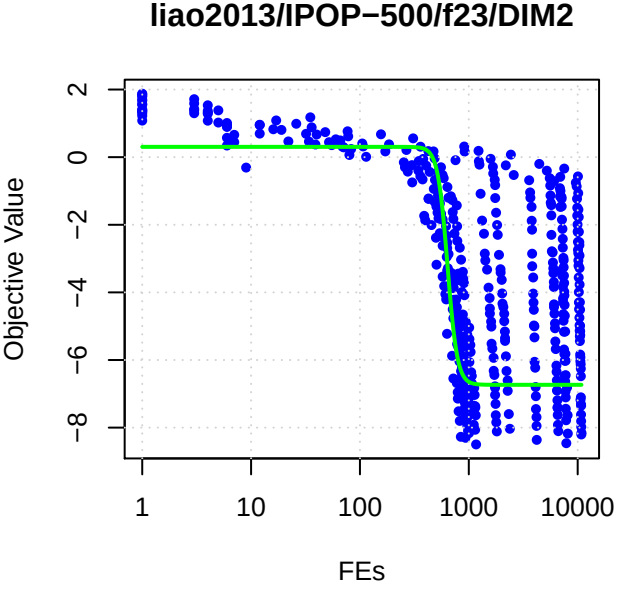
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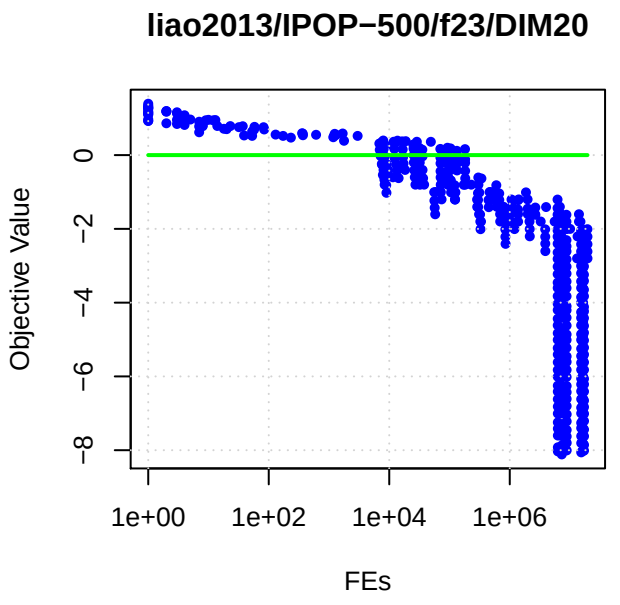
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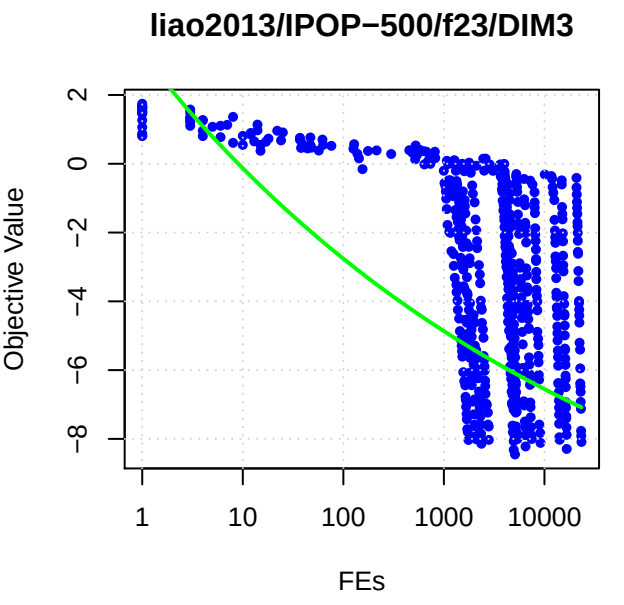
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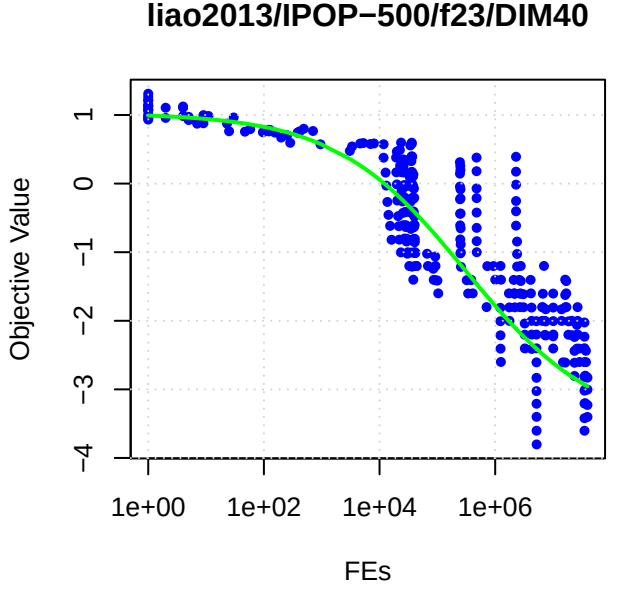
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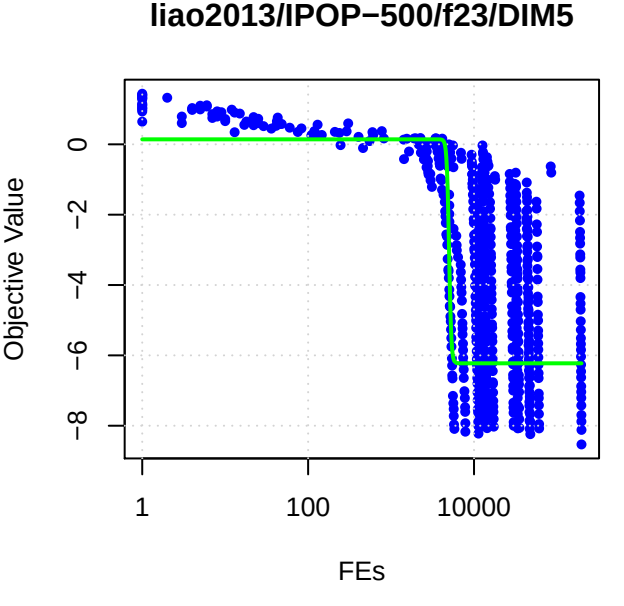
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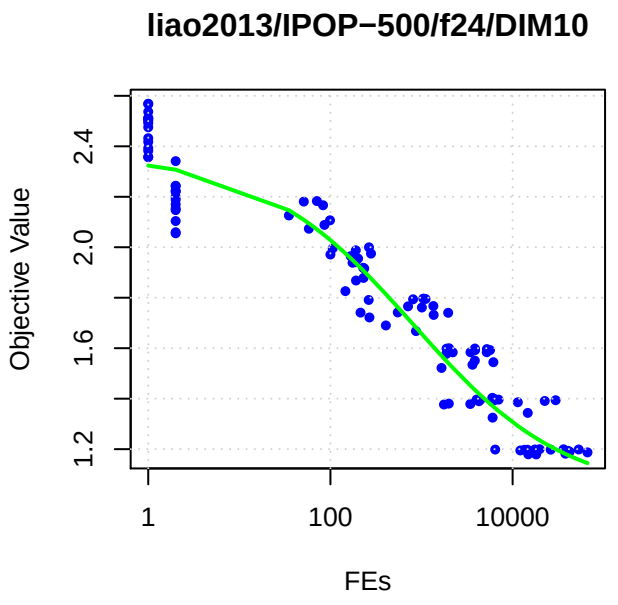
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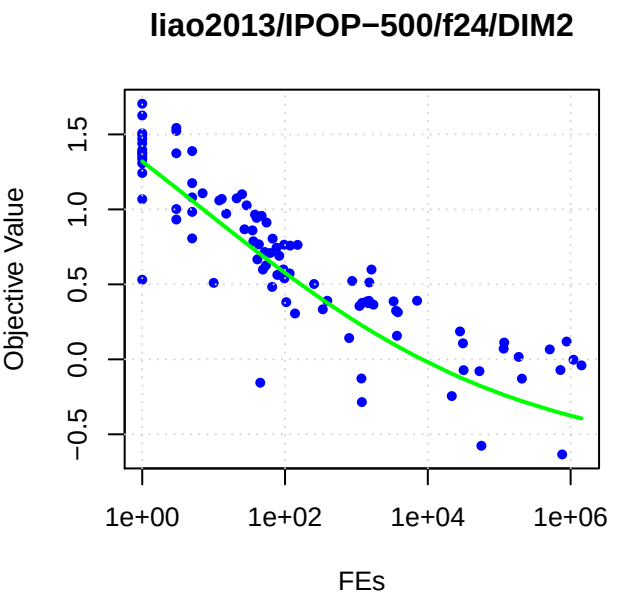
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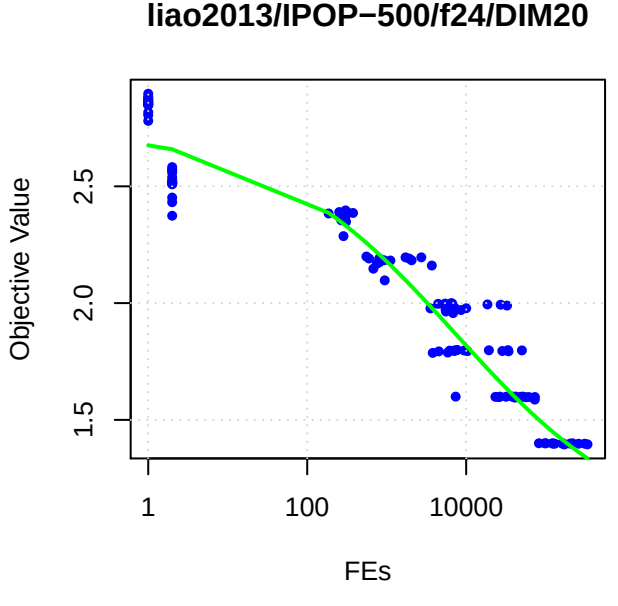
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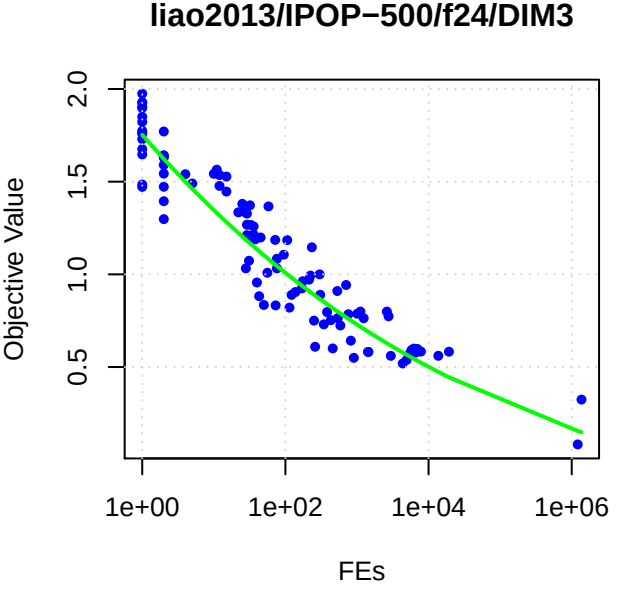
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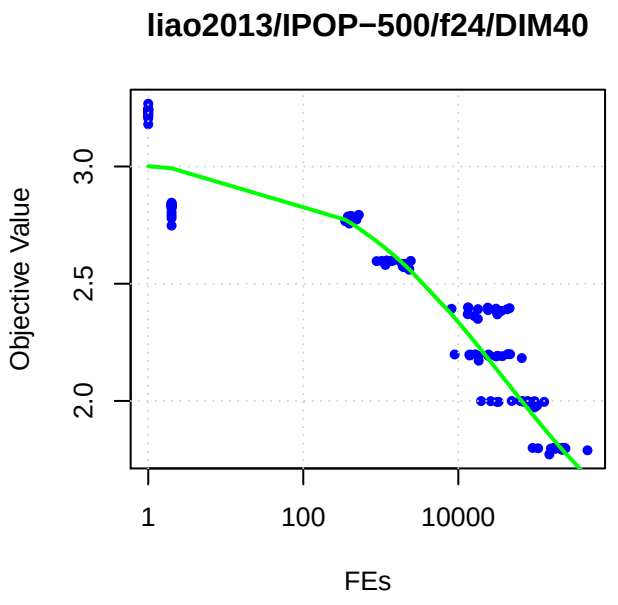
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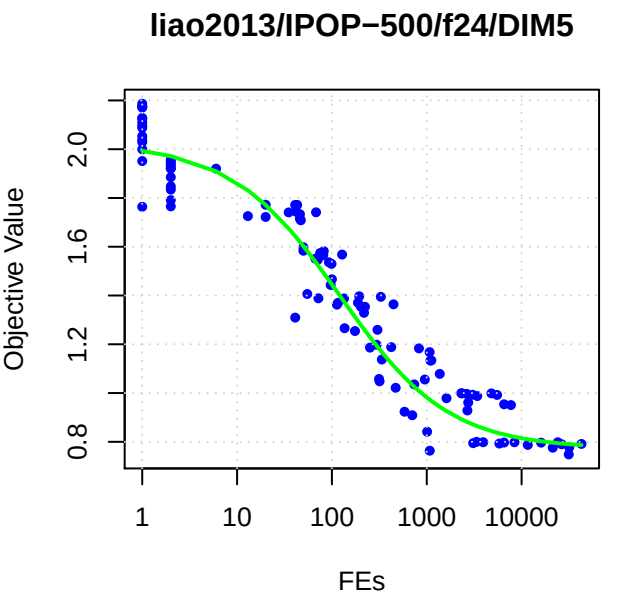
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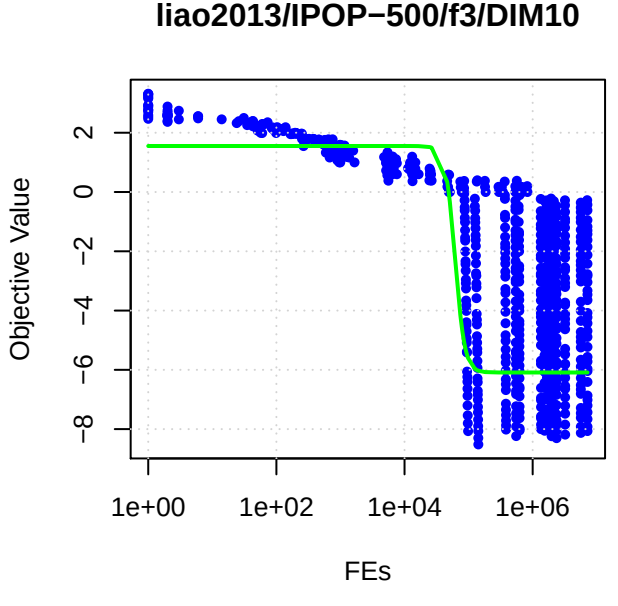
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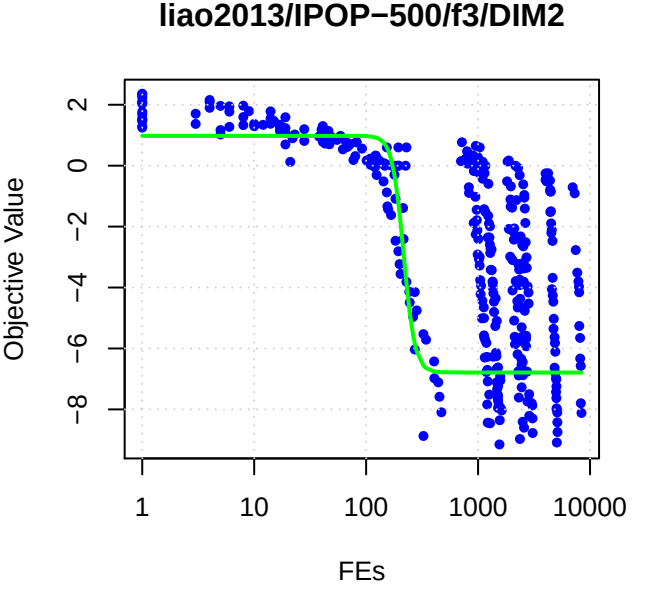
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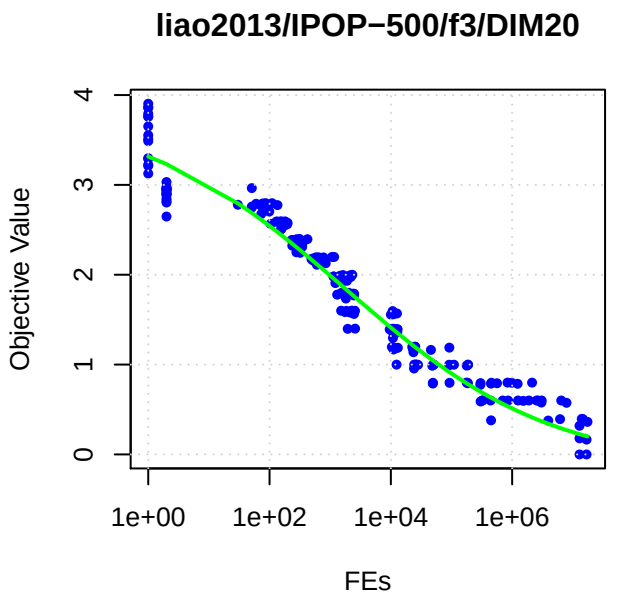
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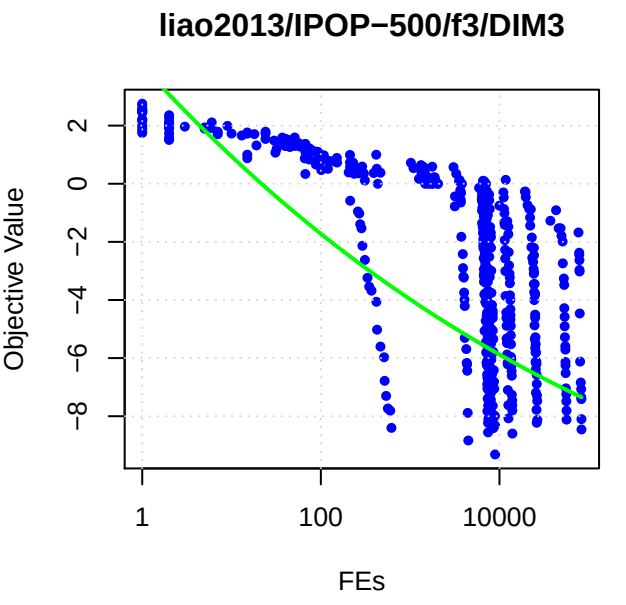
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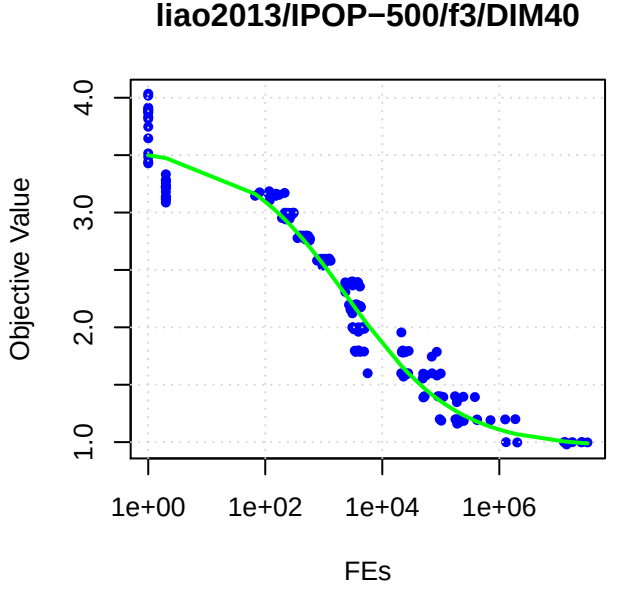
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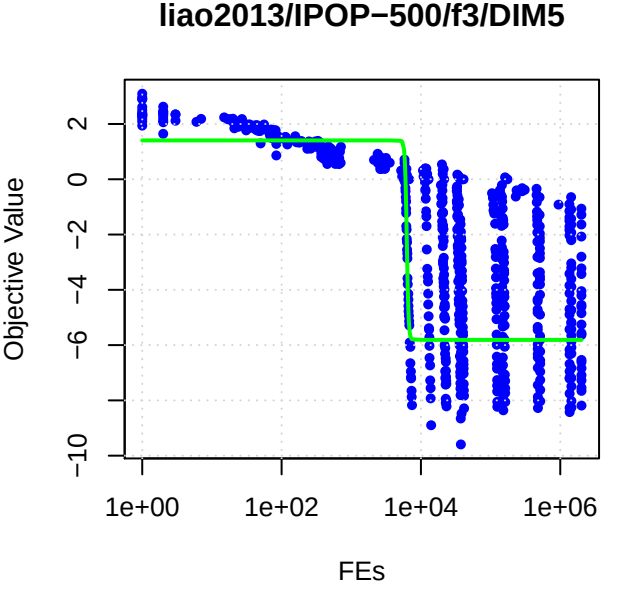
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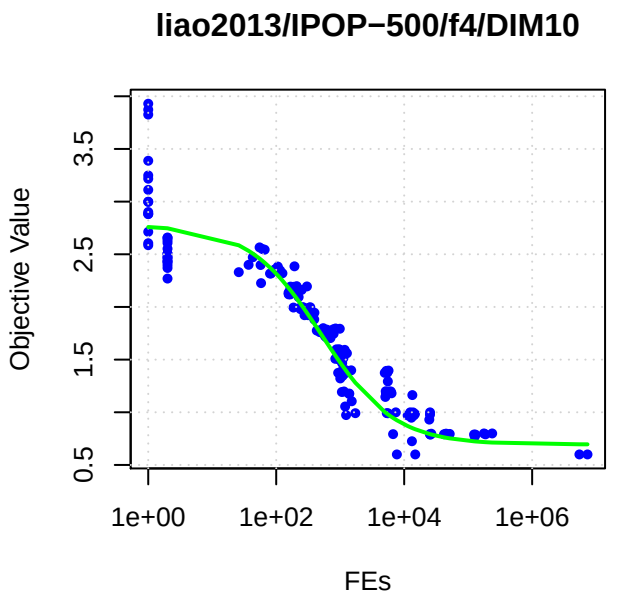
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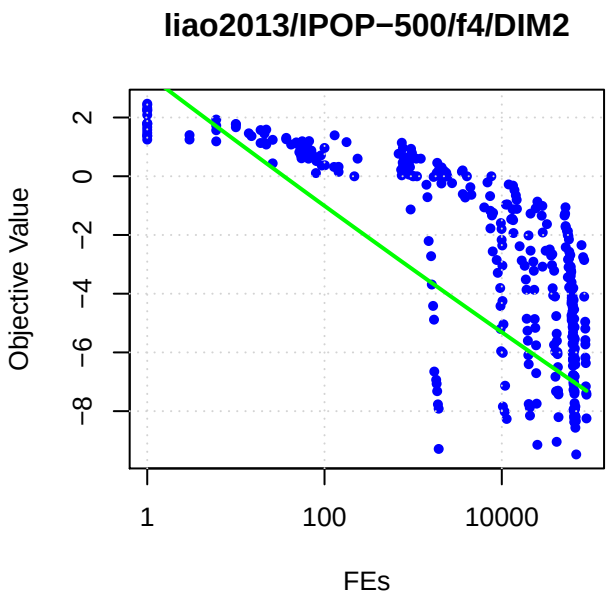
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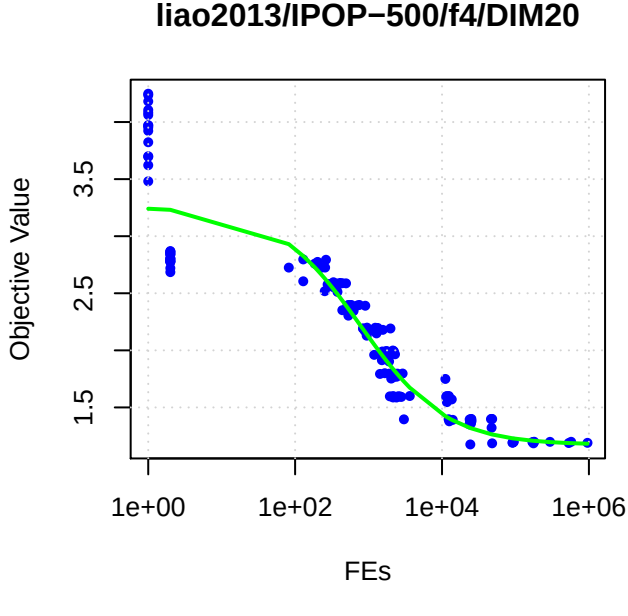
10000
FEs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1e+02
1e+04
1e+06
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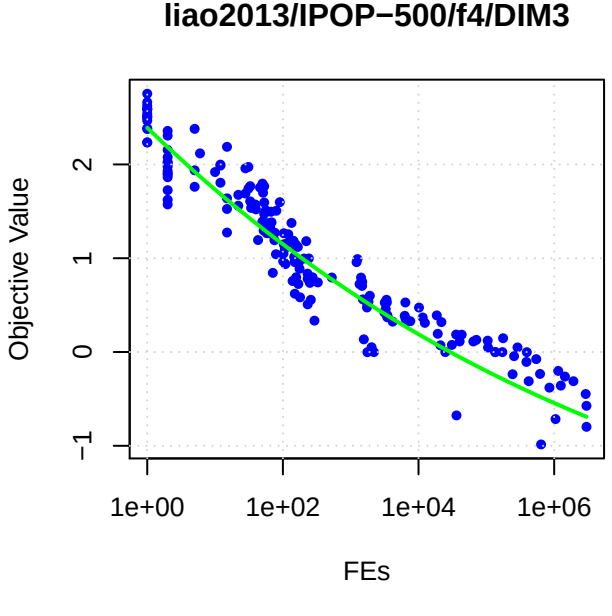
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2
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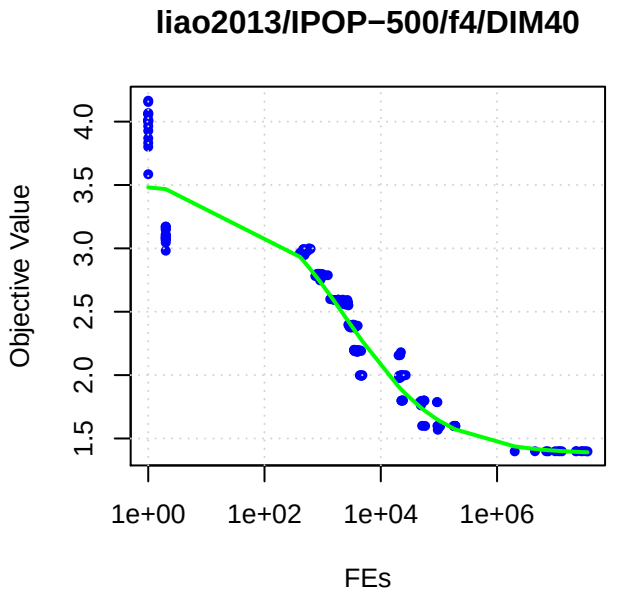
1e+02
1e+04
1e+06
FEs


liao2013/IPOP−500/f4/DIM40
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2.0
1.5
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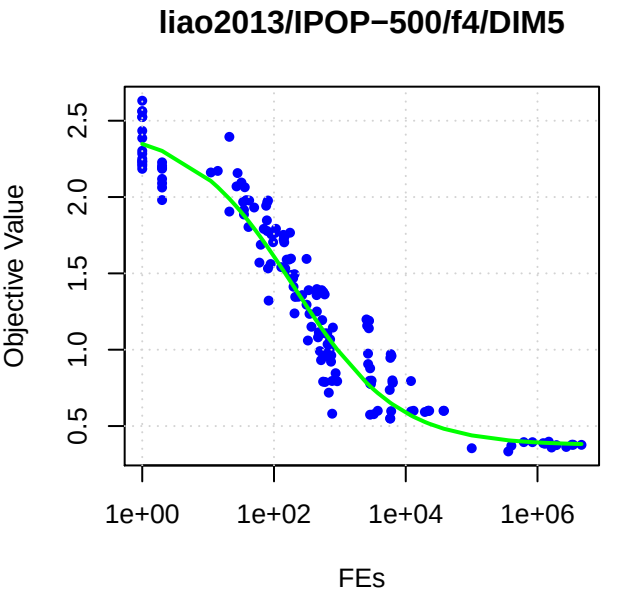
1e+02
1e+04
1e+06
FEs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1.0
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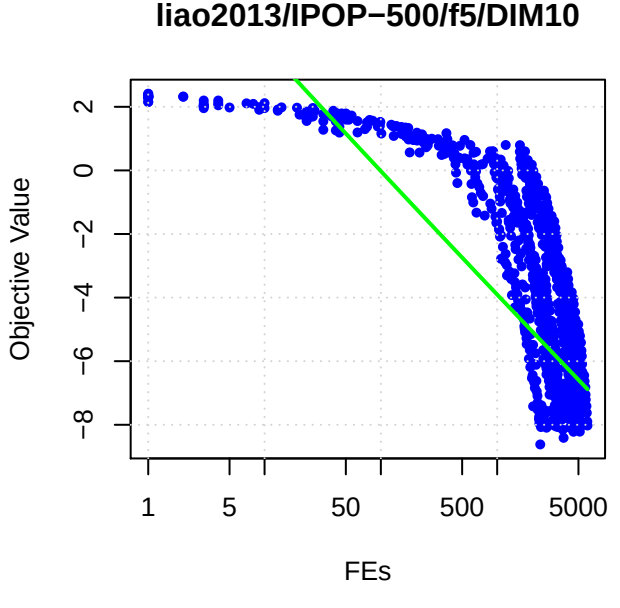
1e+02
1e+04
1e+06
FEs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500
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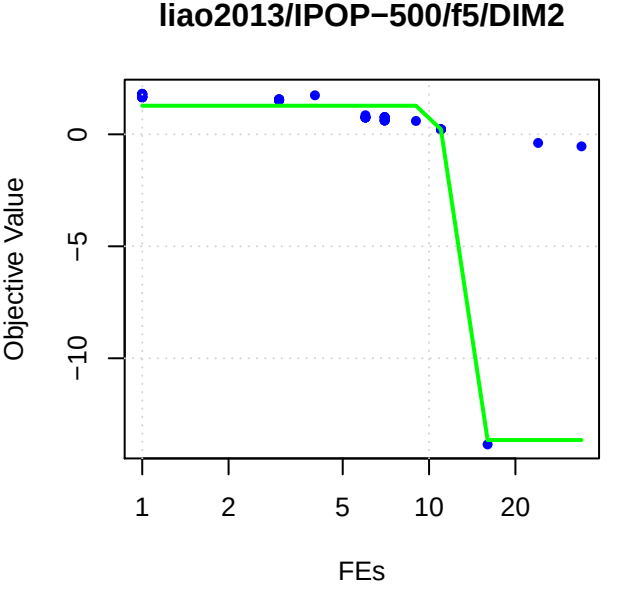
FEs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20
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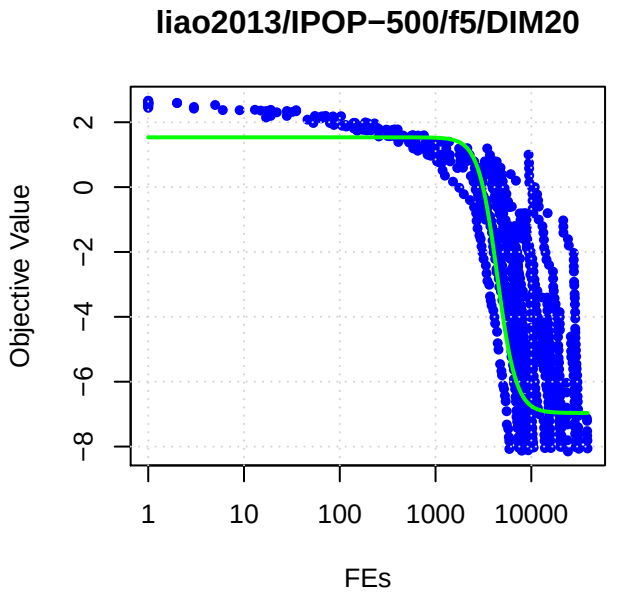
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1000
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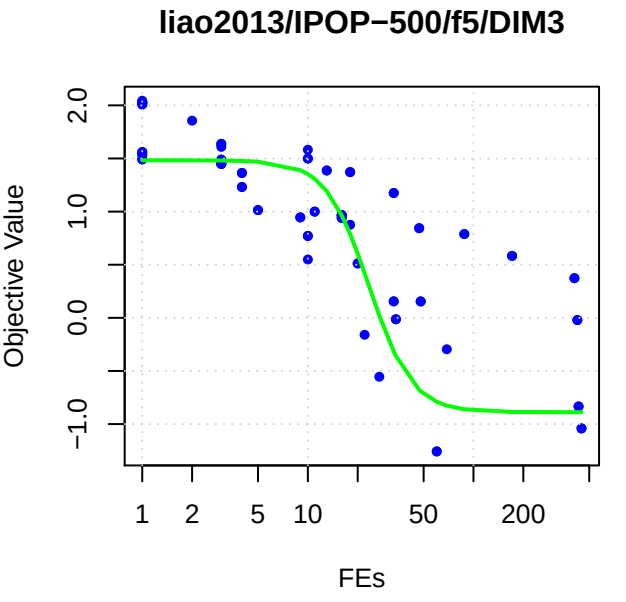
FEs


liao2013/IPOP−500/f5/DIM3
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10
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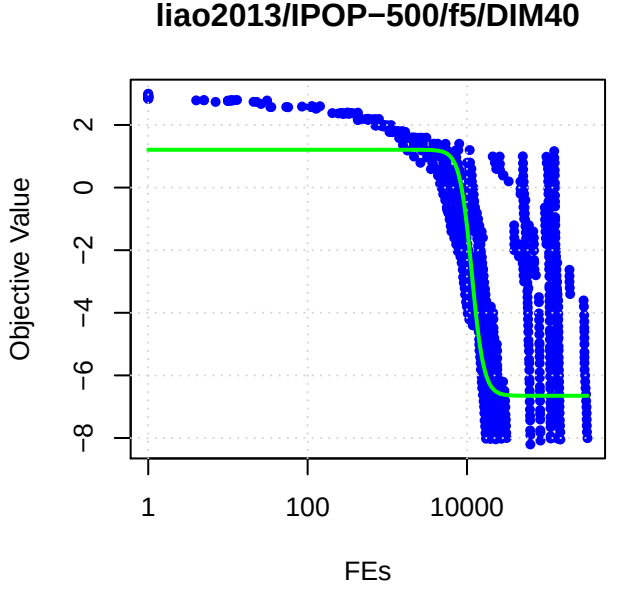
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Objective Value
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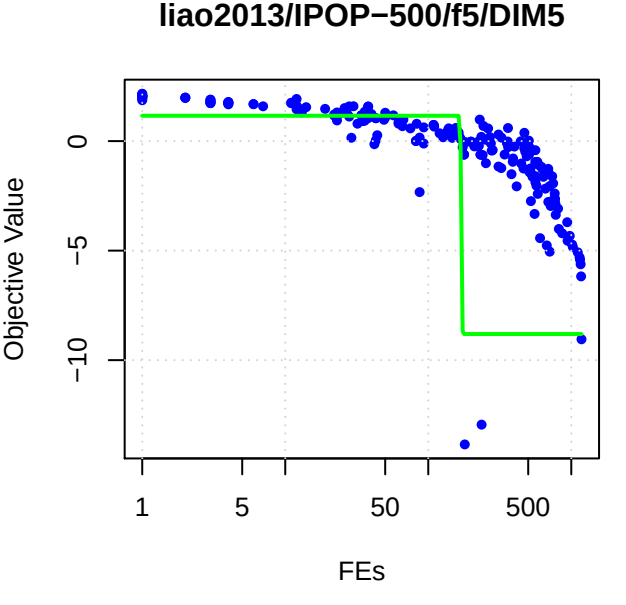
FEs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5
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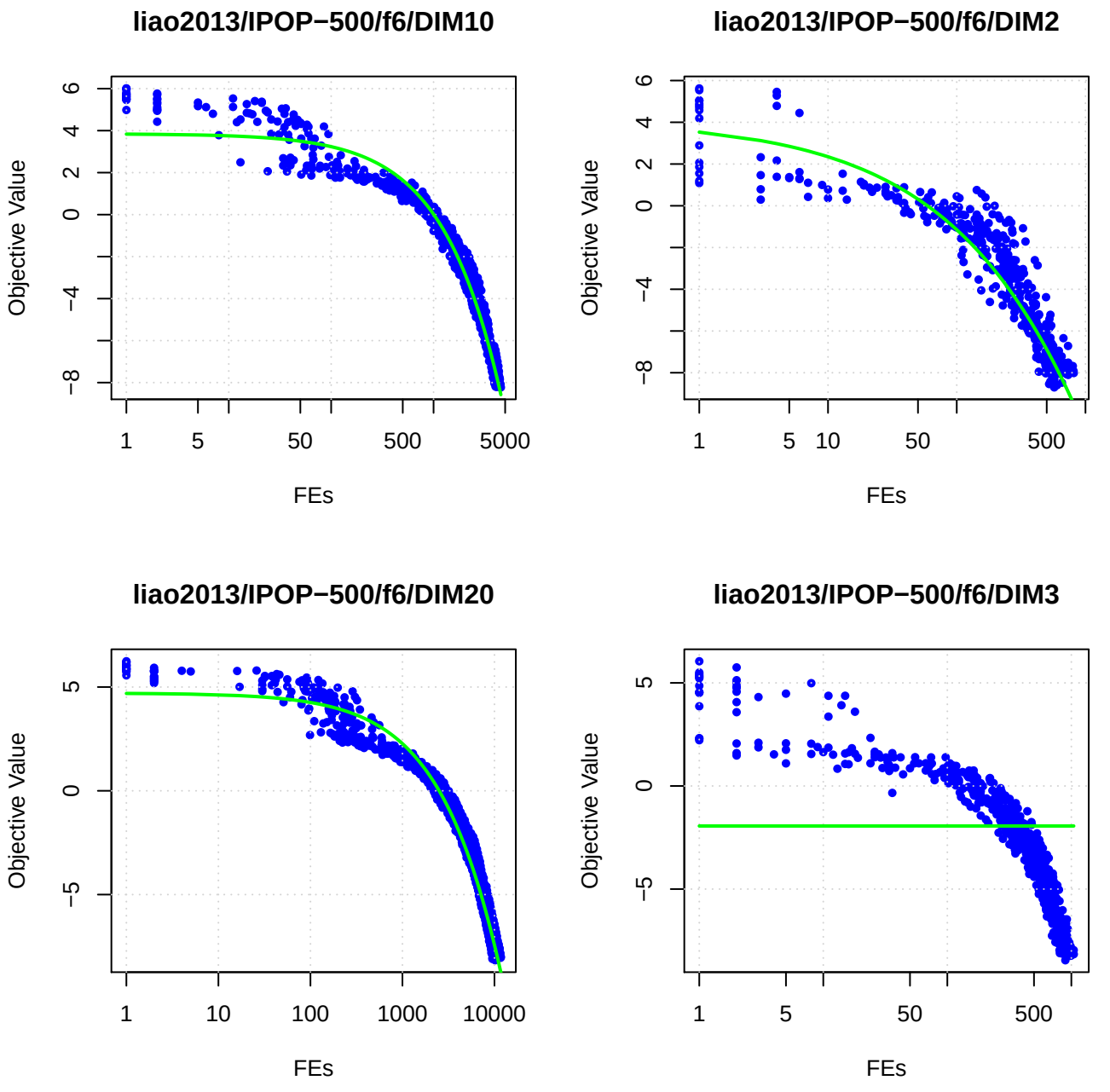
500
FEs


liao2013/IPOP−500/f6/DIM10
Objective Value
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500
5000
FEs
liao2013/IPOP−500/f6/DIM2
Objective Value
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4
2
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−4
−8
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5
10
50
500
FEs
liao2013/IPOP−500/f6/DIM20
Objective Value
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1
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liao2013/IPOP−500/f6/DIM3
Objective Value
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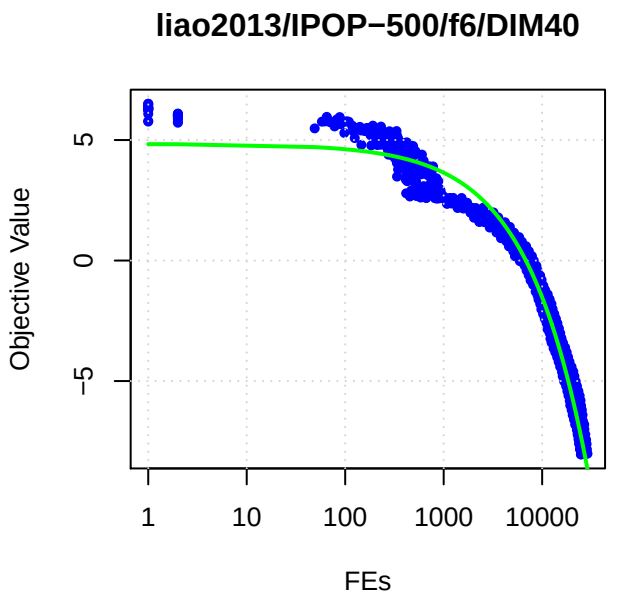
5
50
500
FEs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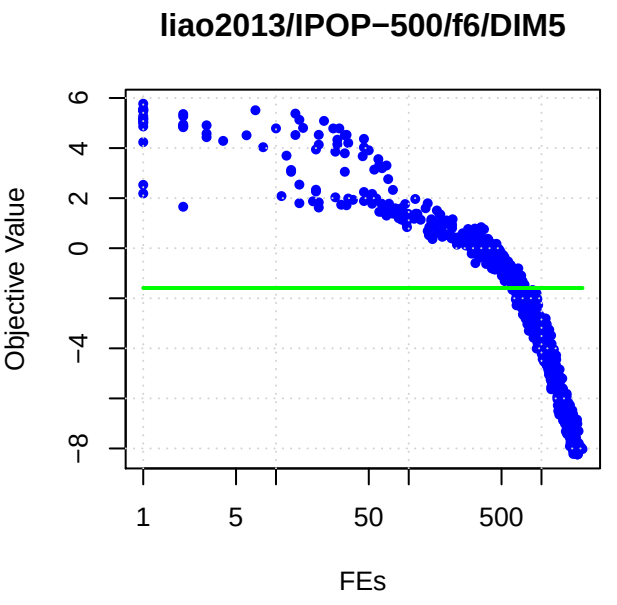
FEs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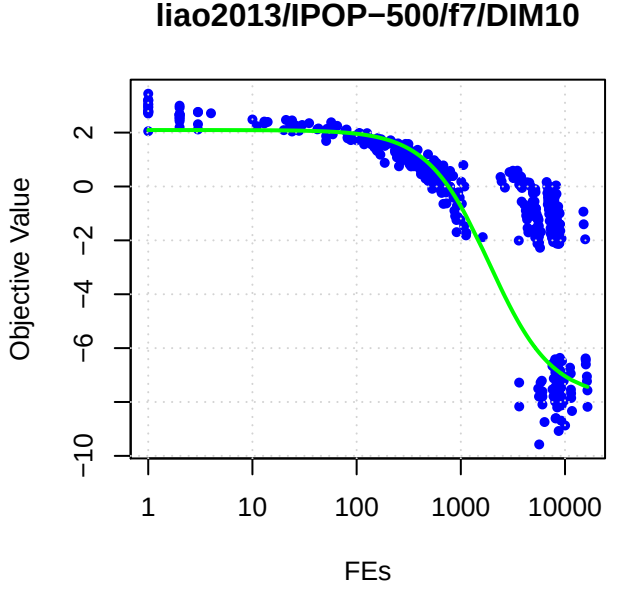
FEs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Objective Value
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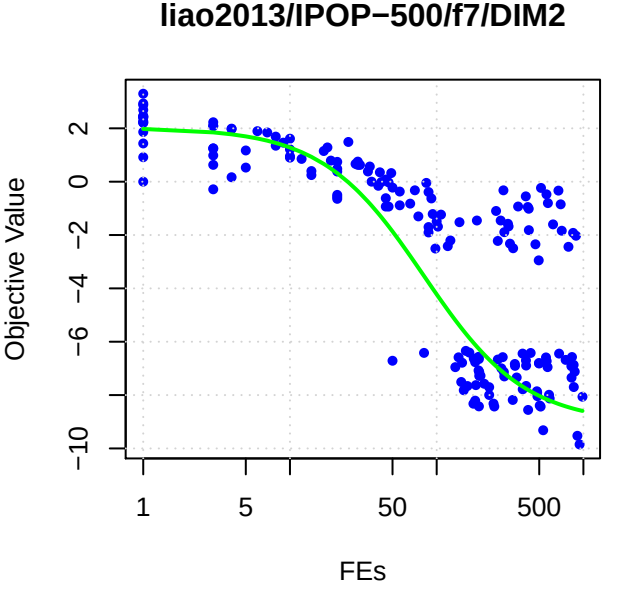
FEs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Objective Value
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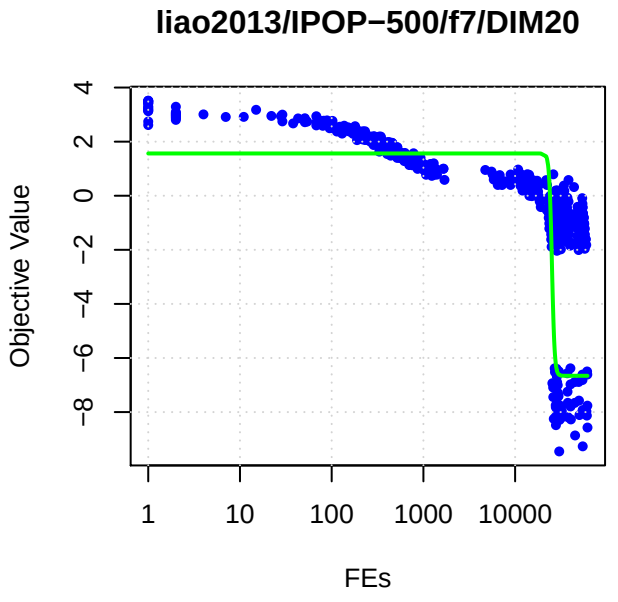
5
50
500
FEs


liao2013/IPOP−500/f7/DIM20
Objective Value
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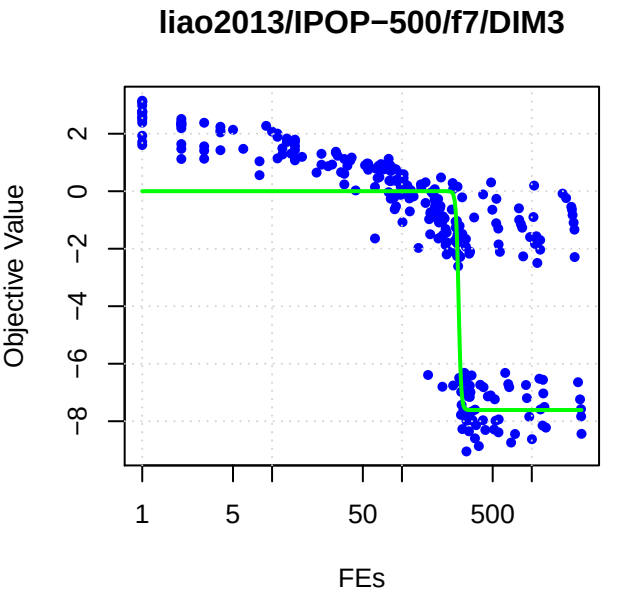
10000
FEs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Objective Value
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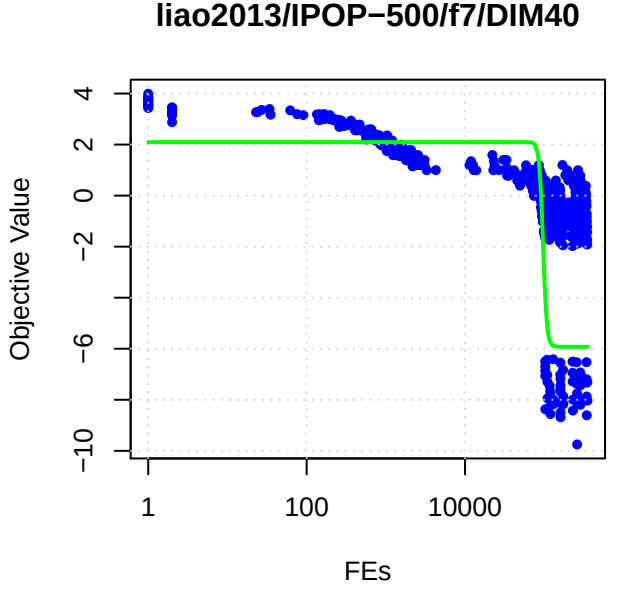
FEs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Objective Value
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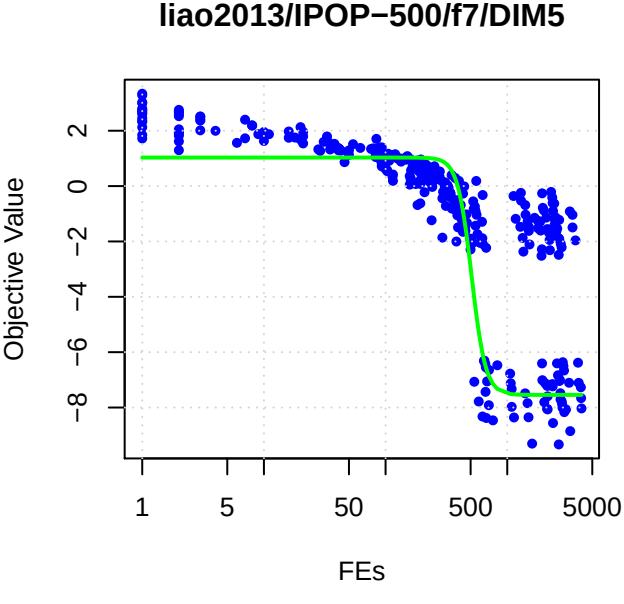
10000
FEs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Objective Value
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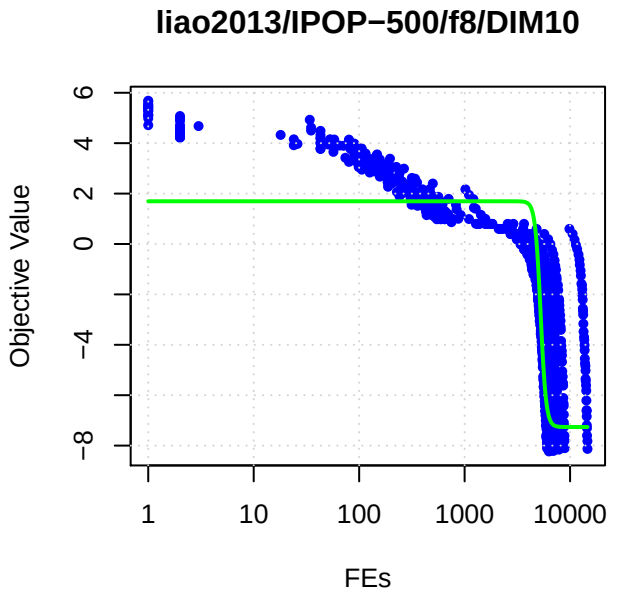
FEs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Objective Value
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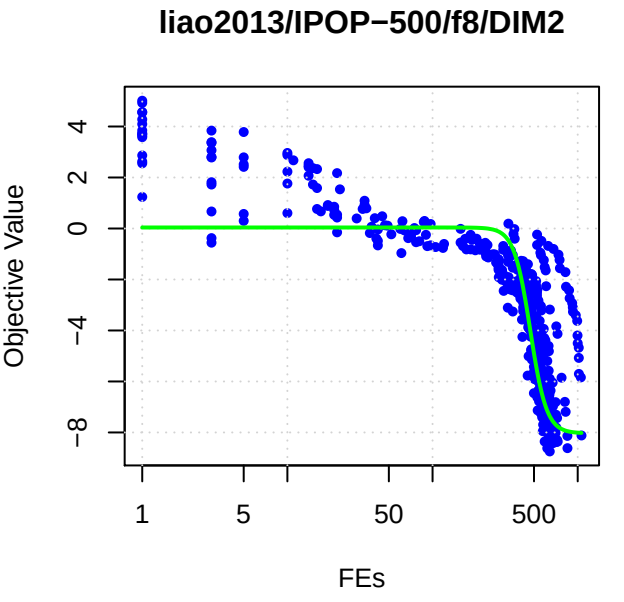
1000
10000
FEs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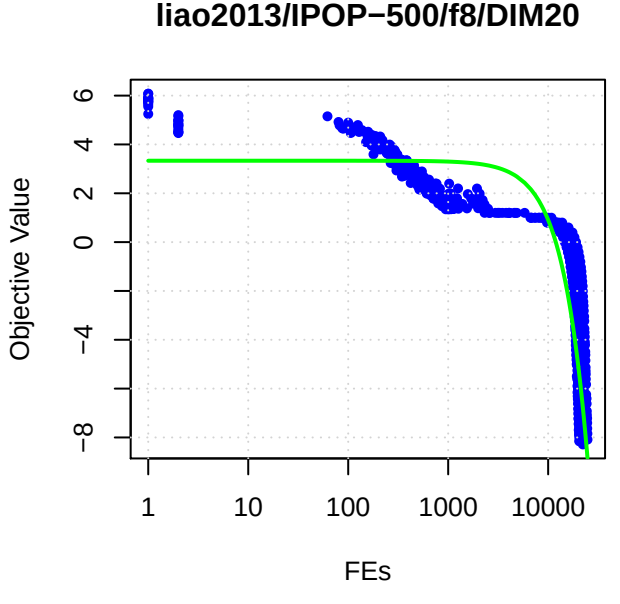
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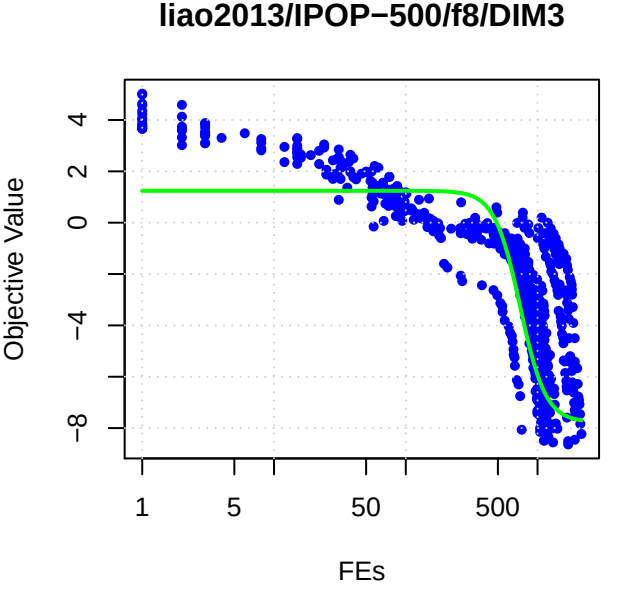
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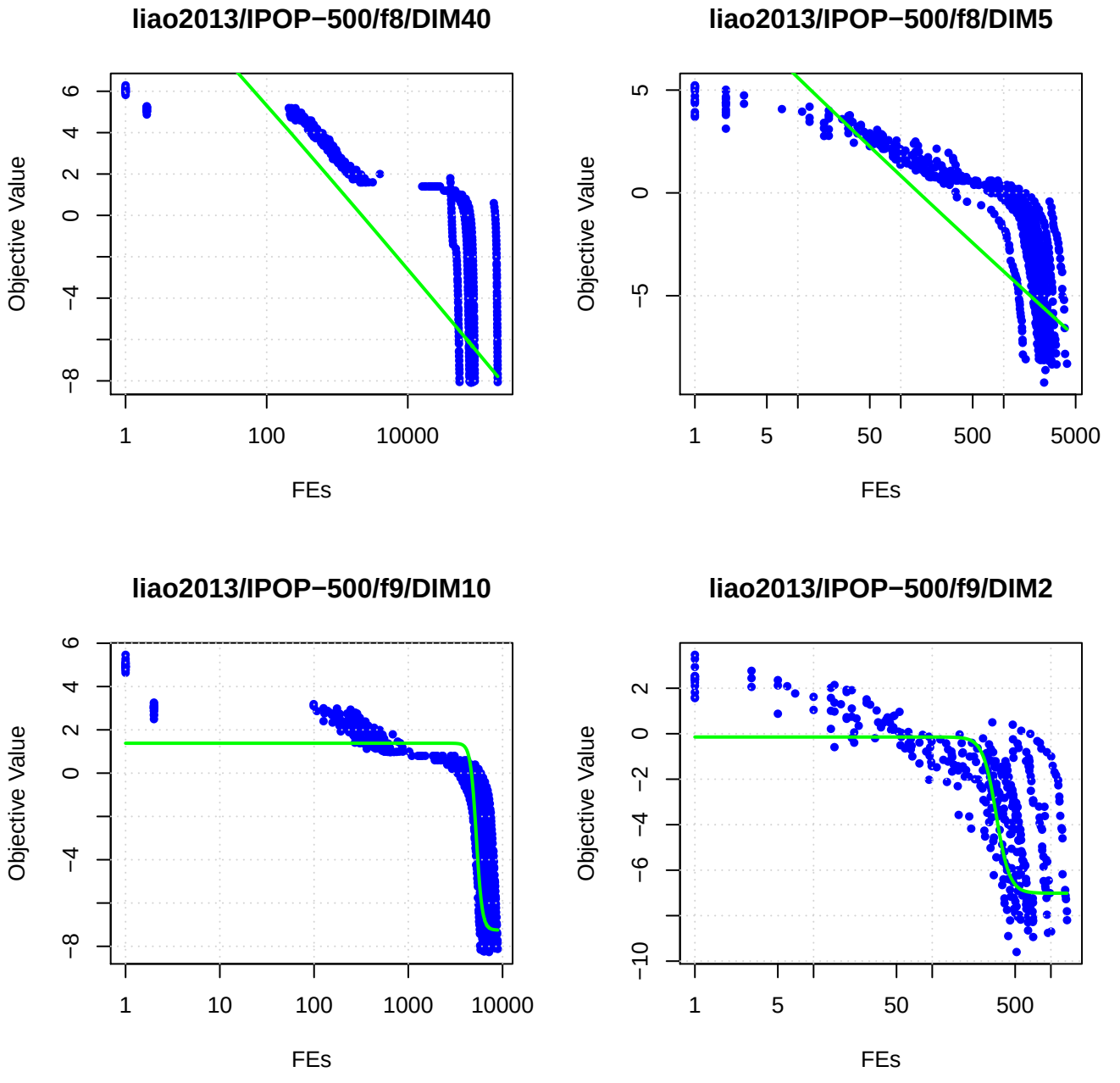
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Objective Value
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Objective Value
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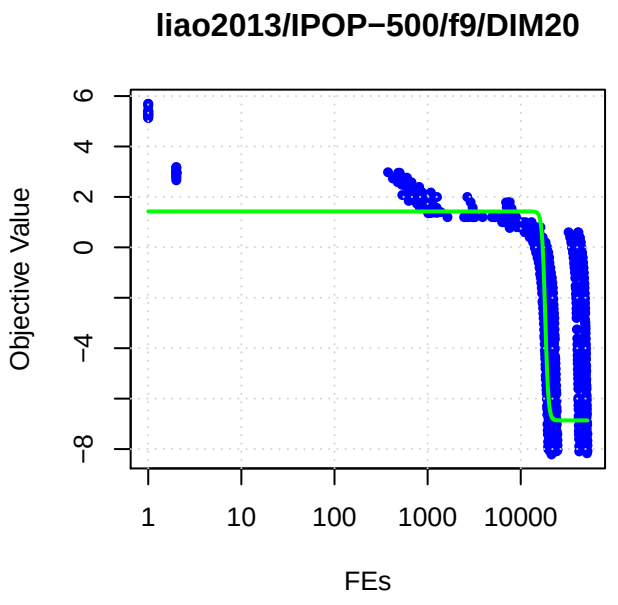
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Objective Value
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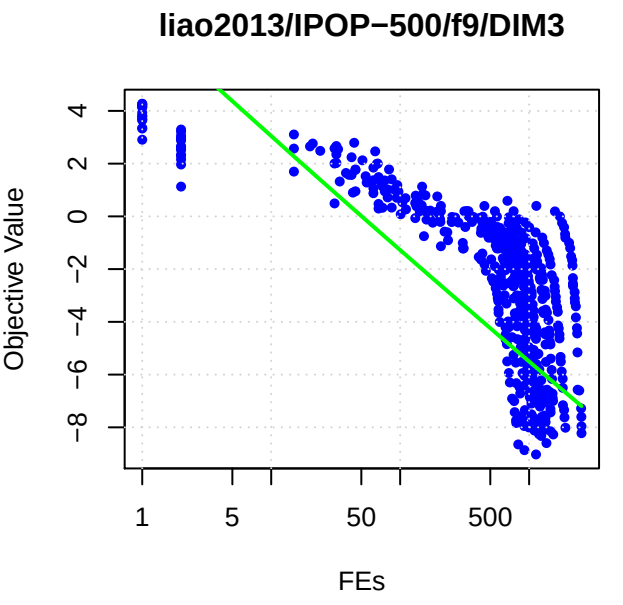
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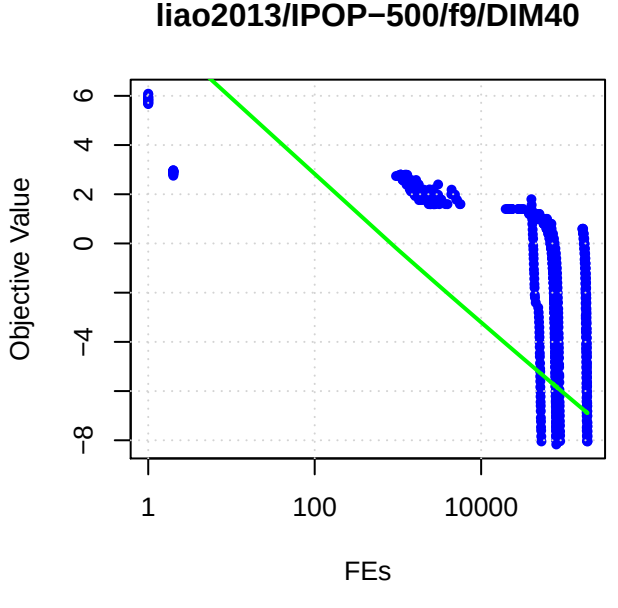
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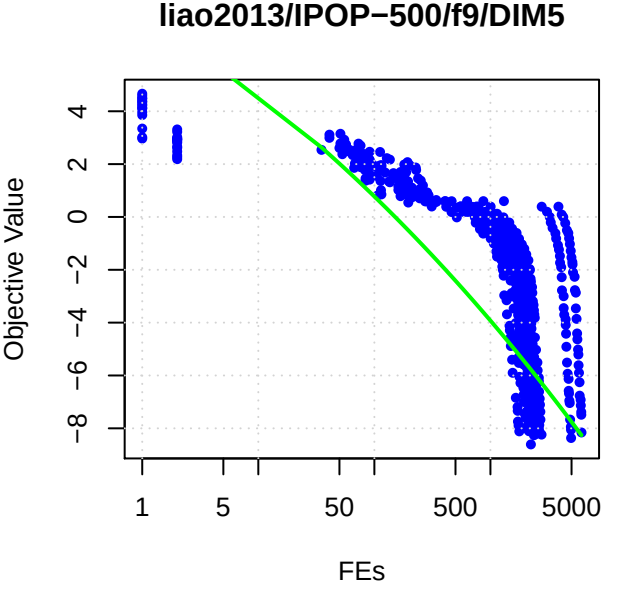
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Objective Value
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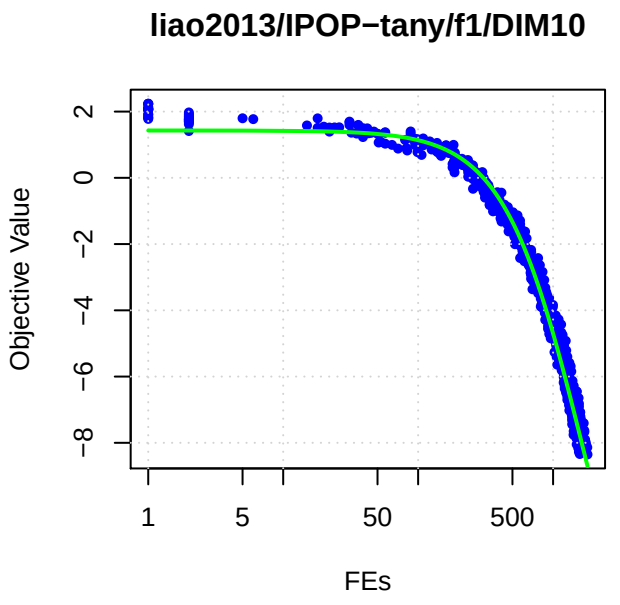
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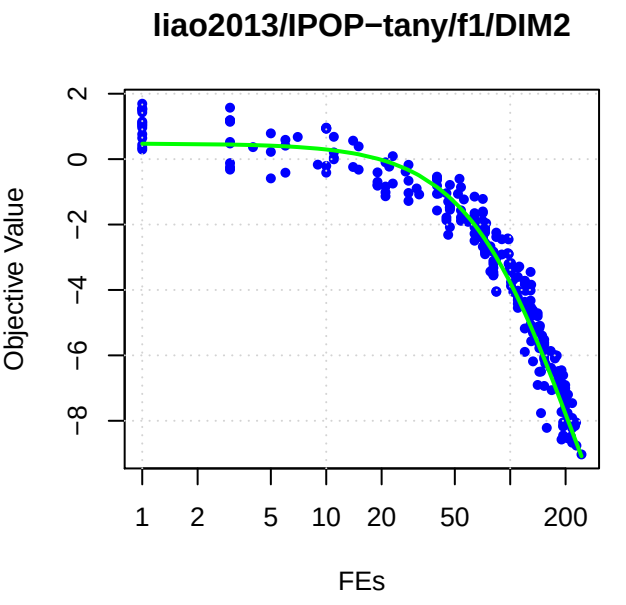
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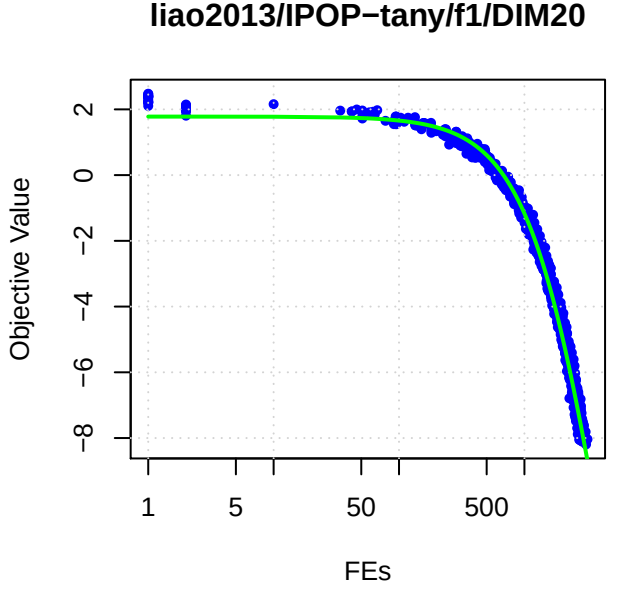
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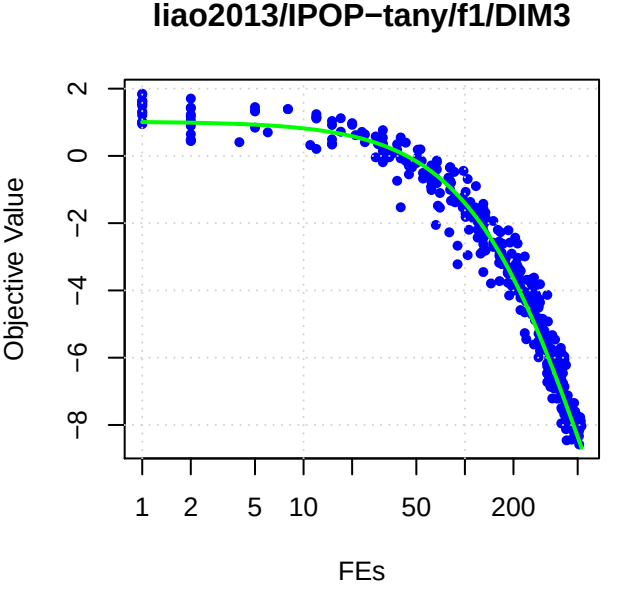
liao2013/IPOP−tany/f1/DIM3
Objective Value
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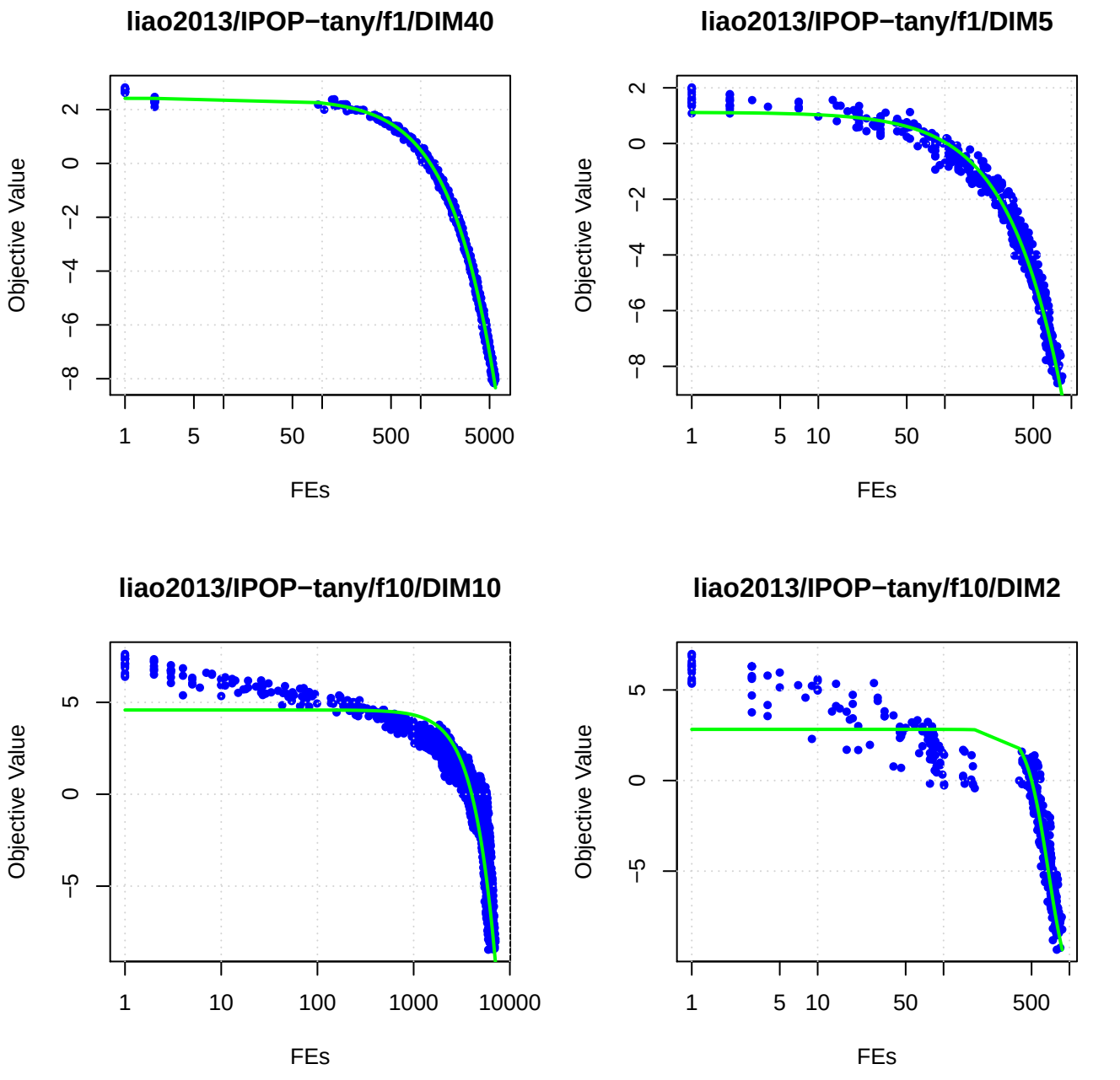
FEs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Objective Value
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Objective Value
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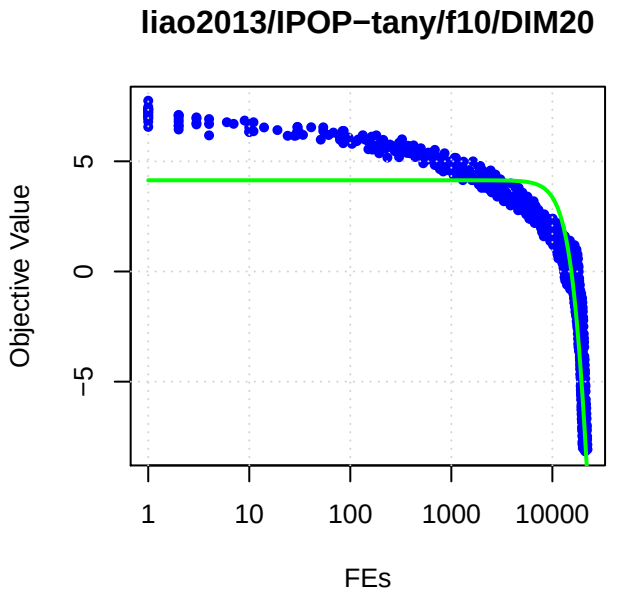
Objective Value
FEs
liao2013/IPOP−tany/f10/DIM2
Objective Value
FEs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Objective Value
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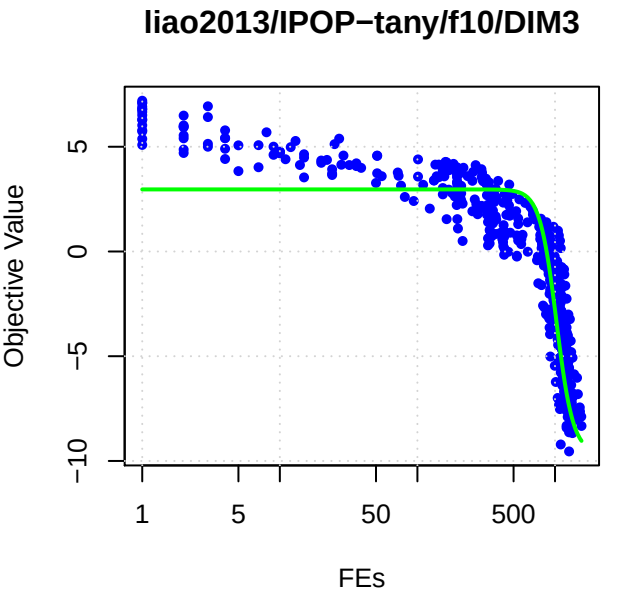
FEs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Objective Value
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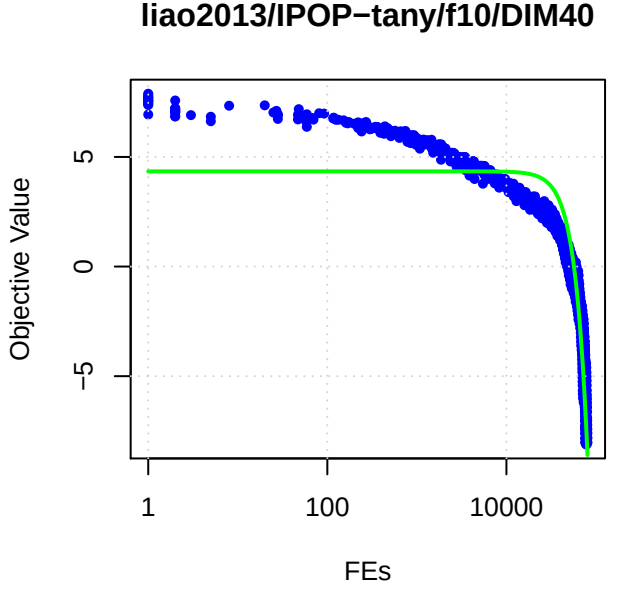
FEs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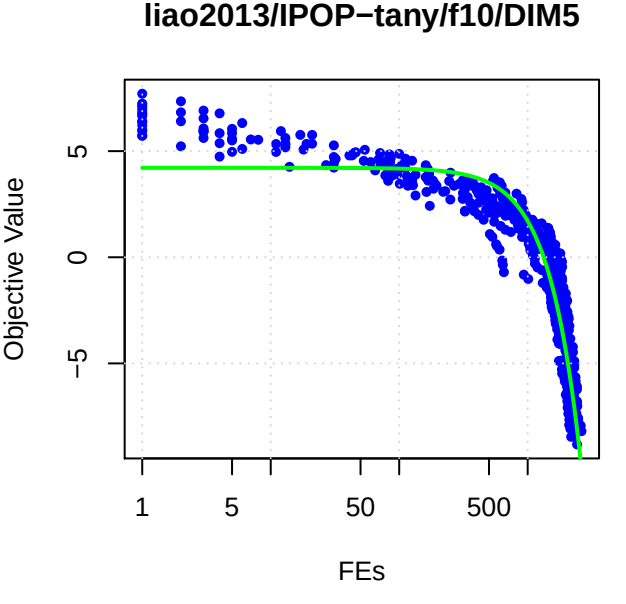
FEs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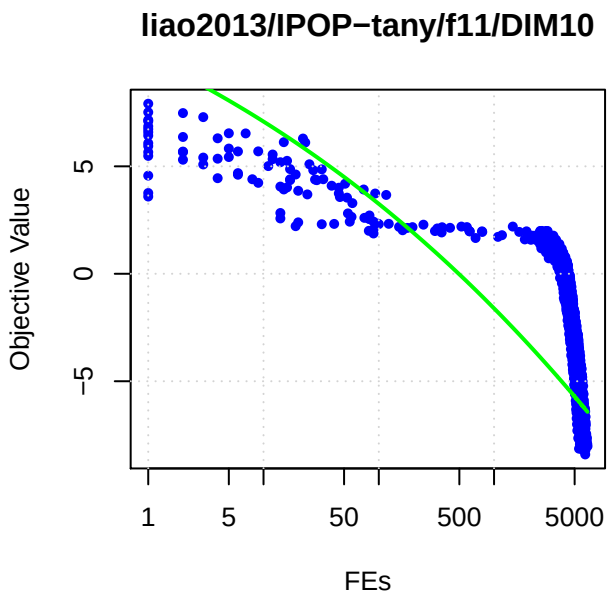
FEs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Objective Value
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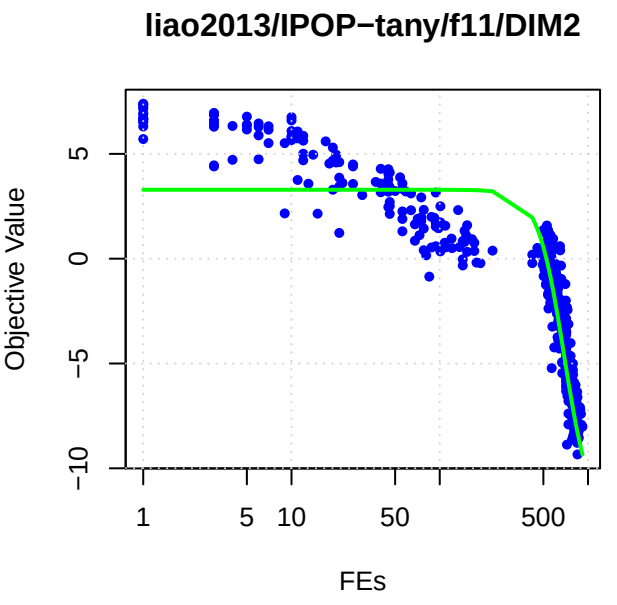
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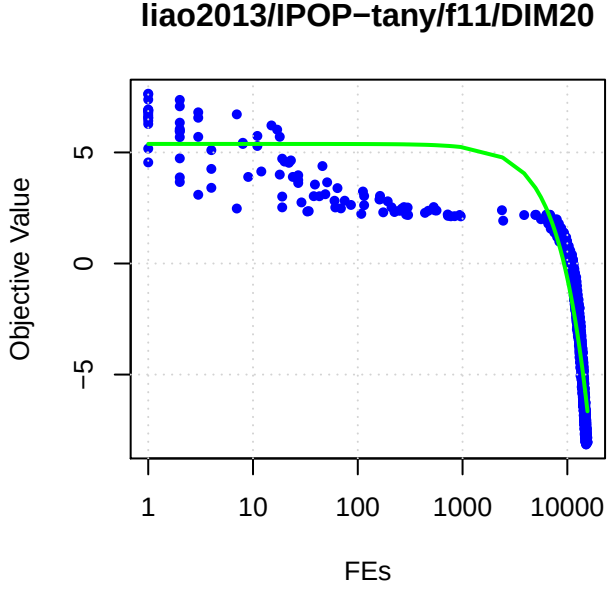
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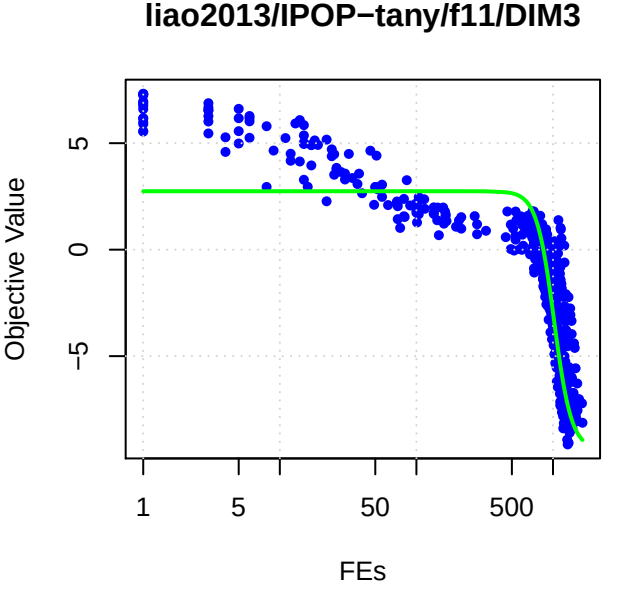
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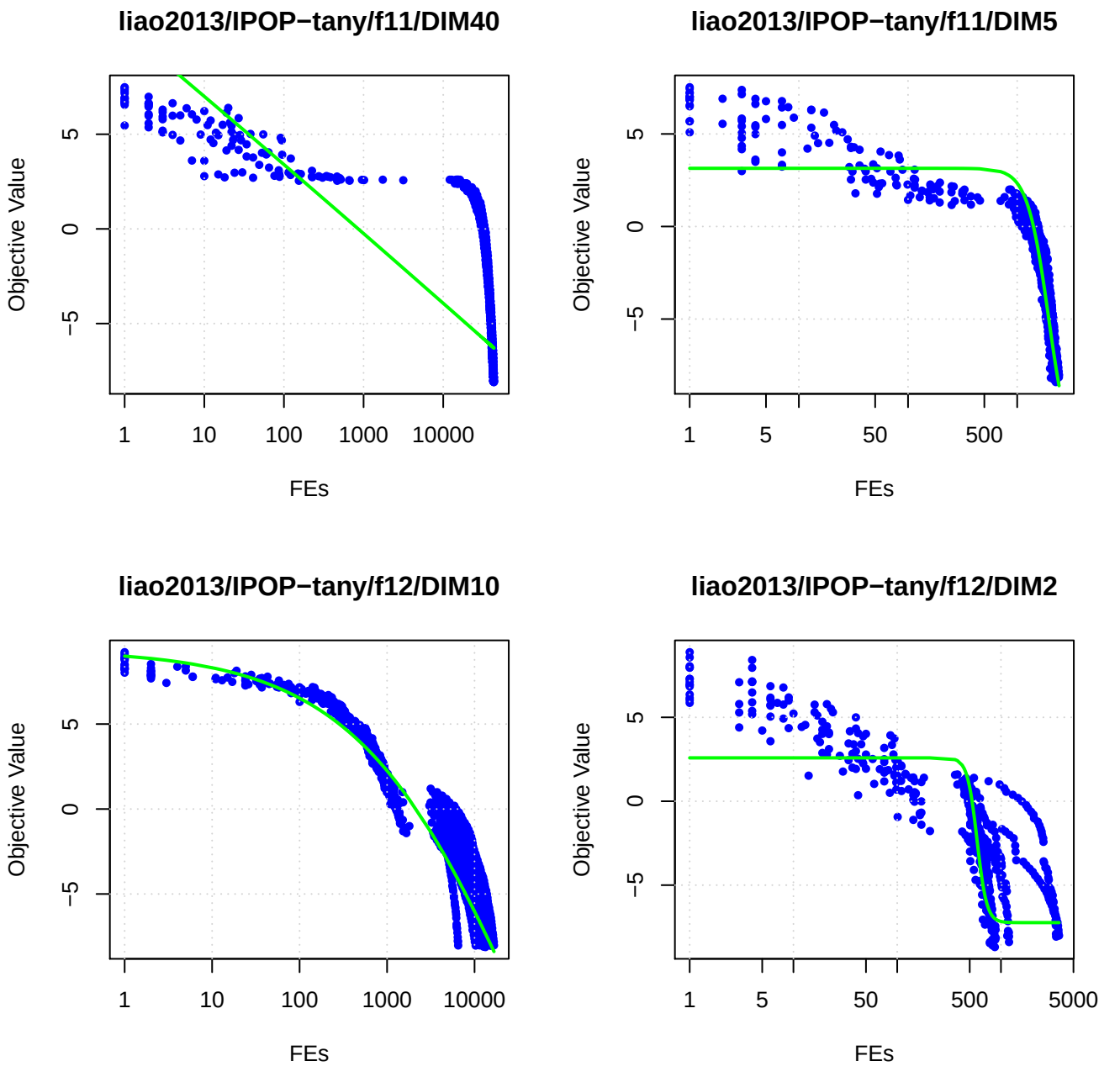
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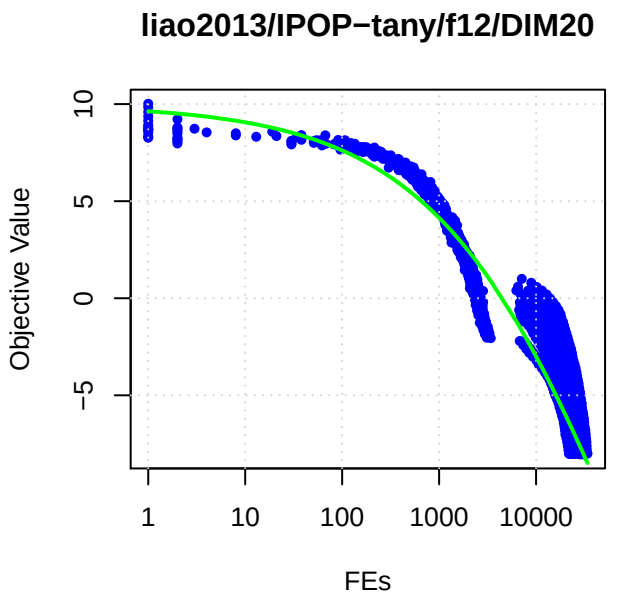
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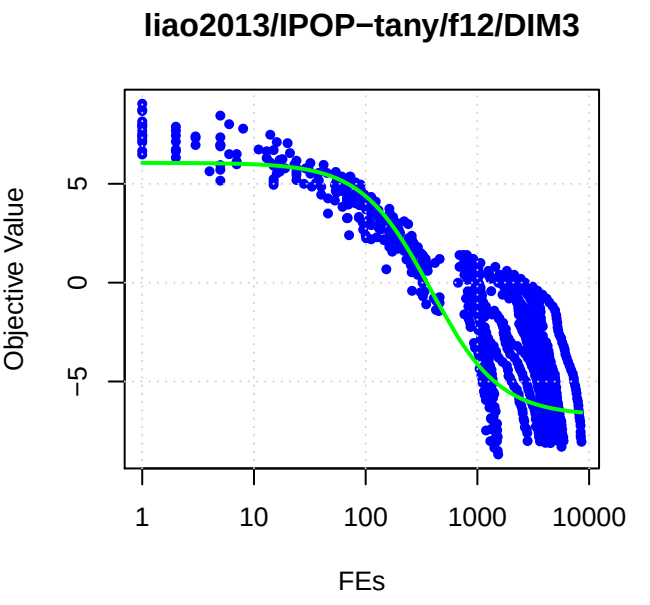
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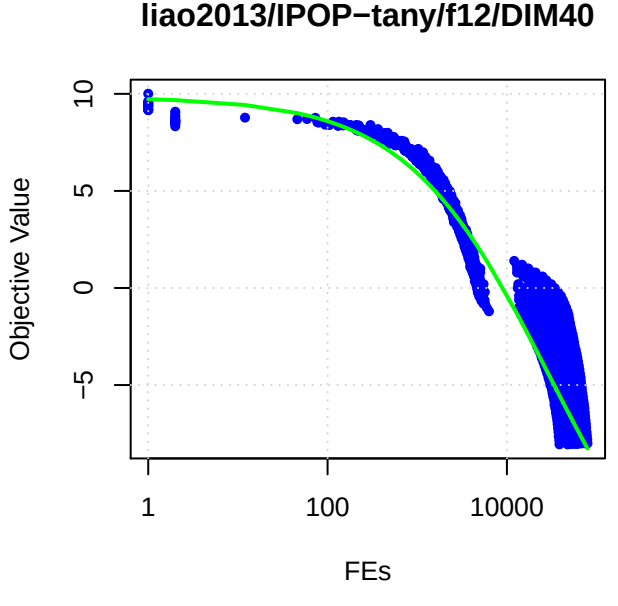
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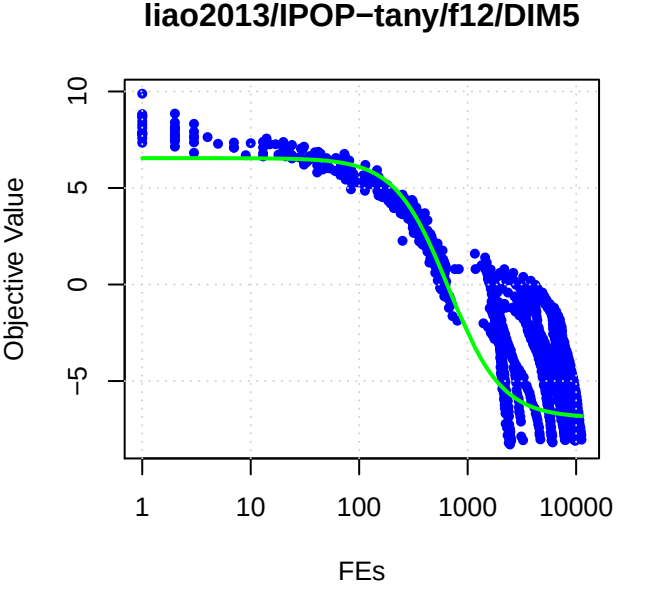
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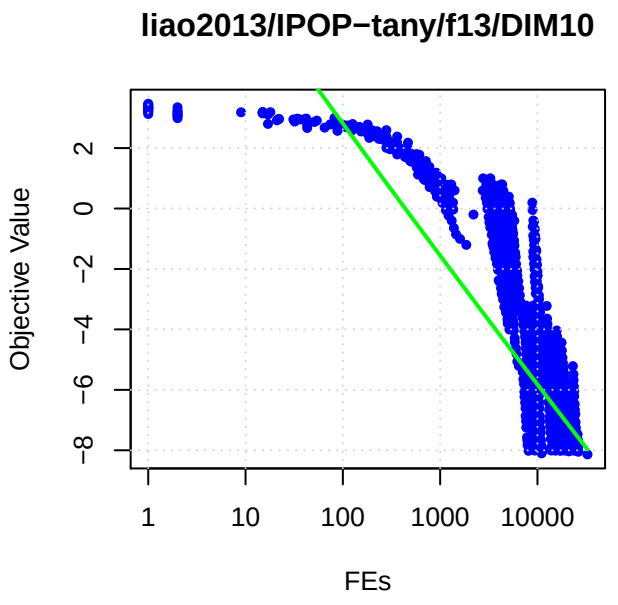
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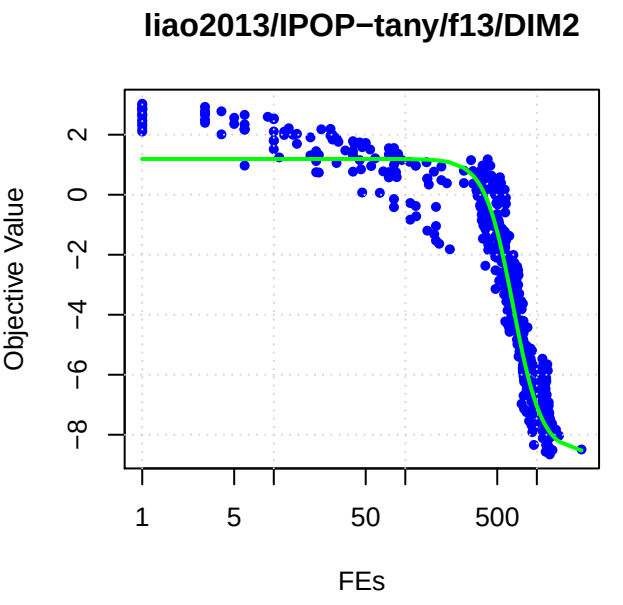
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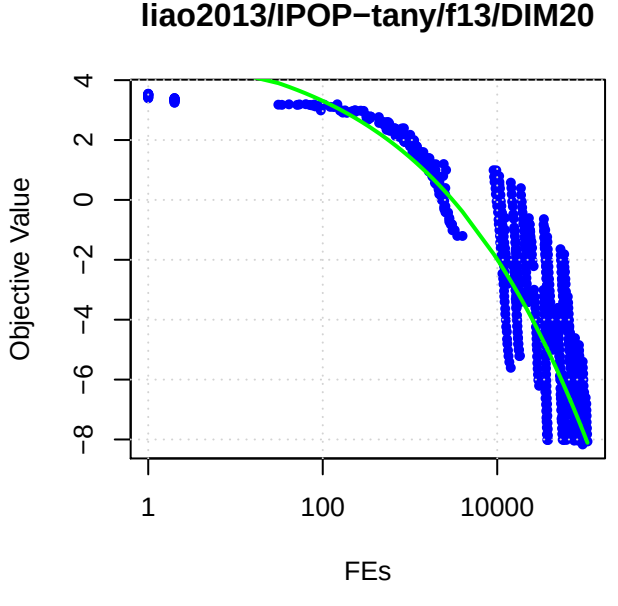
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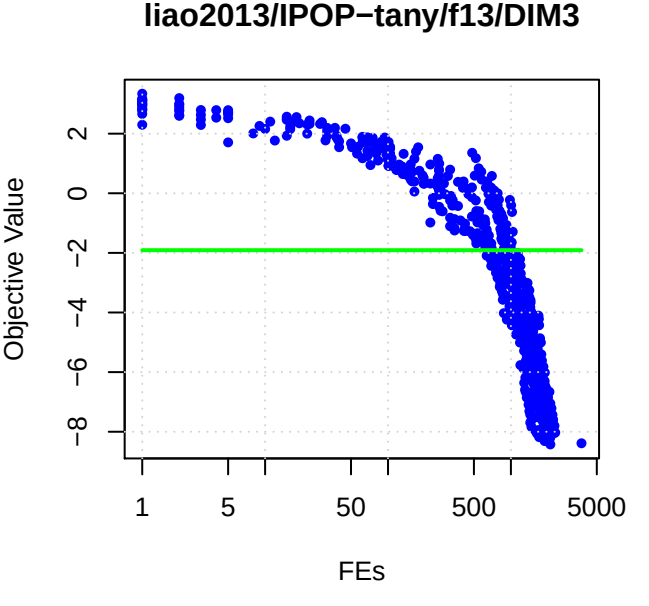
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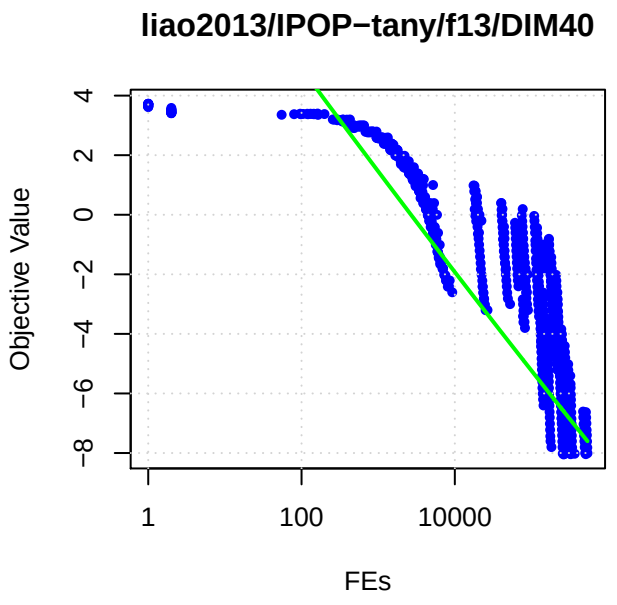
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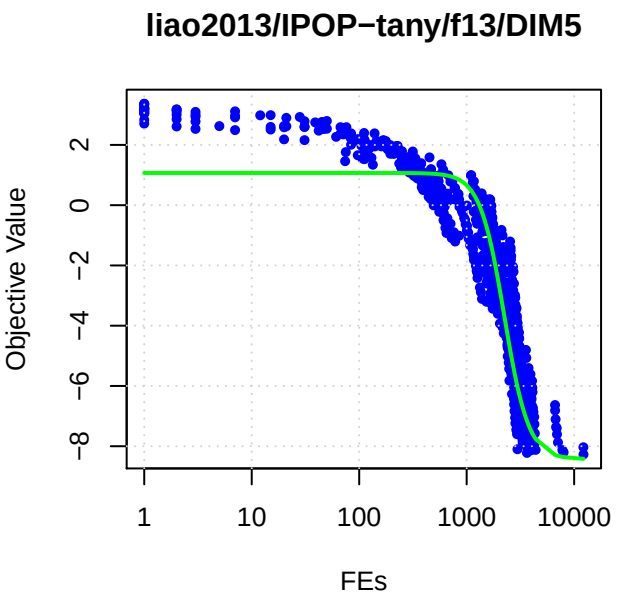
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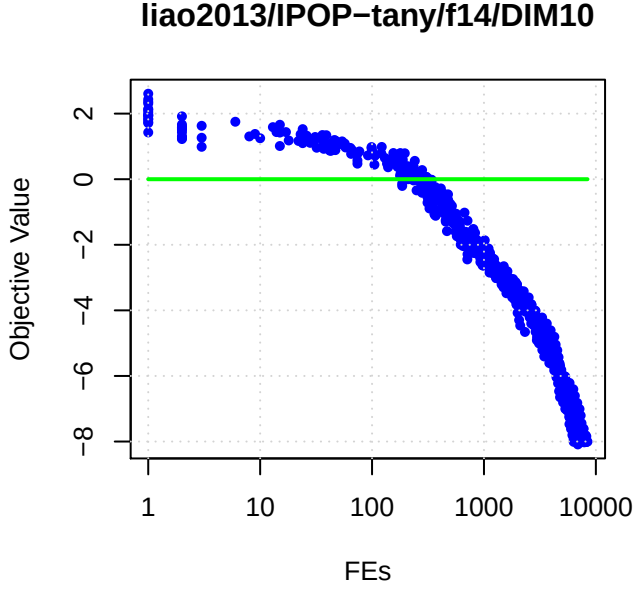
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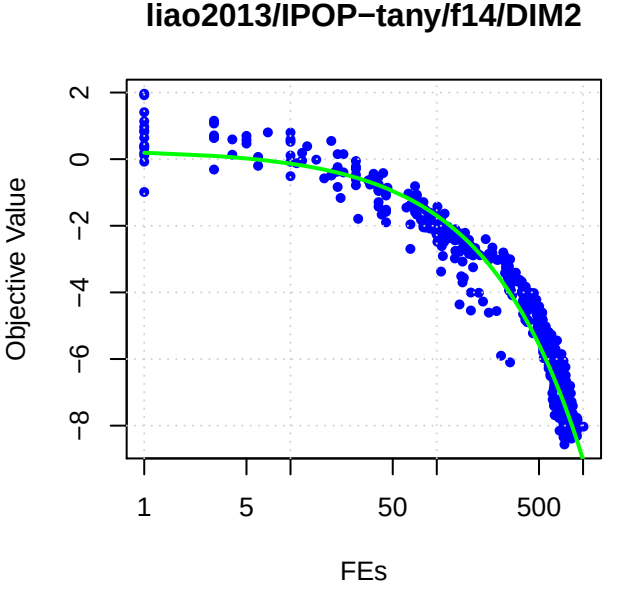
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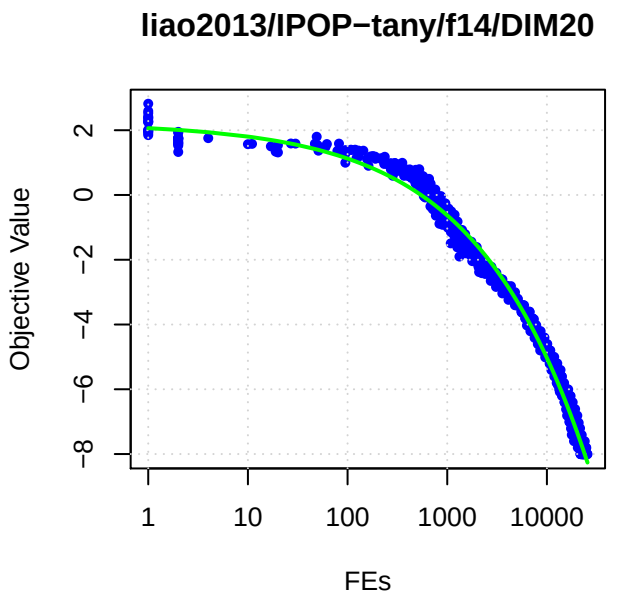
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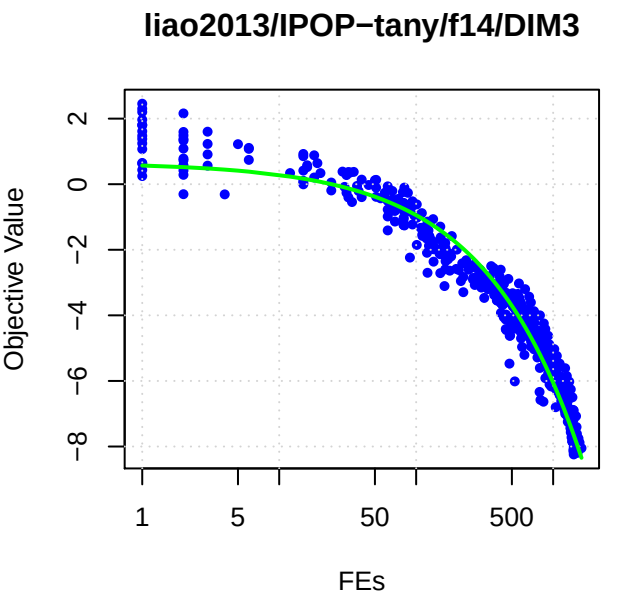
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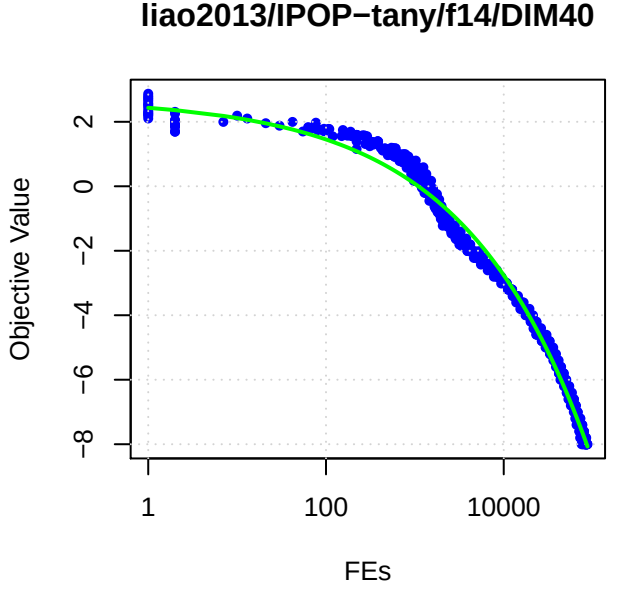
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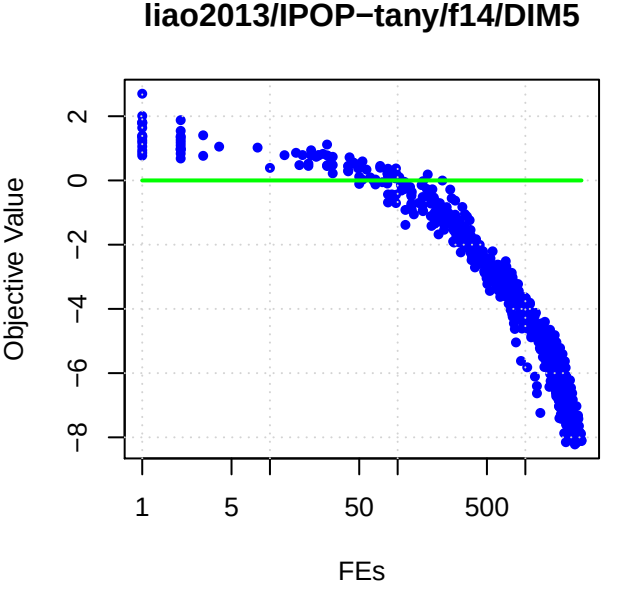
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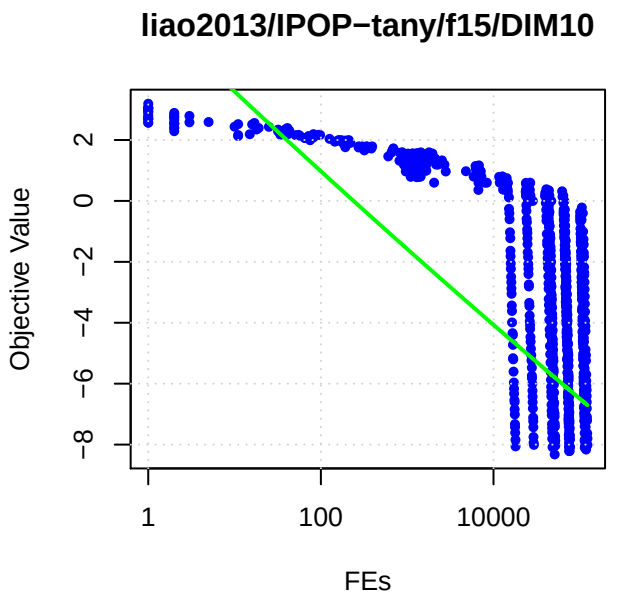
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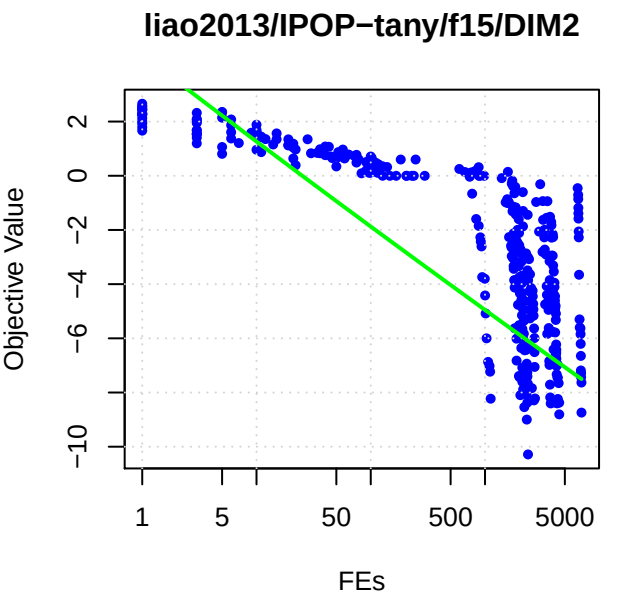
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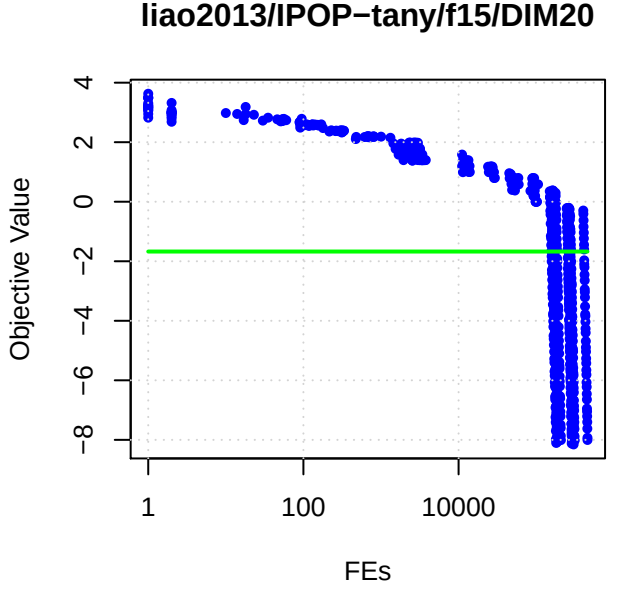
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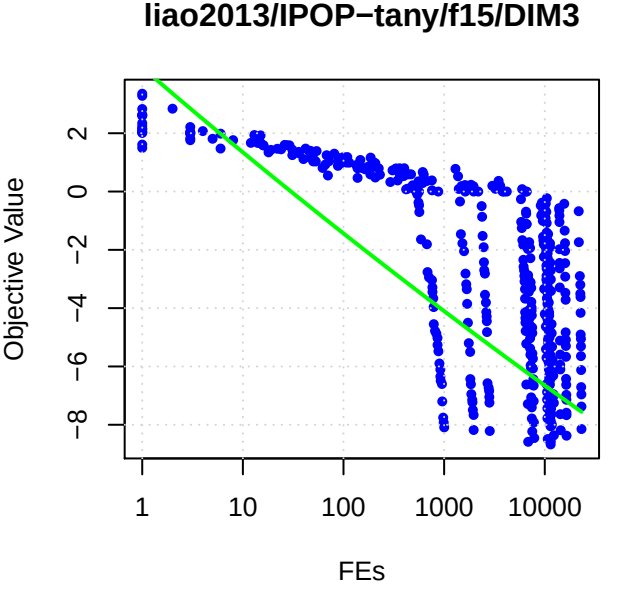
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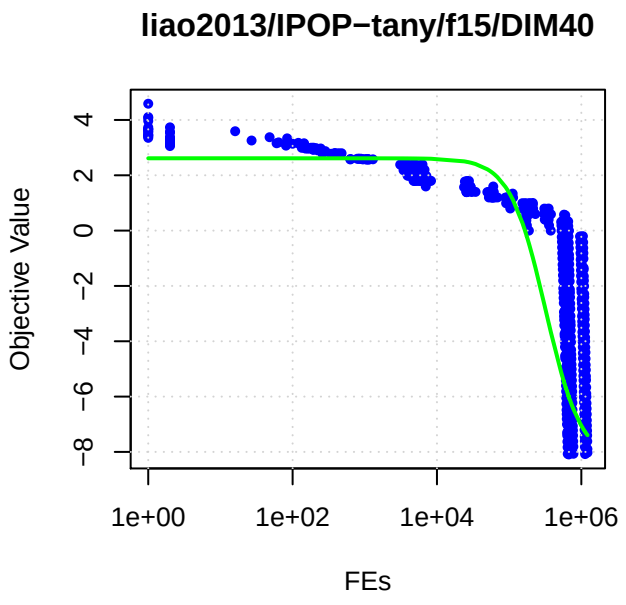
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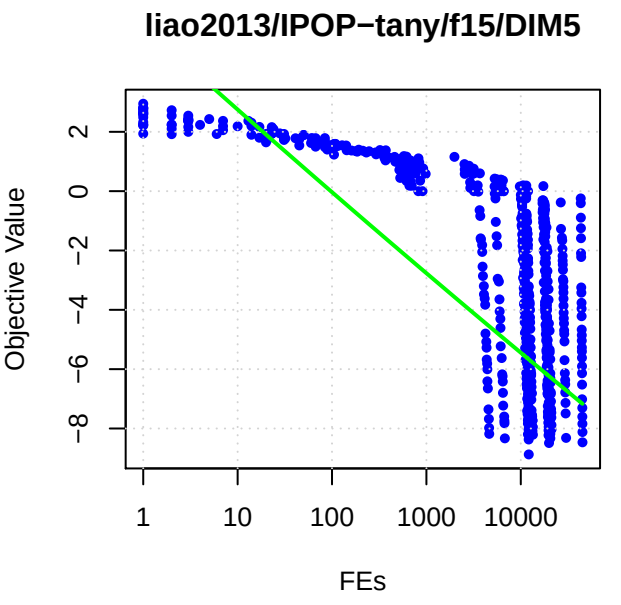
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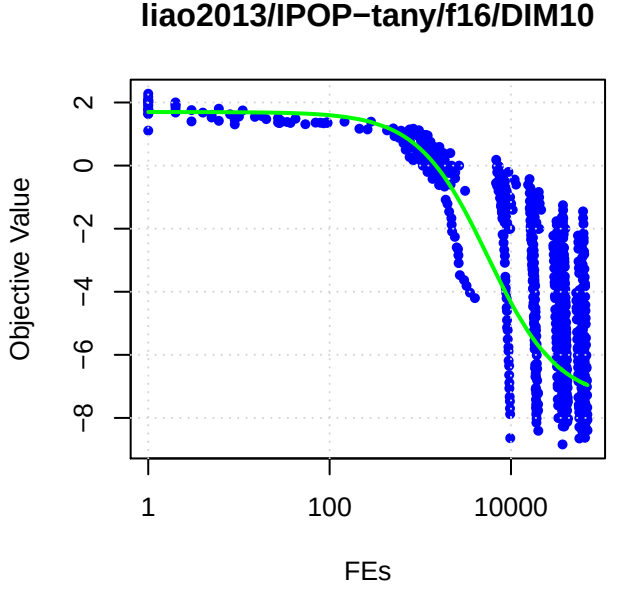
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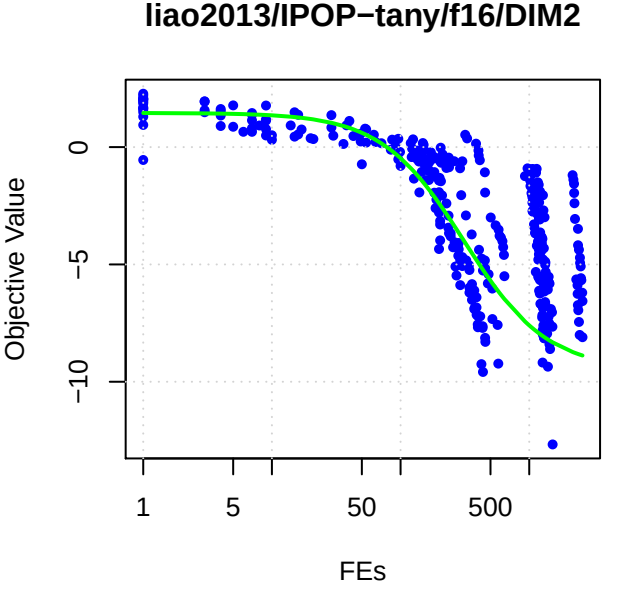
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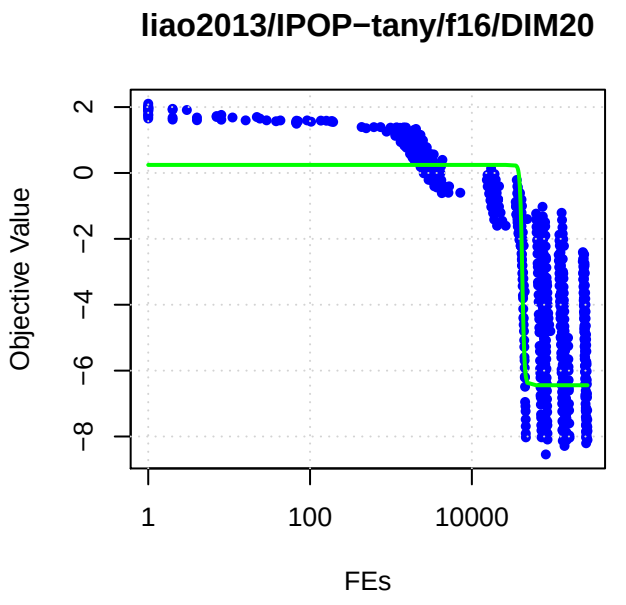
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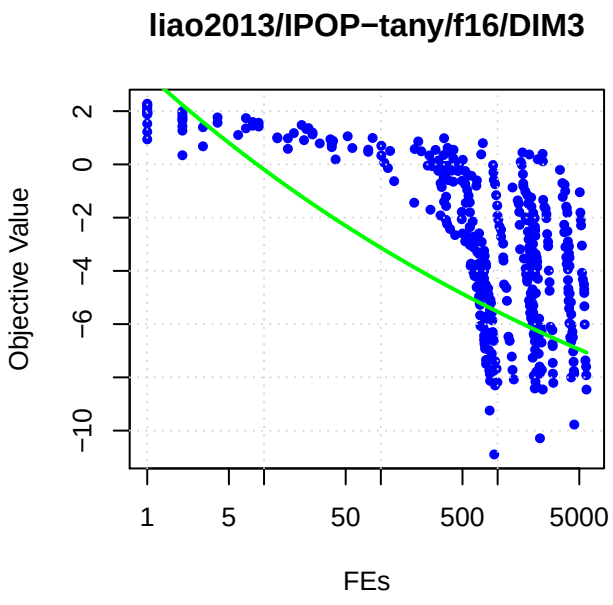
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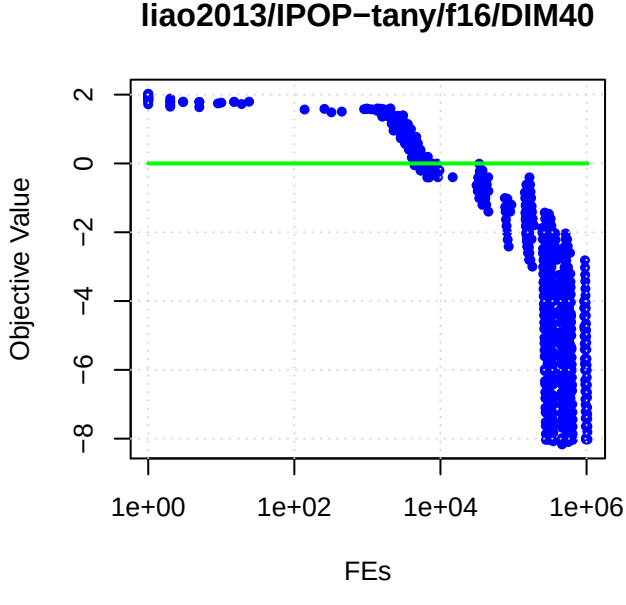
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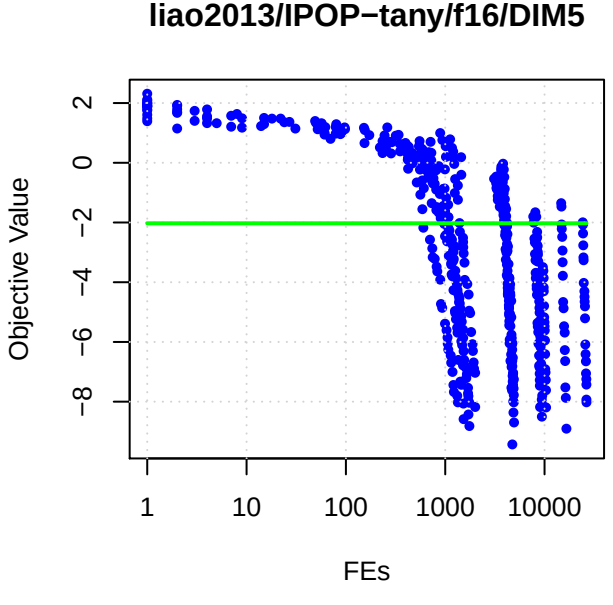
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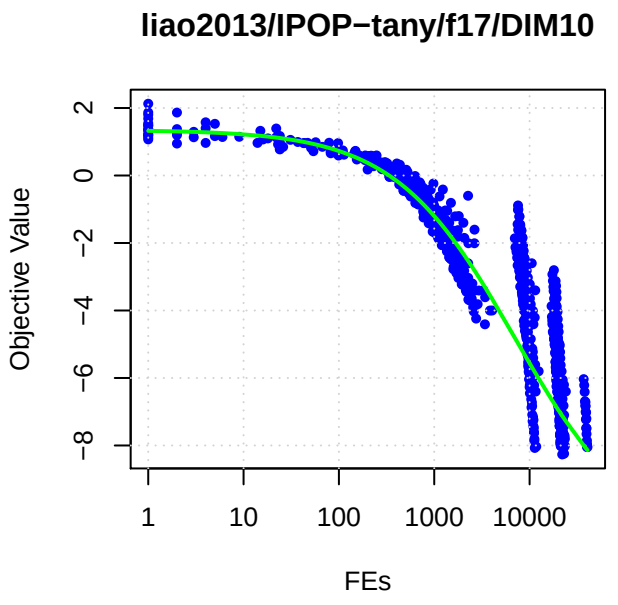
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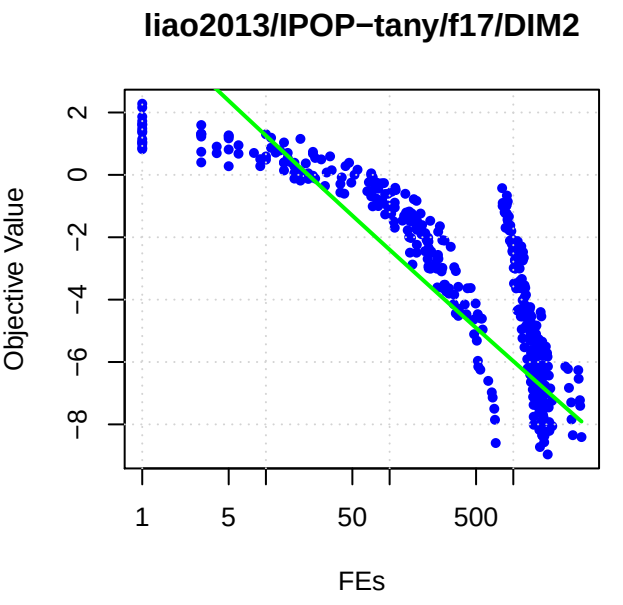
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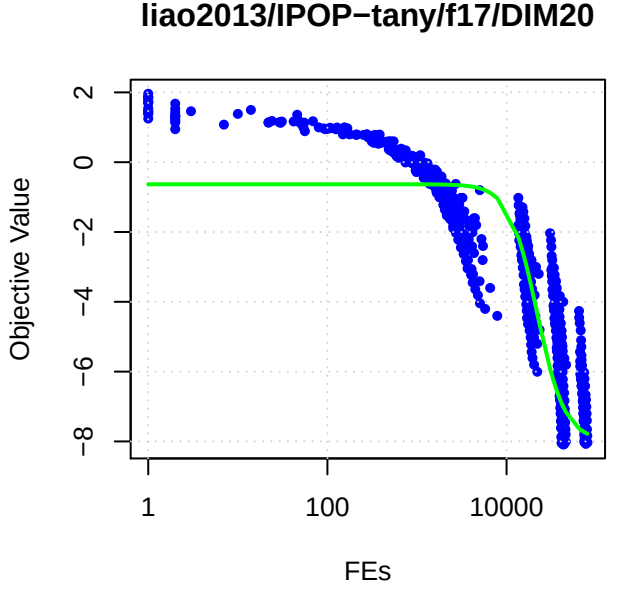
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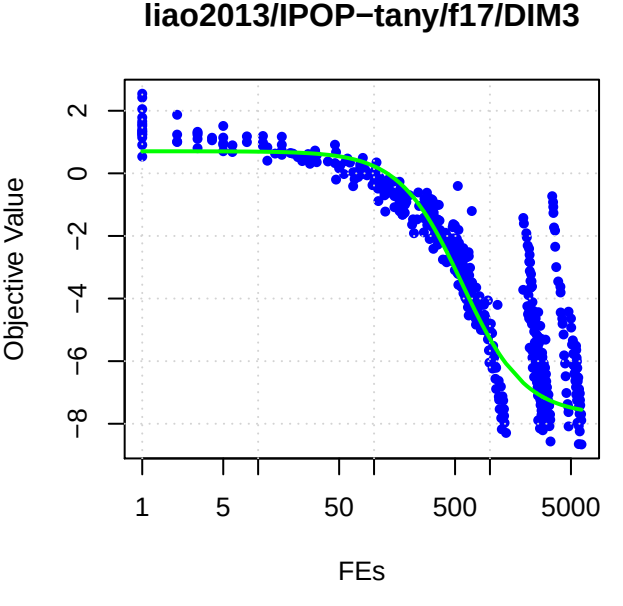
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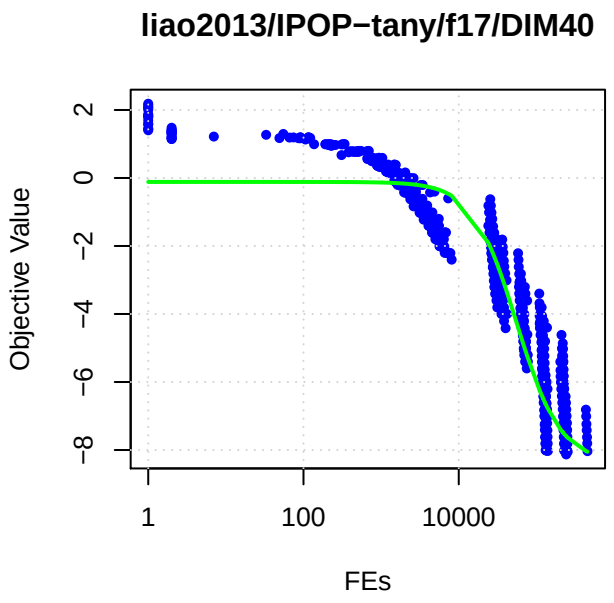
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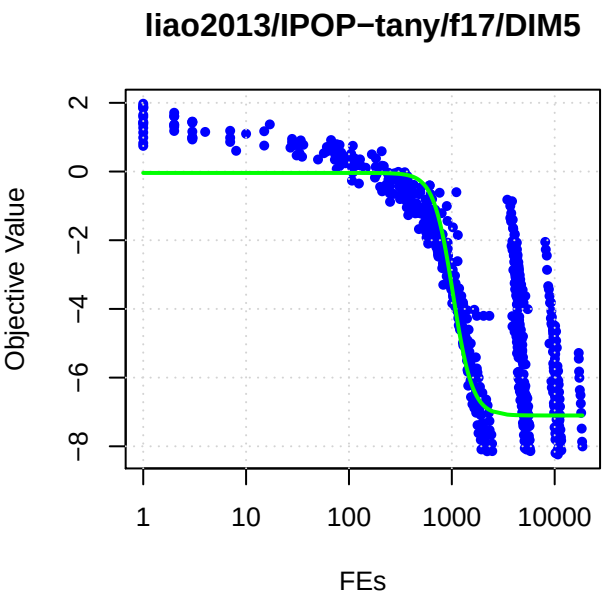
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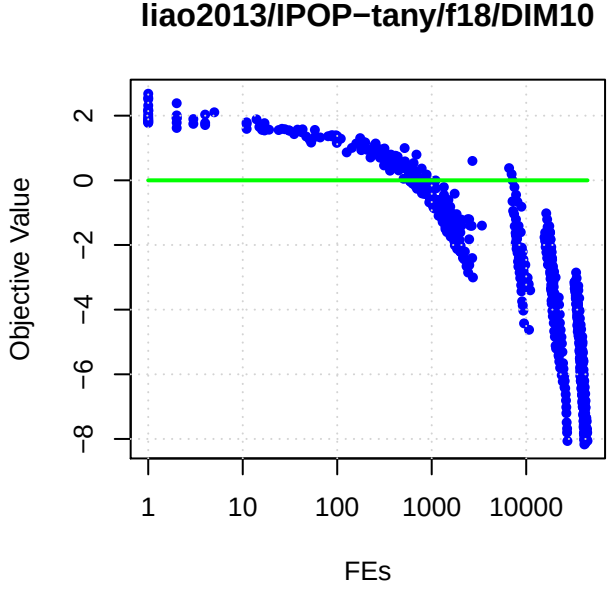
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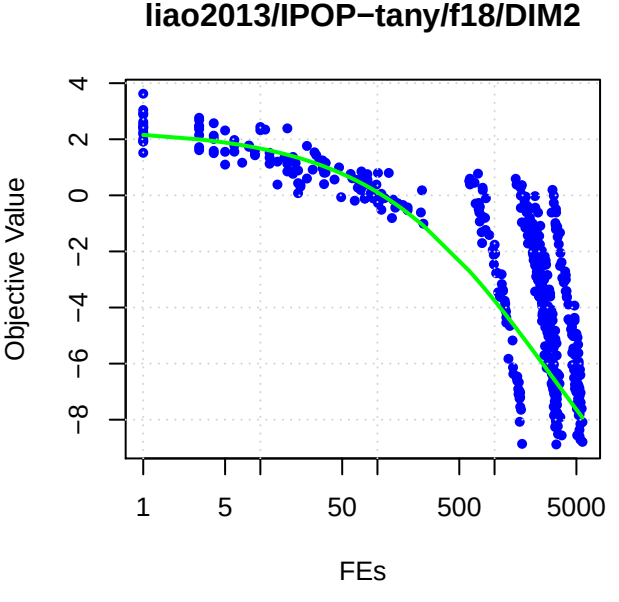
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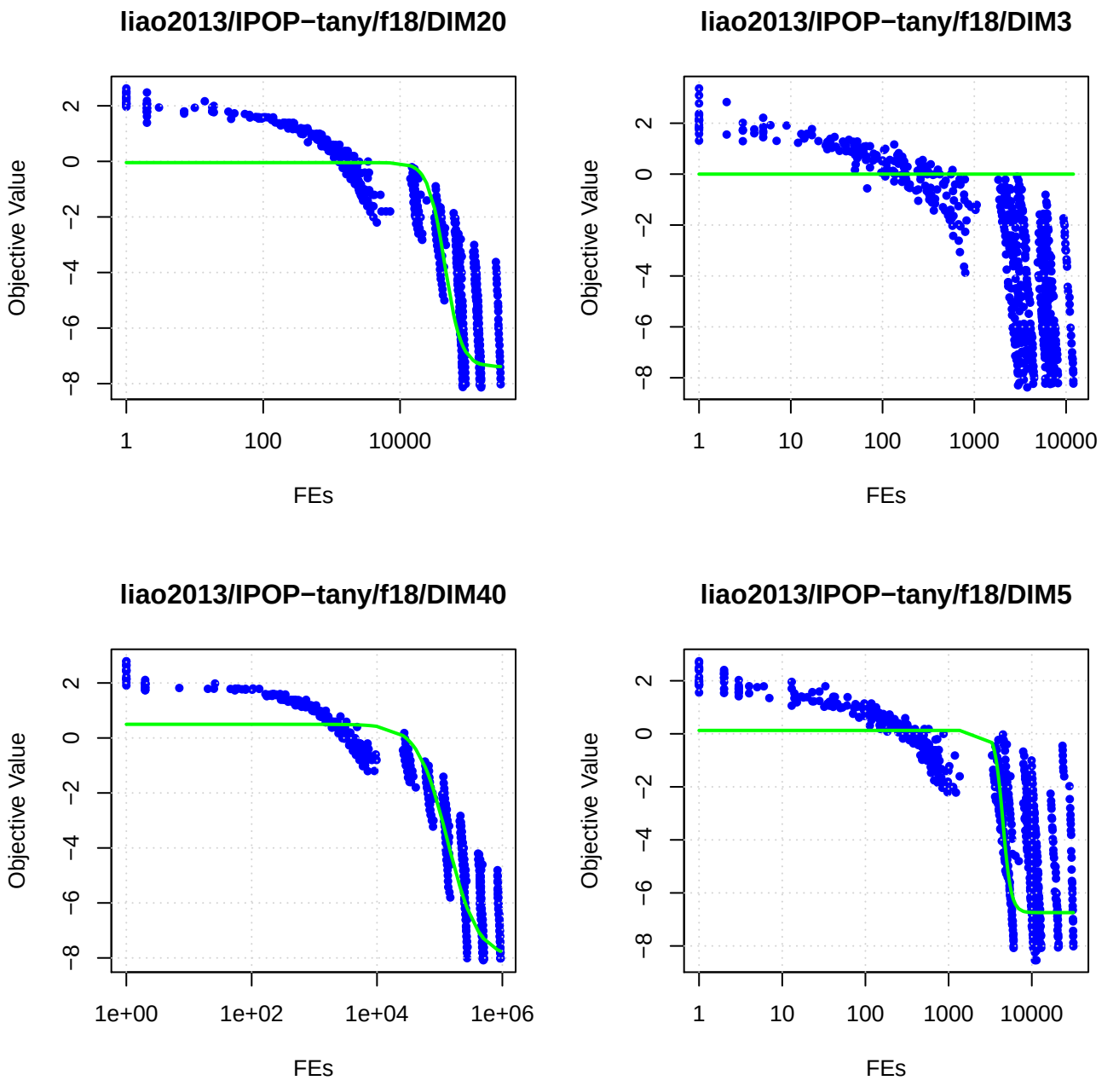
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liao2013/IPOP−tany/f18/DIM40
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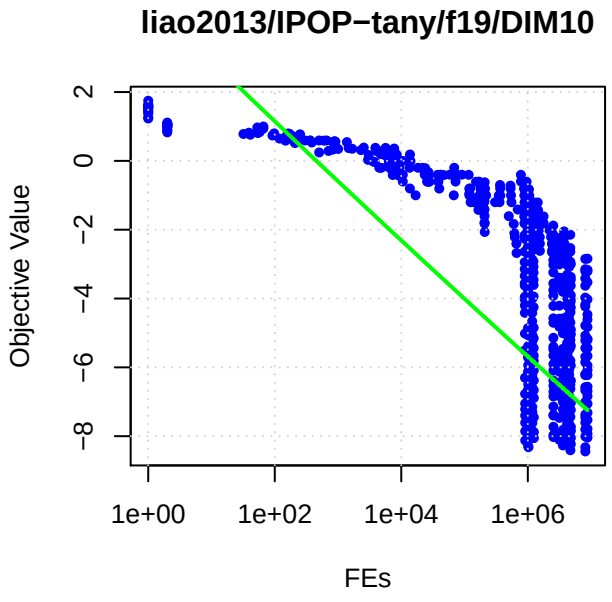
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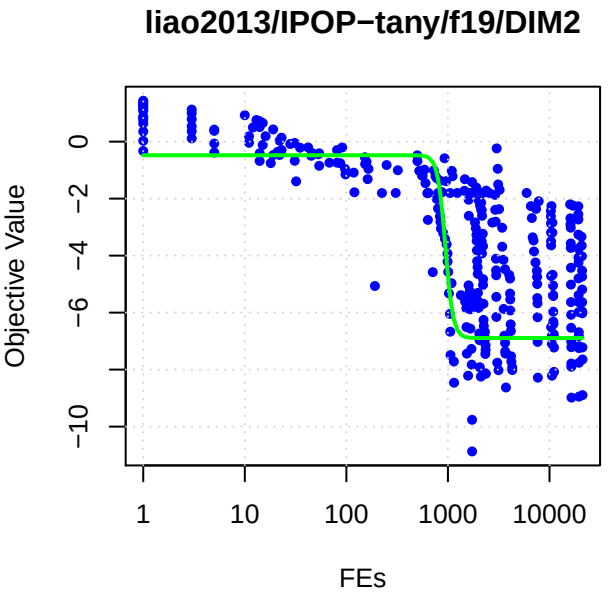
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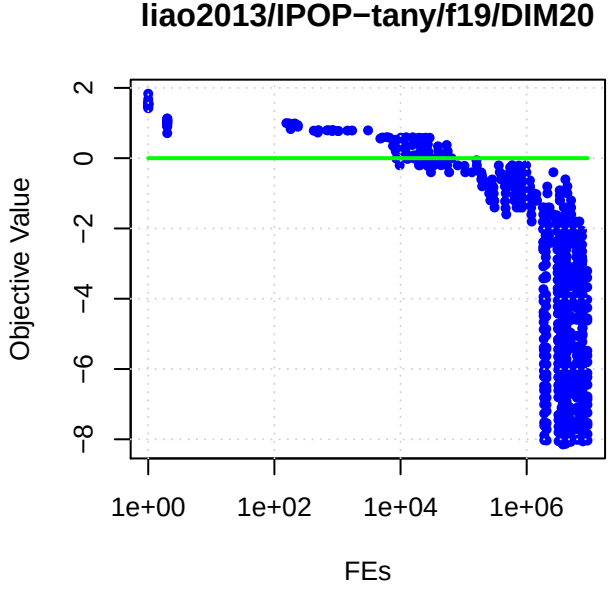
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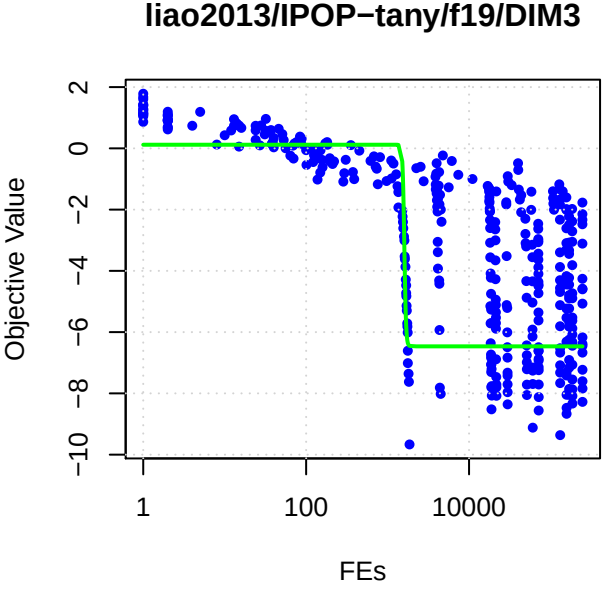
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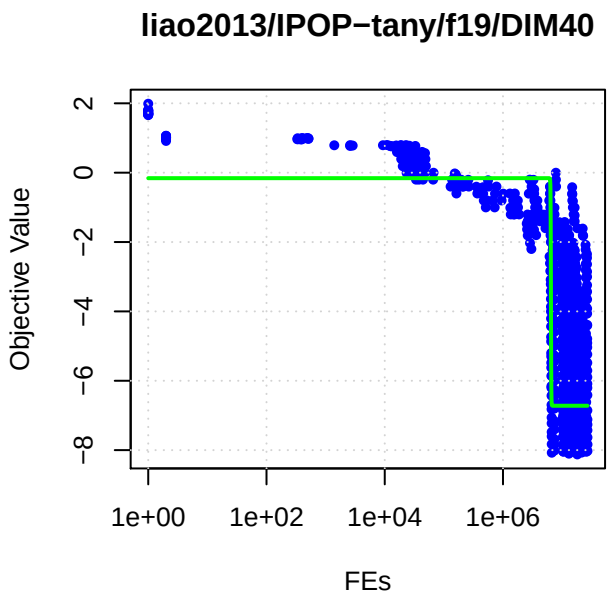
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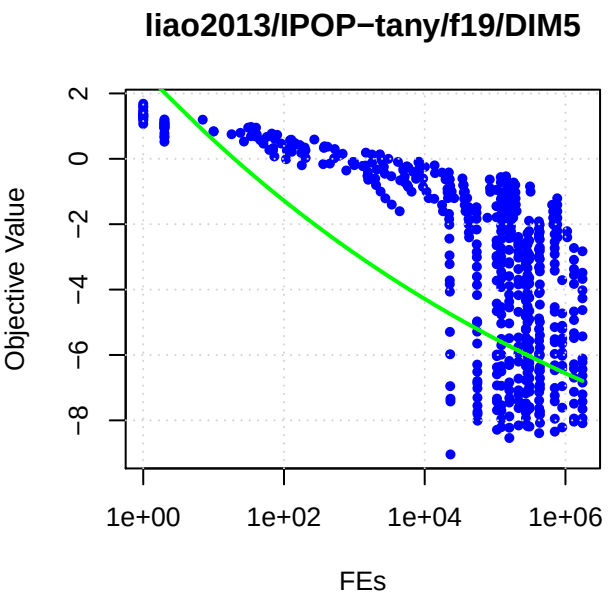
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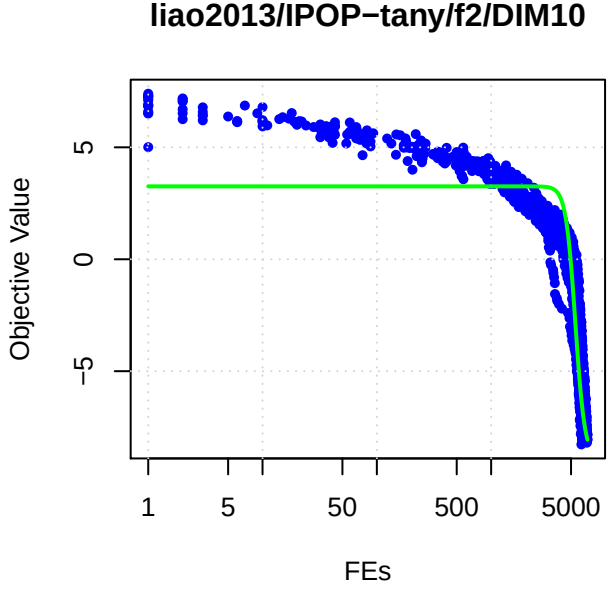
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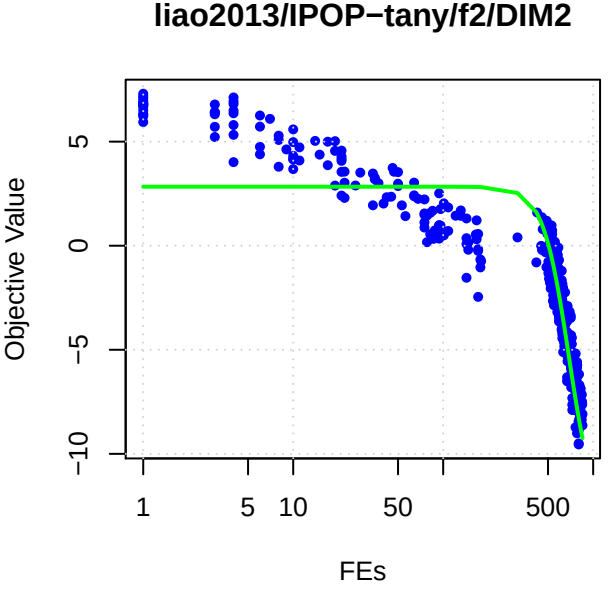
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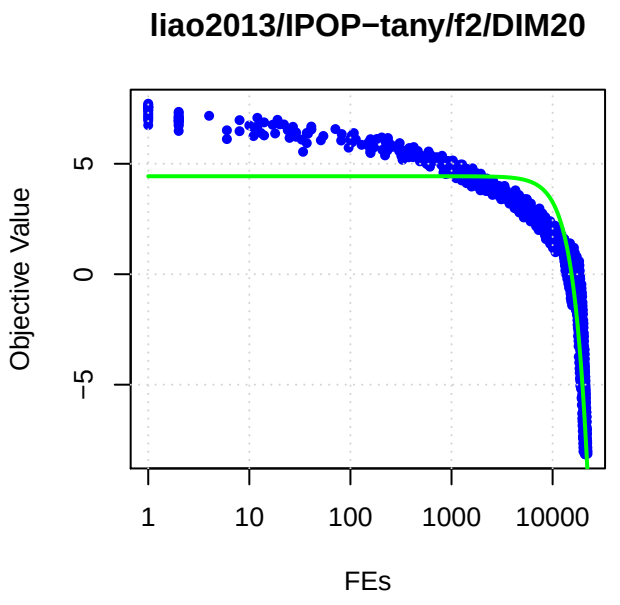
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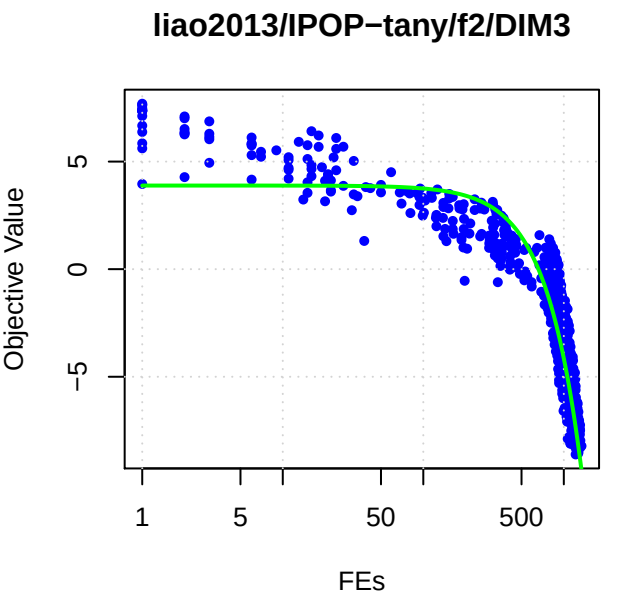
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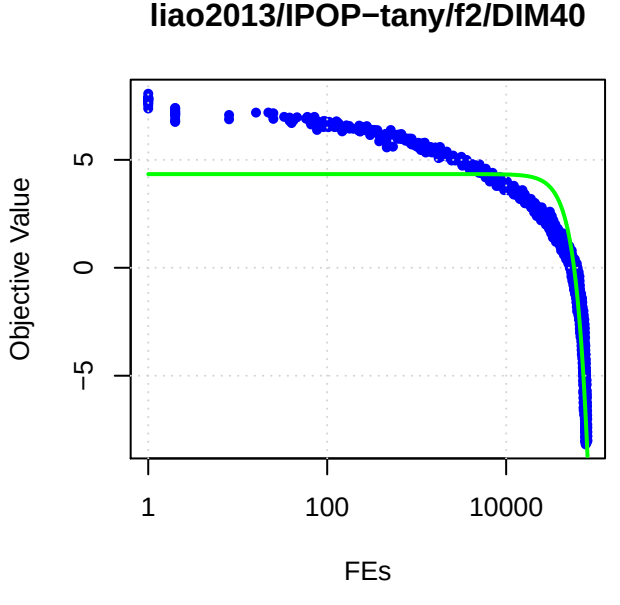
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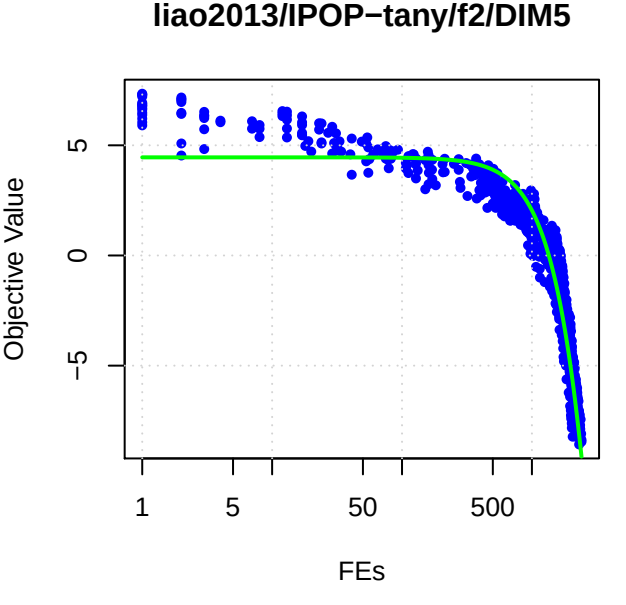
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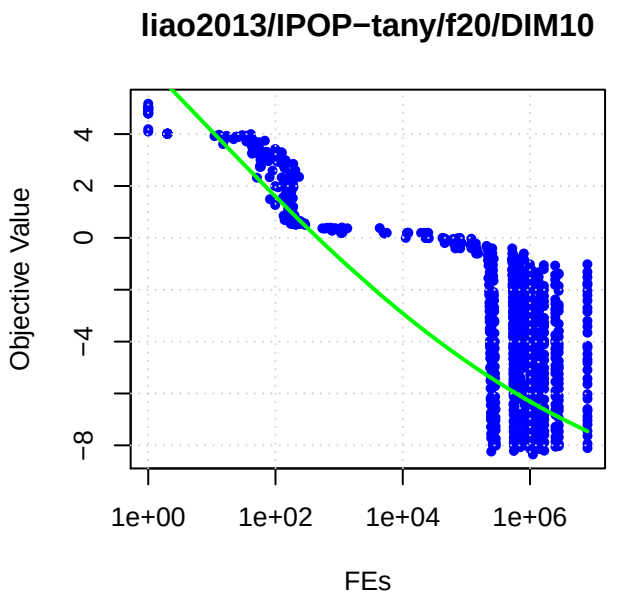
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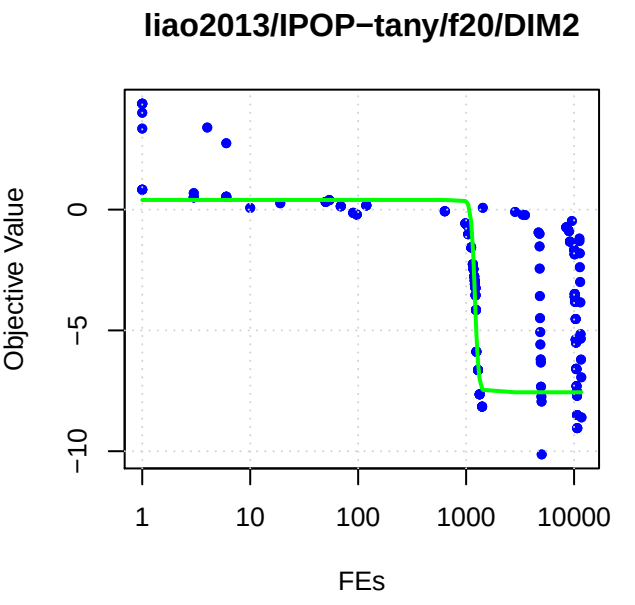
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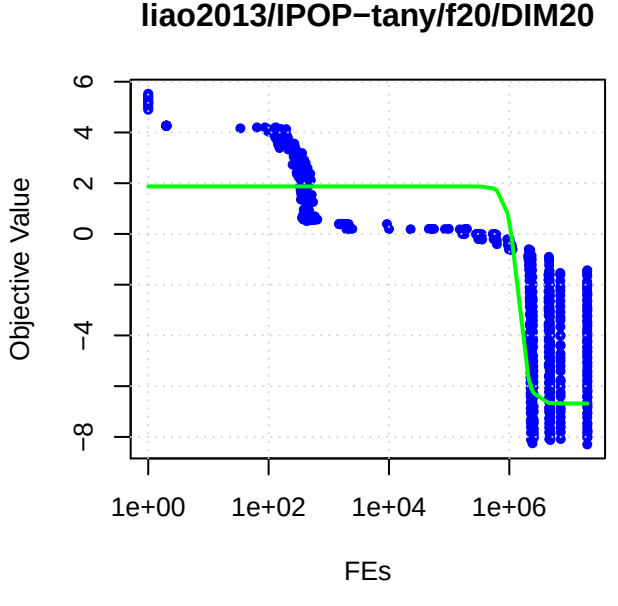
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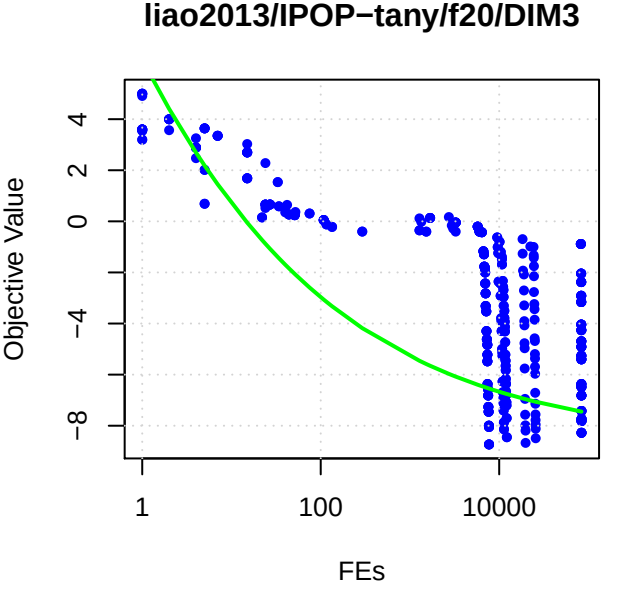
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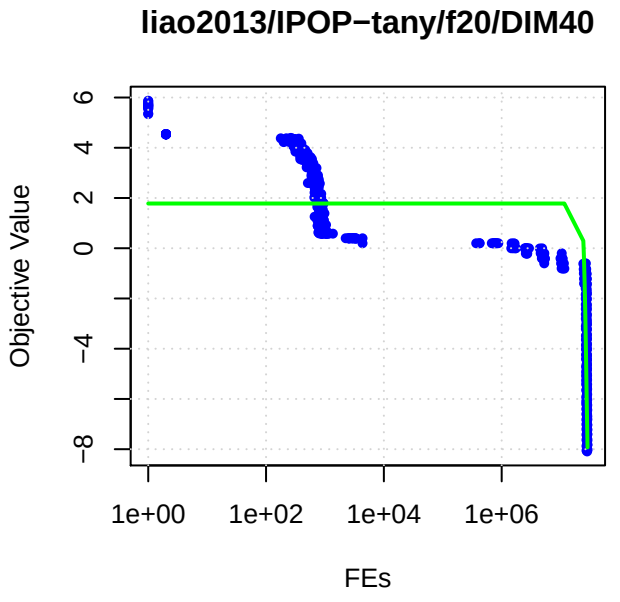
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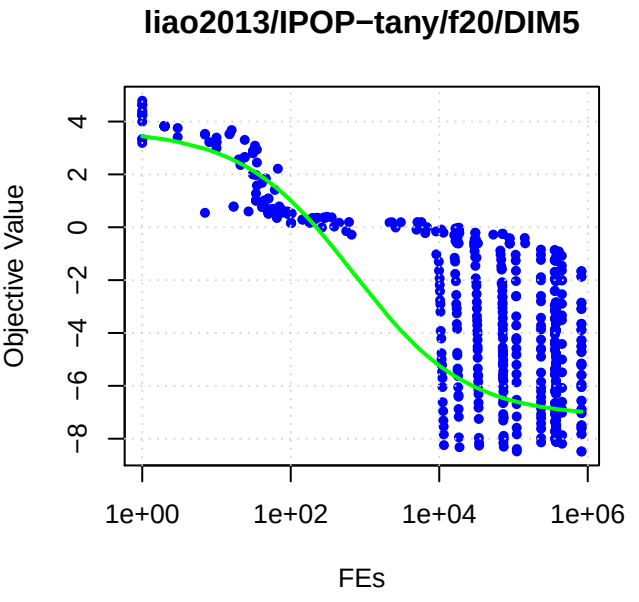
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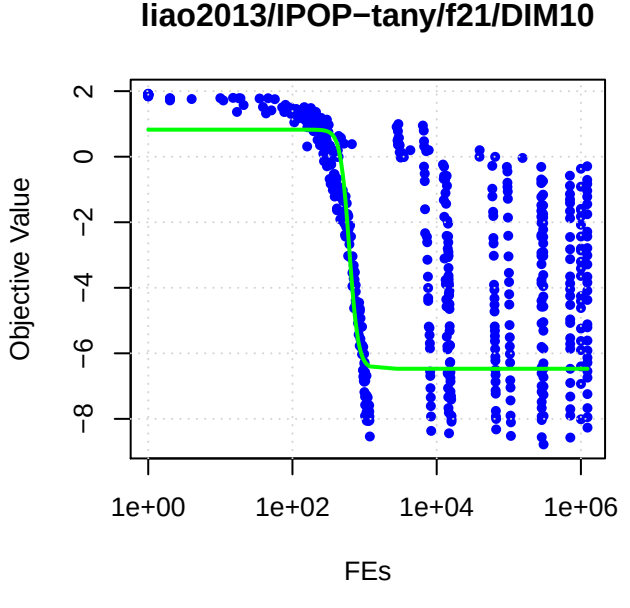
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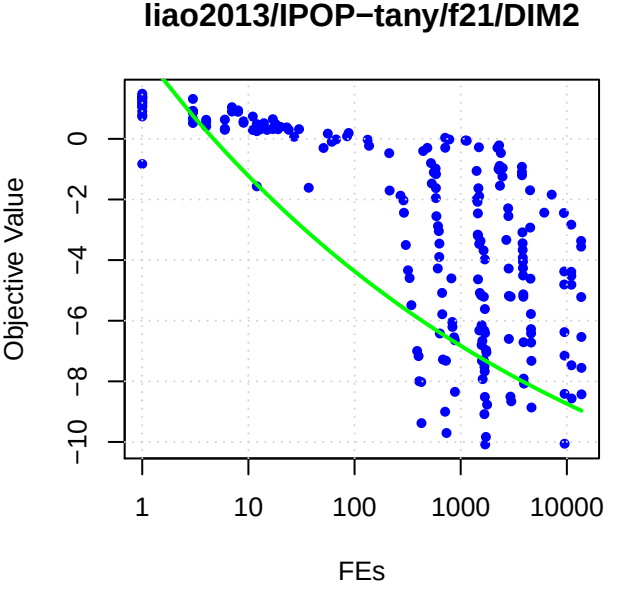
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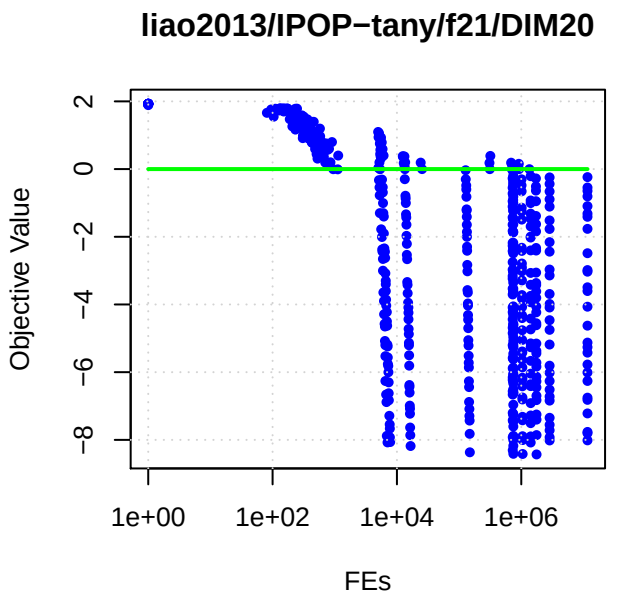
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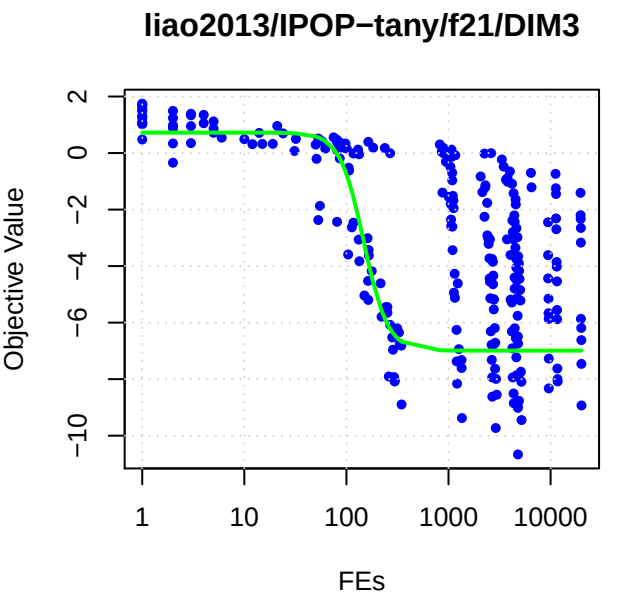
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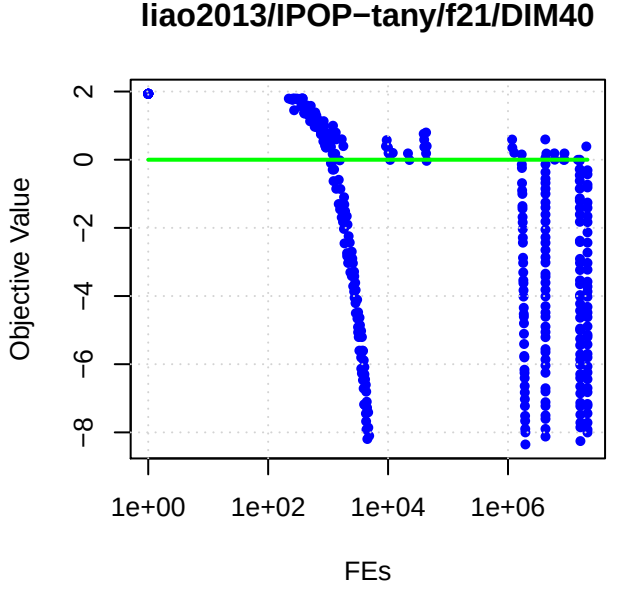
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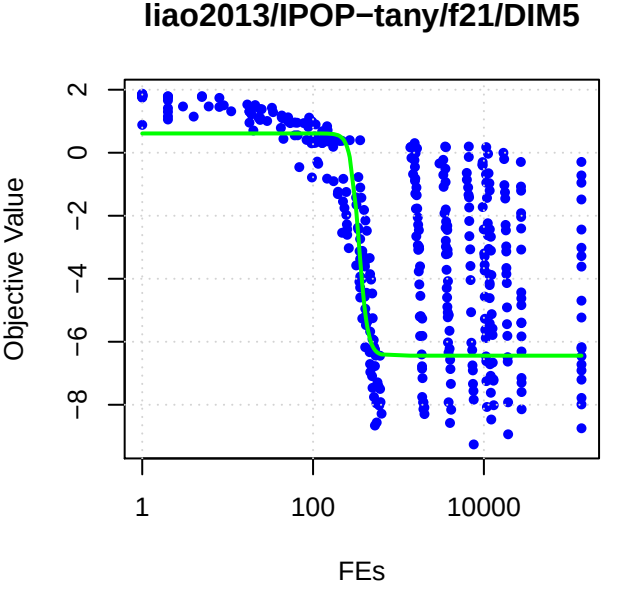
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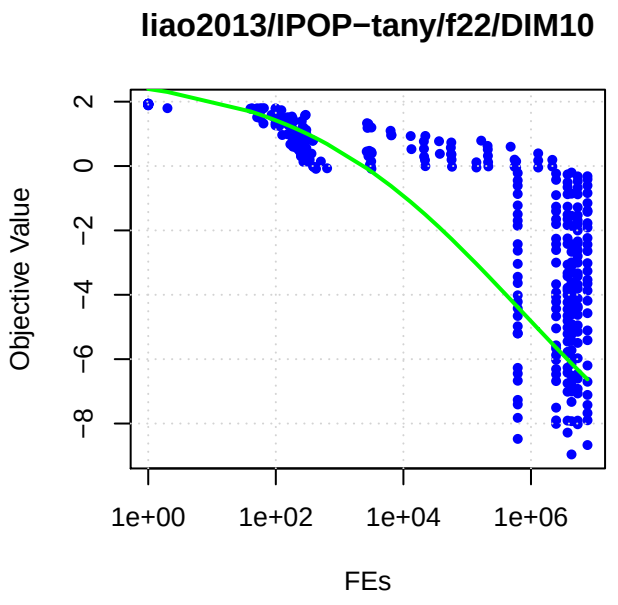
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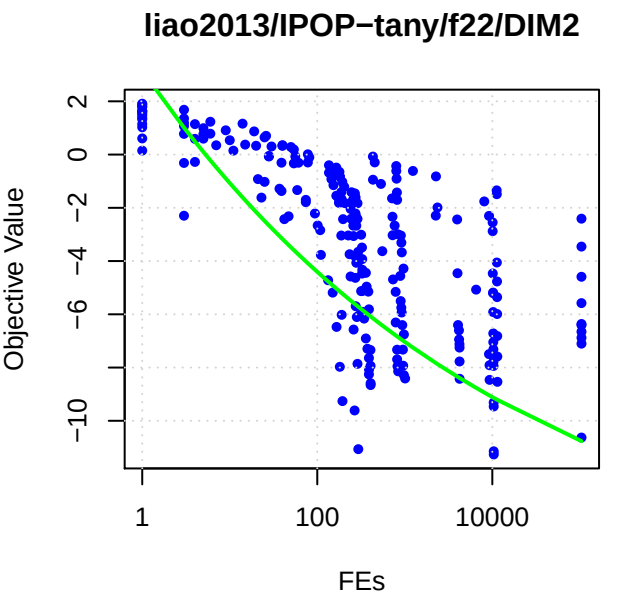
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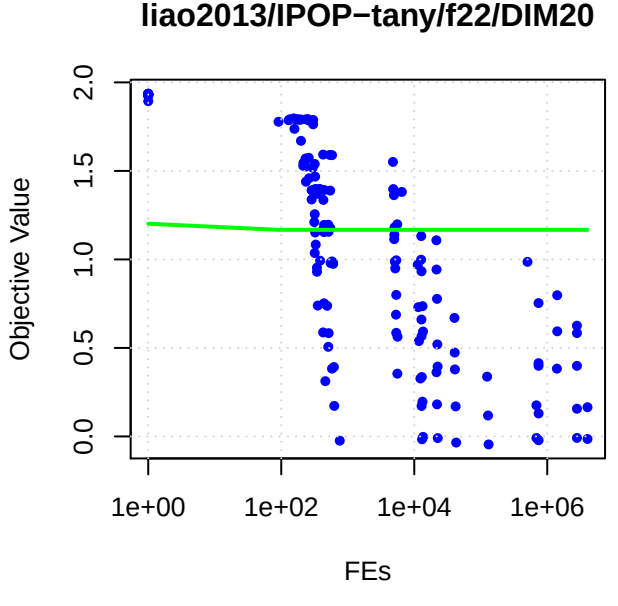
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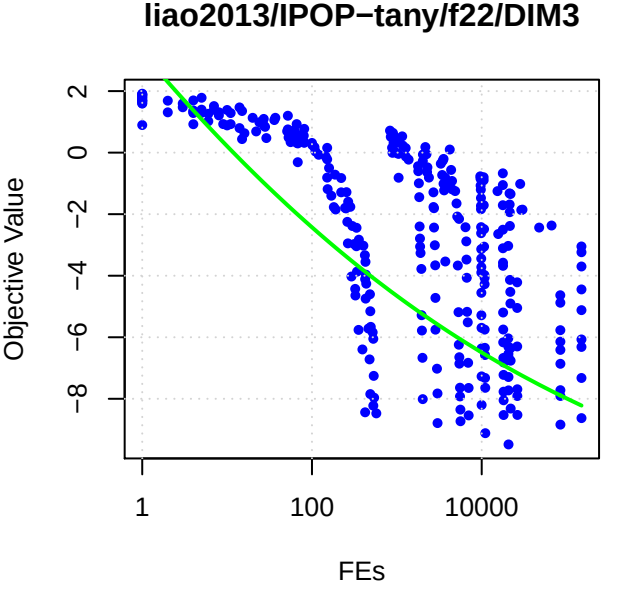
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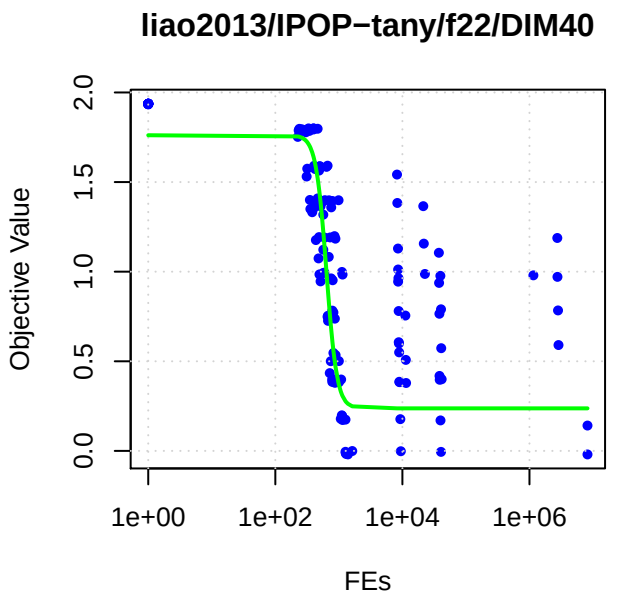
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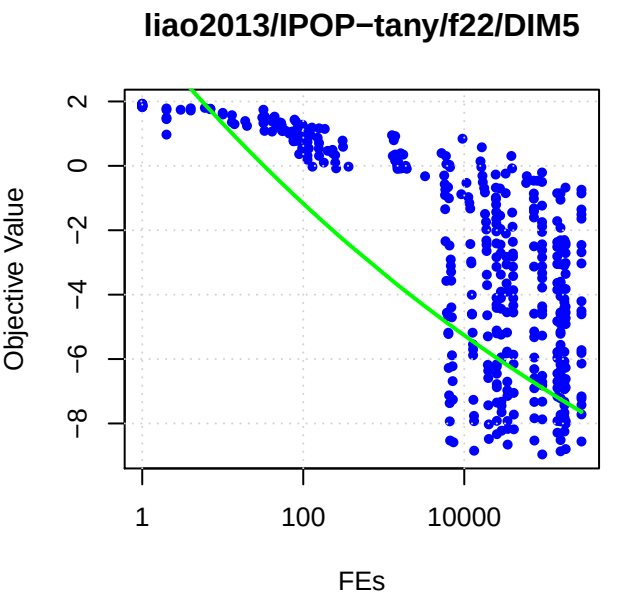
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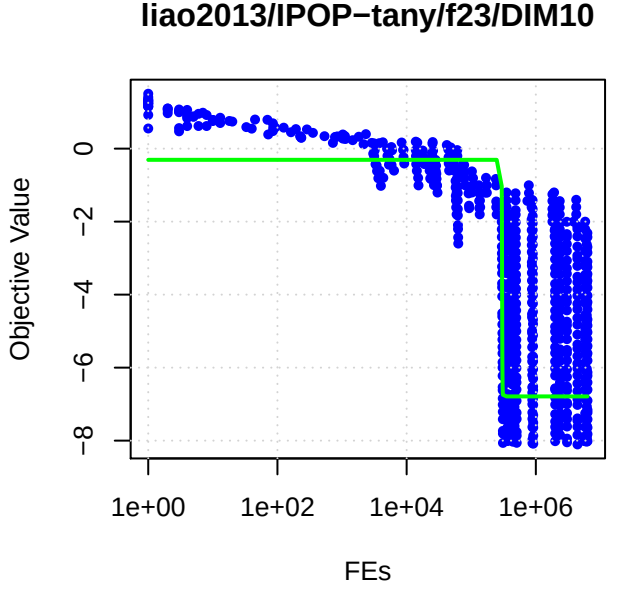
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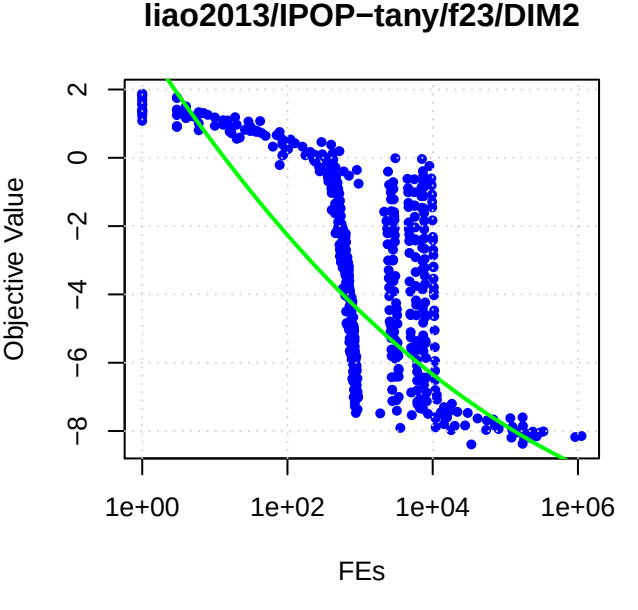
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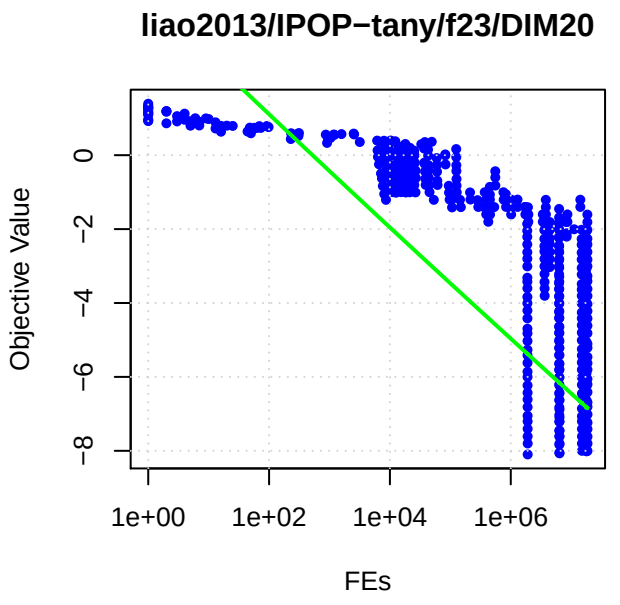
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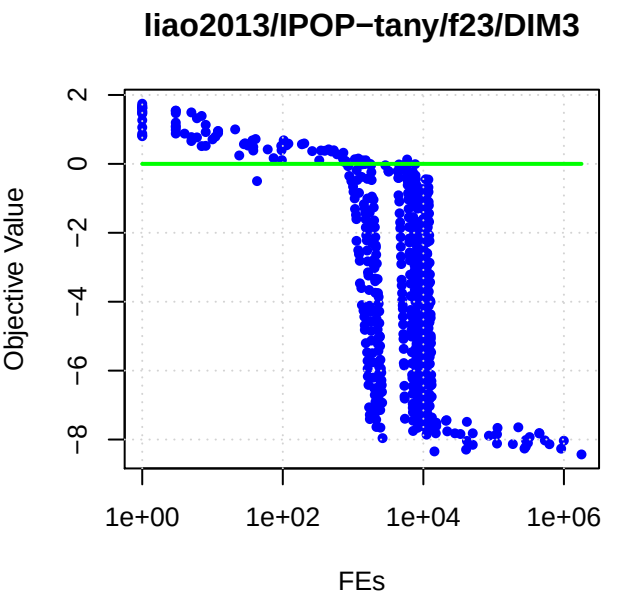
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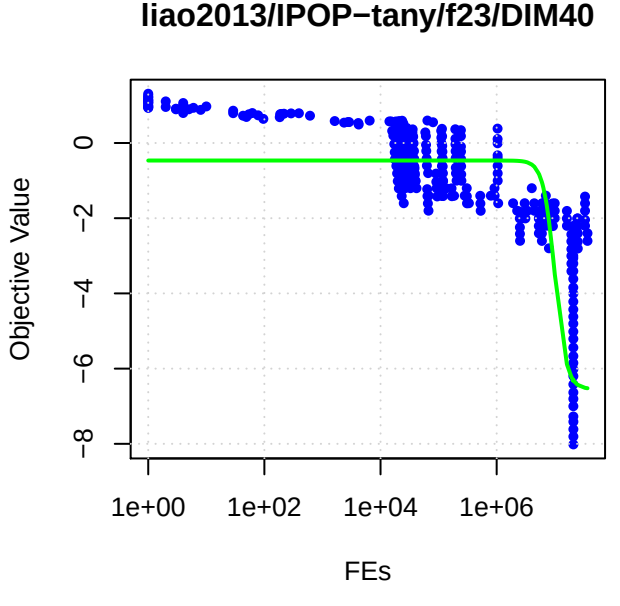
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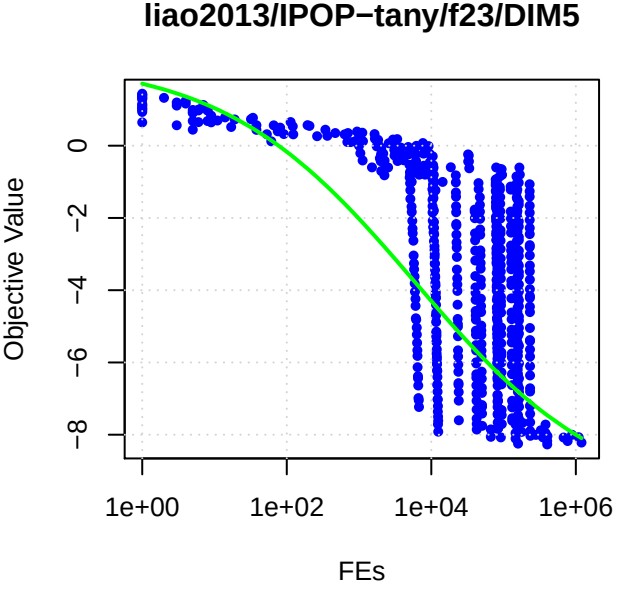
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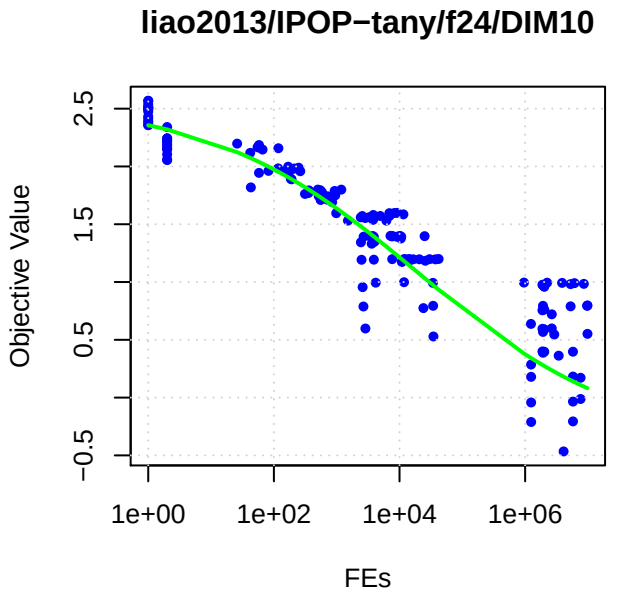
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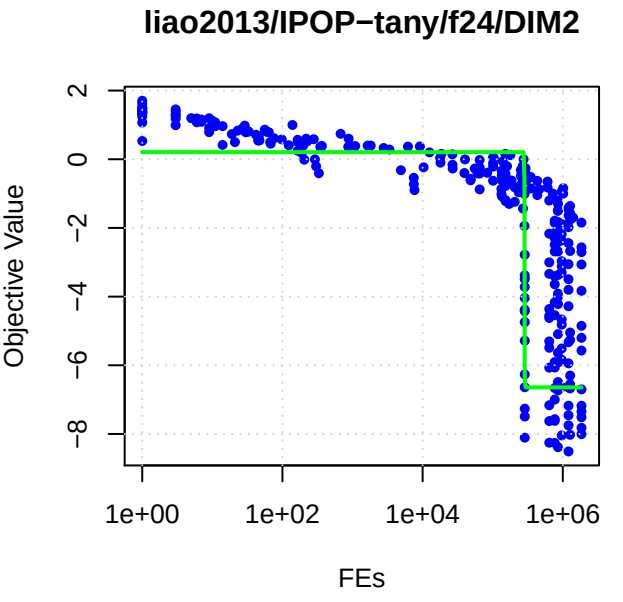
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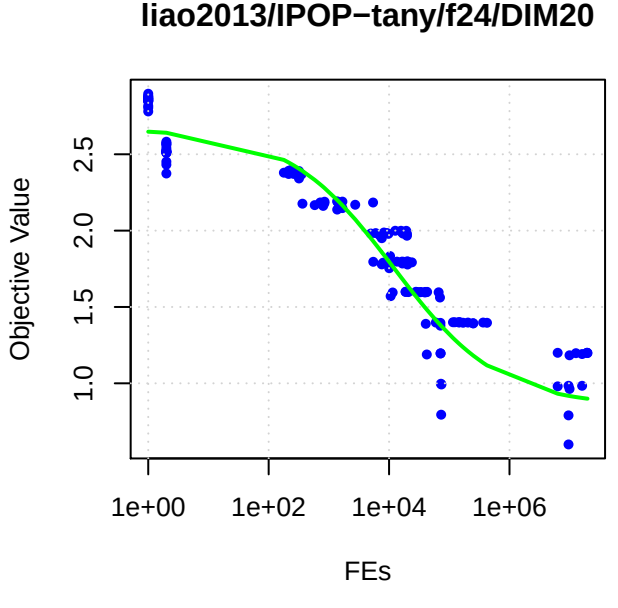
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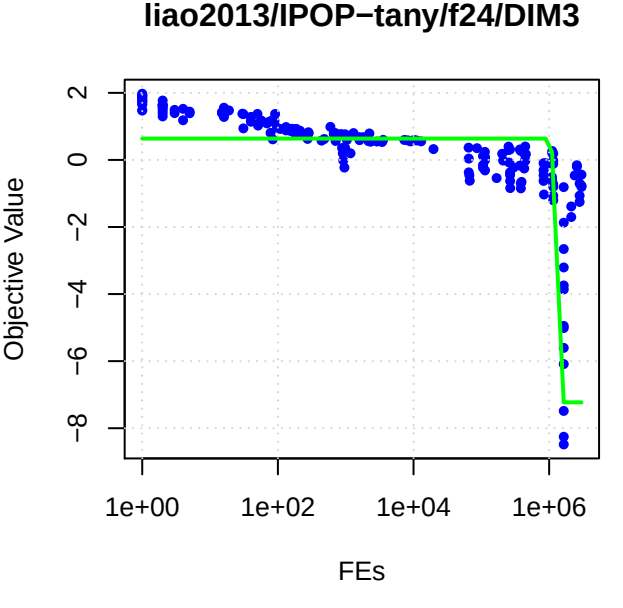
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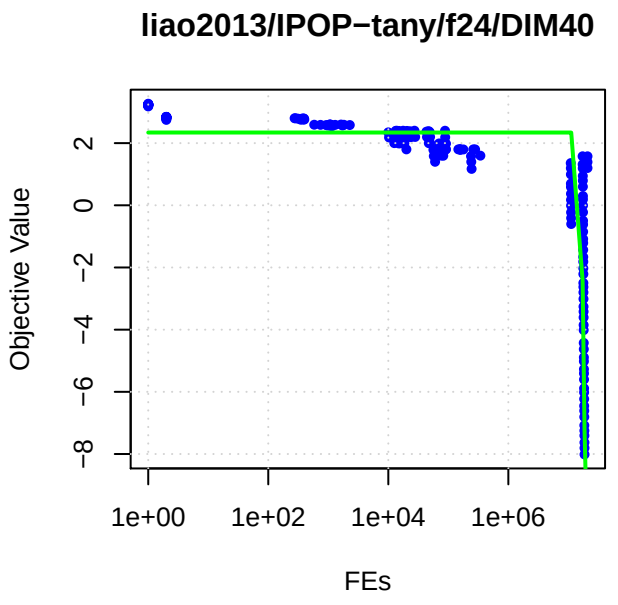
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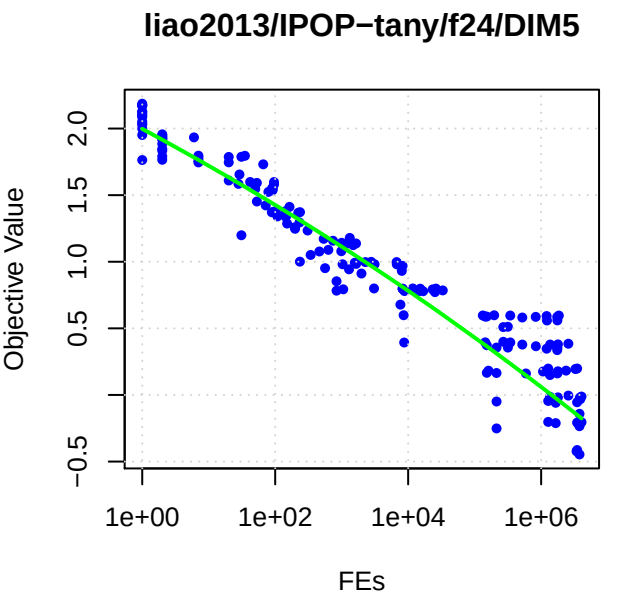
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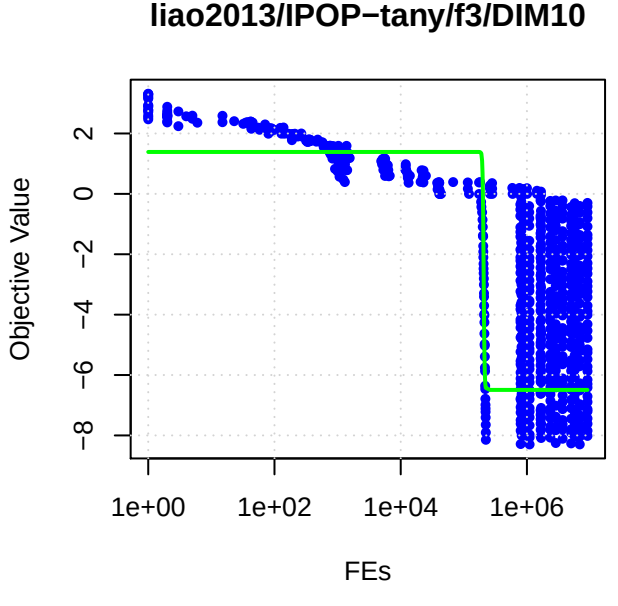
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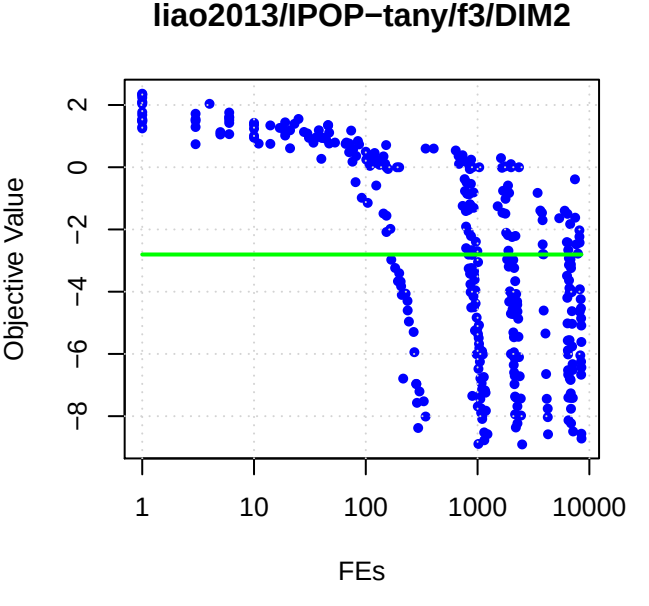
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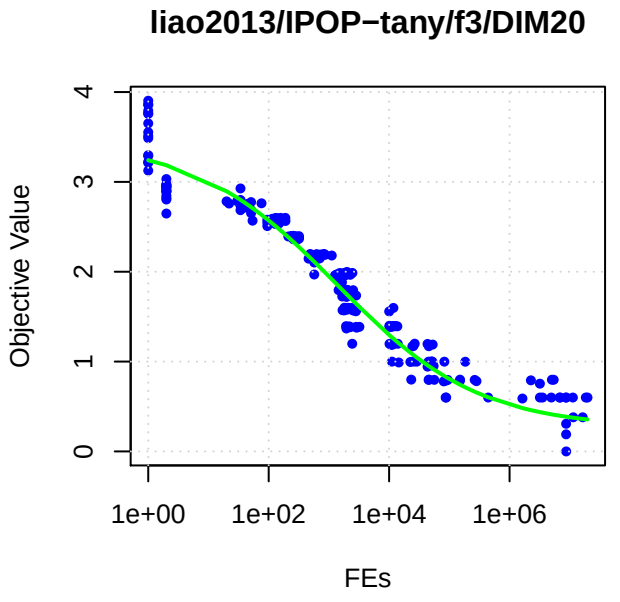
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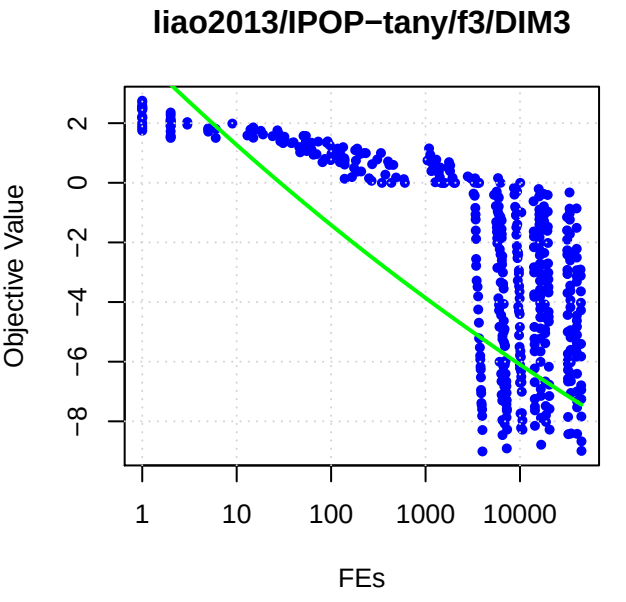
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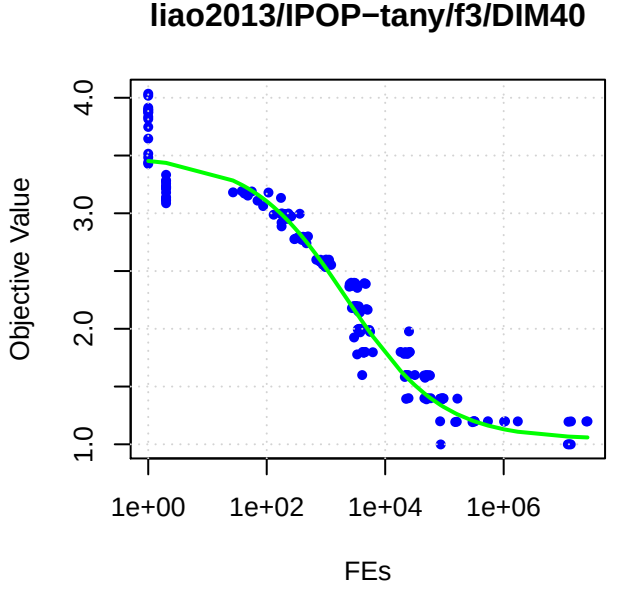
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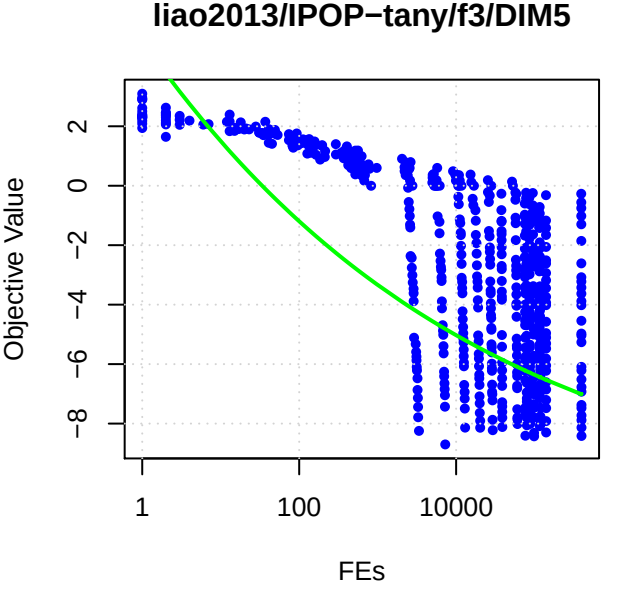
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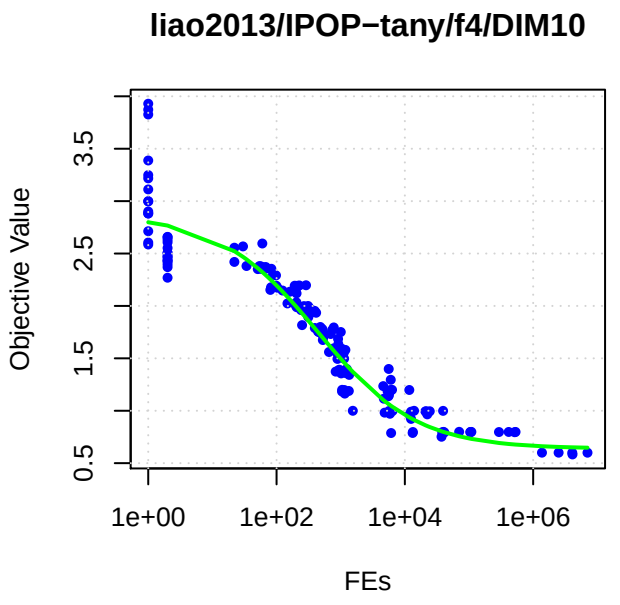
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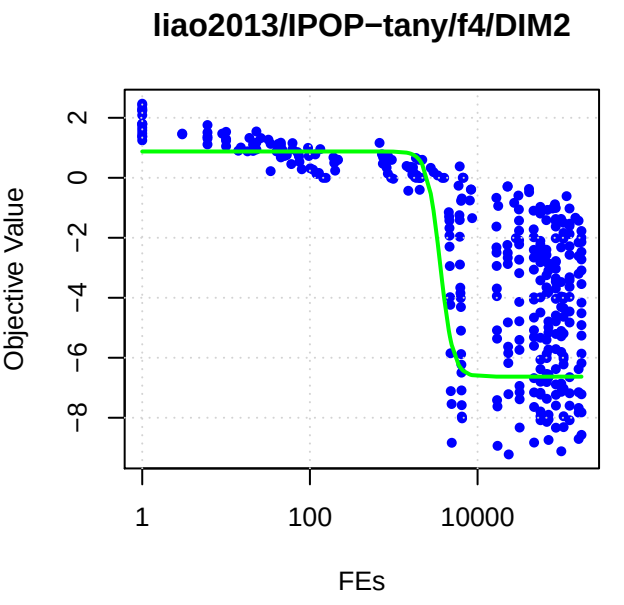
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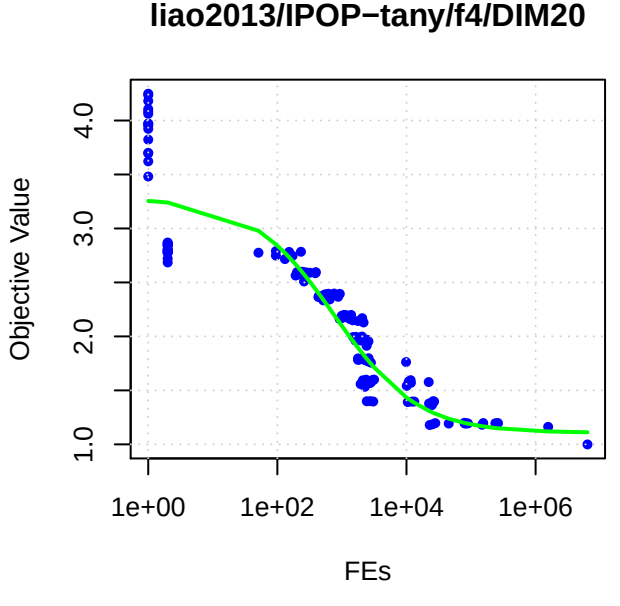
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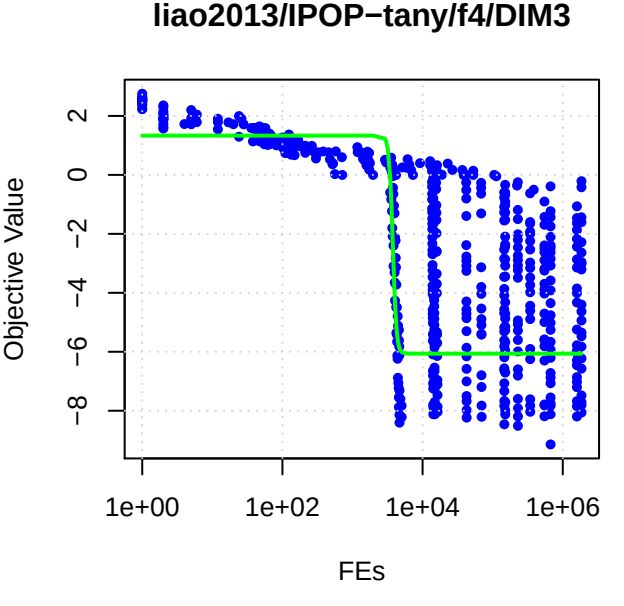
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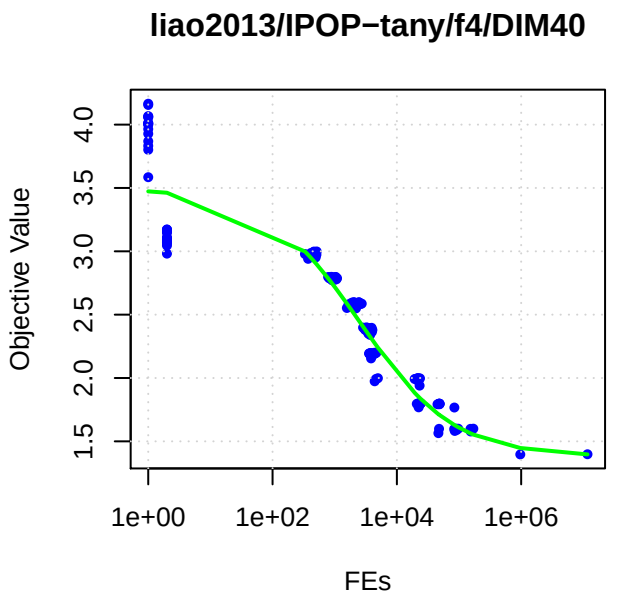
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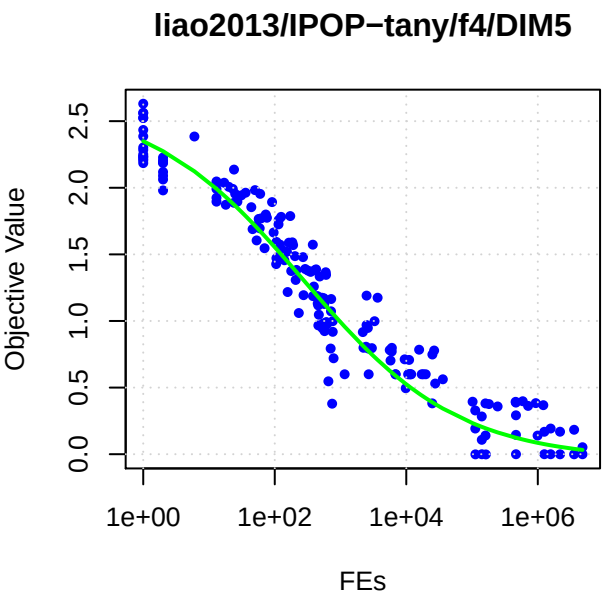
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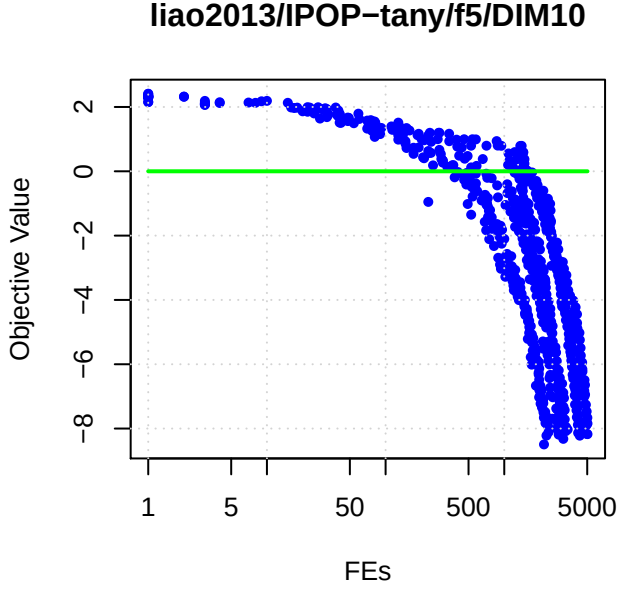
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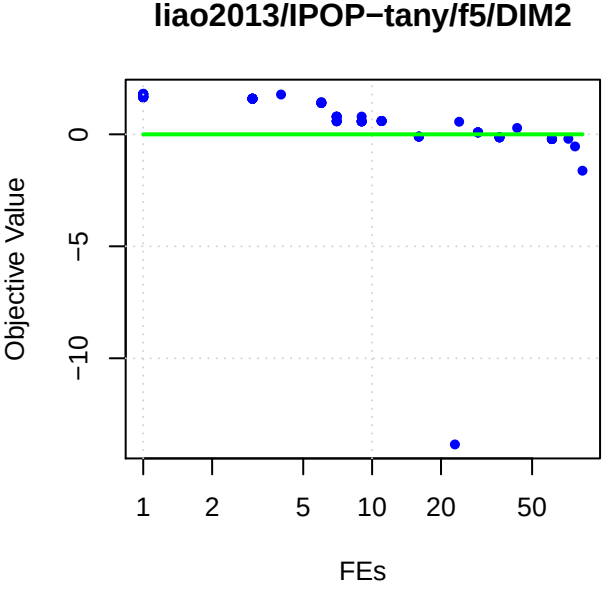
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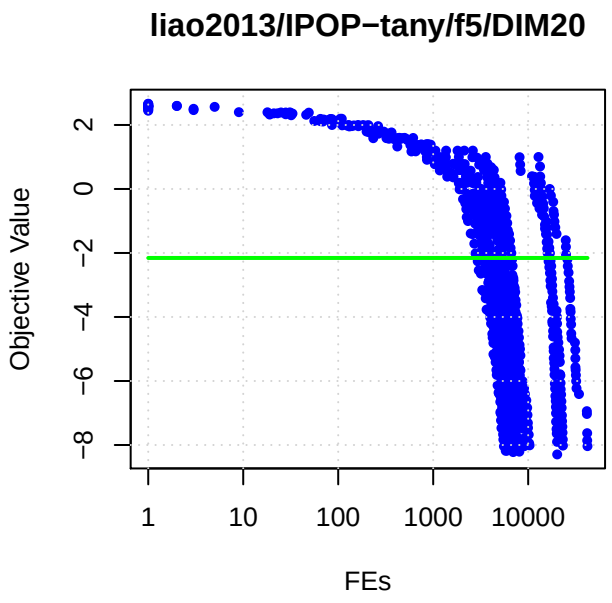
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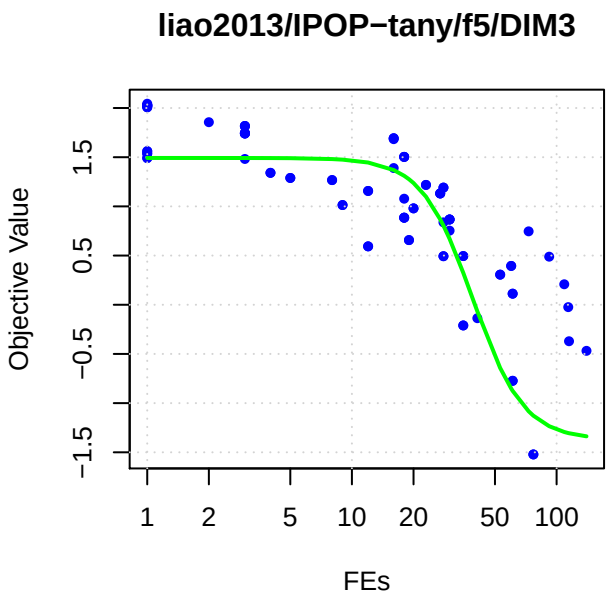
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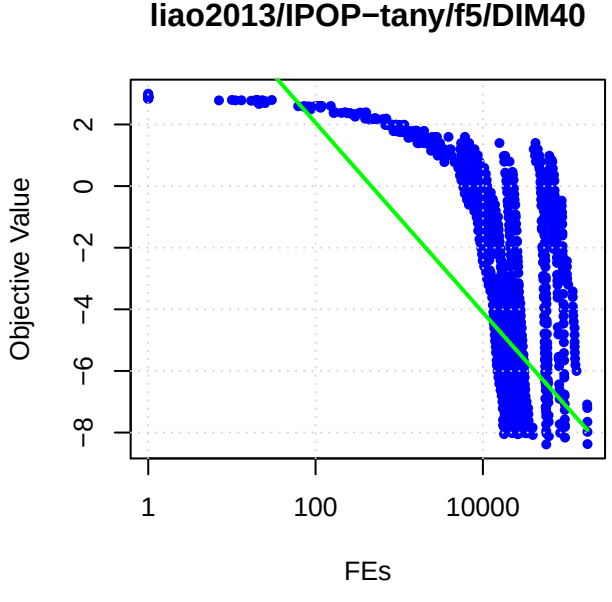
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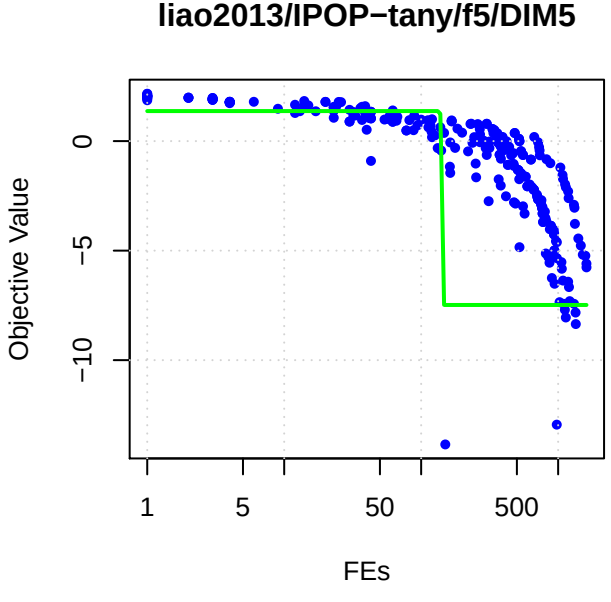
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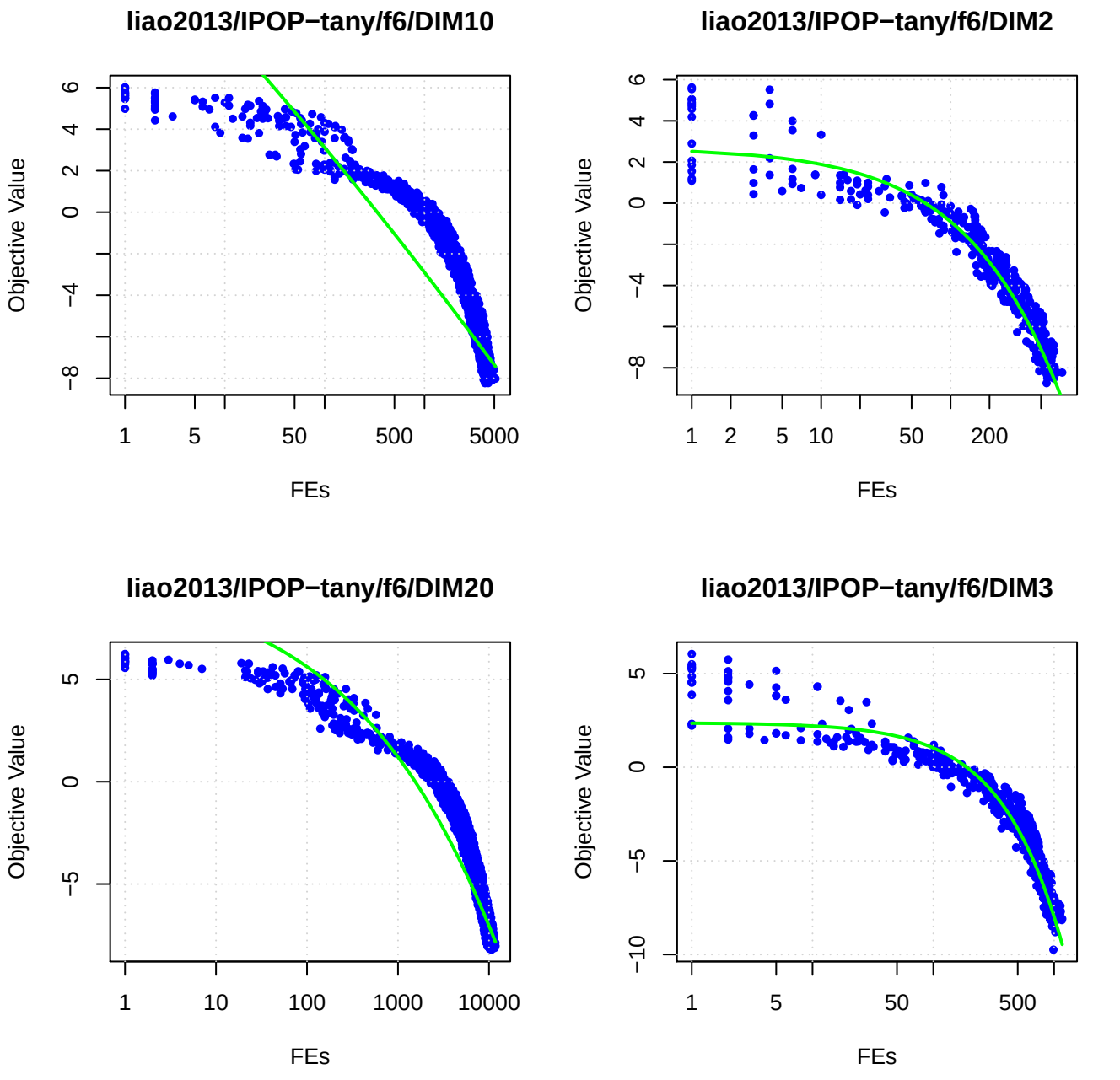
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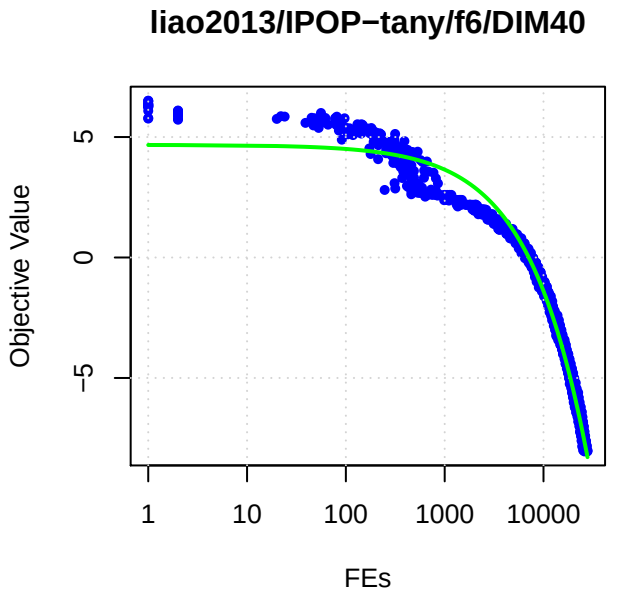
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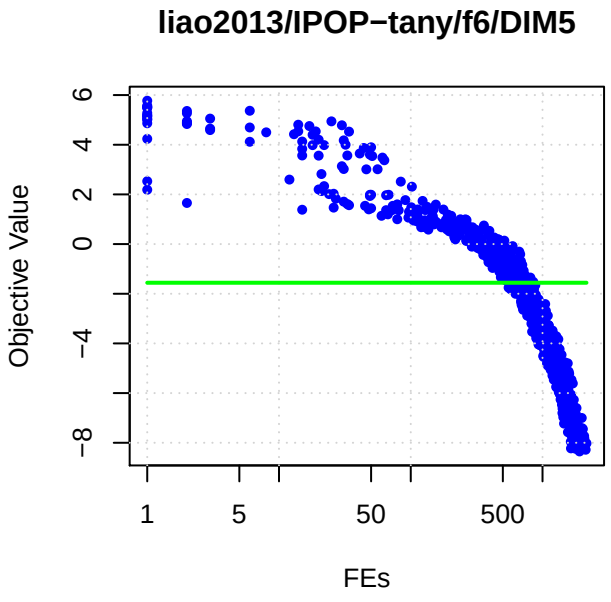
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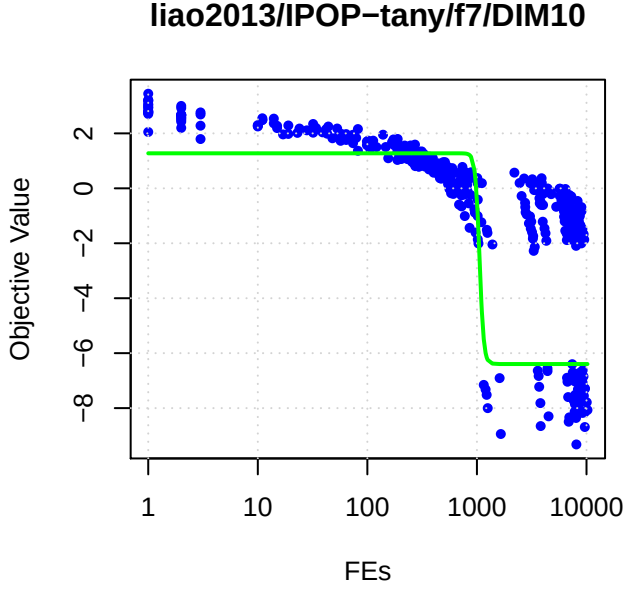
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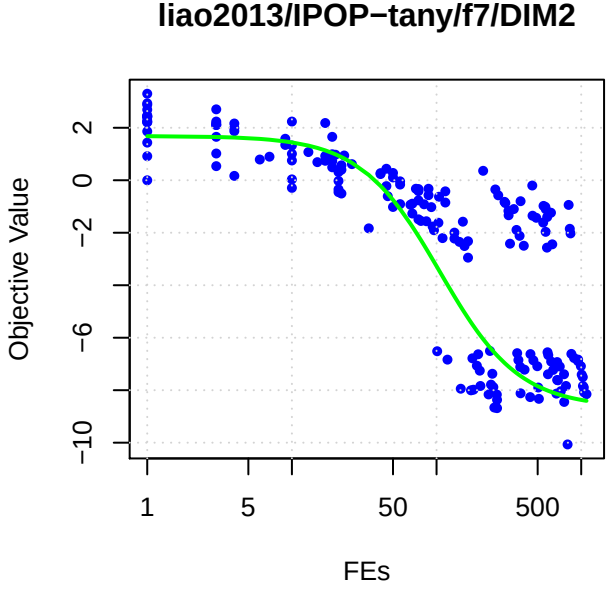
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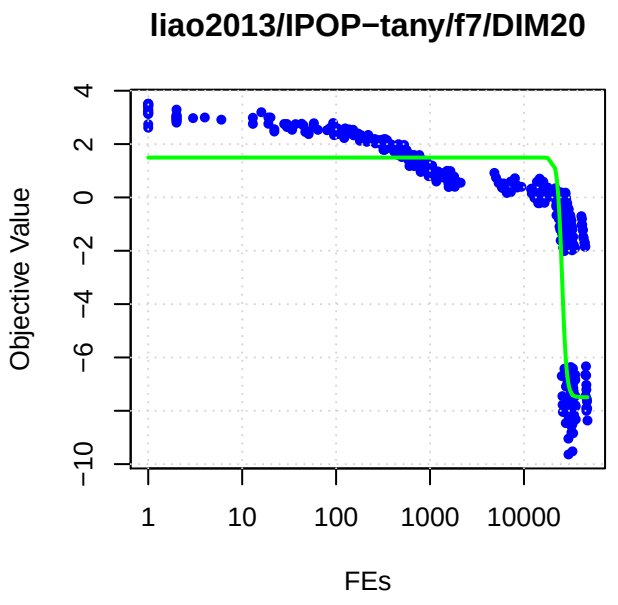
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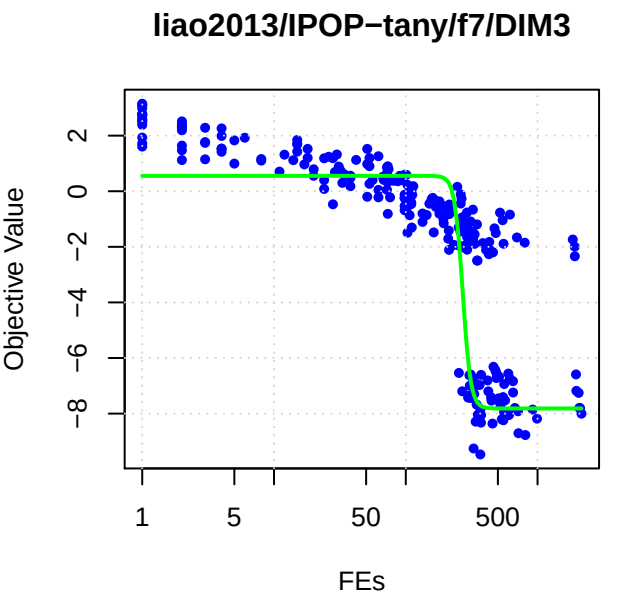
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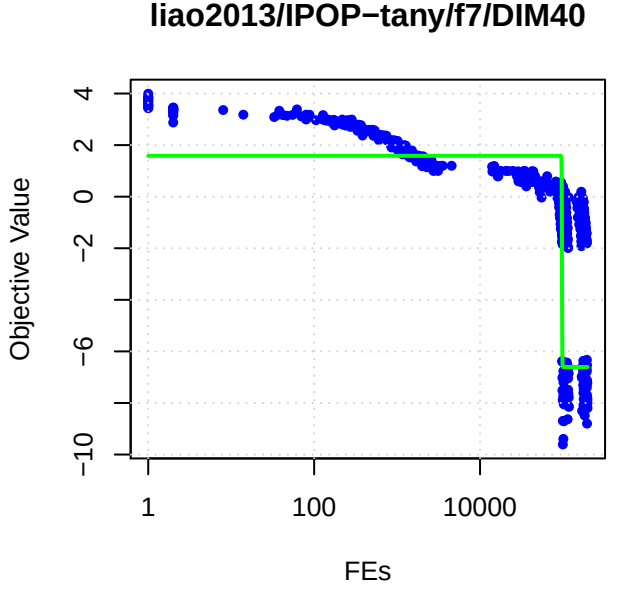
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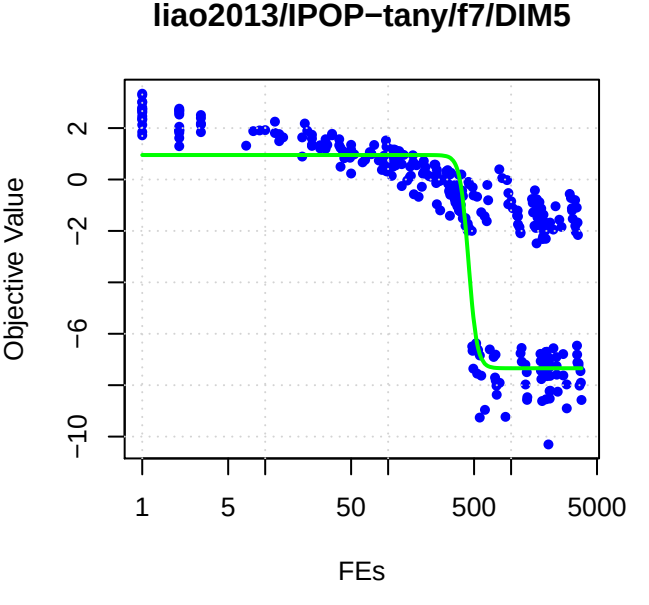
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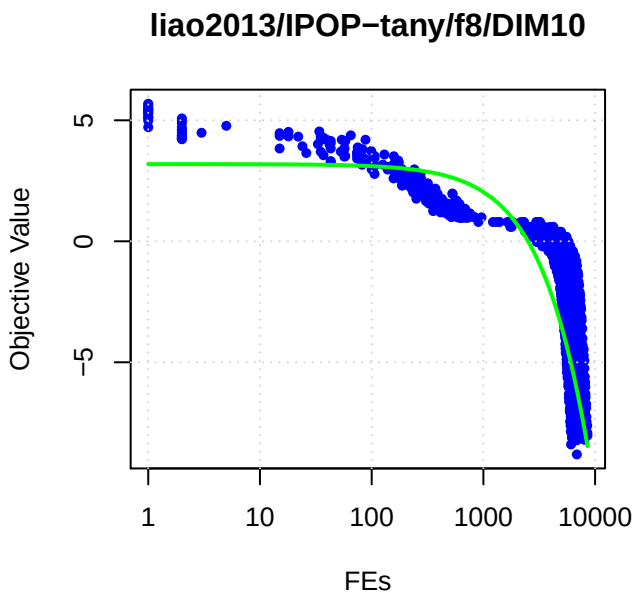
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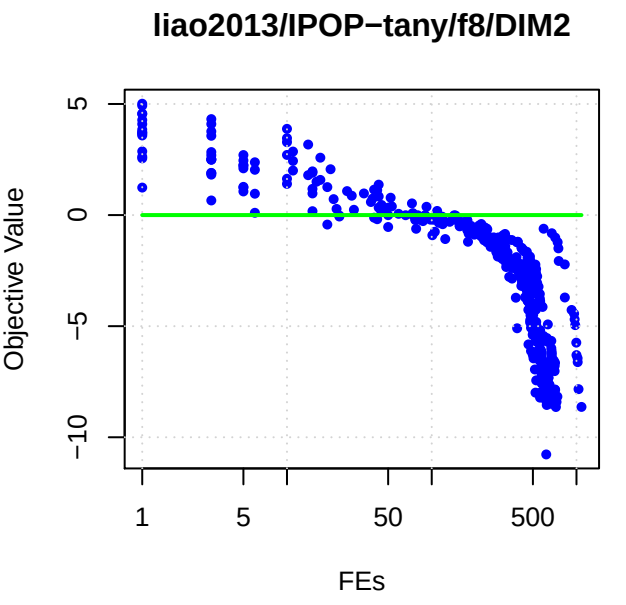
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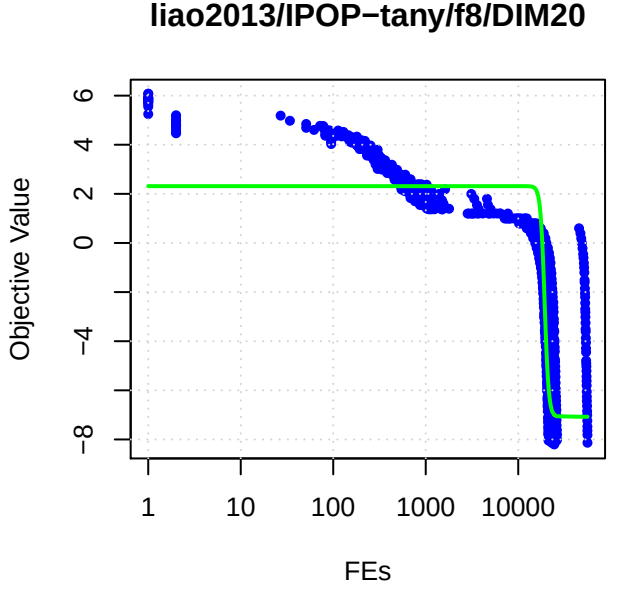
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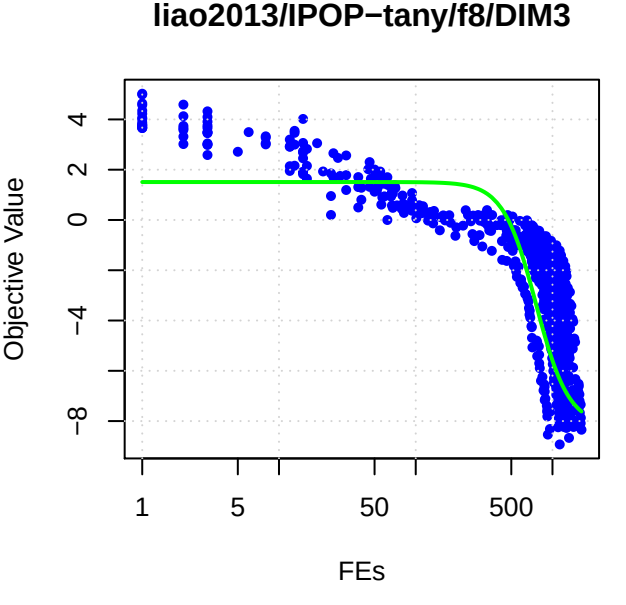
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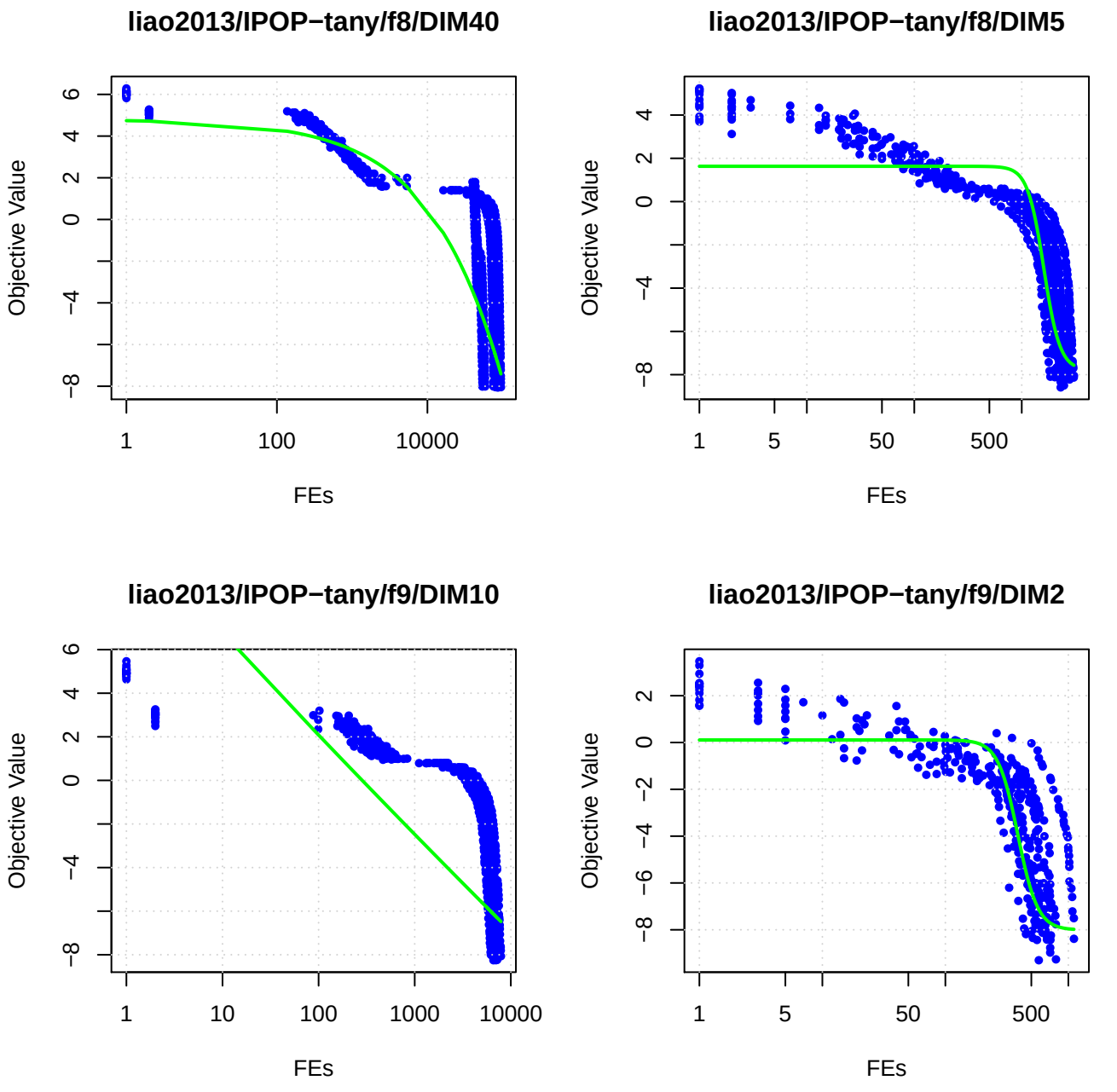
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Objective Value
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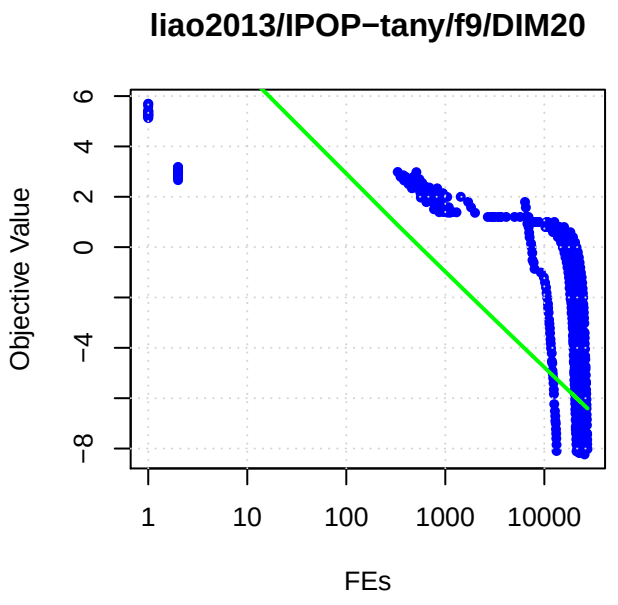
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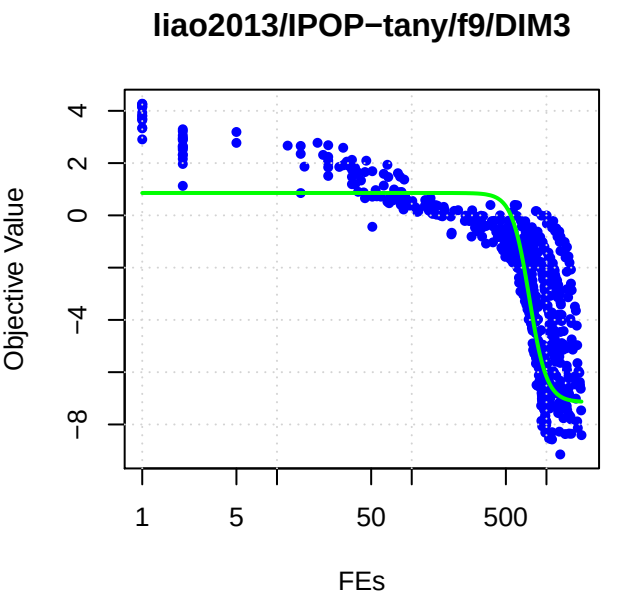
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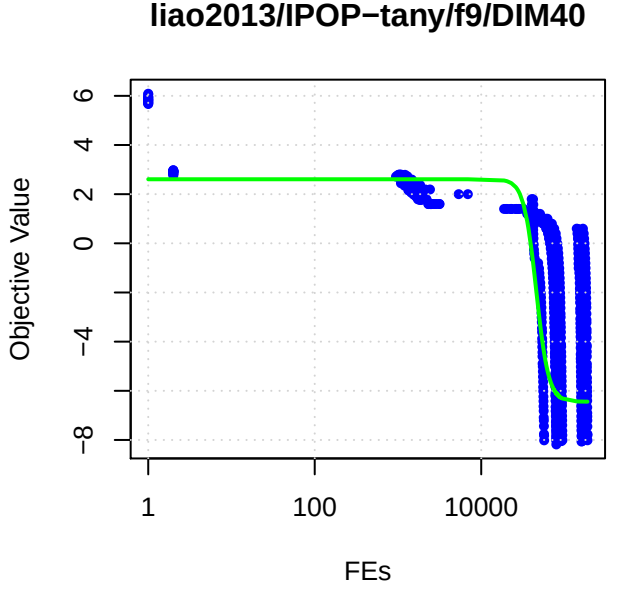
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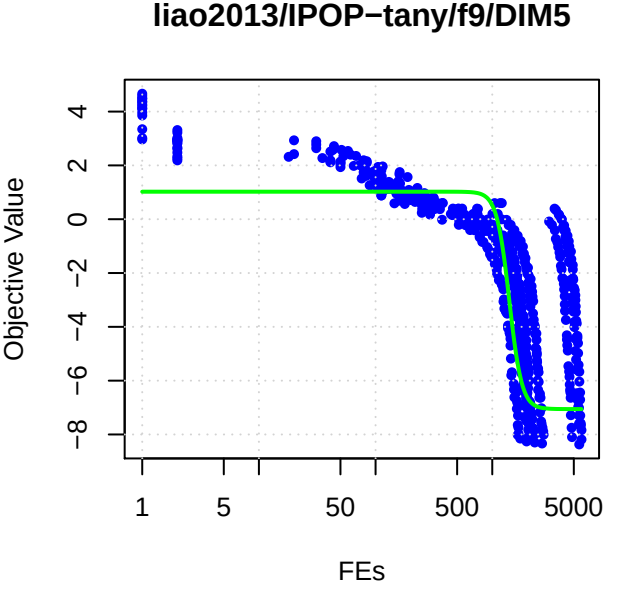
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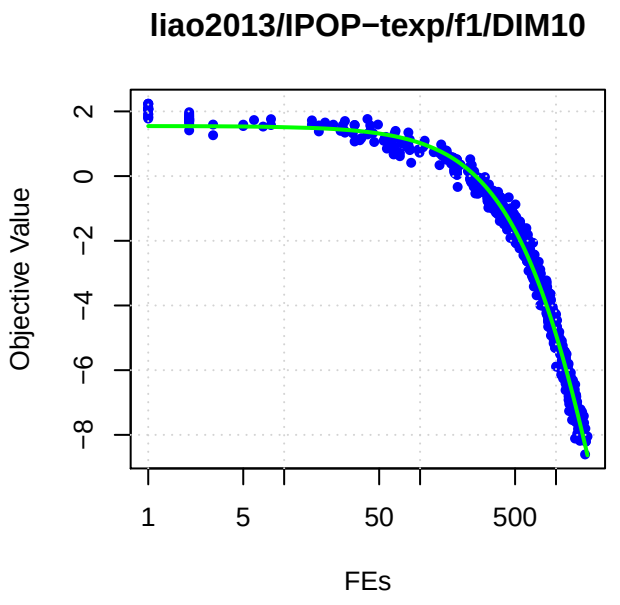
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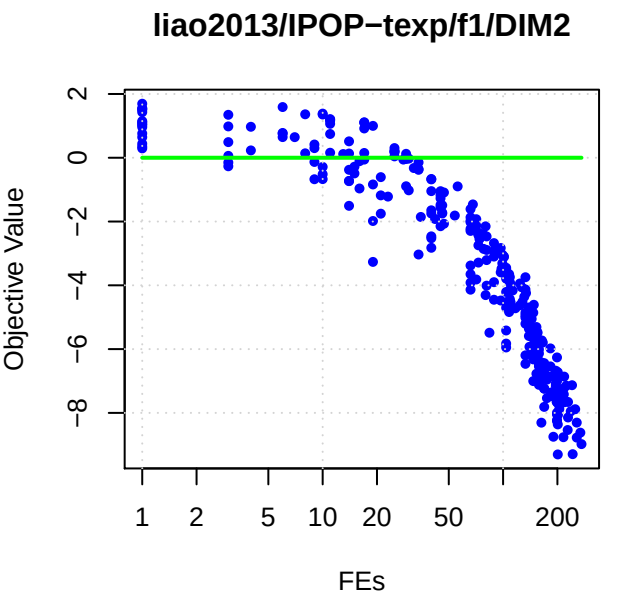
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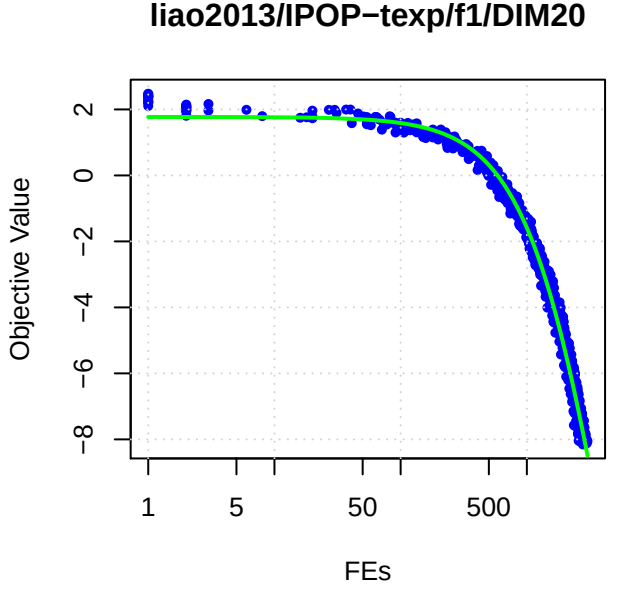
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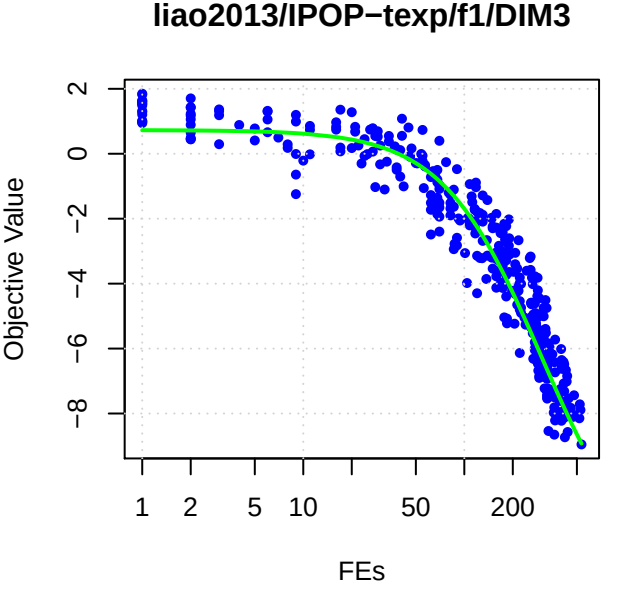
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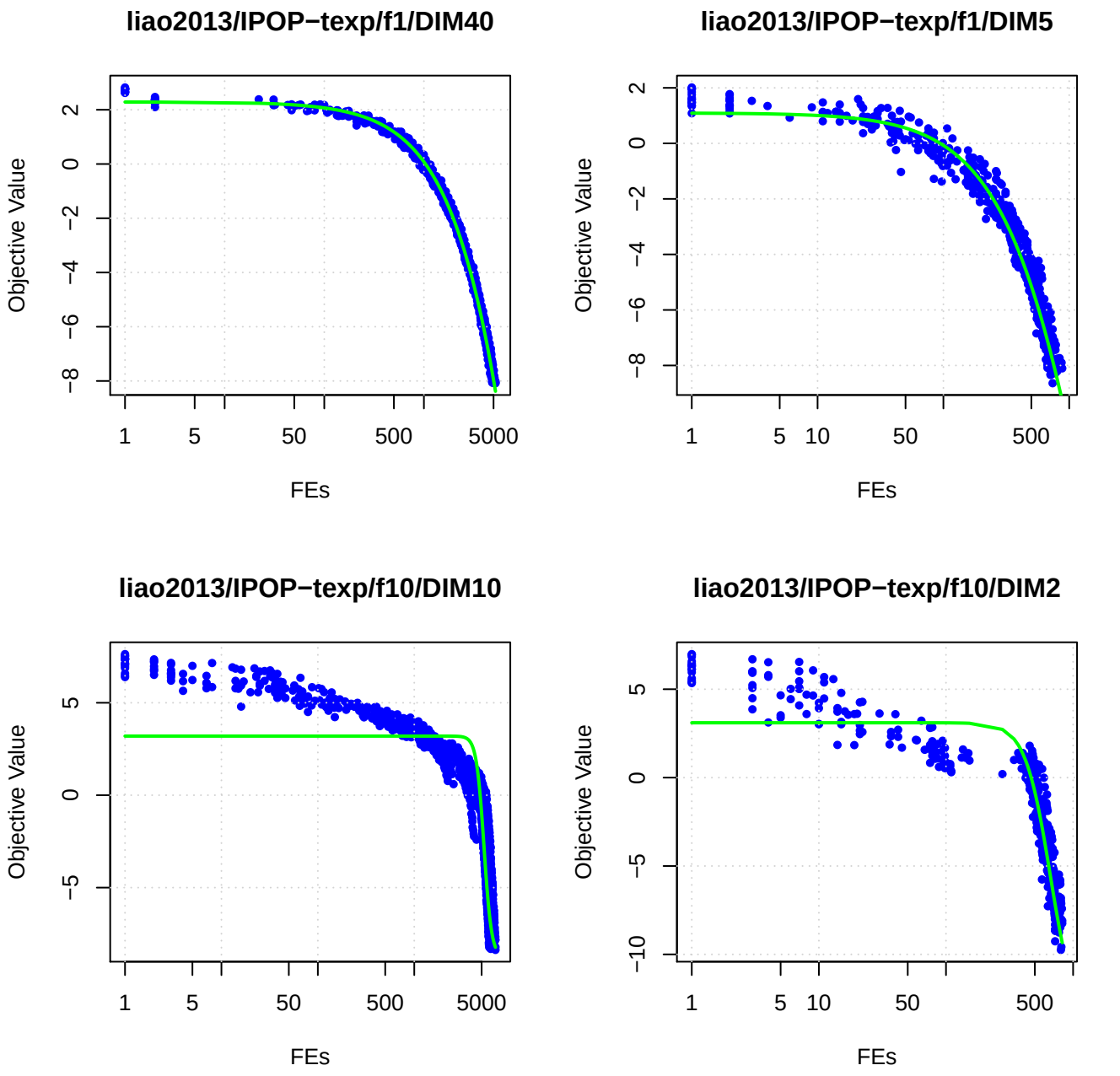
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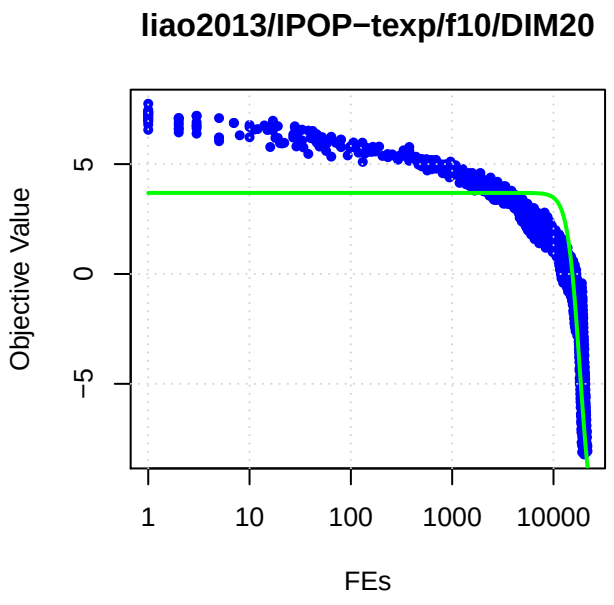
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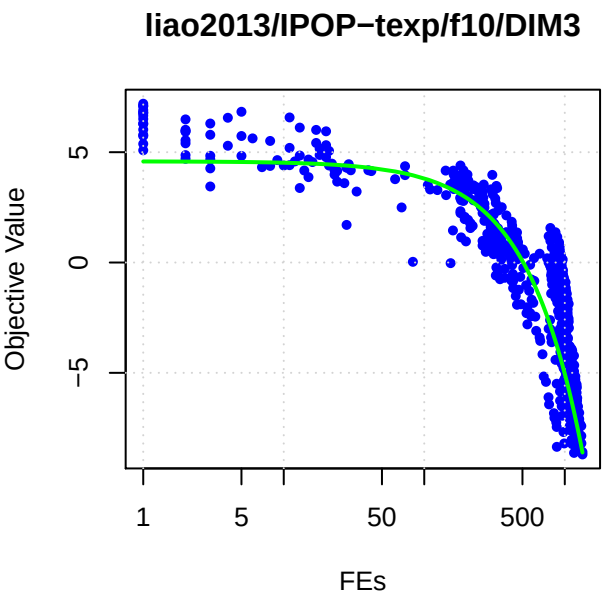
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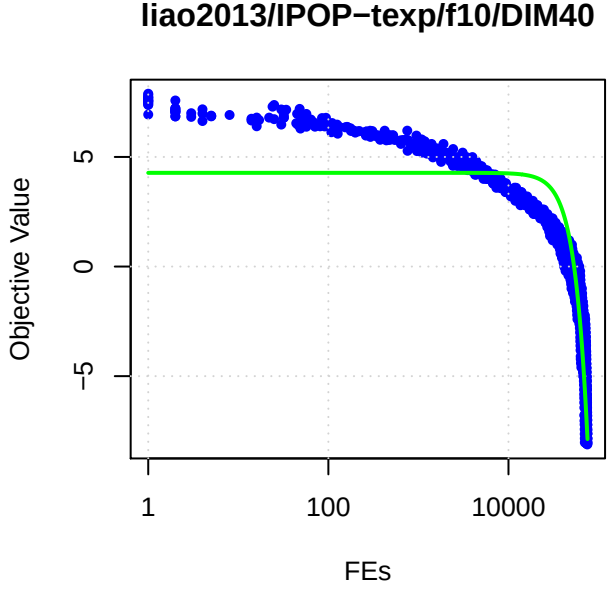
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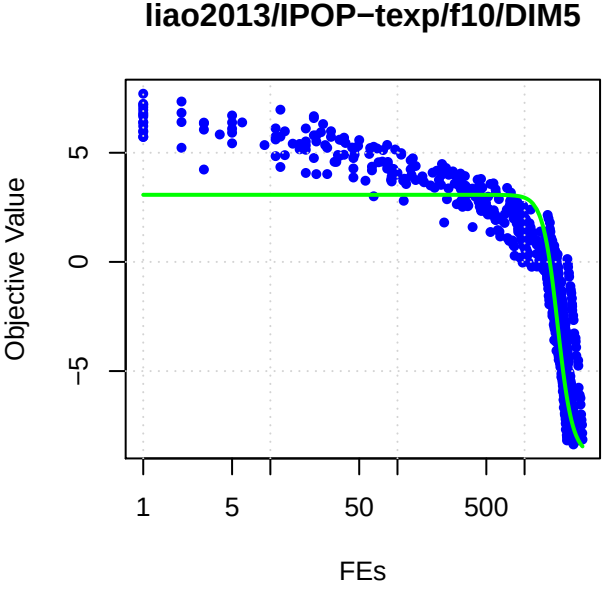
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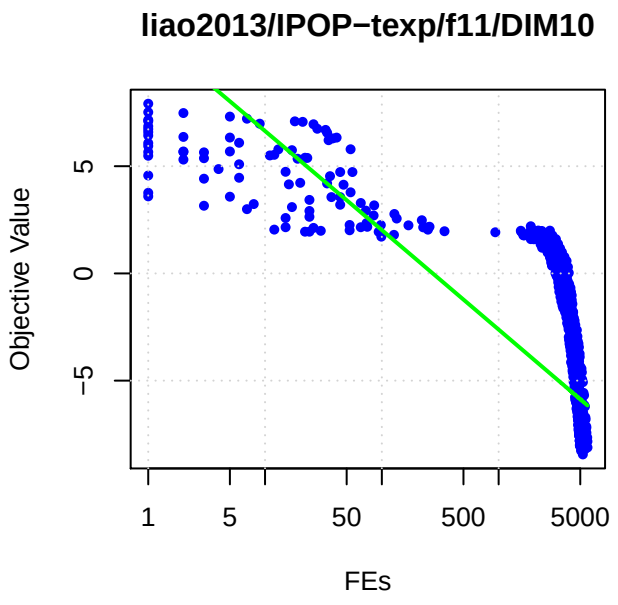
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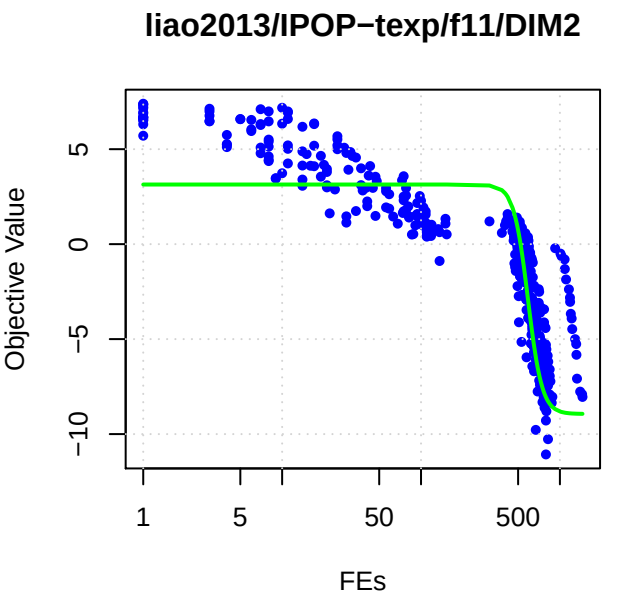
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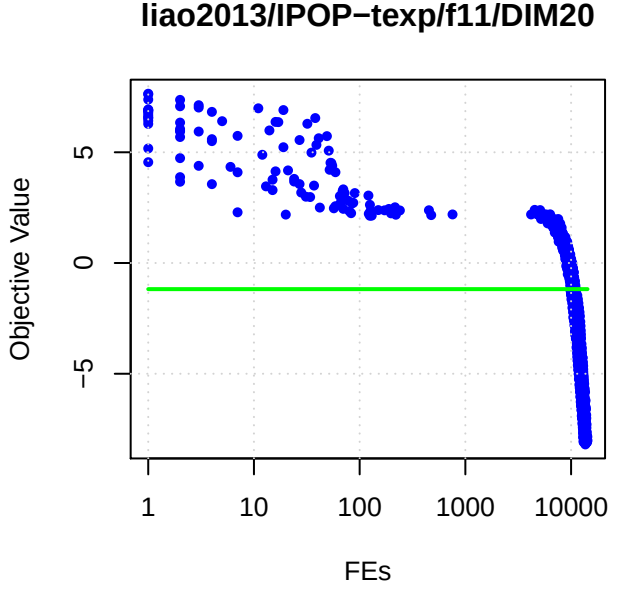
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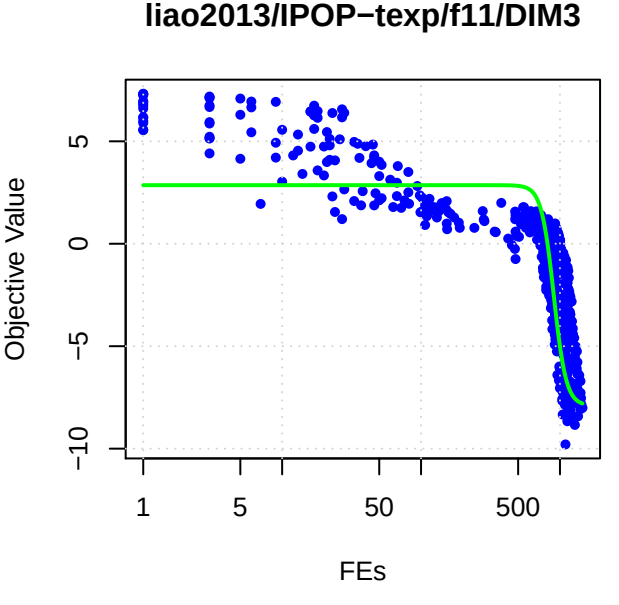
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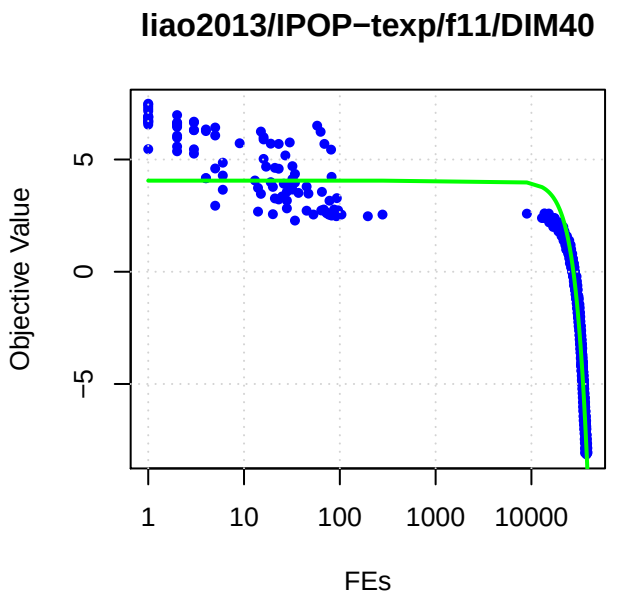
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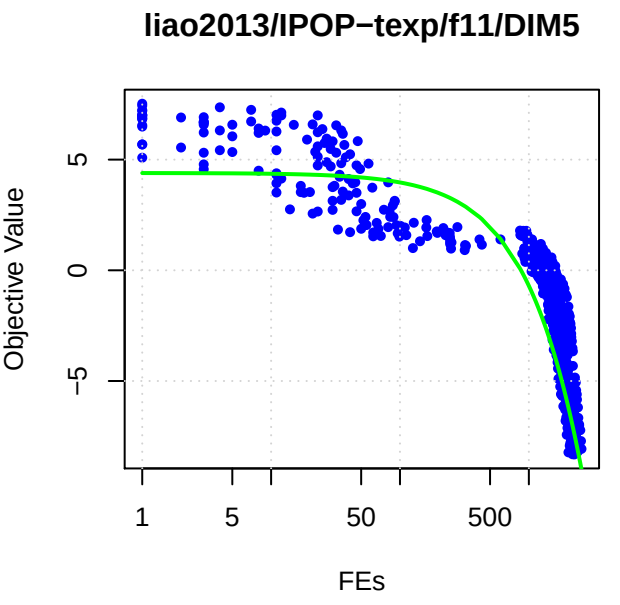
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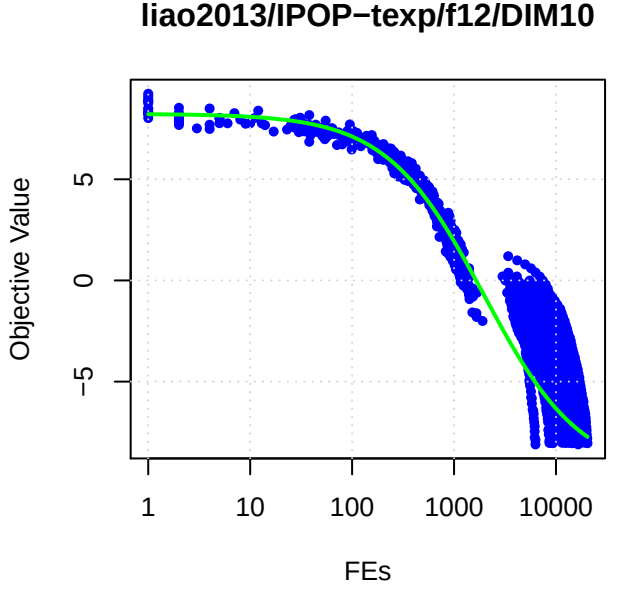
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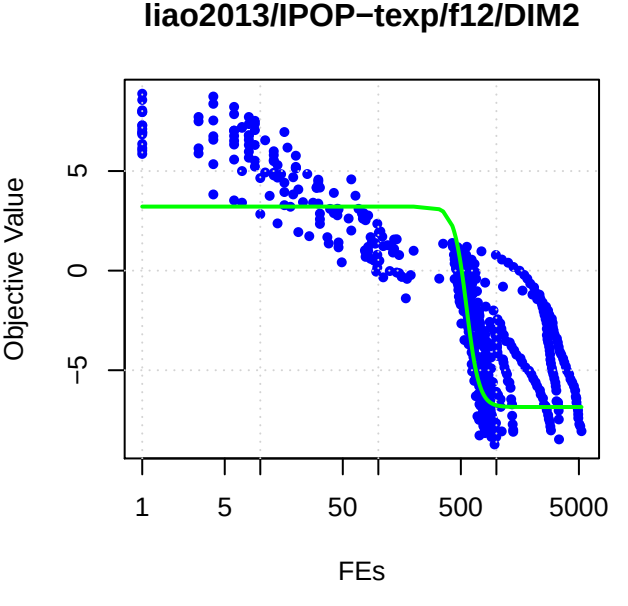
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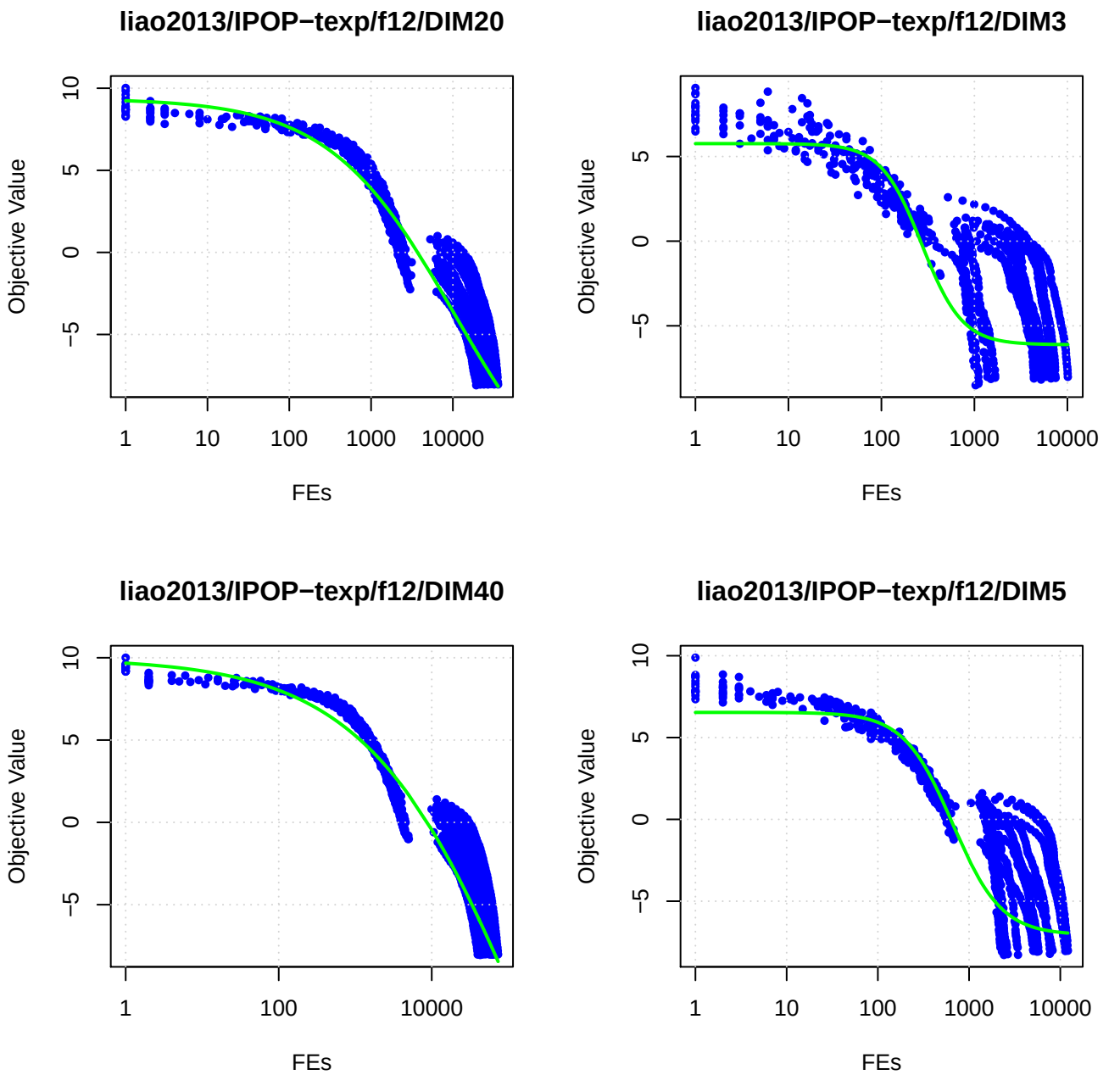
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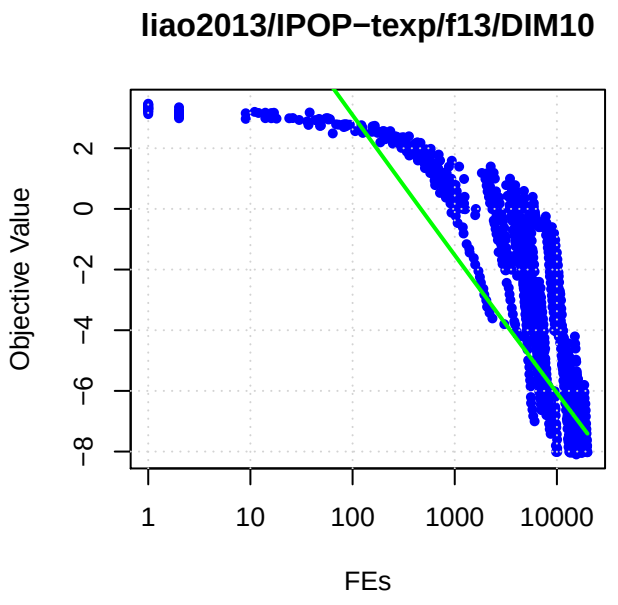
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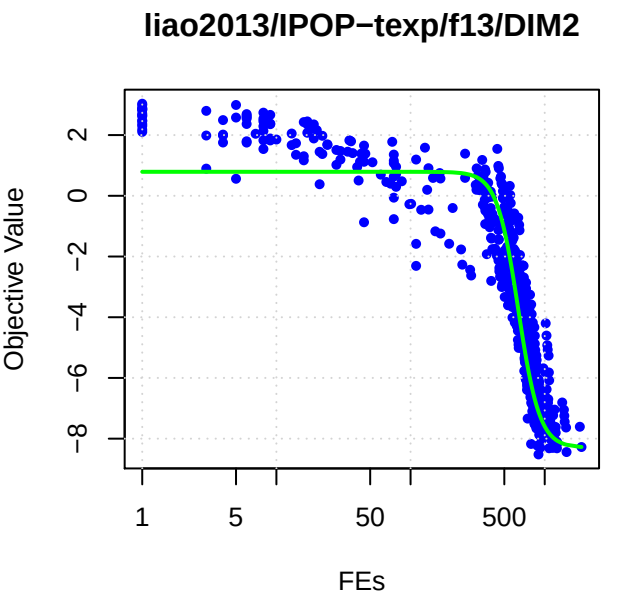
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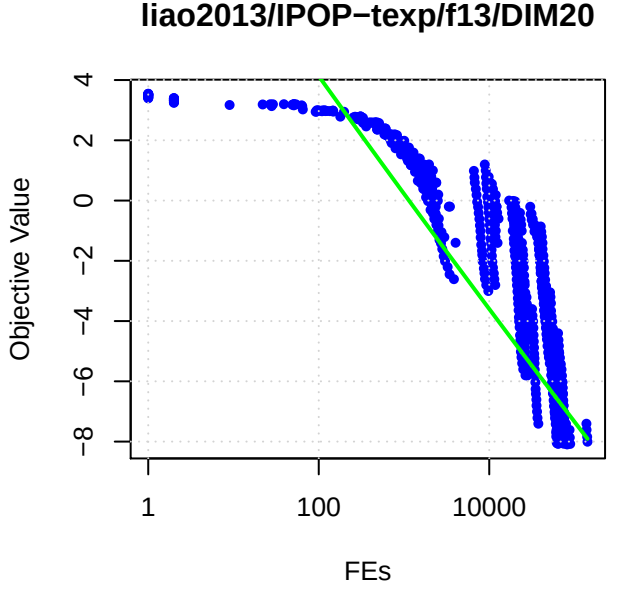
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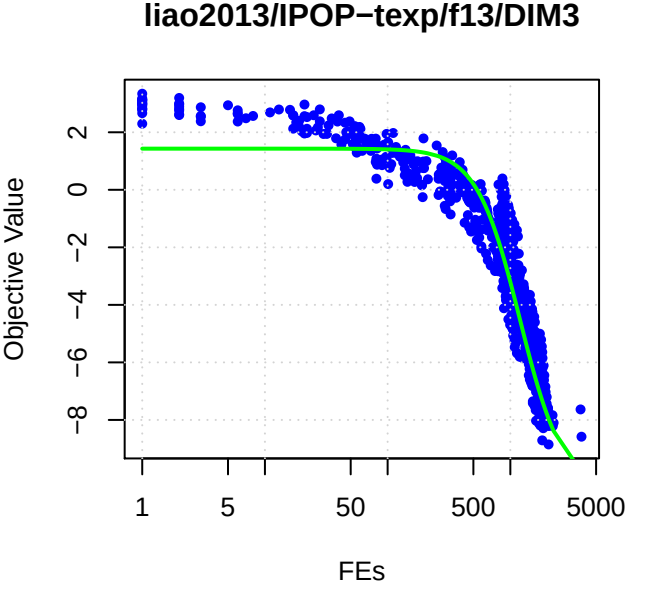
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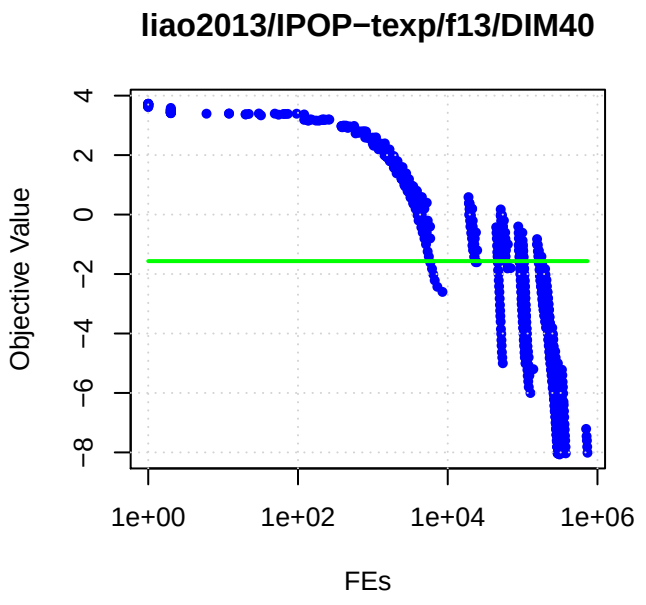
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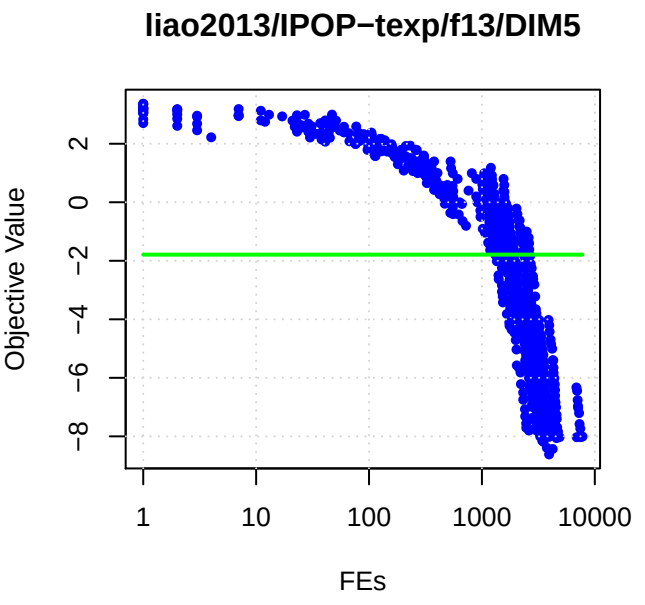
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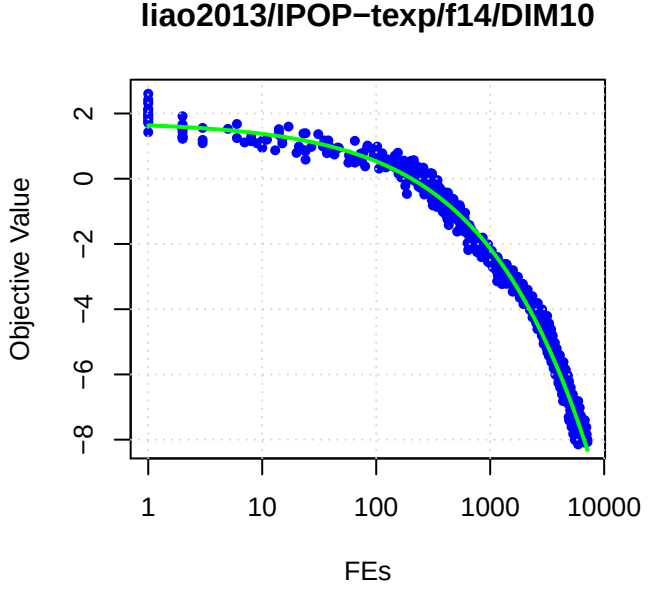
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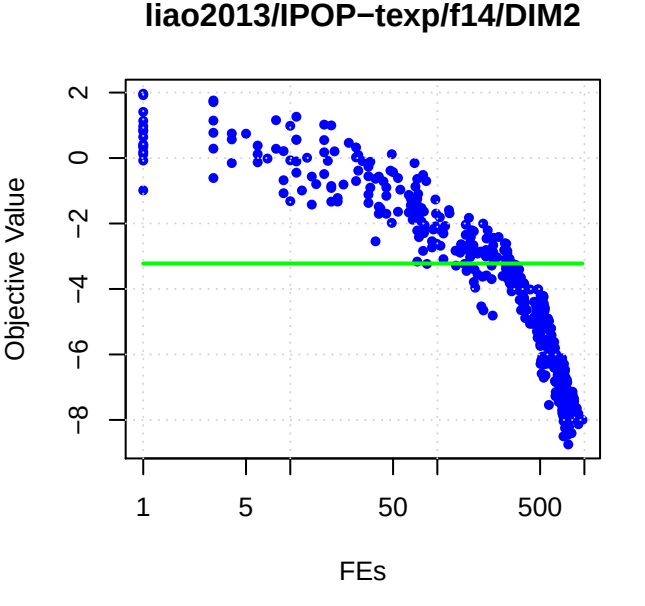
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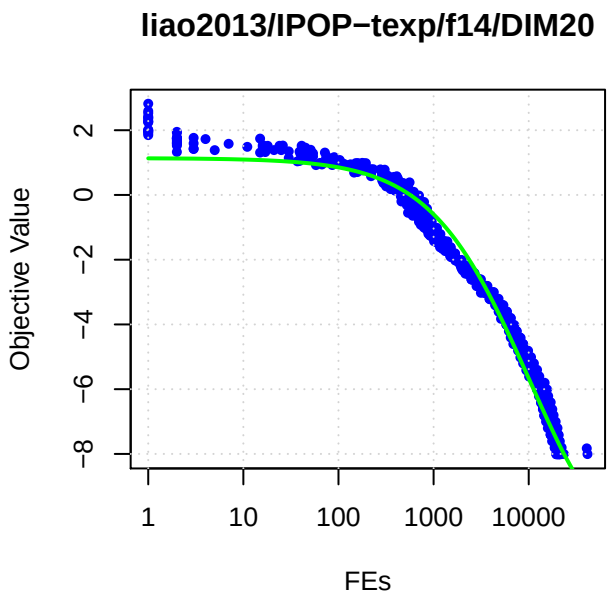
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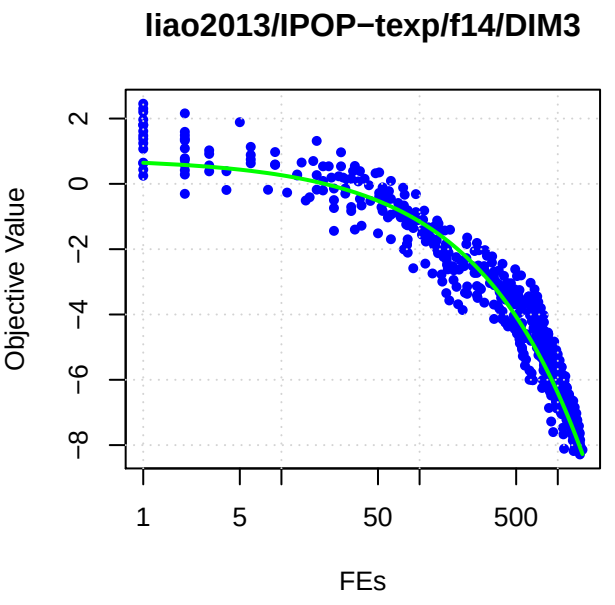
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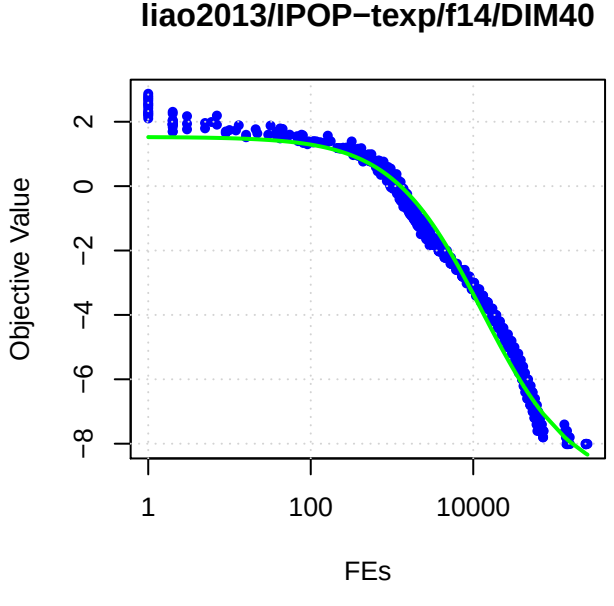
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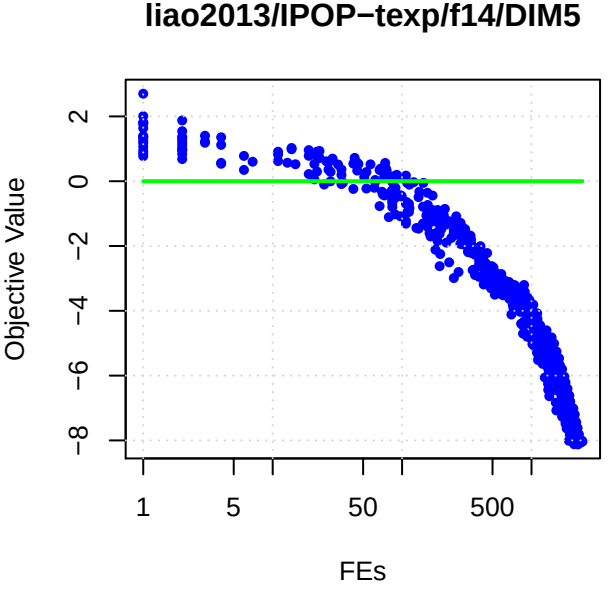
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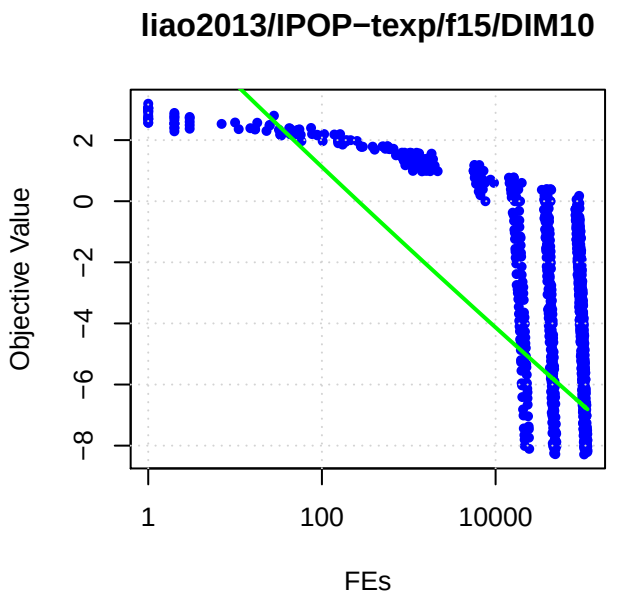
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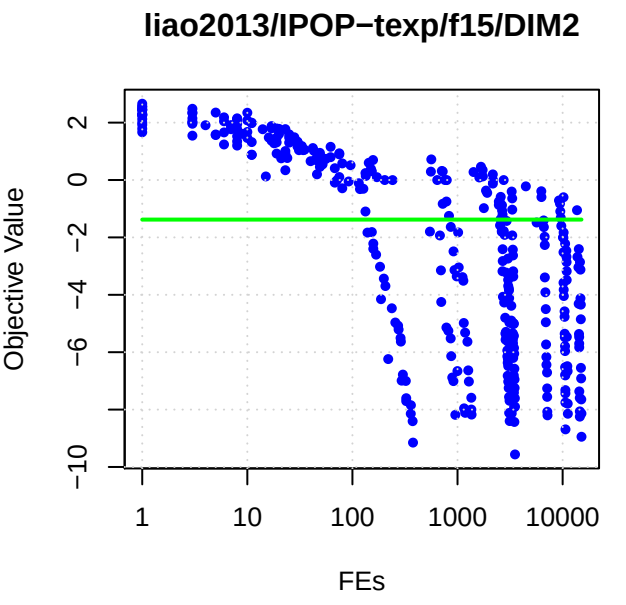
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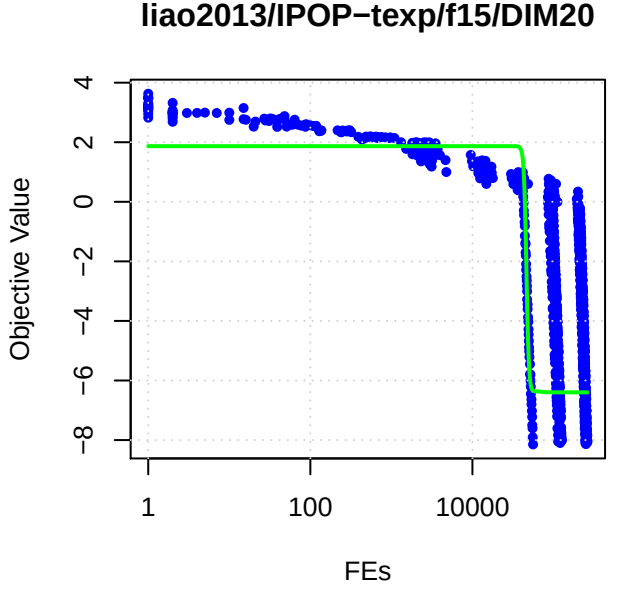
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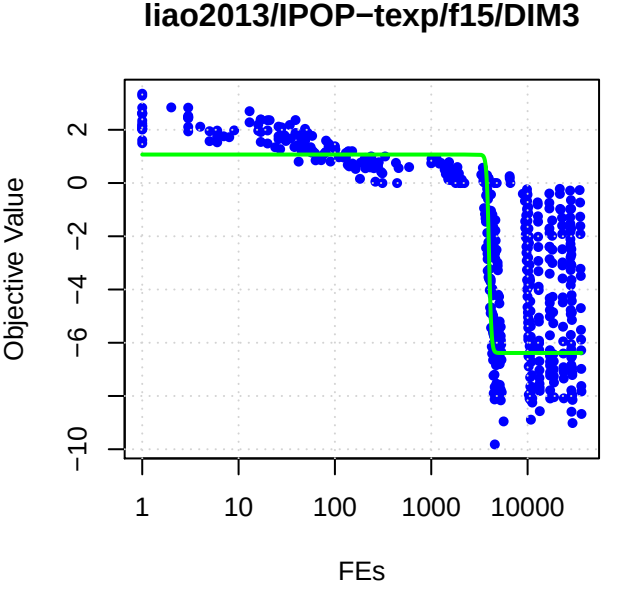
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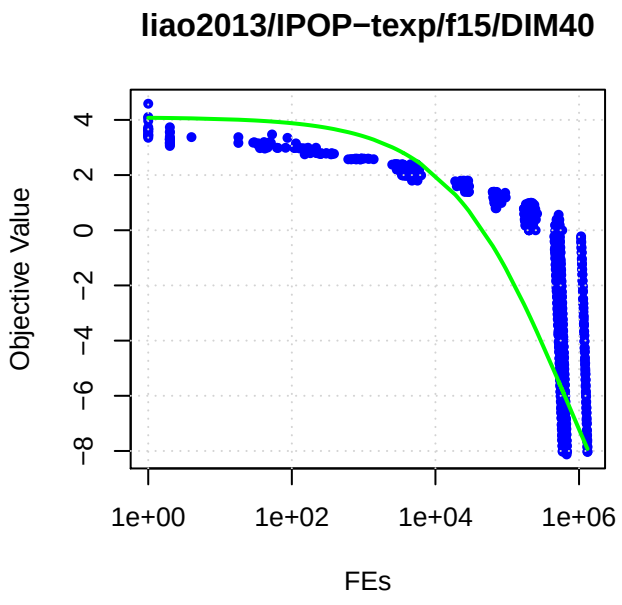
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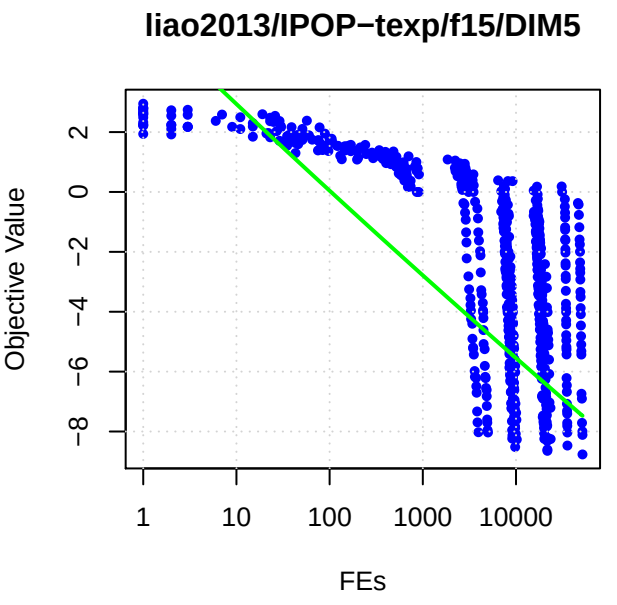
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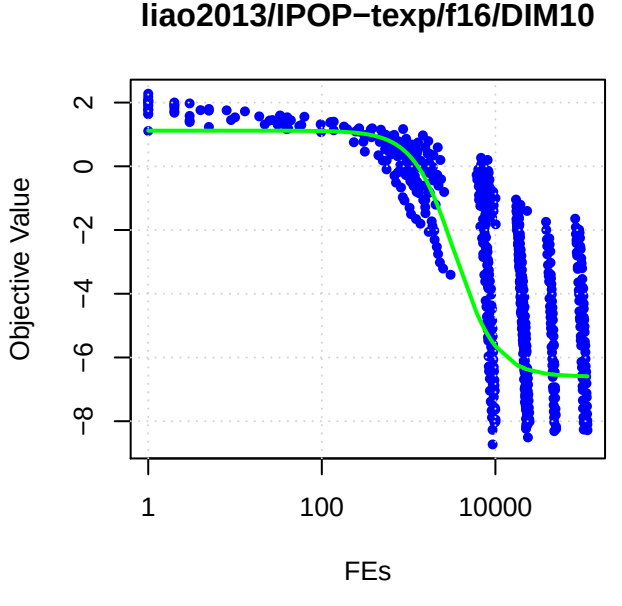
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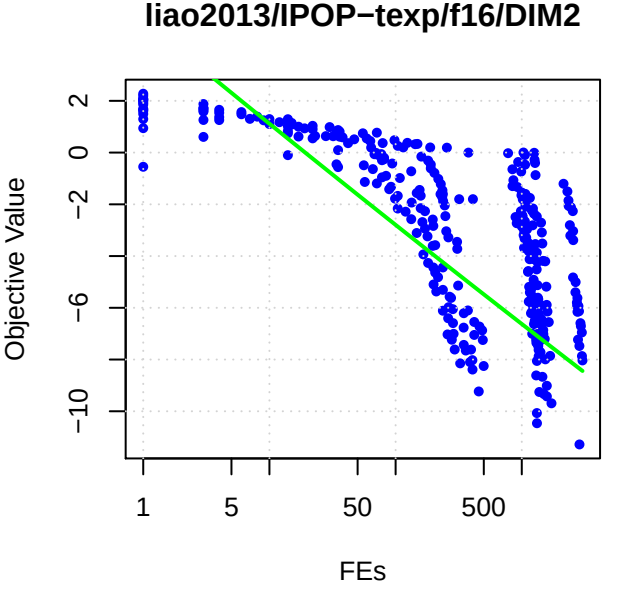
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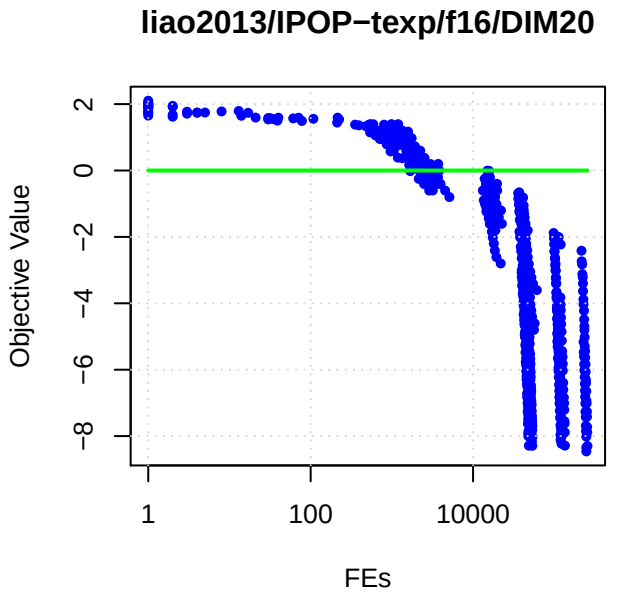
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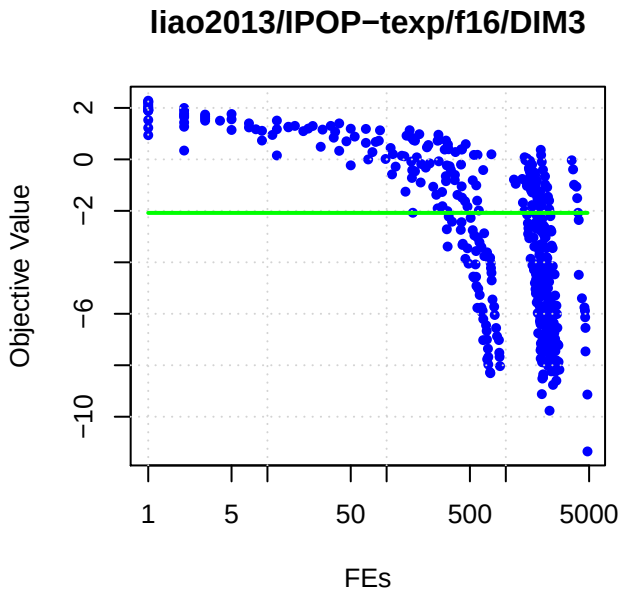
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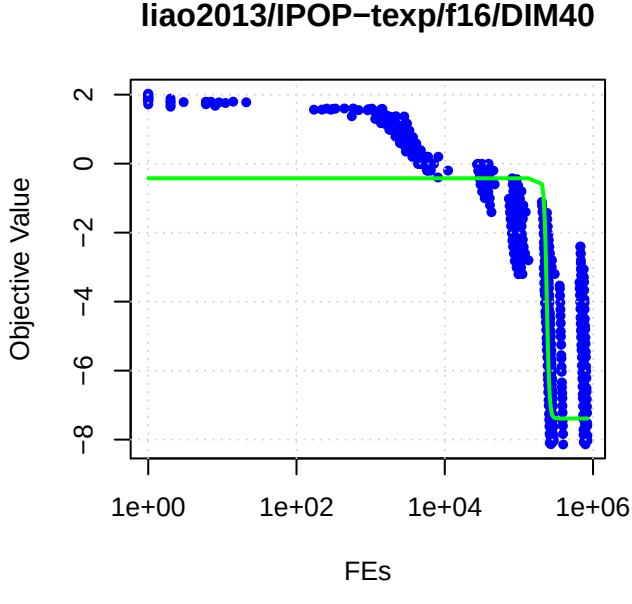
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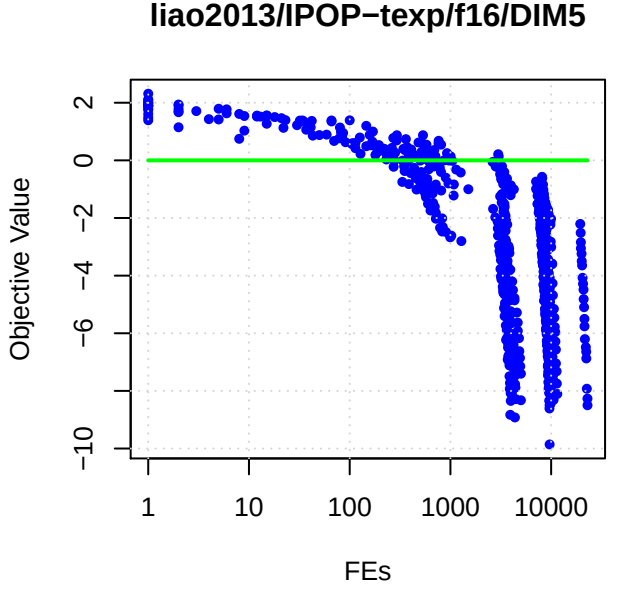
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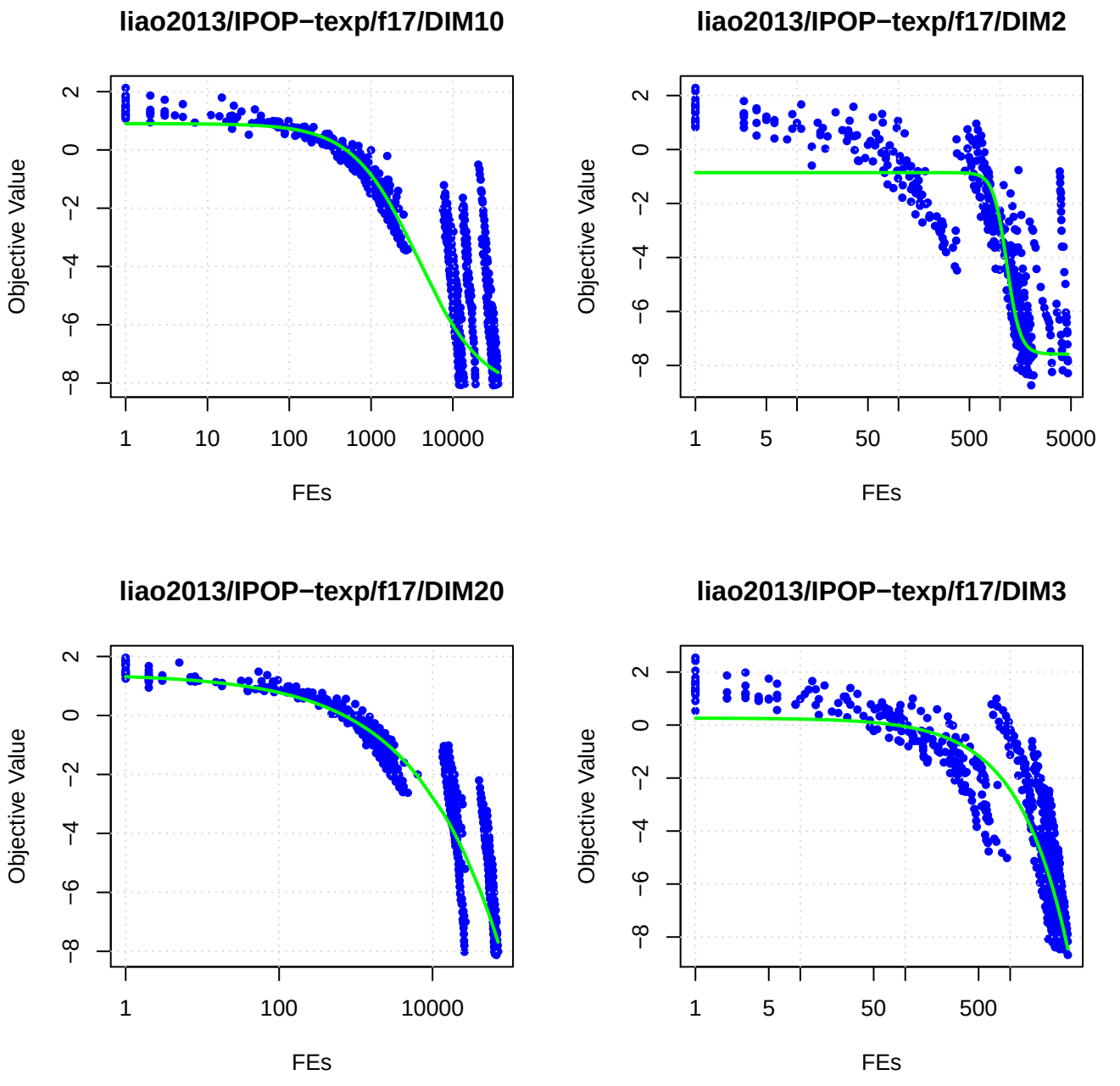
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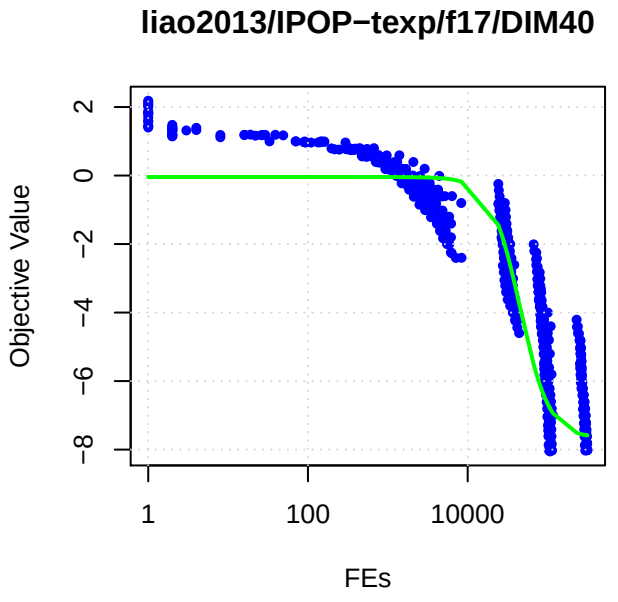
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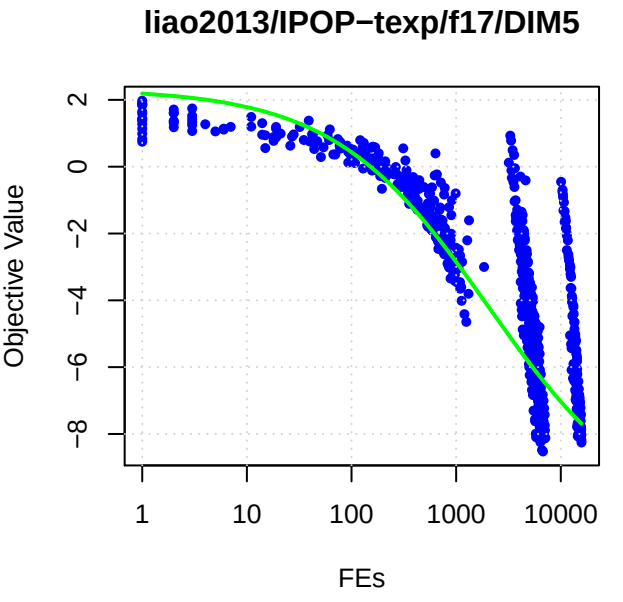
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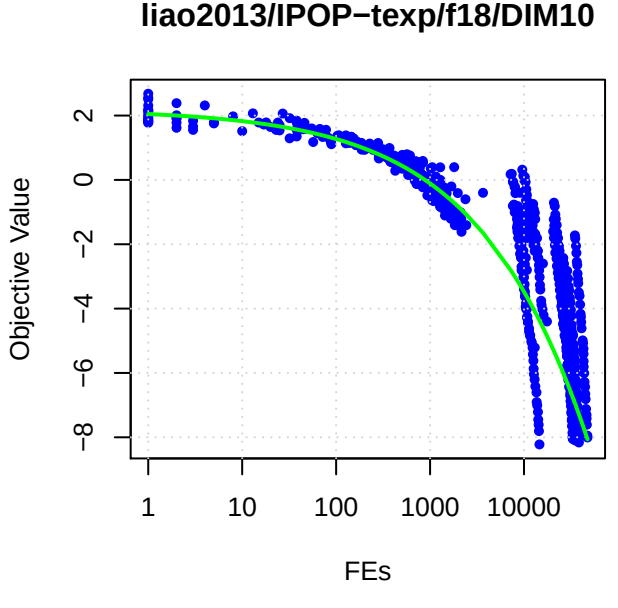
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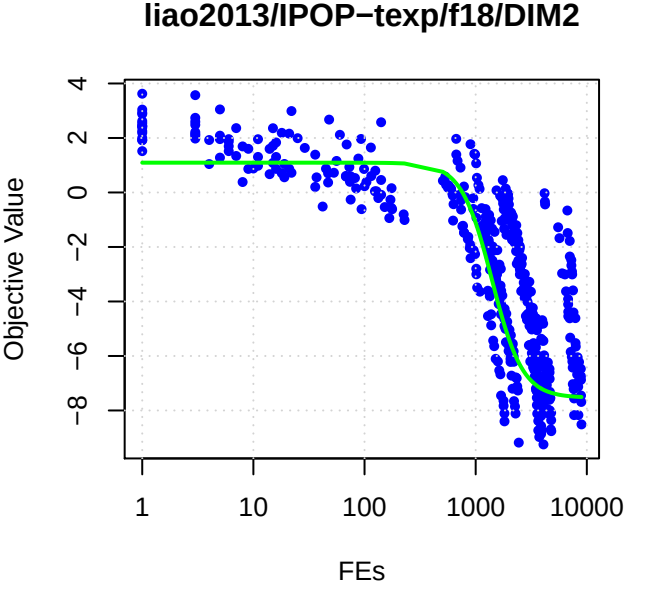
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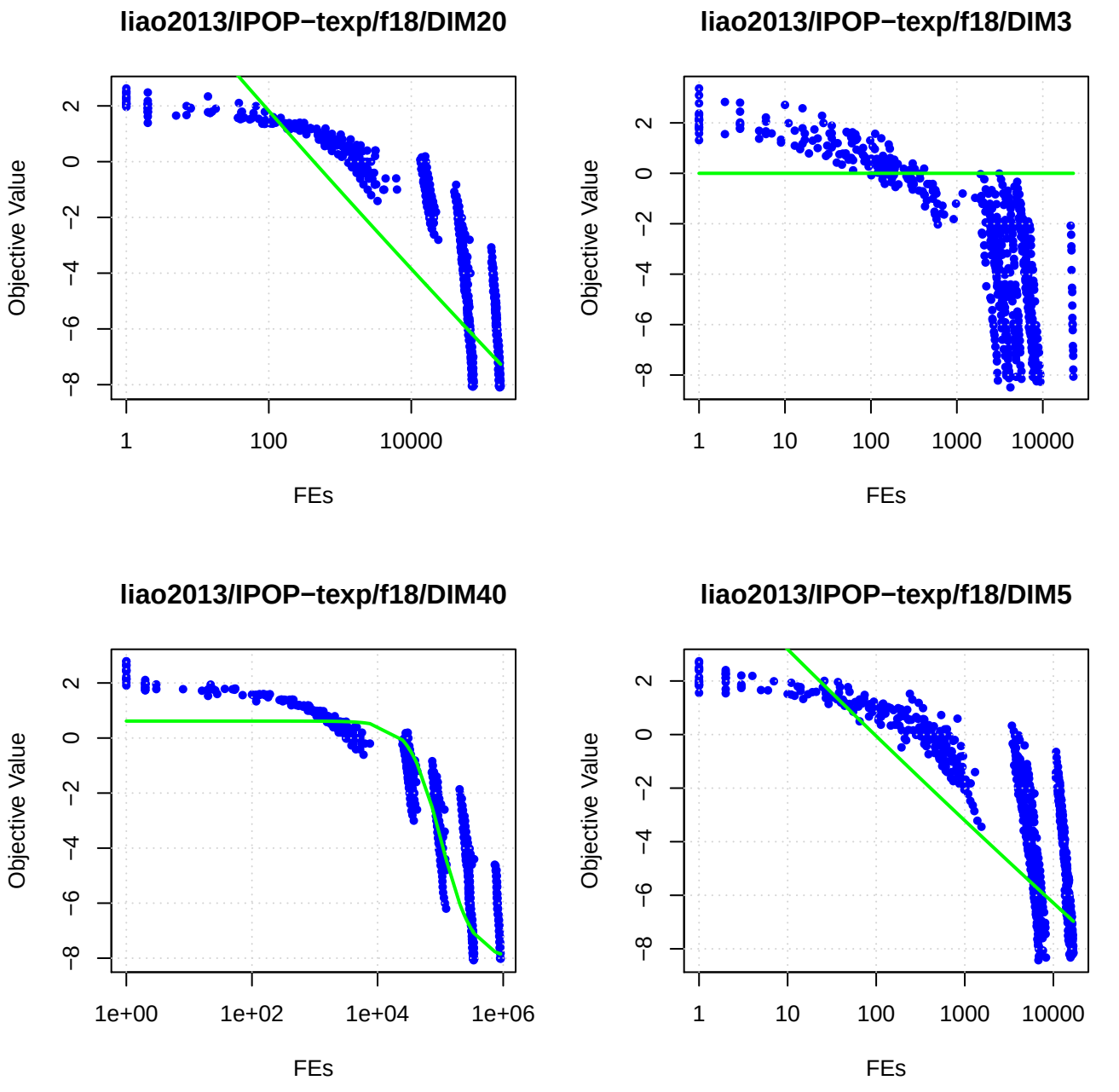
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Objective Value
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liao2013/IPOP−texp/f18/DIM5
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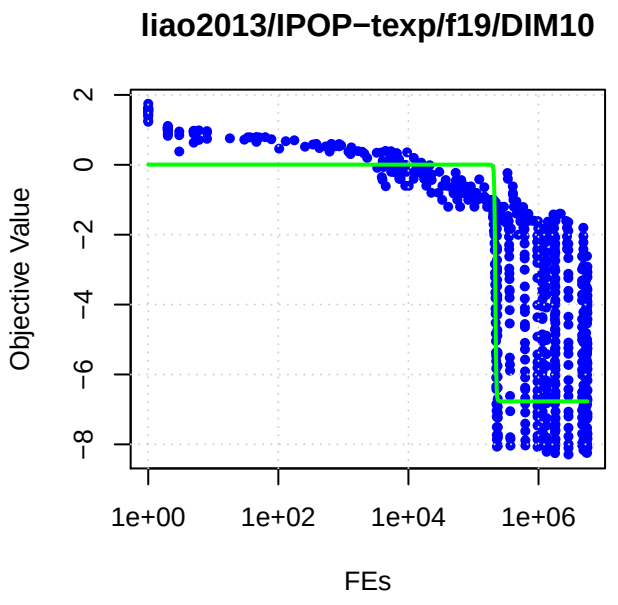
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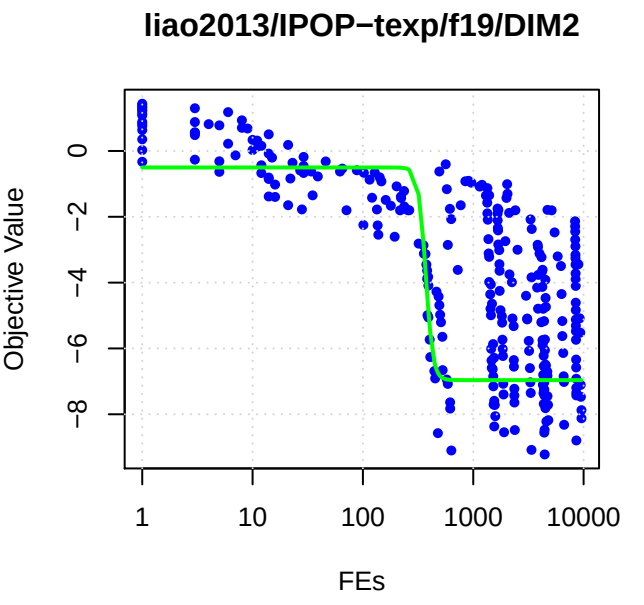
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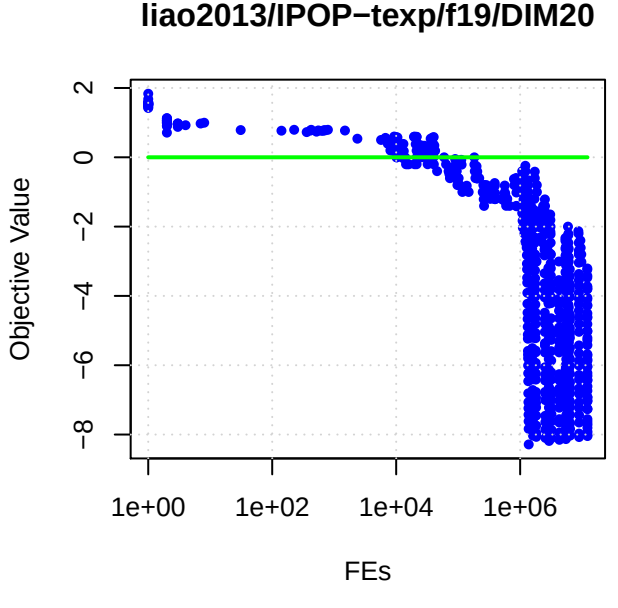
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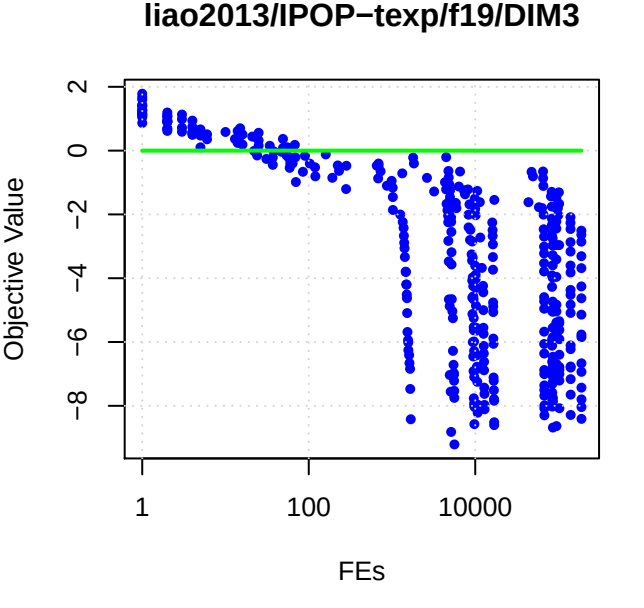
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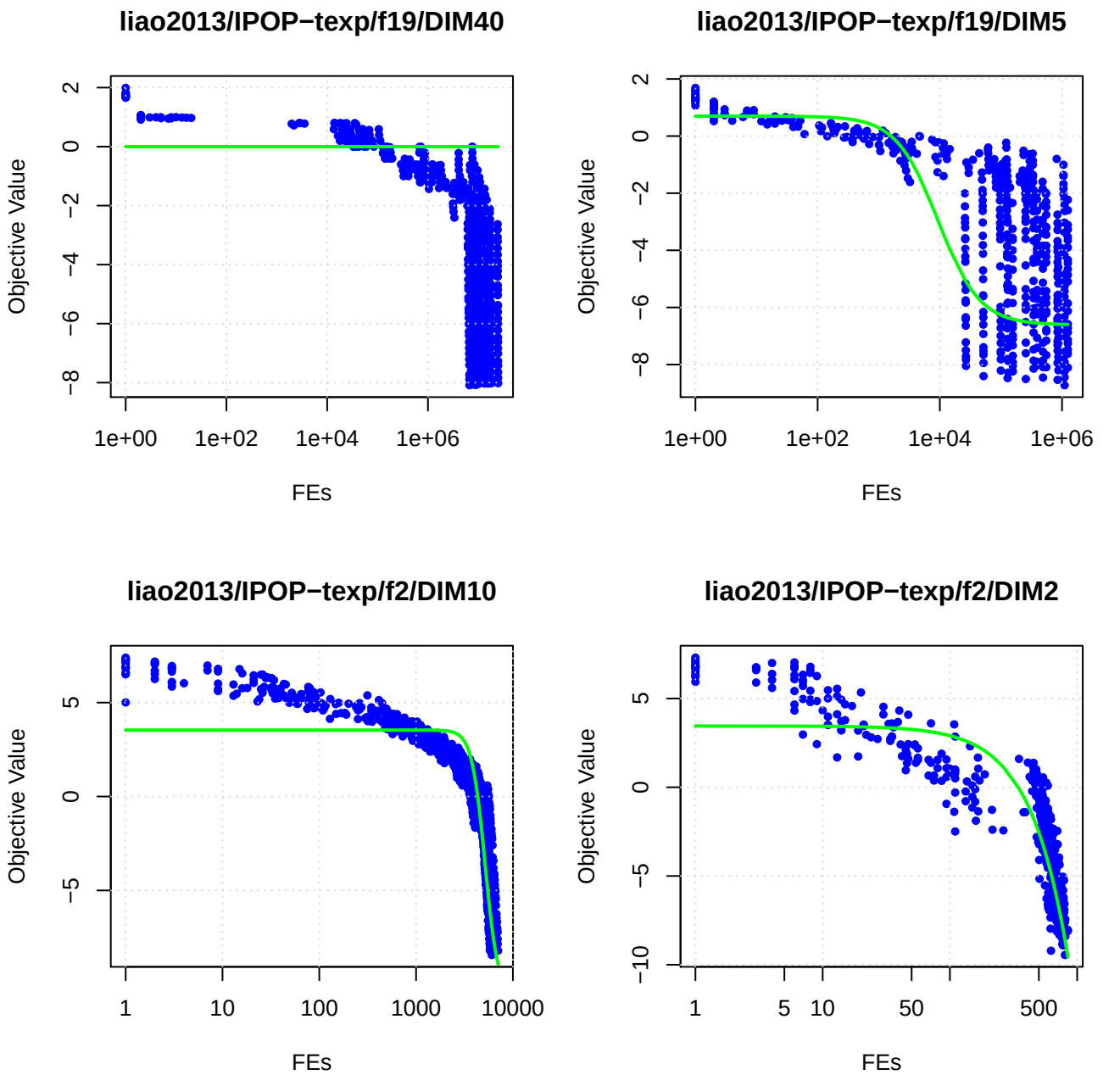
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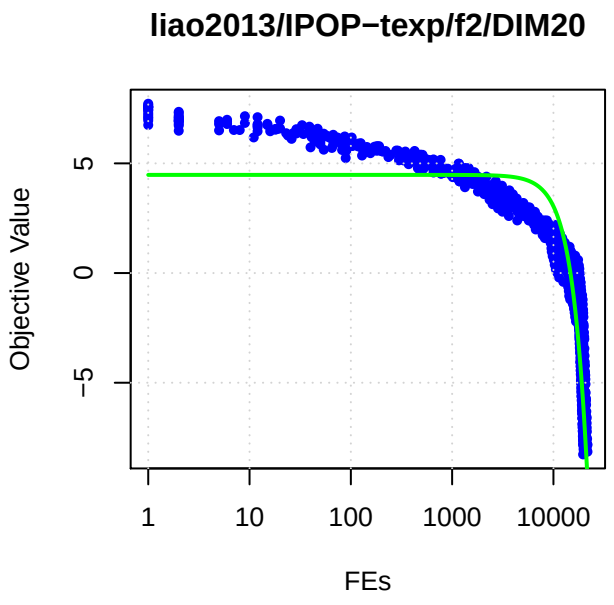
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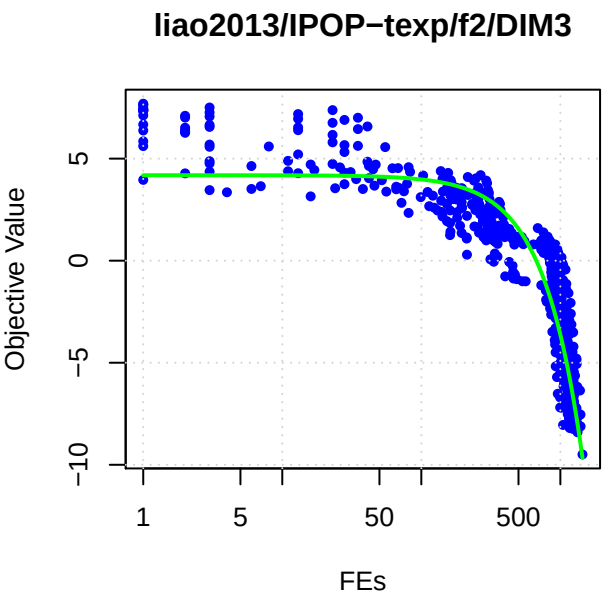
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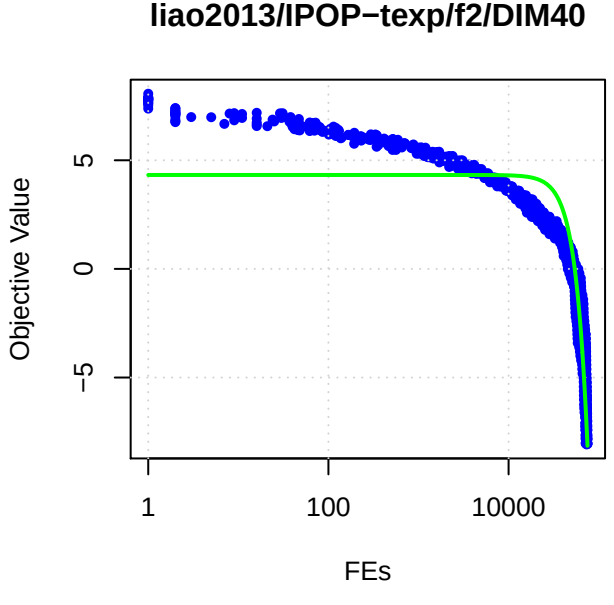
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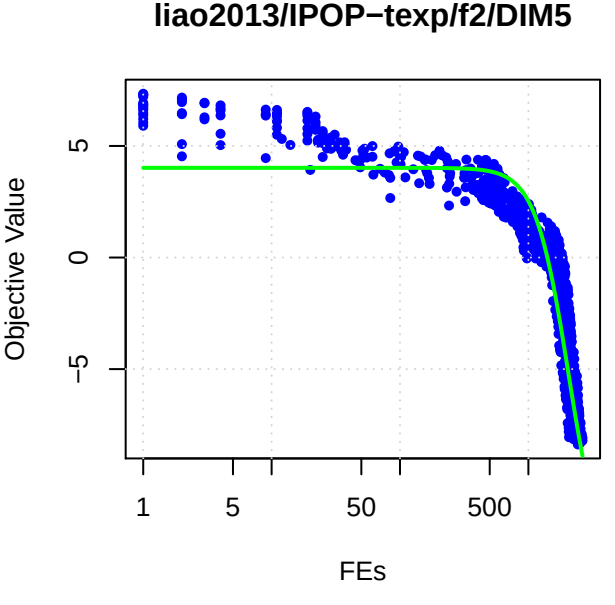
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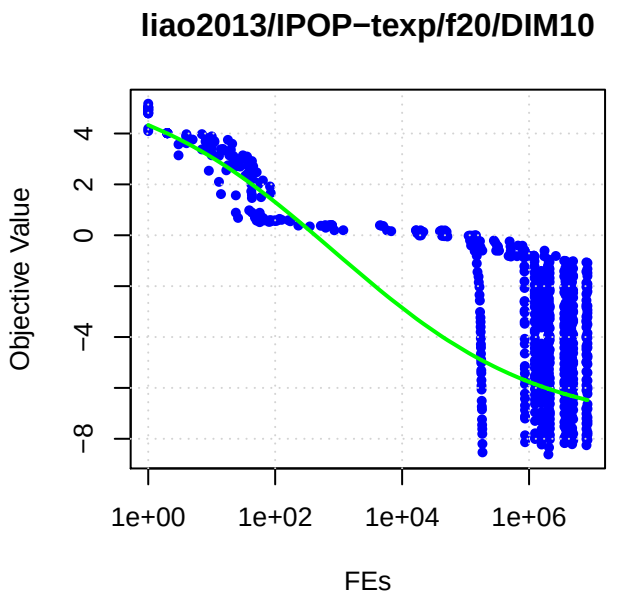
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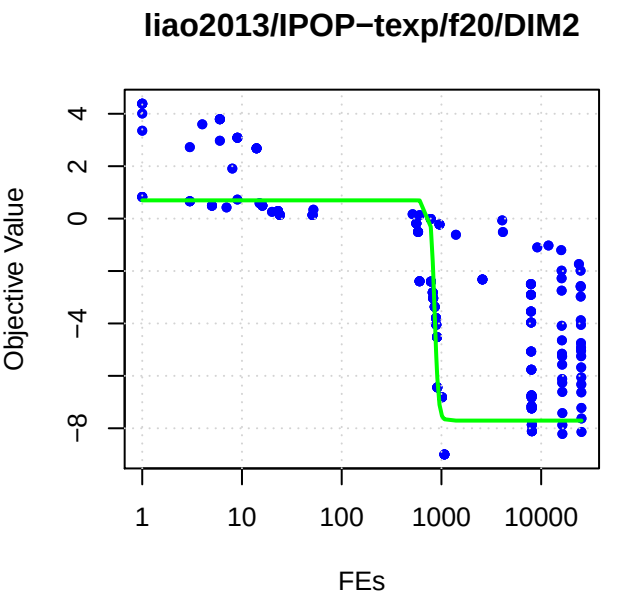
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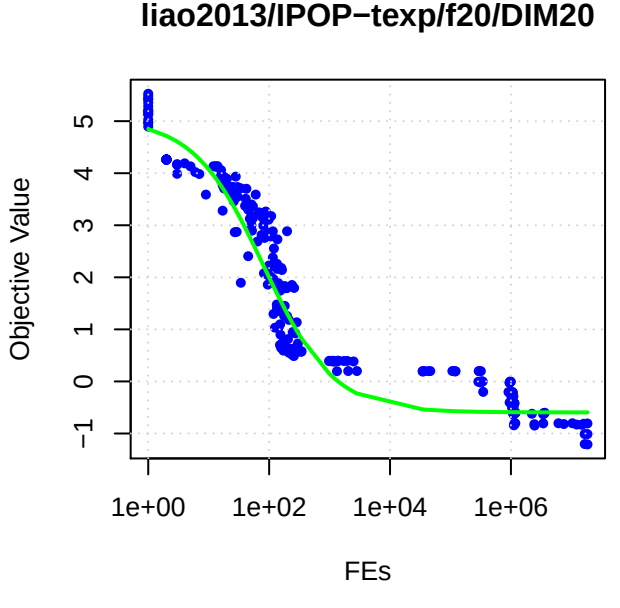
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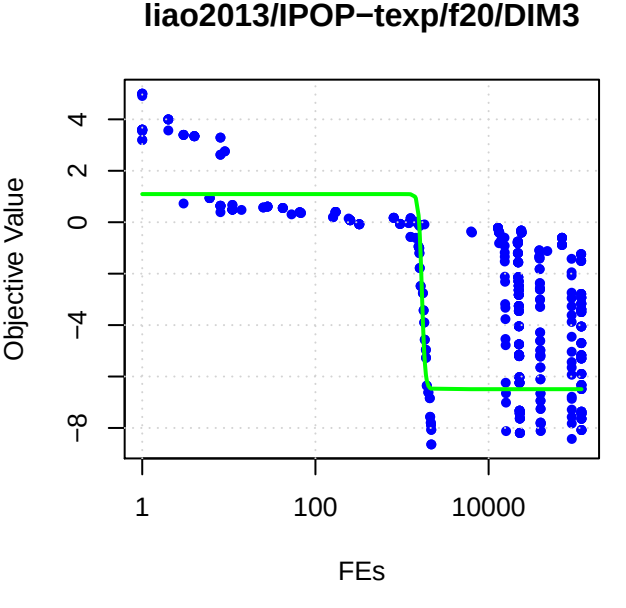
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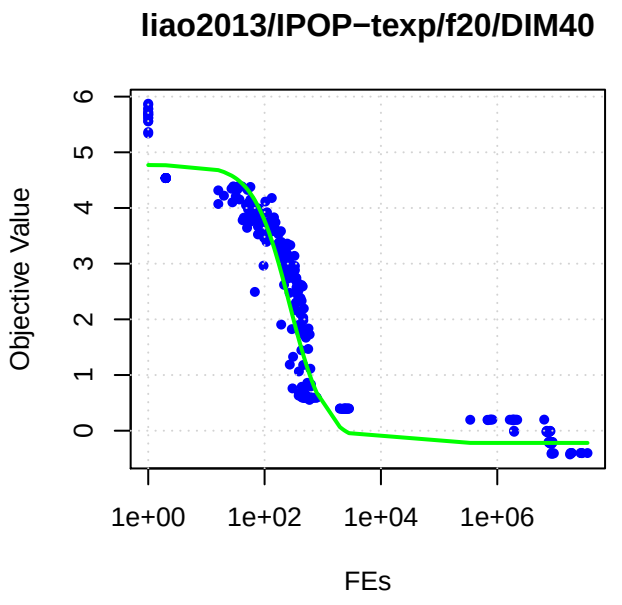
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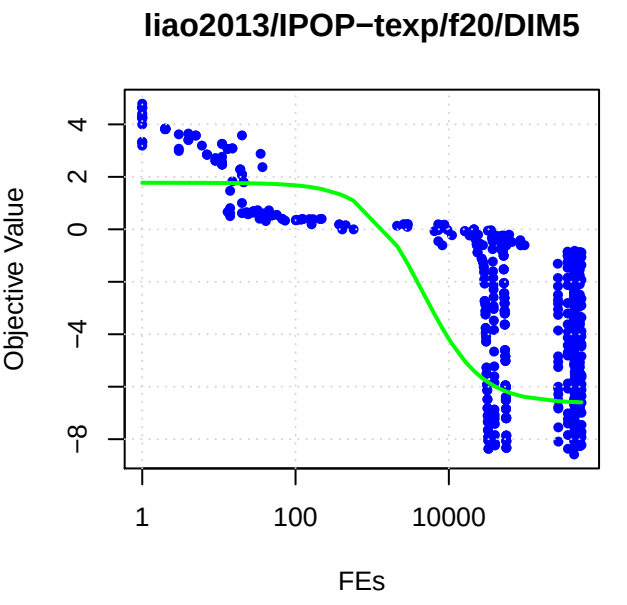
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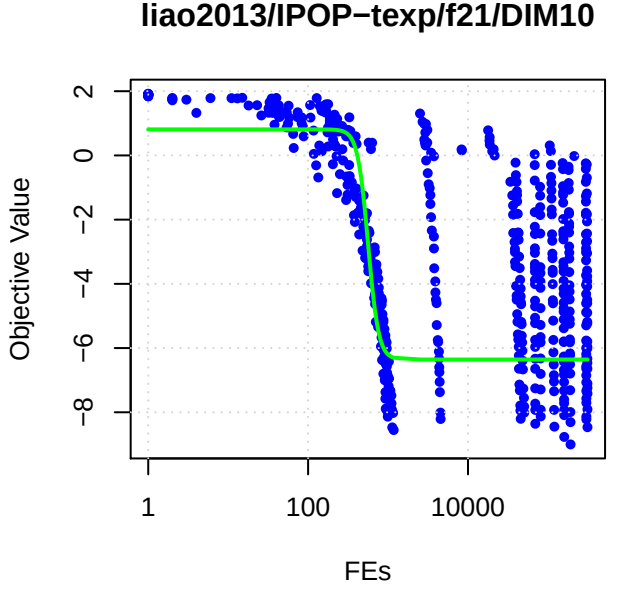
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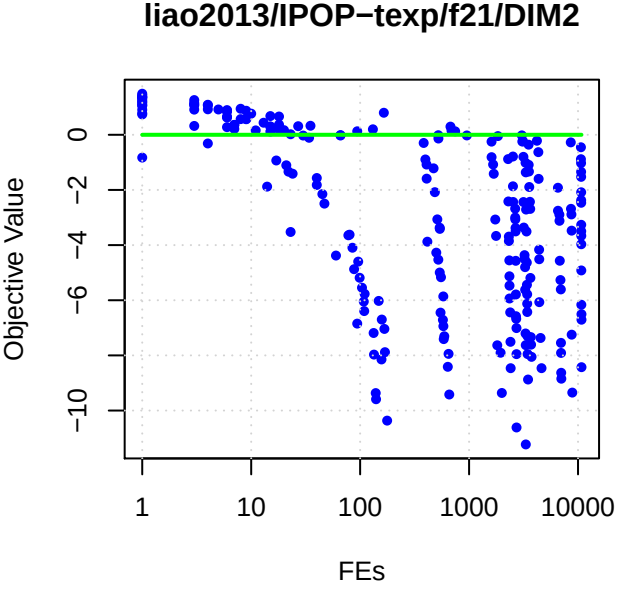
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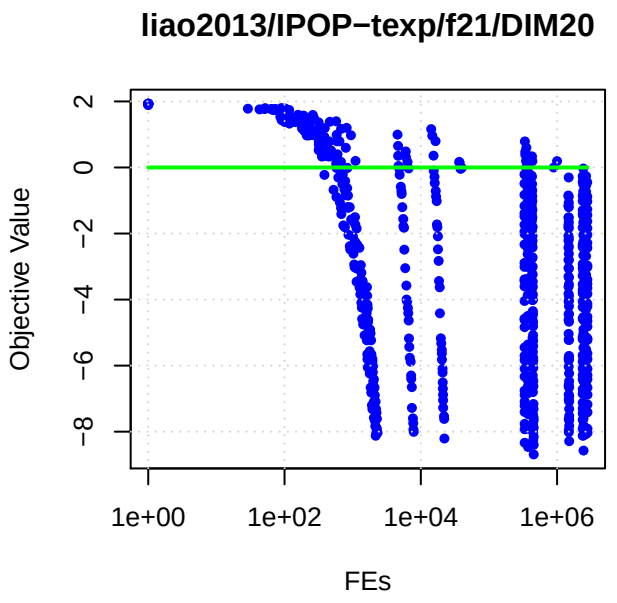
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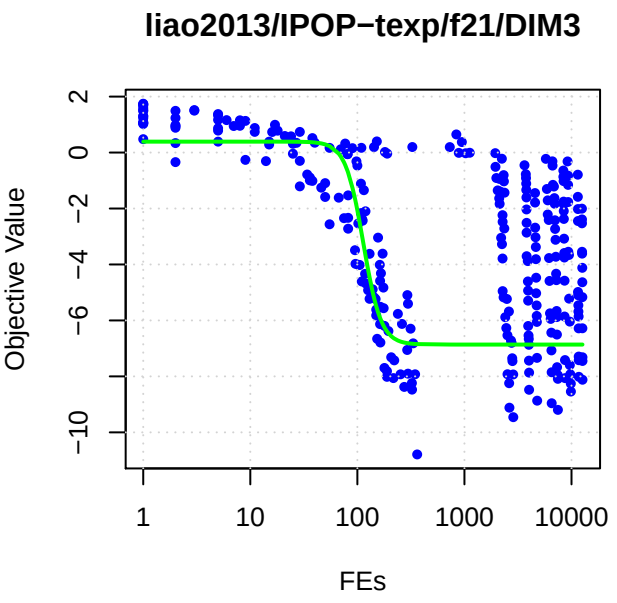
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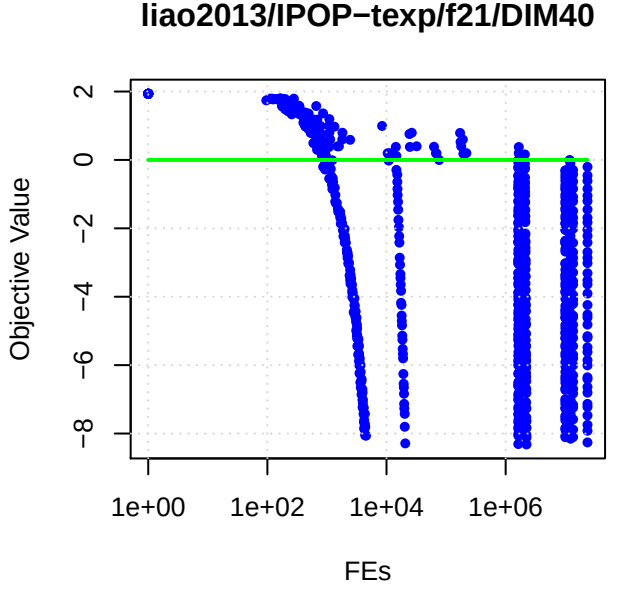
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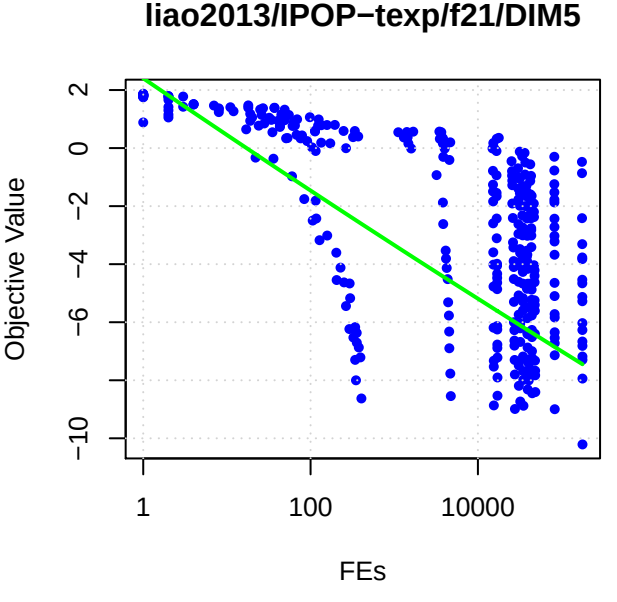
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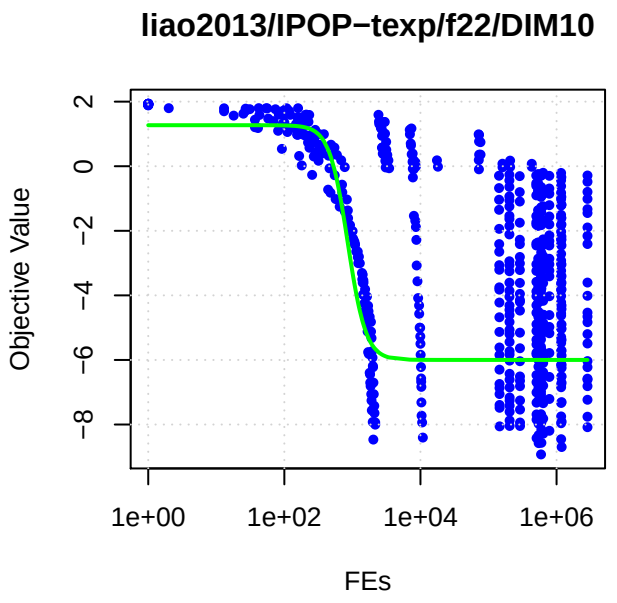
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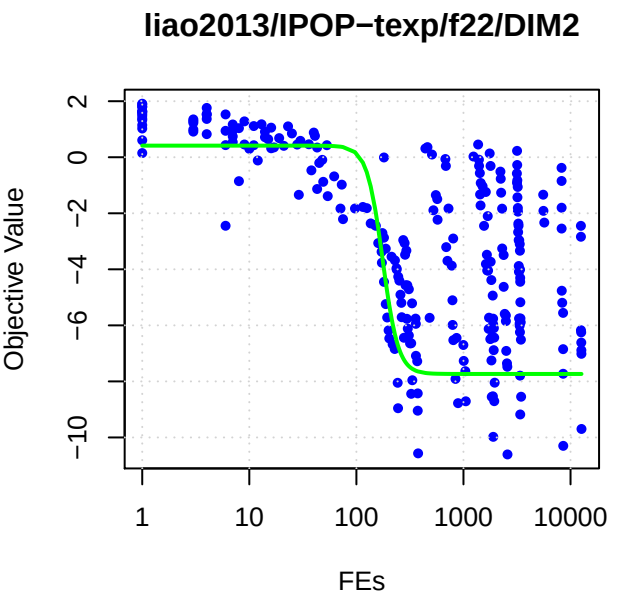
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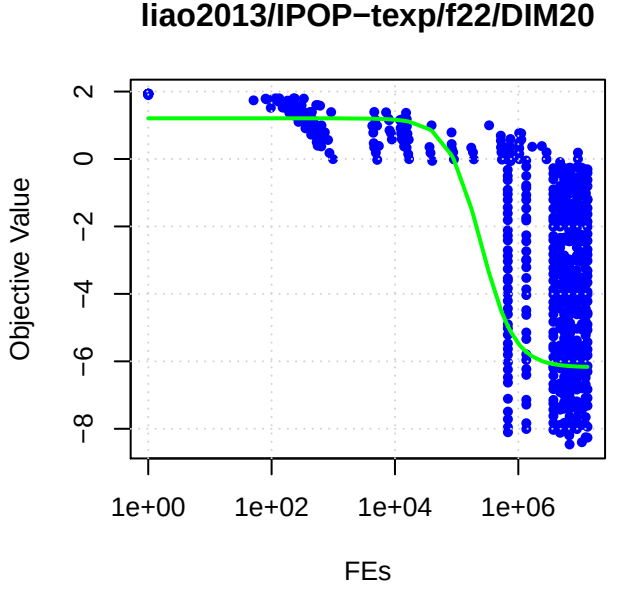
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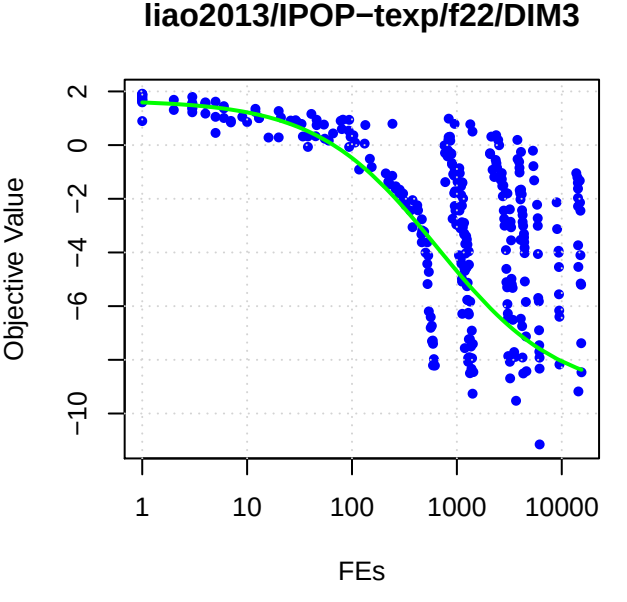
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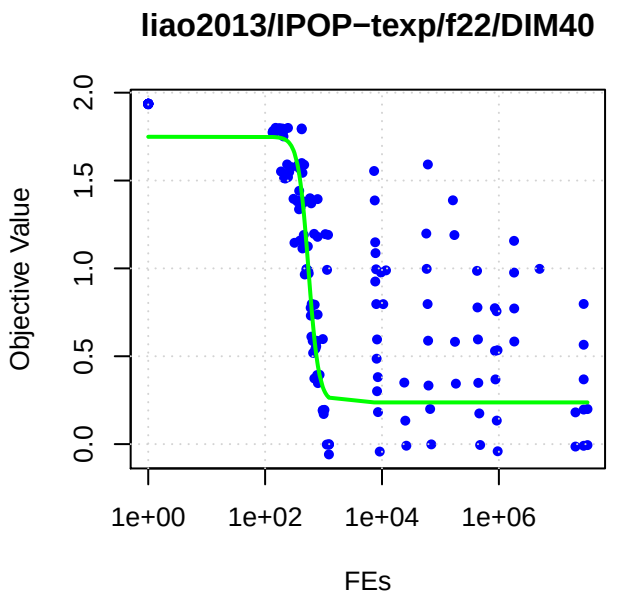
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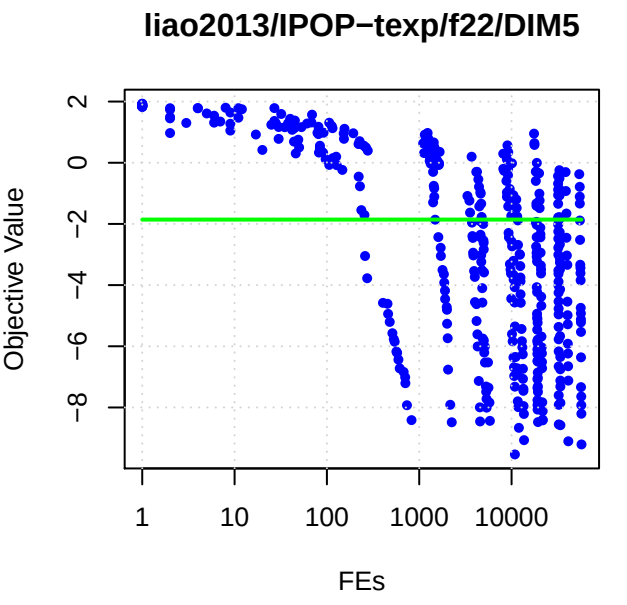
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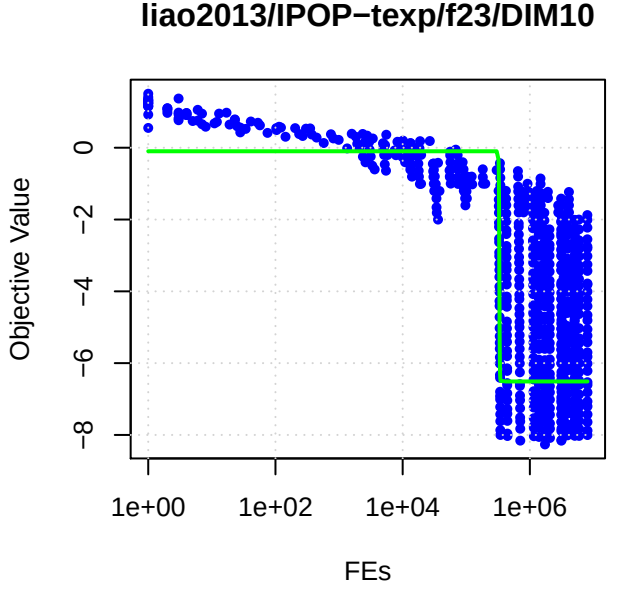
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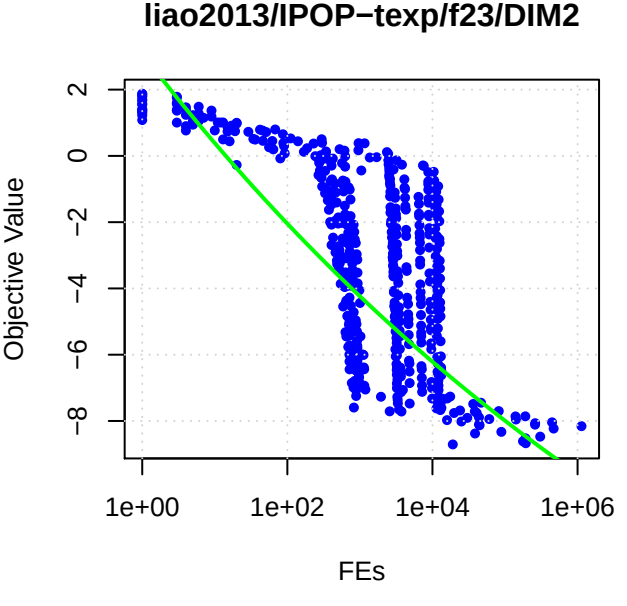
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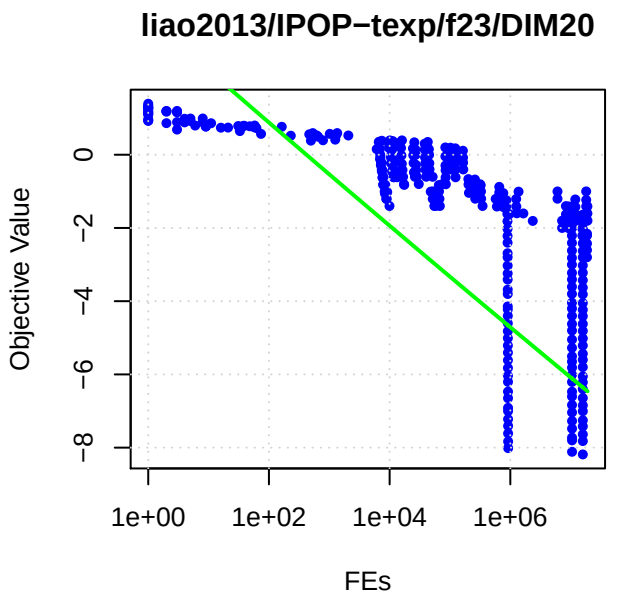
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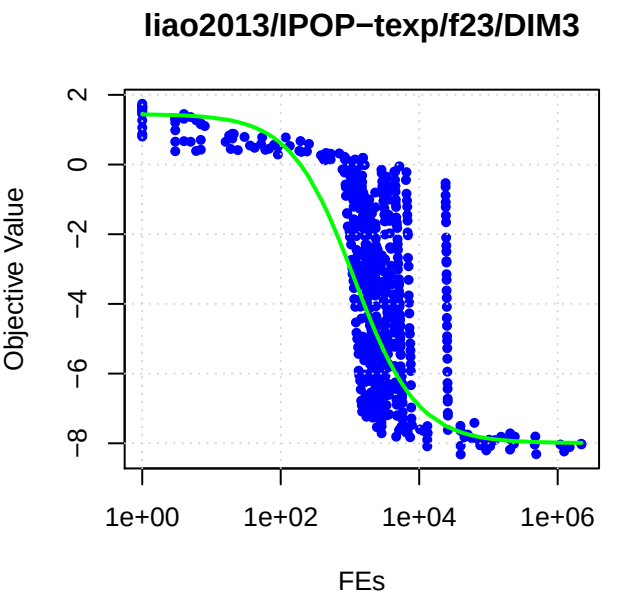
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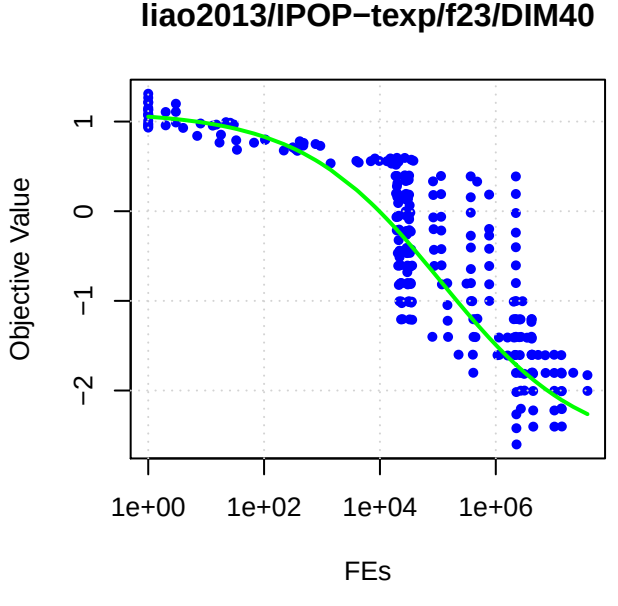
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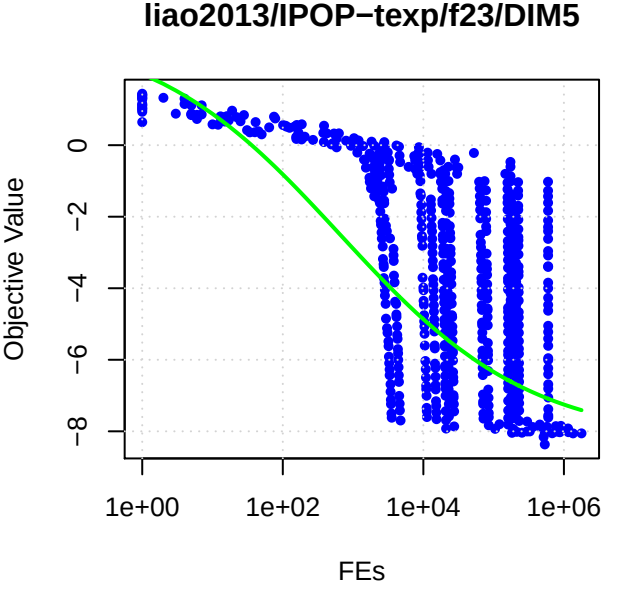
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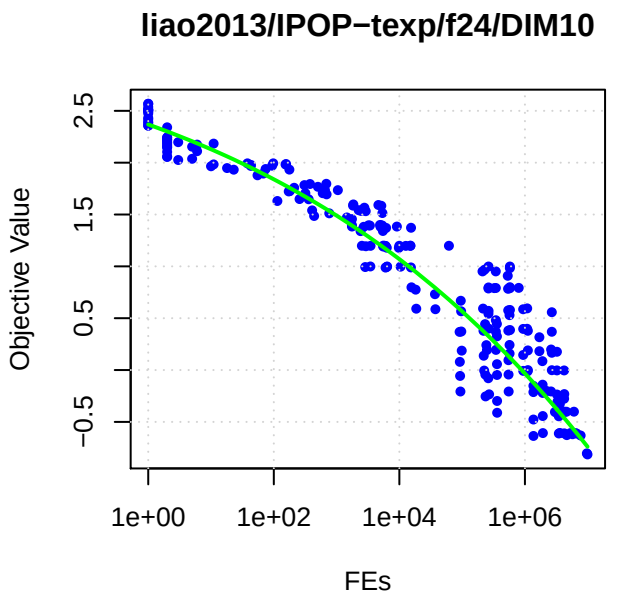
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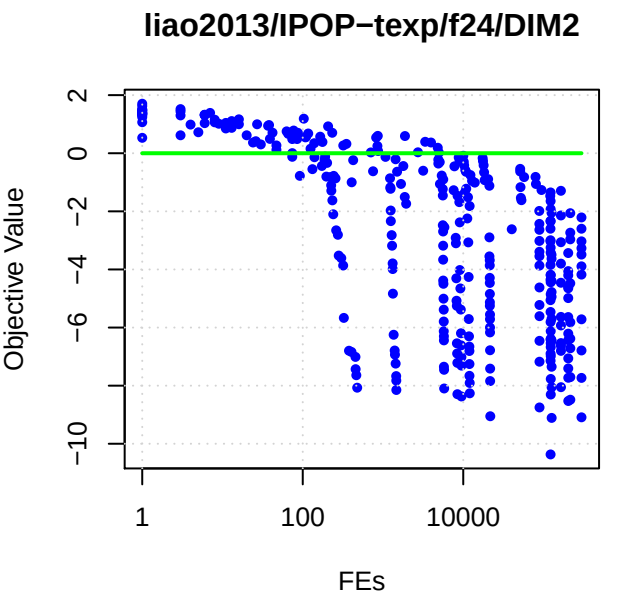
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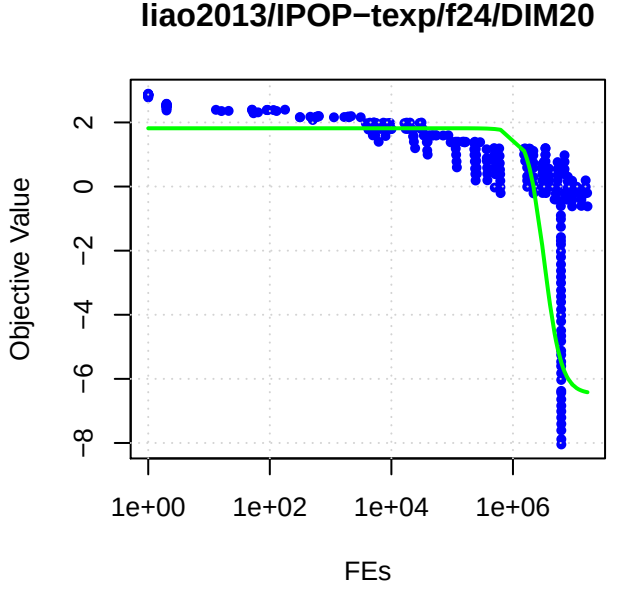
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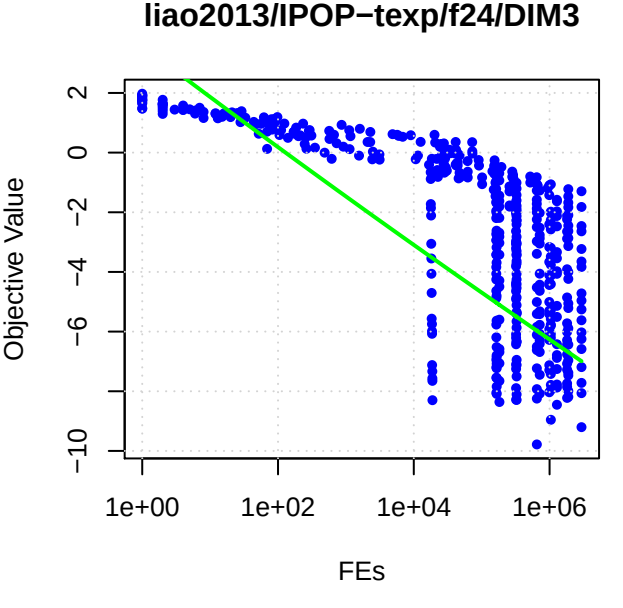
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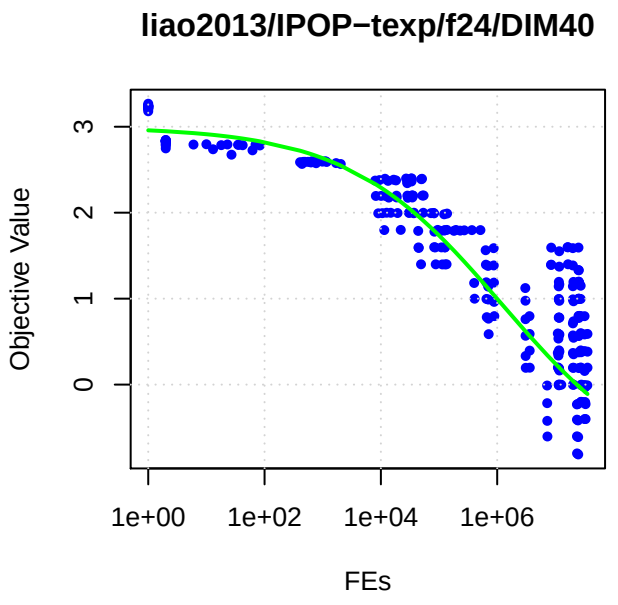
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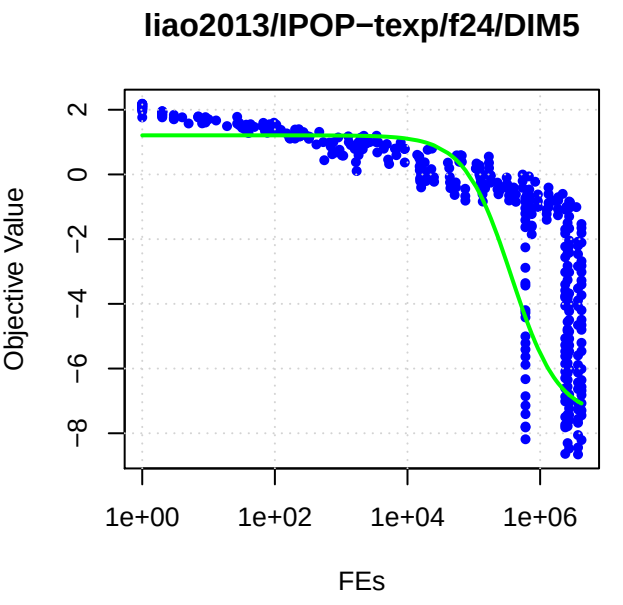
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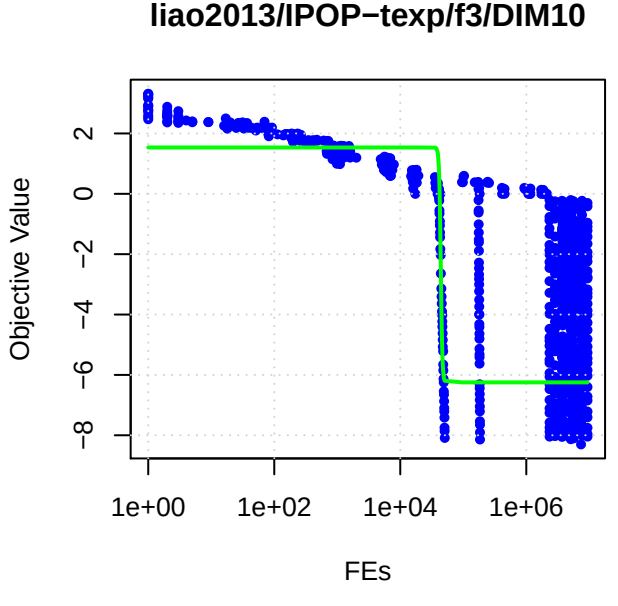
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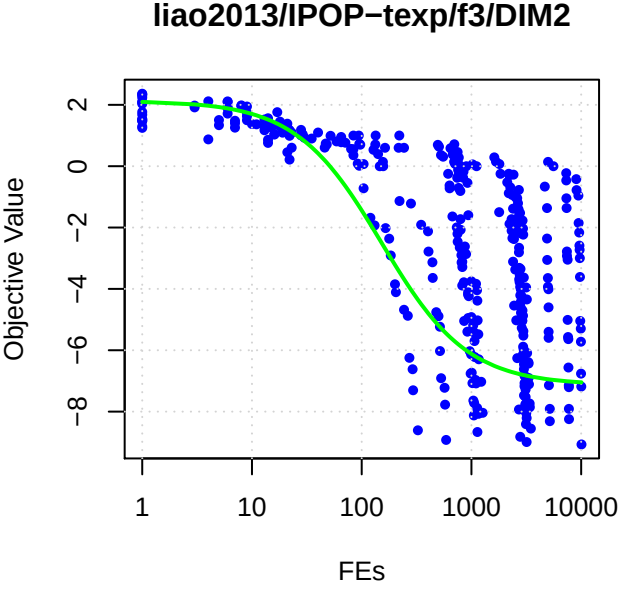
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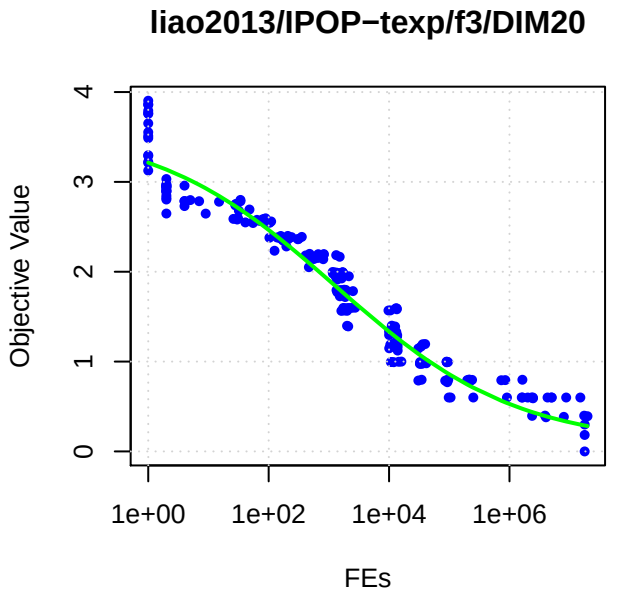
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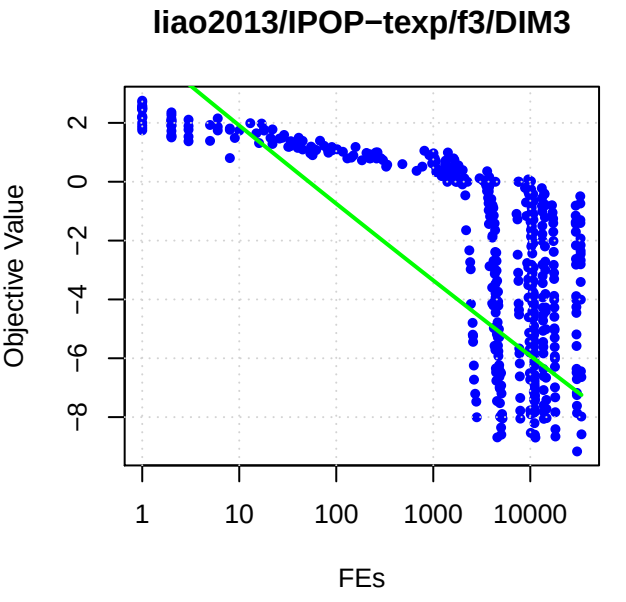
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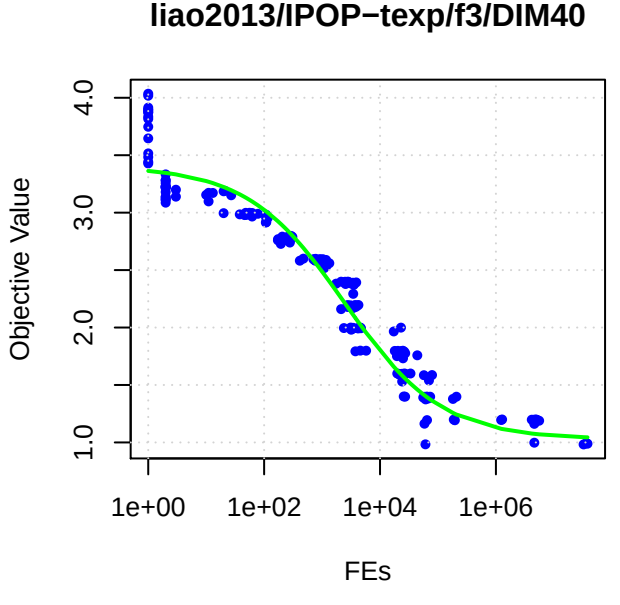
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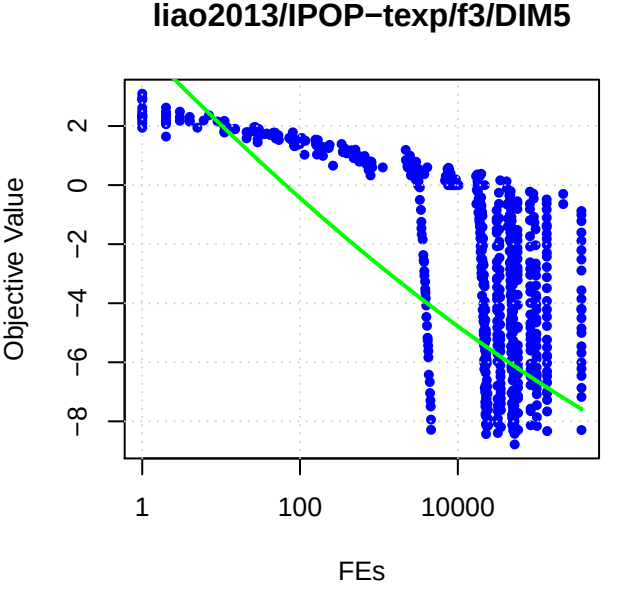
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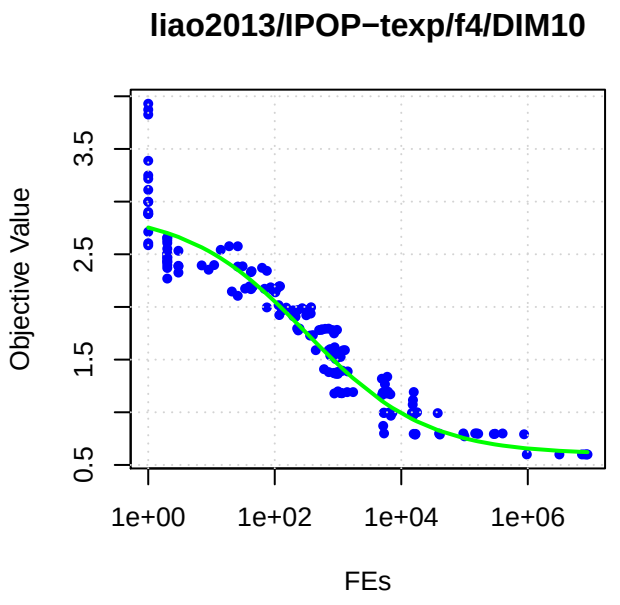
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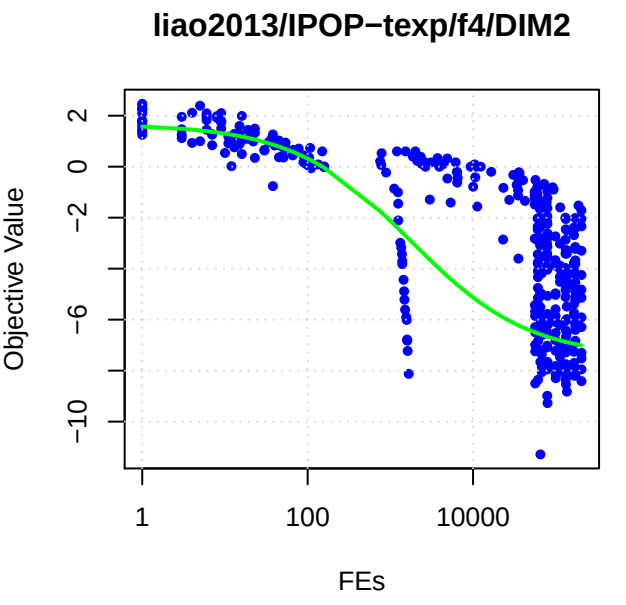
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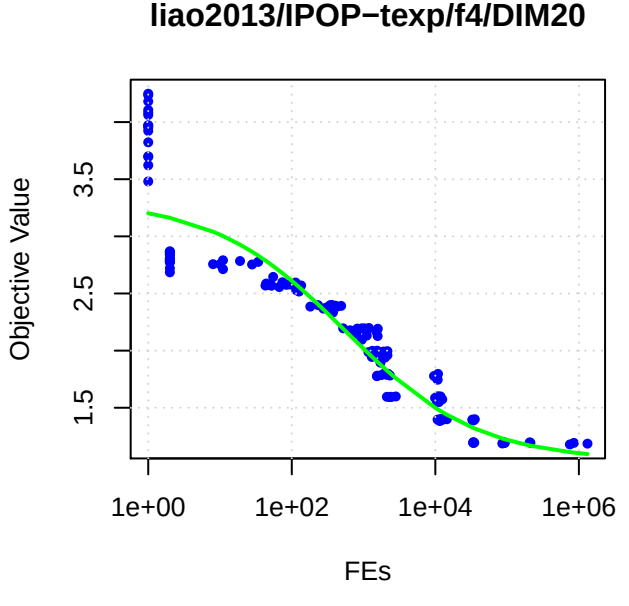
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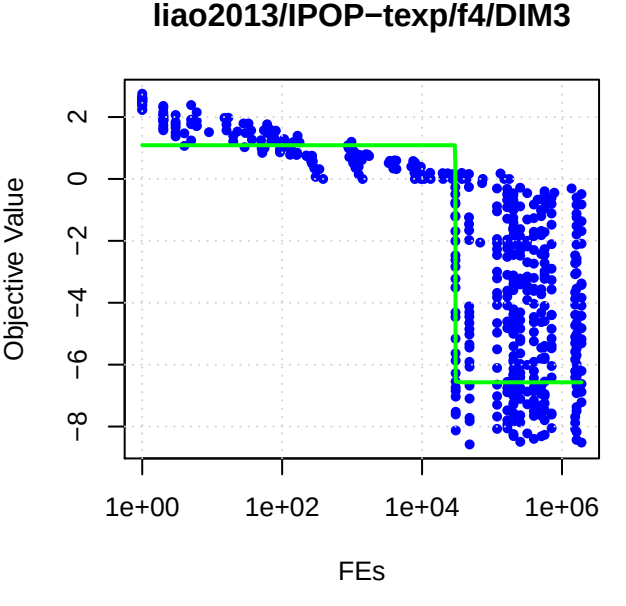
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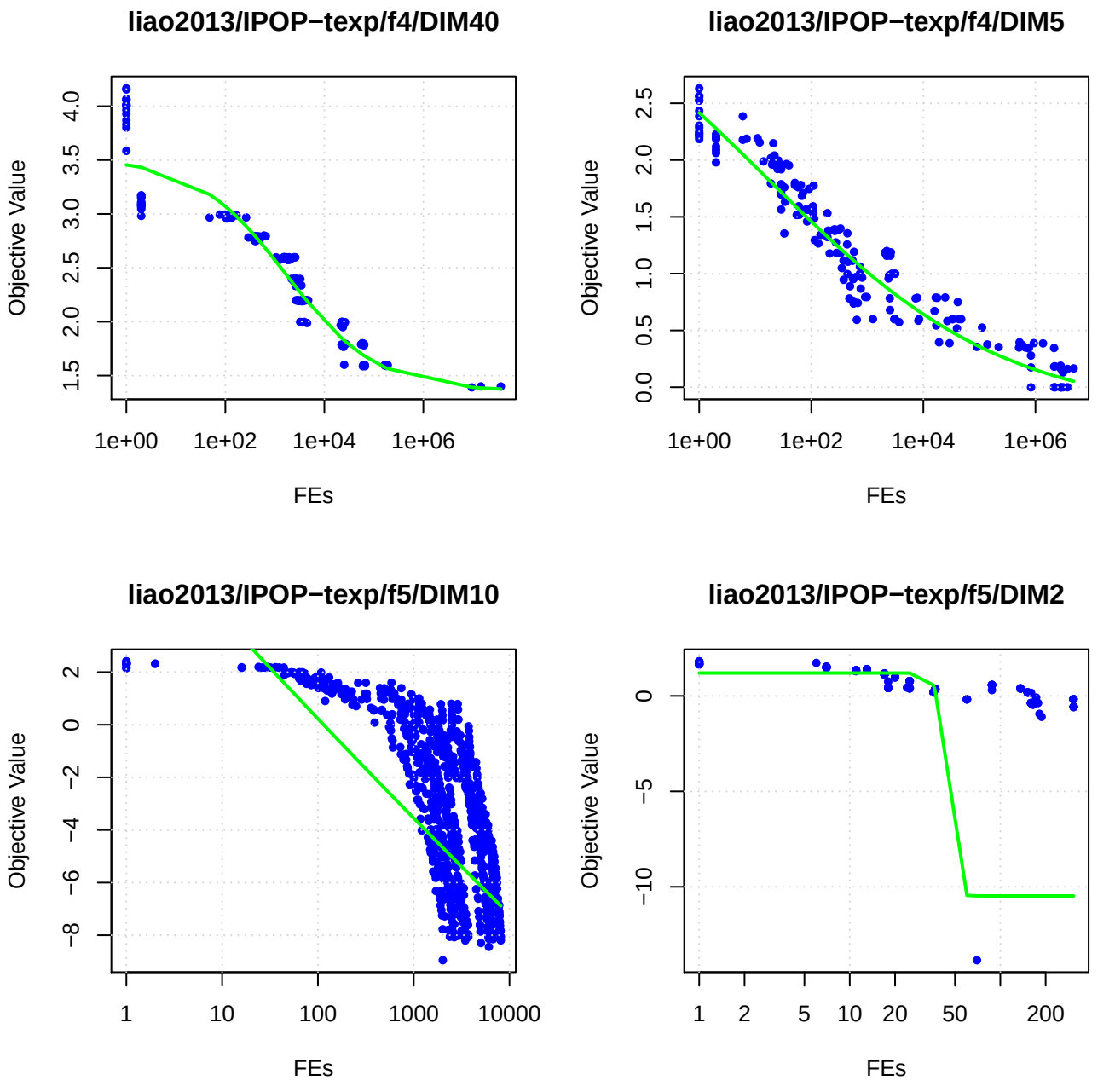
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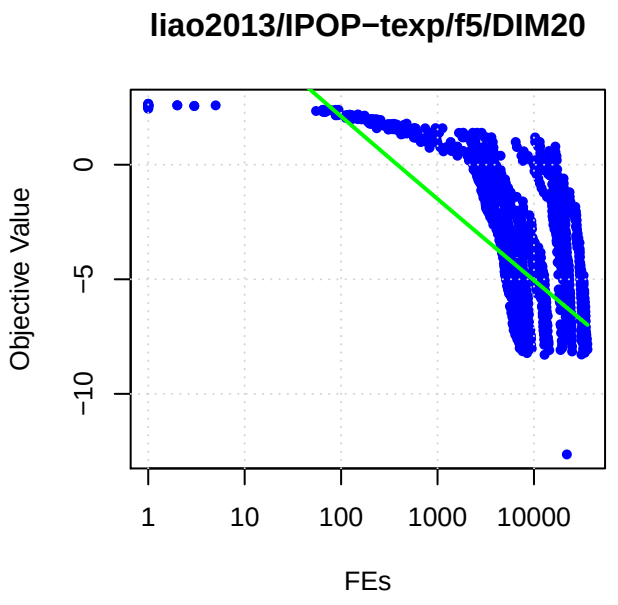
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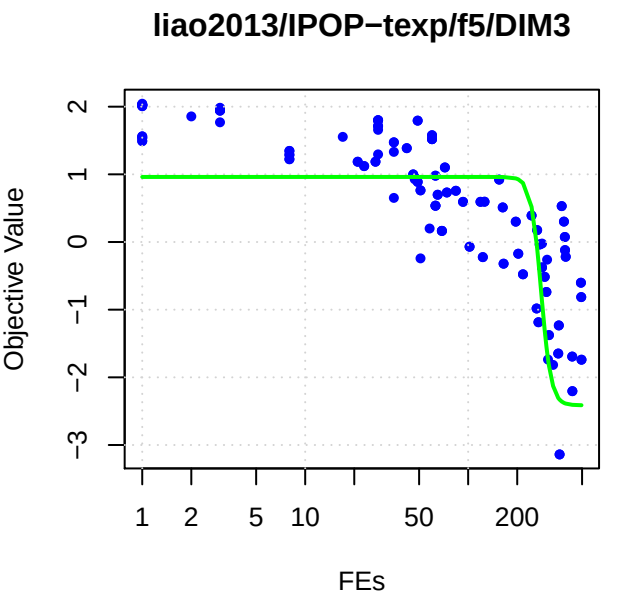
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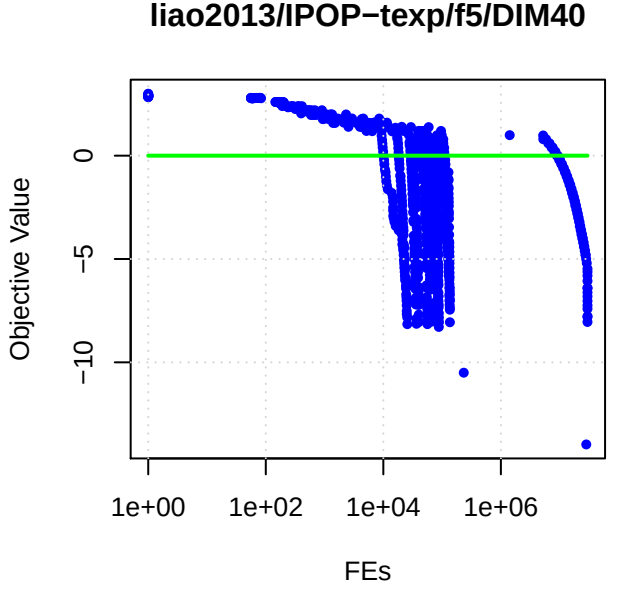
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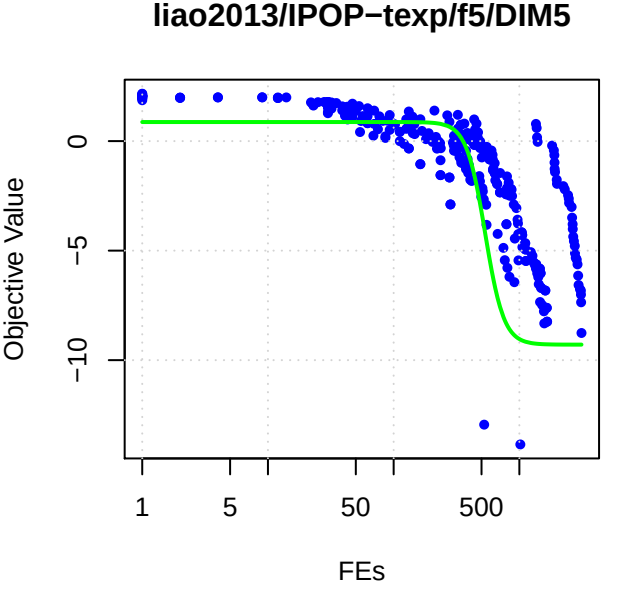
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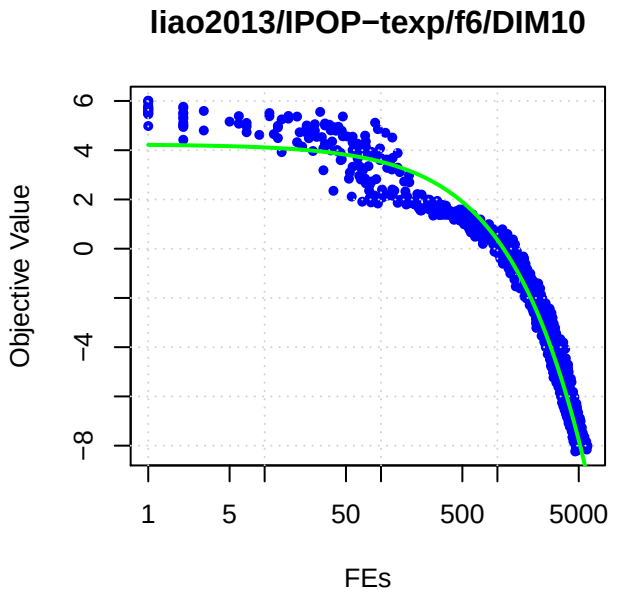
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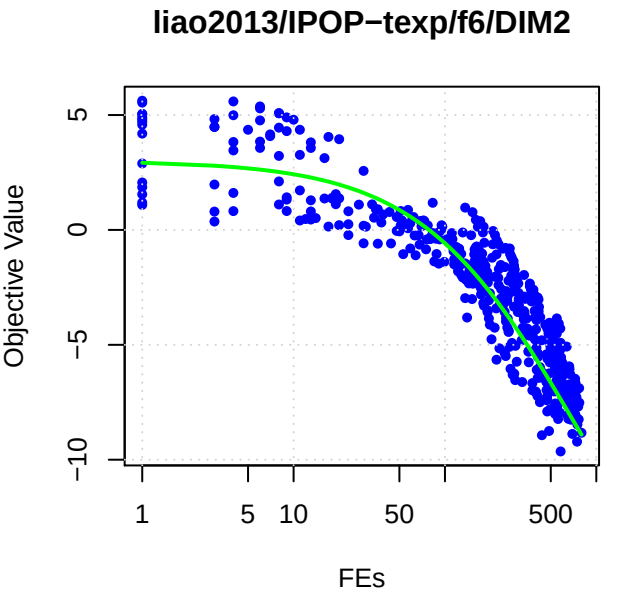
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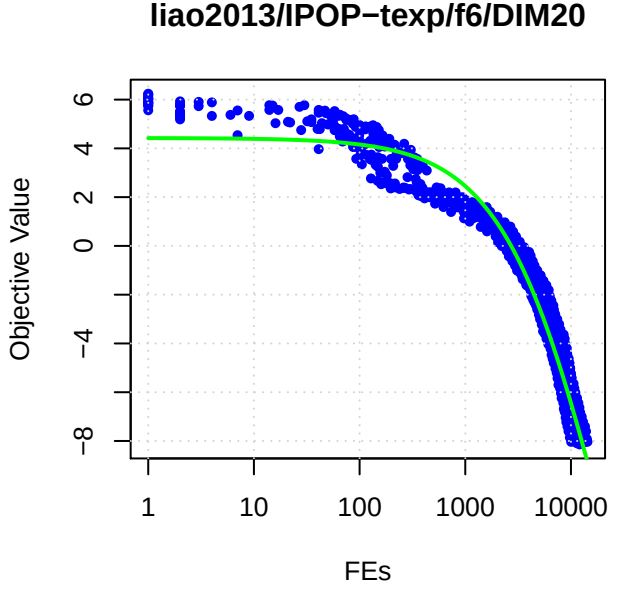
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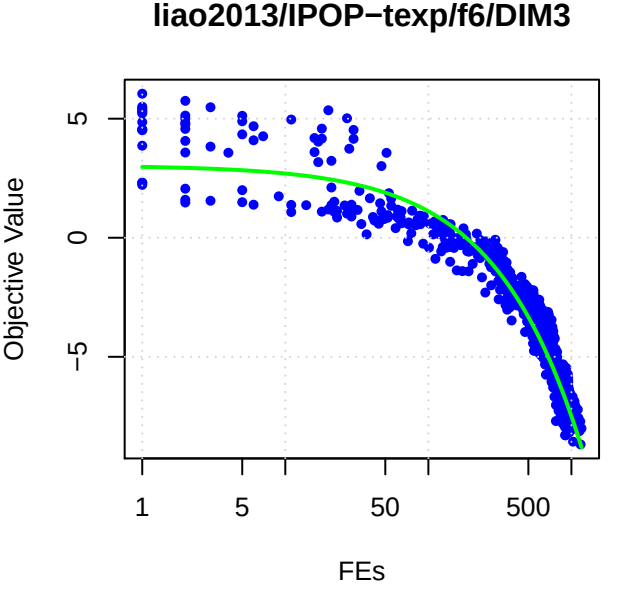
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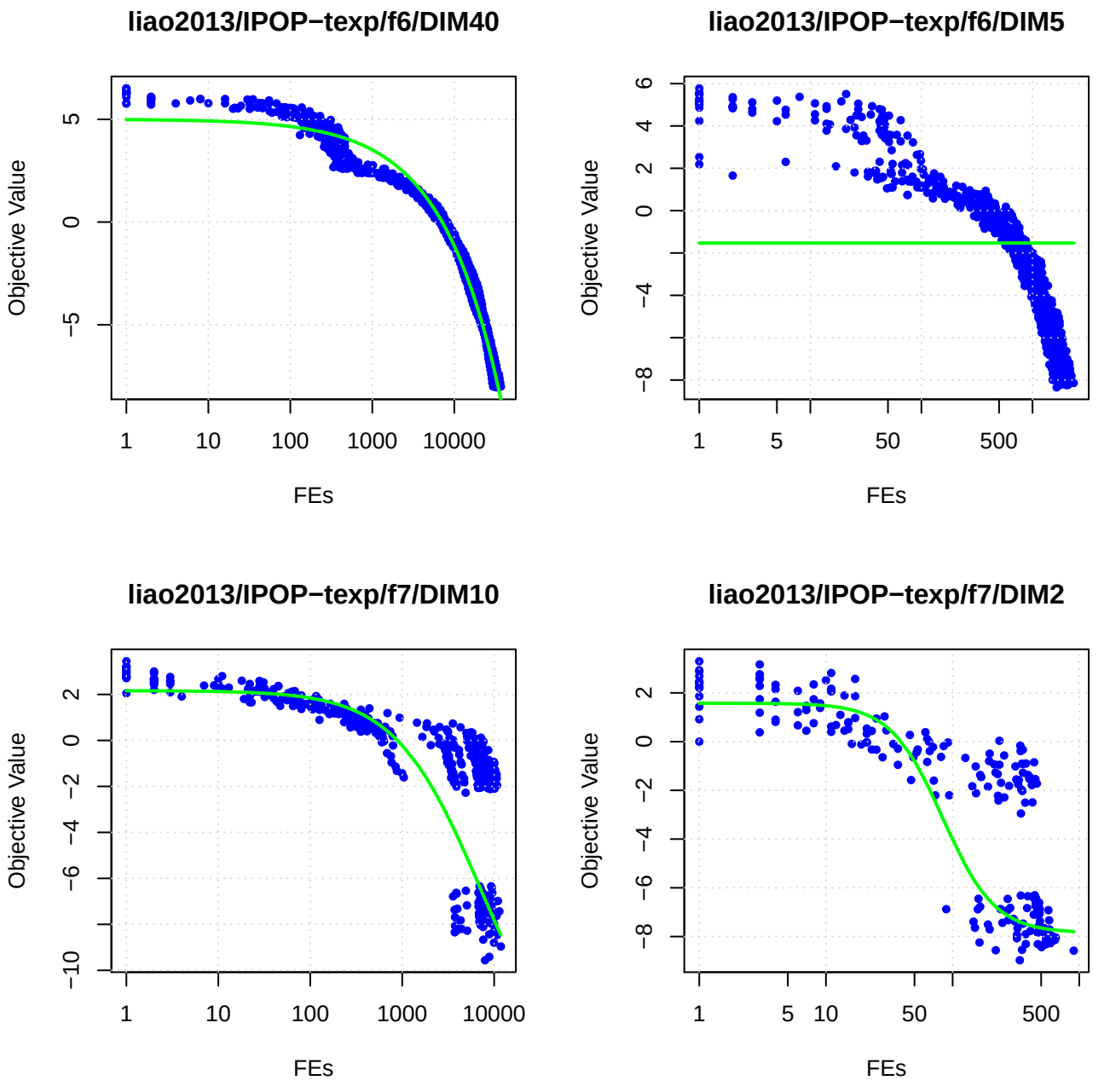
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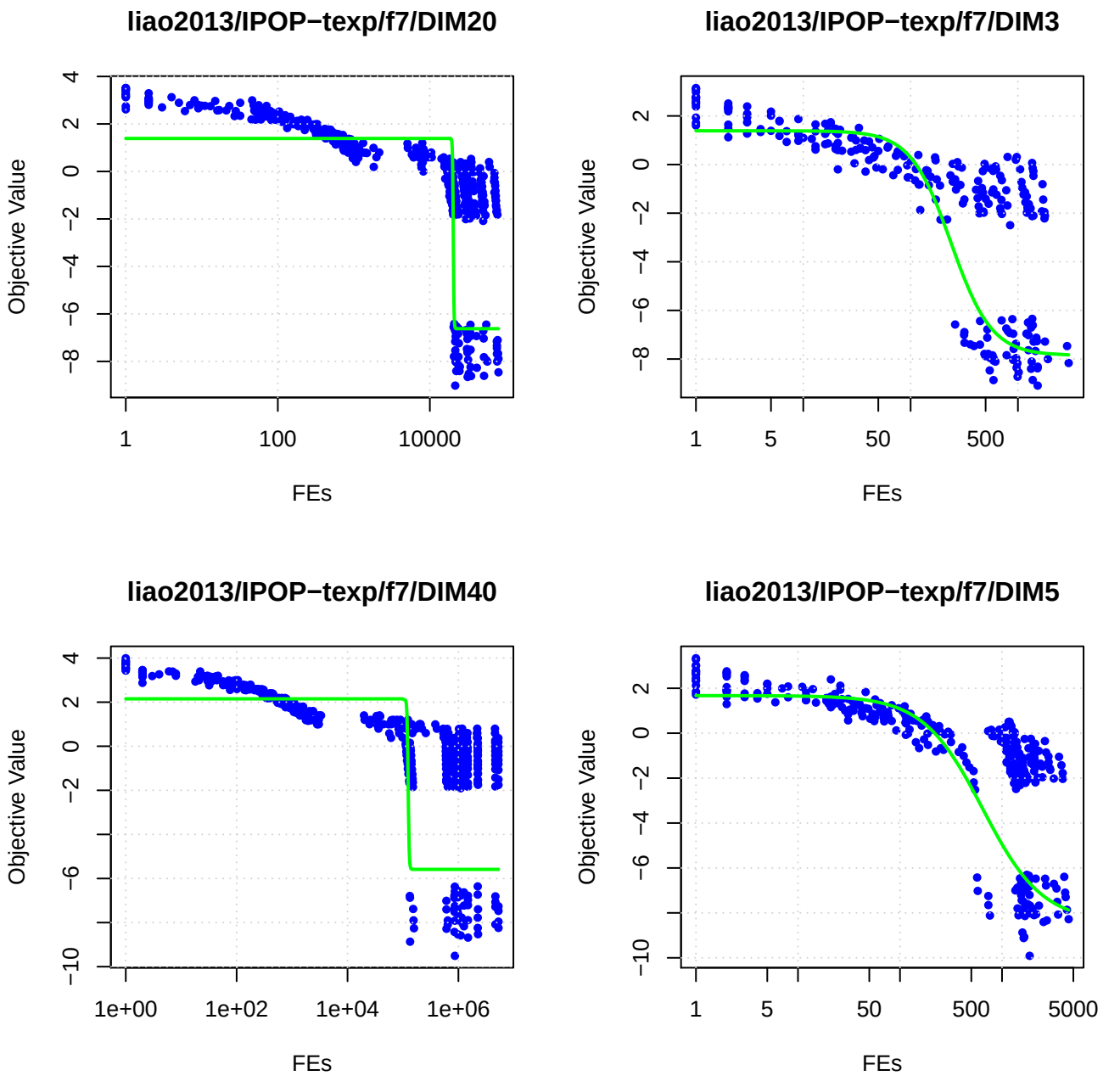
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Objective Value
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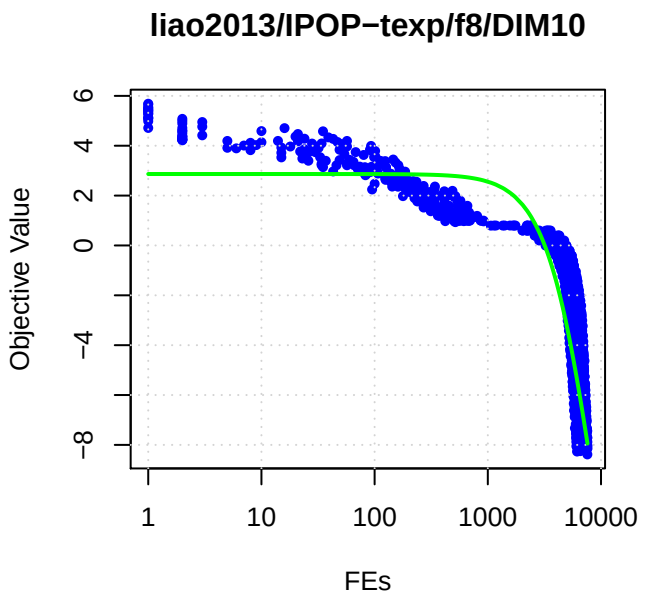
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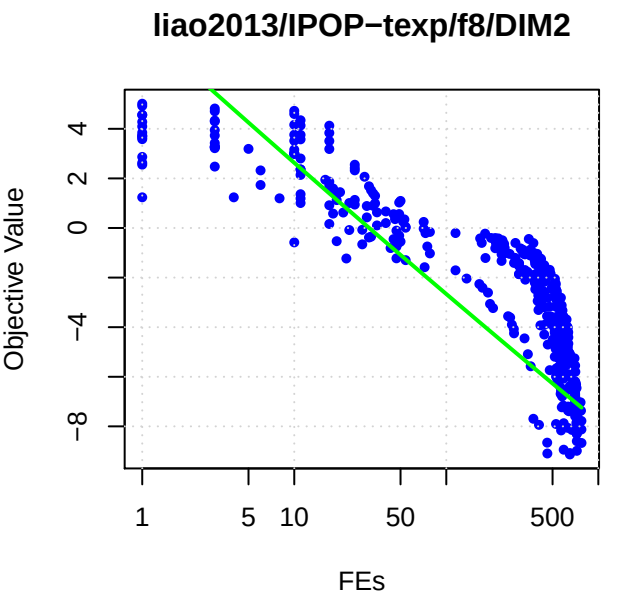
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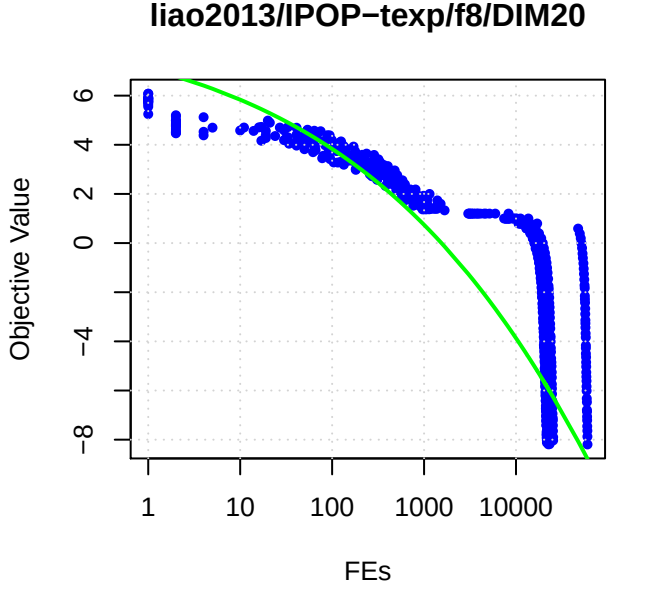
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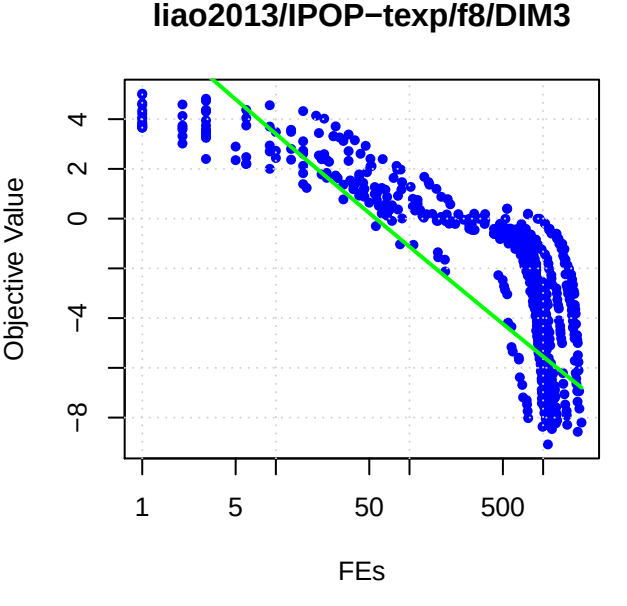
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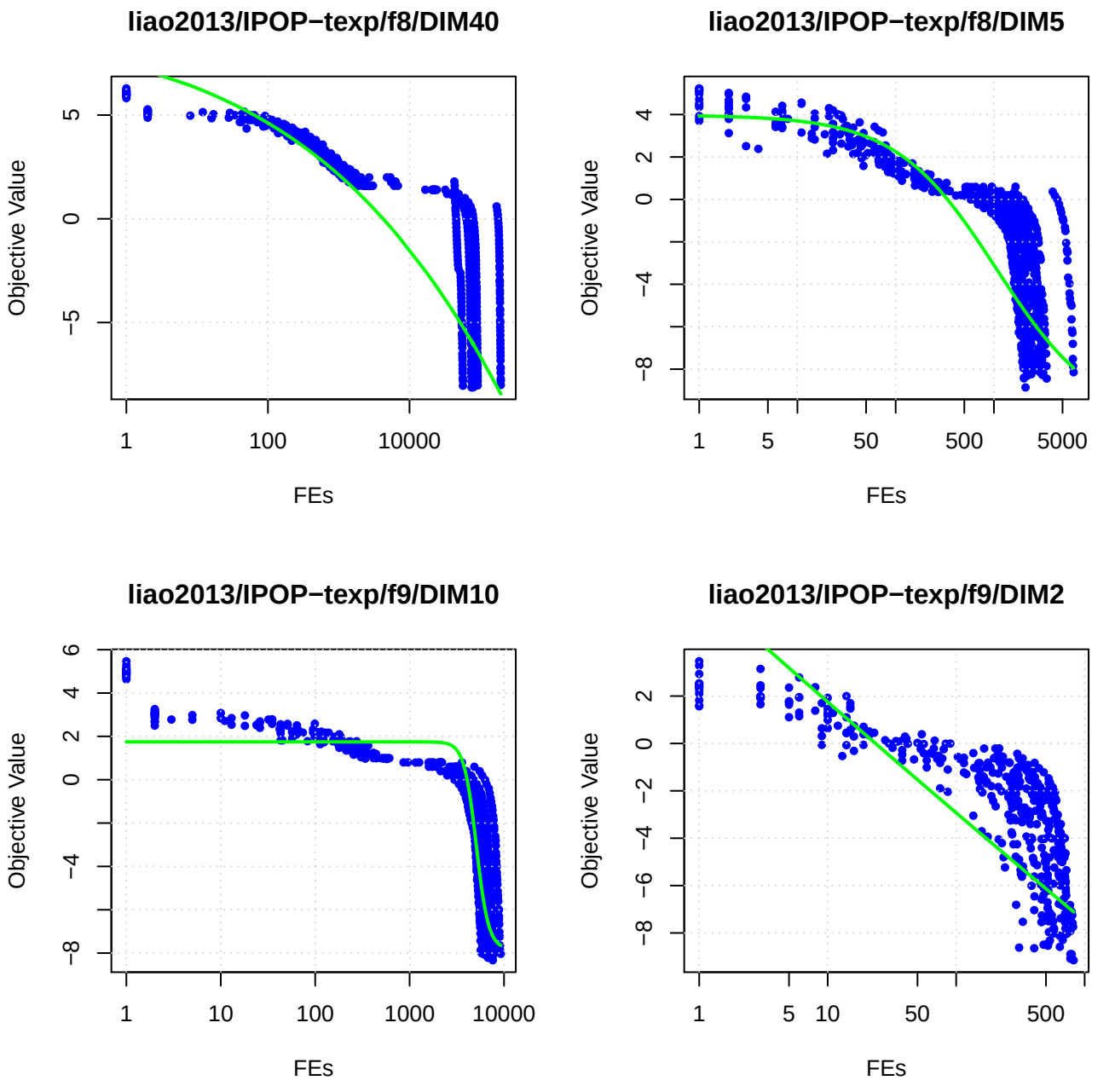
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100
10000
FEs
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Objective Value
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2
0
−4
−8
1
5
50
500
5000
FEs
liao2013/IPOP−texp/f9/DIM10
Objective Value
6
4
2
0
−4
−8
1
10
100
1000
10000
FEs
liao2013/IPOP−texp/f9/DIM2
Objective Value
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−4
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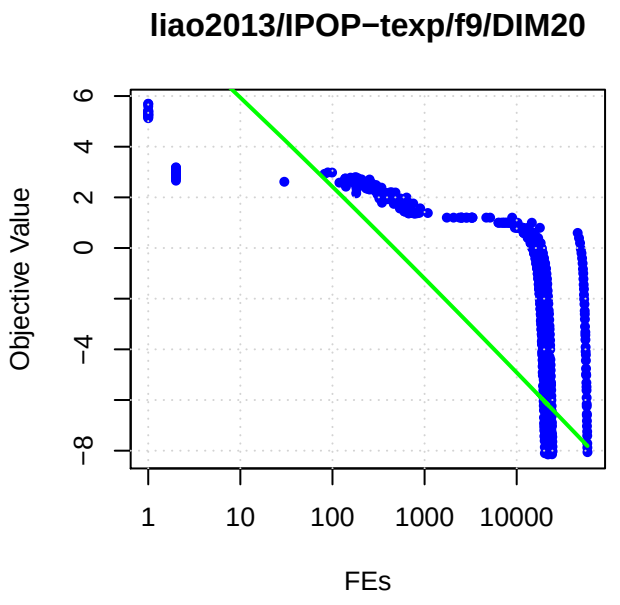
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FEs
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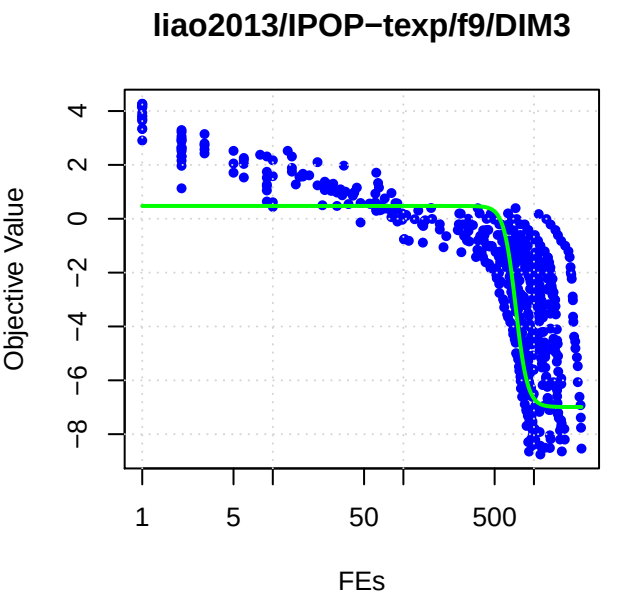
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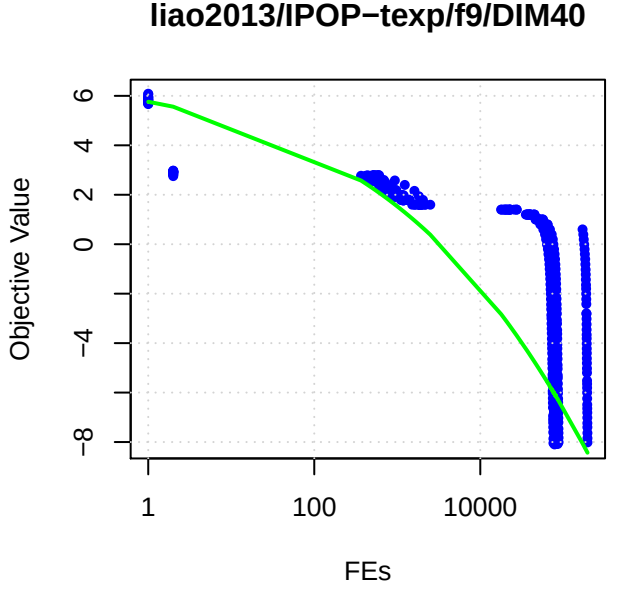
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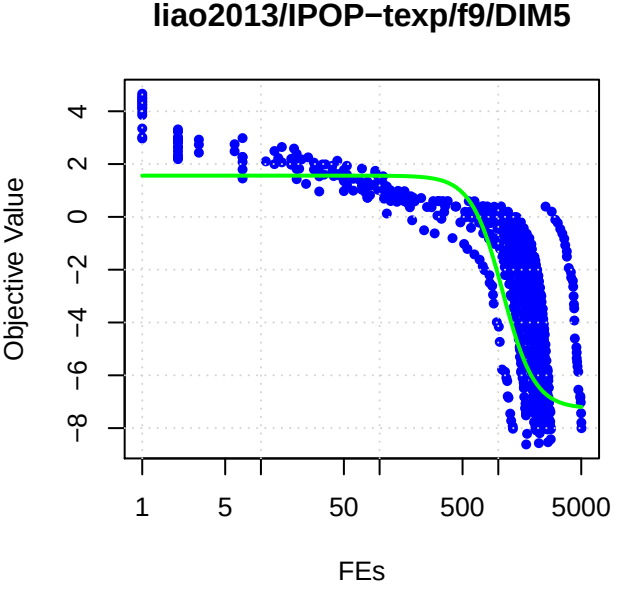
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FEs
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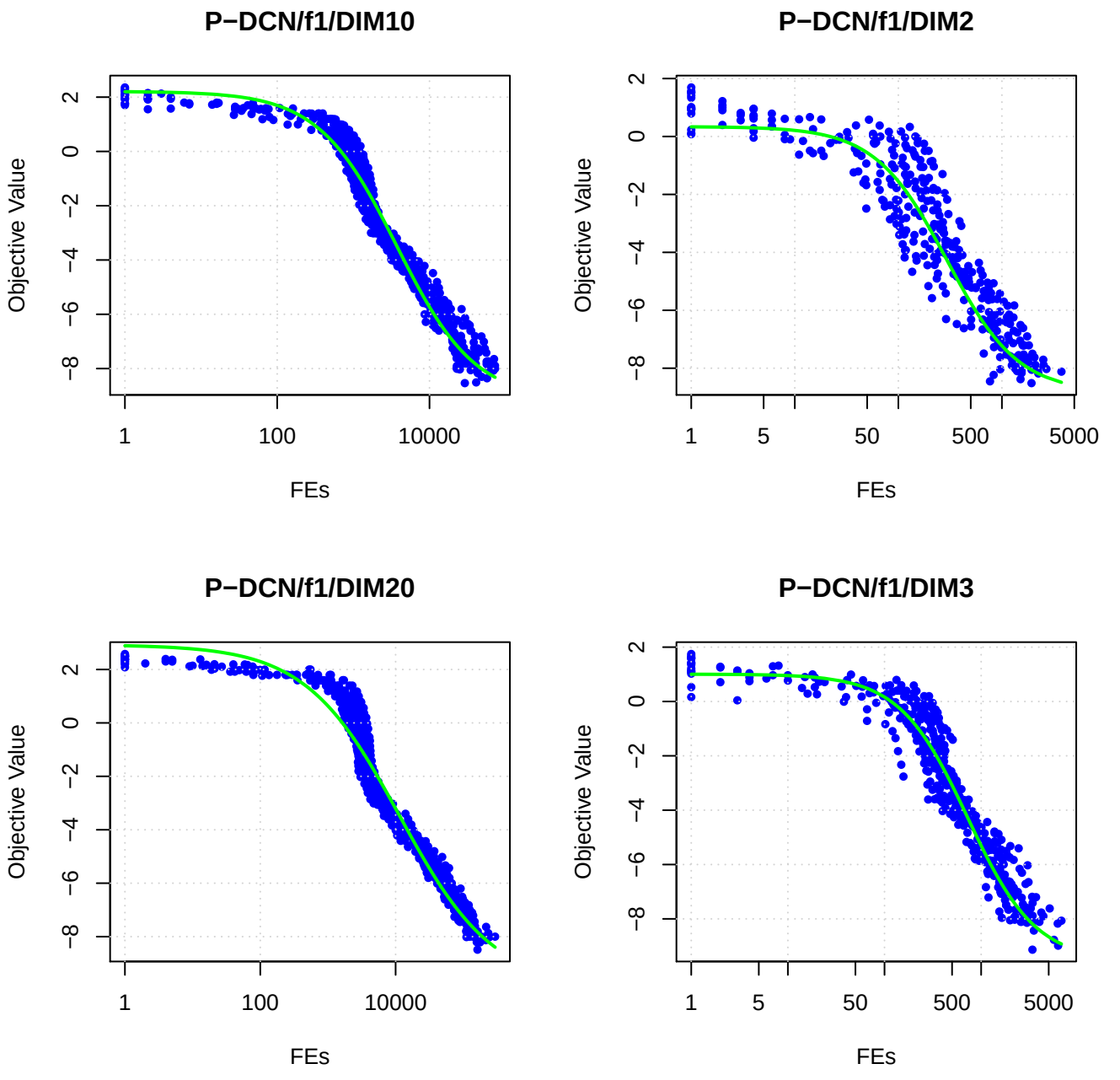
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P−DCN/f1/DIM2
P−DCN/f1/DIM20
P−DCN/f1/DIM3
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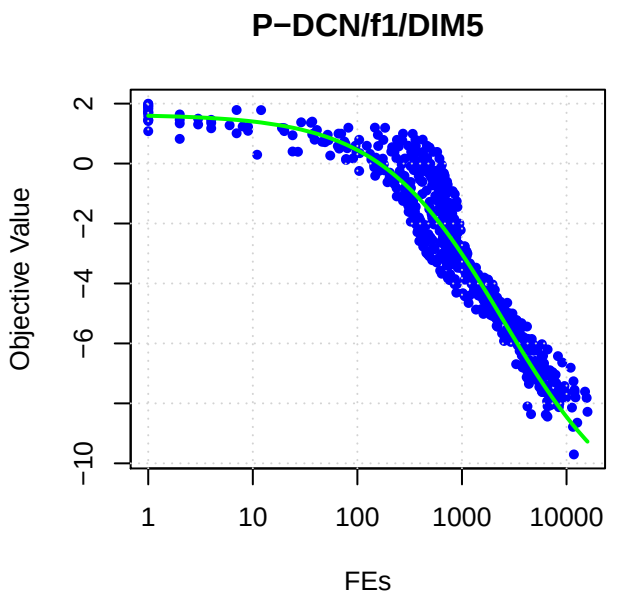
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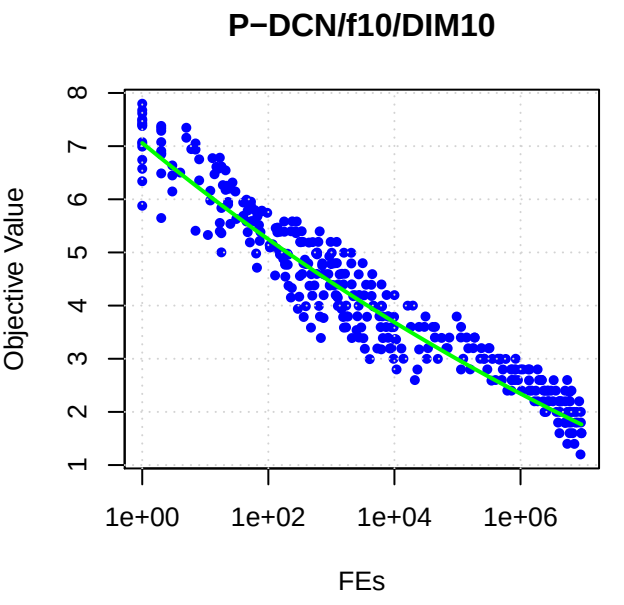
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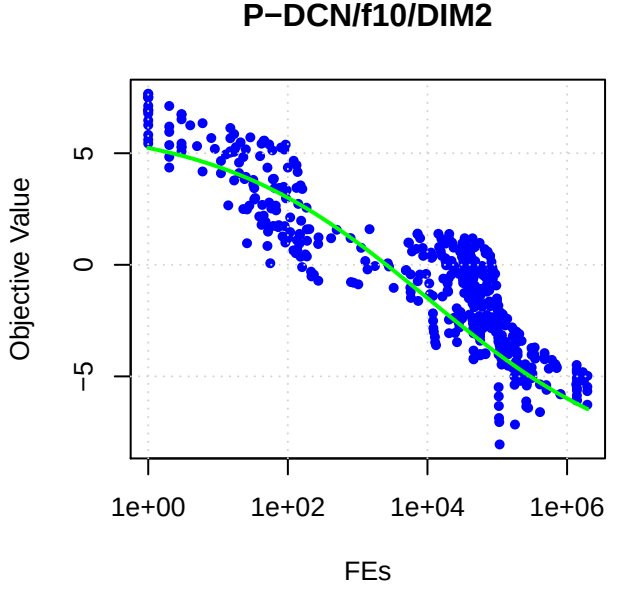
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Objective Value
FEs
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1e+04
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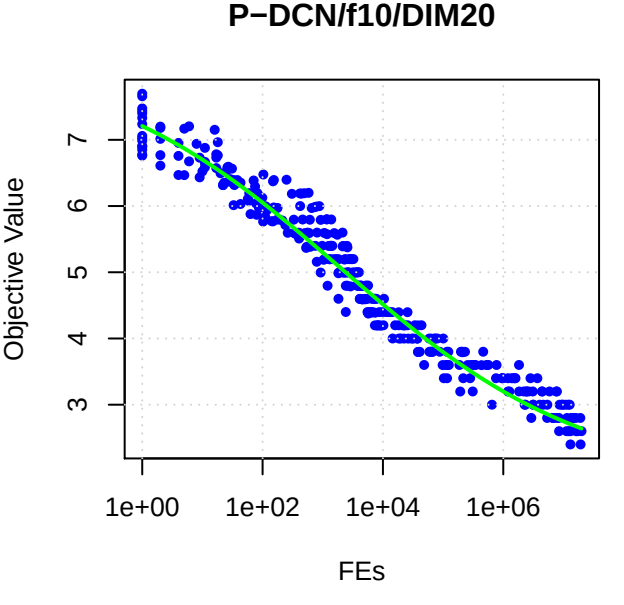
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Objective Value
FEs
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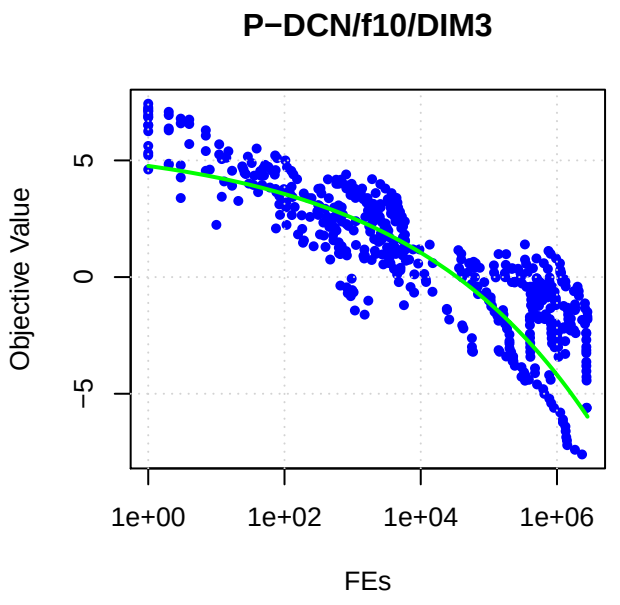
1e+04
1e+06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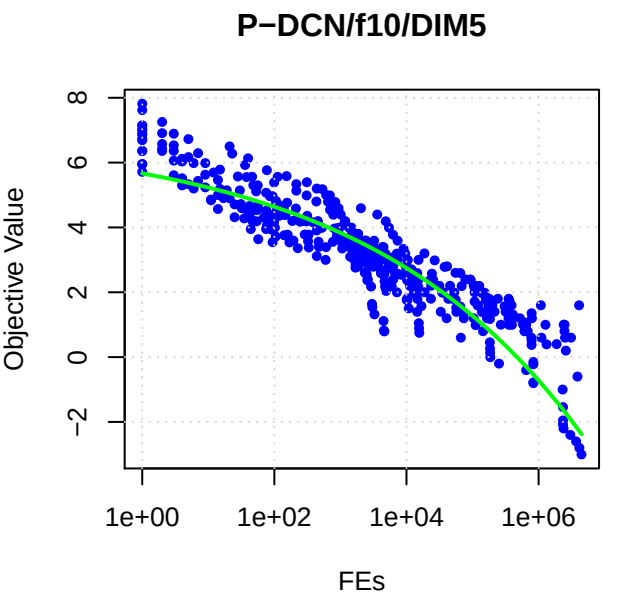
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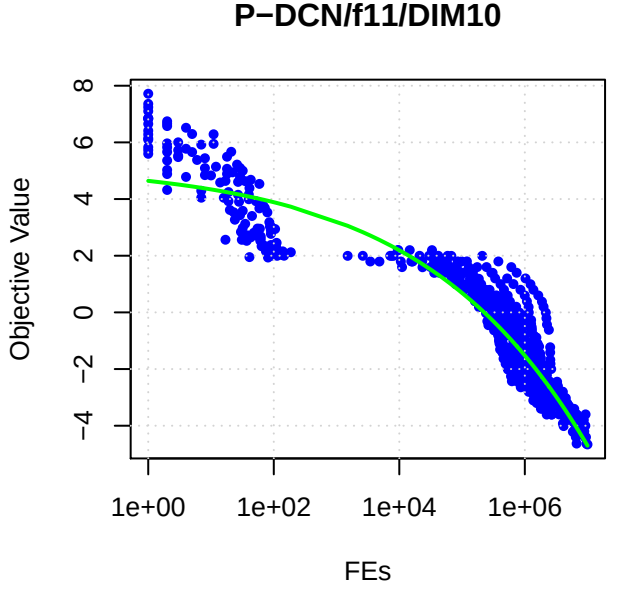
FEs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Objective Value
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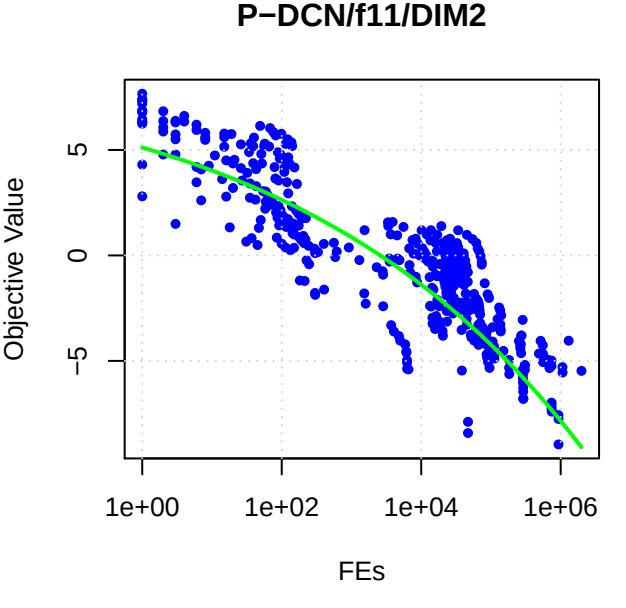
FEs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Objective Value
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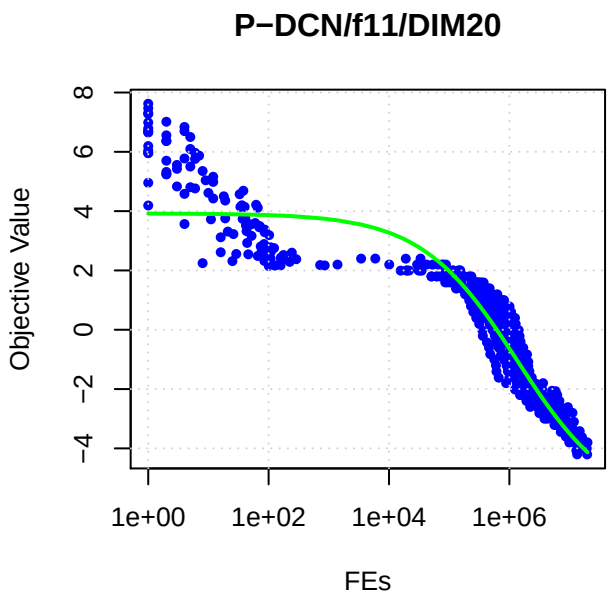
FEs


P−DCN/f11/DIM20
Objective Value
FEs
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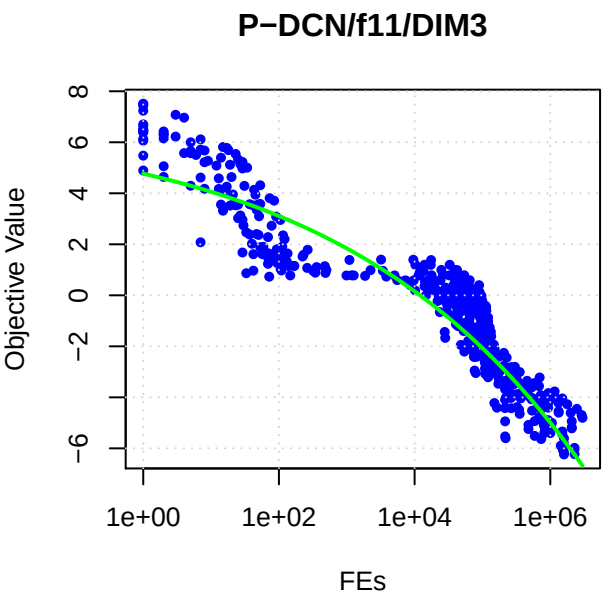
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Objective Value
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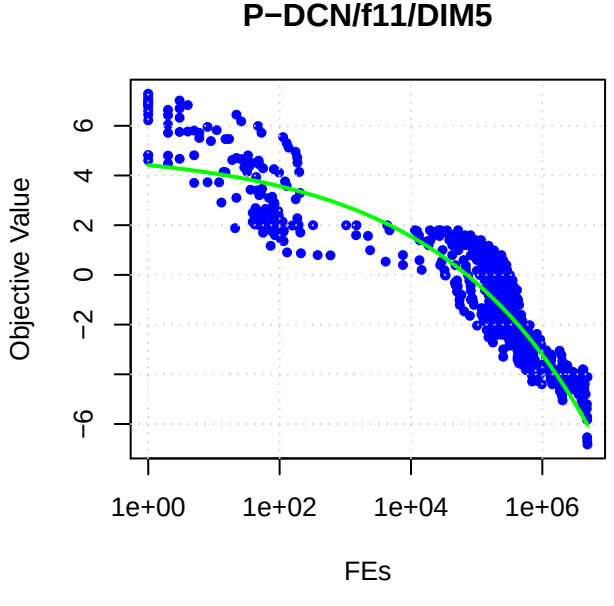
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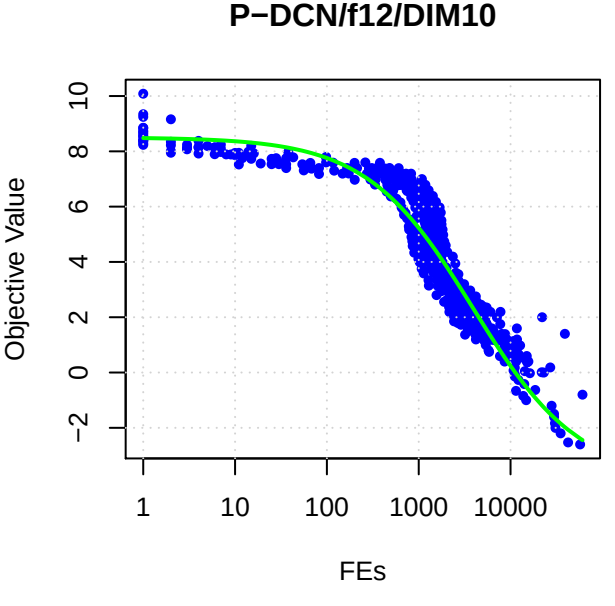
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Objective Value
FEs
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6
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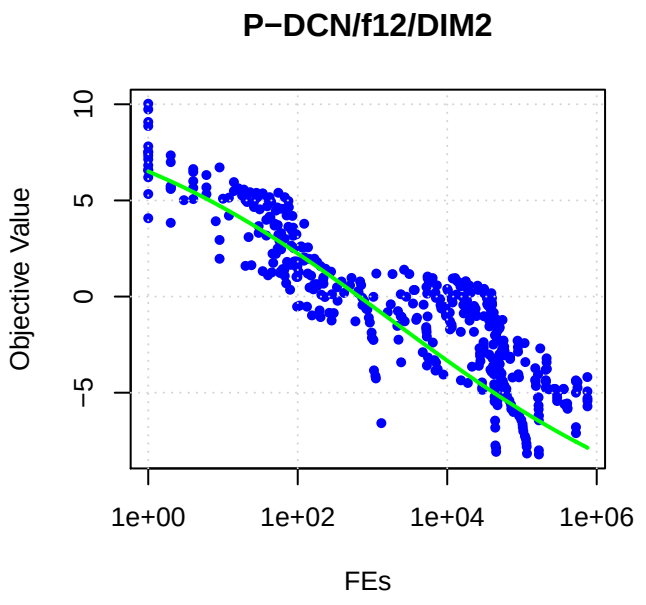
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Objective Value
FEs
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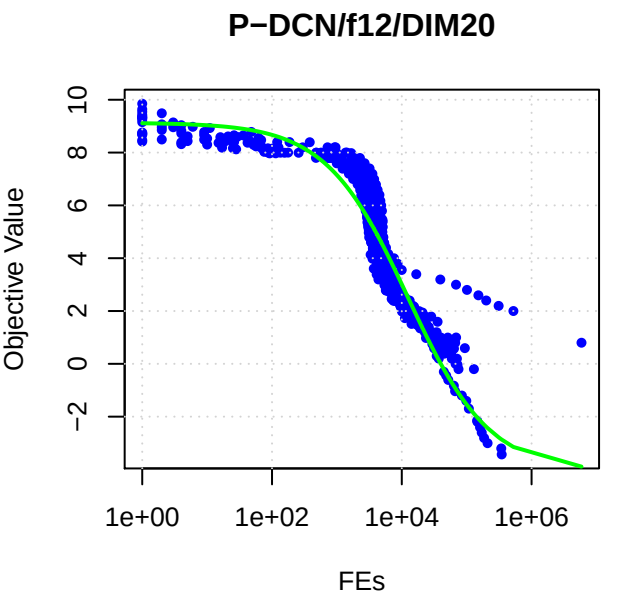
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Objective Value
FEs
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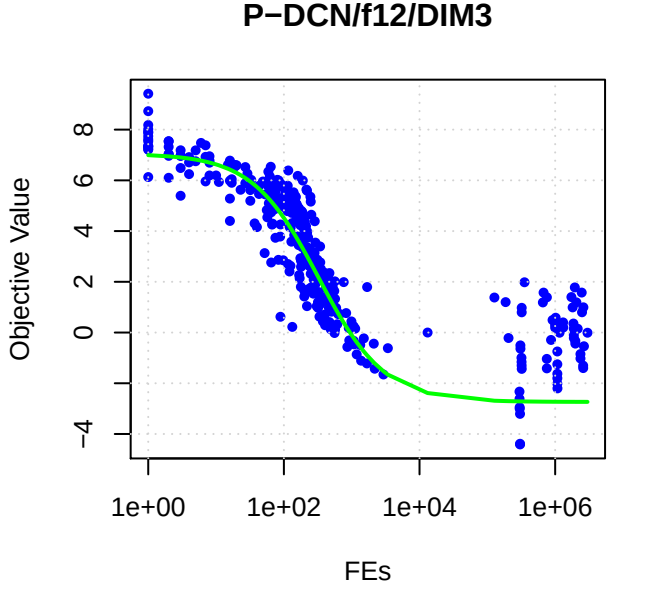
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Objective Value
FEs
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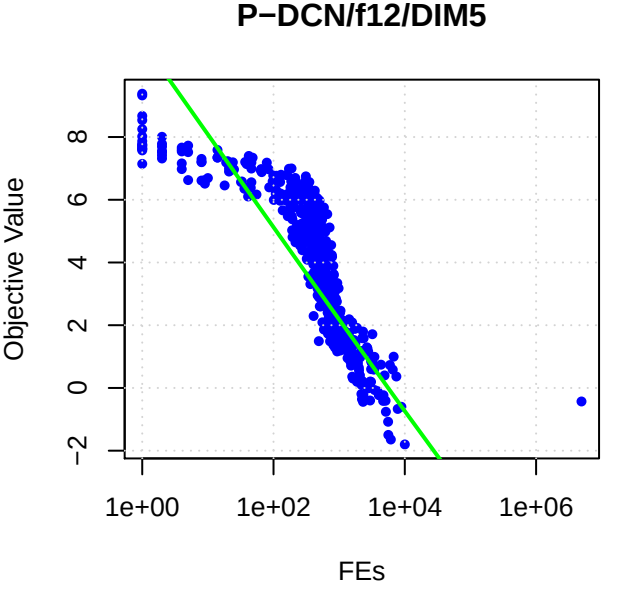
1e+02
1e+04
1e+06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Objective Value
FEs
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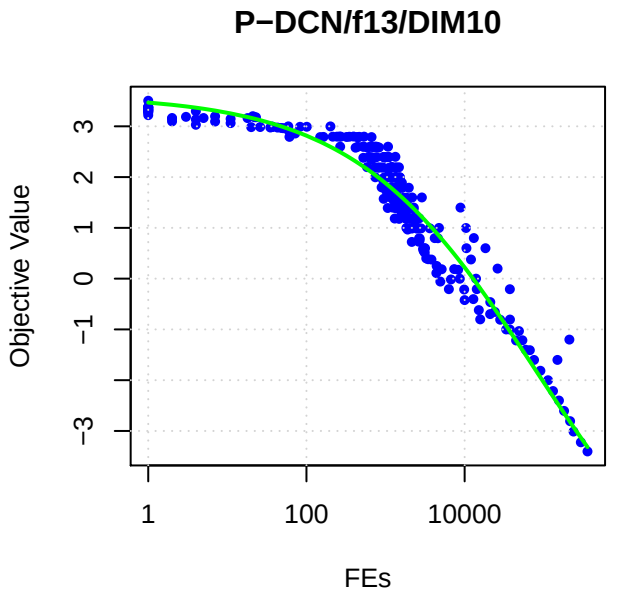
1e+02
1e+04
1e+06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Objective Value
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10000
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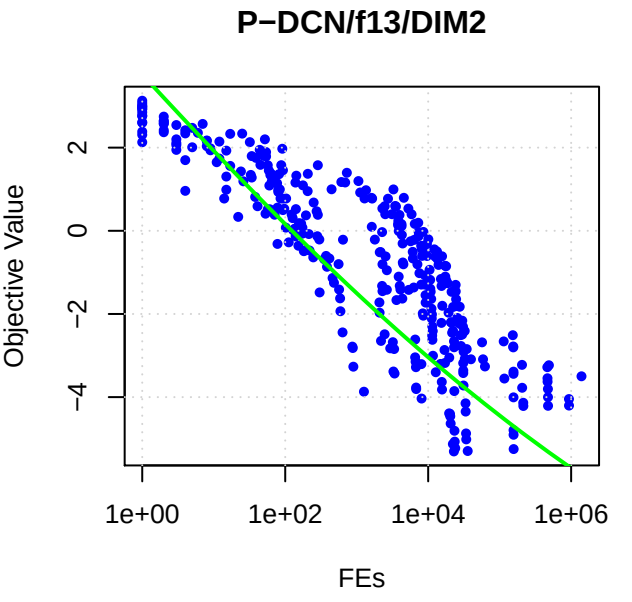
1
0
−1
−3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Objective Value
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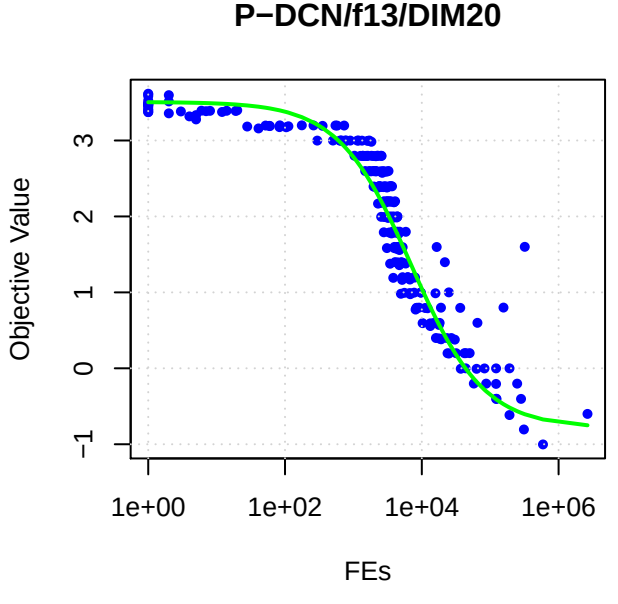
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Objective Value
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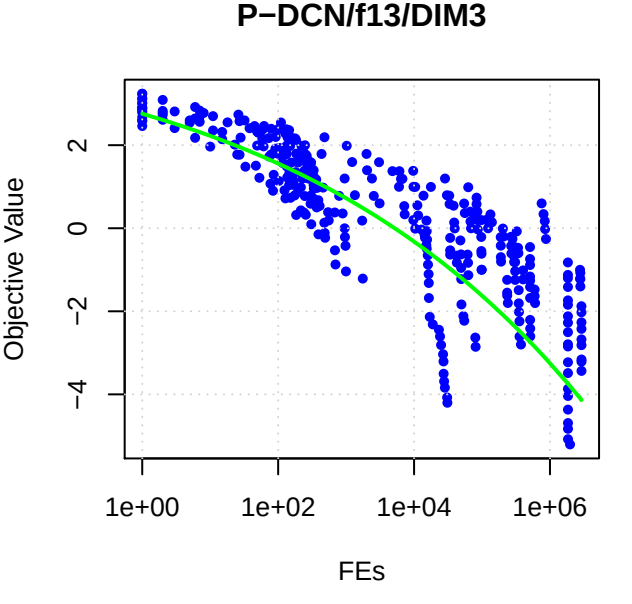
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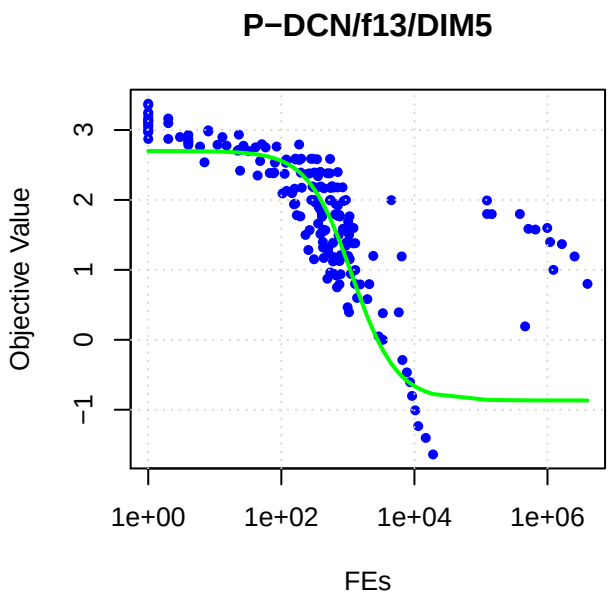
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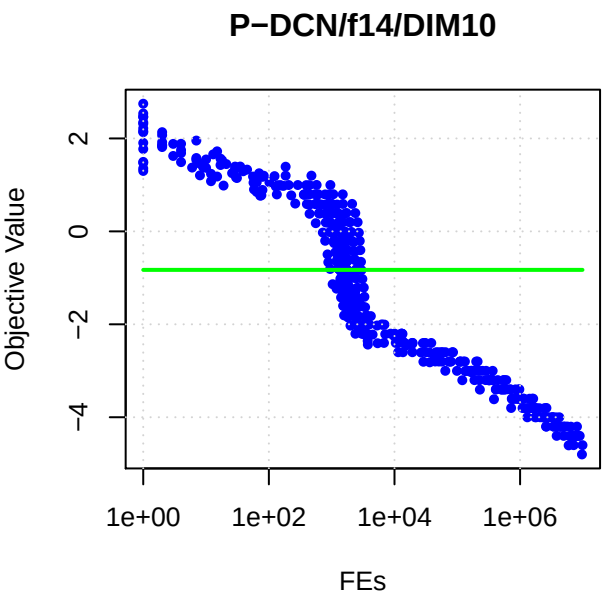
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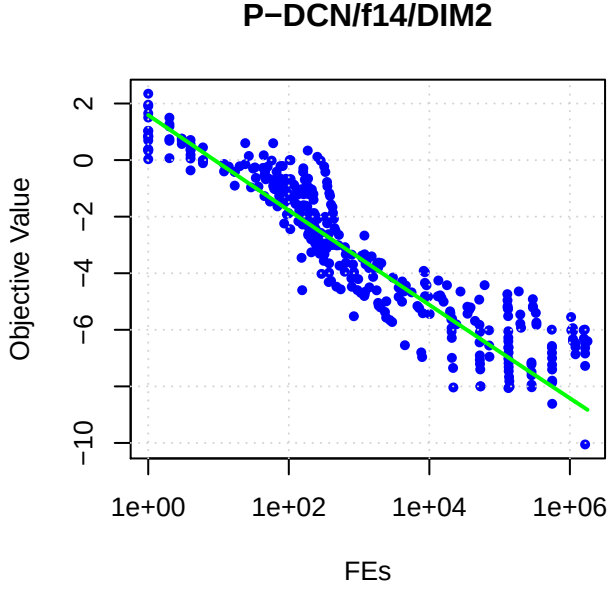
P−DCN/f14/DIM2
Objective Value
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−4
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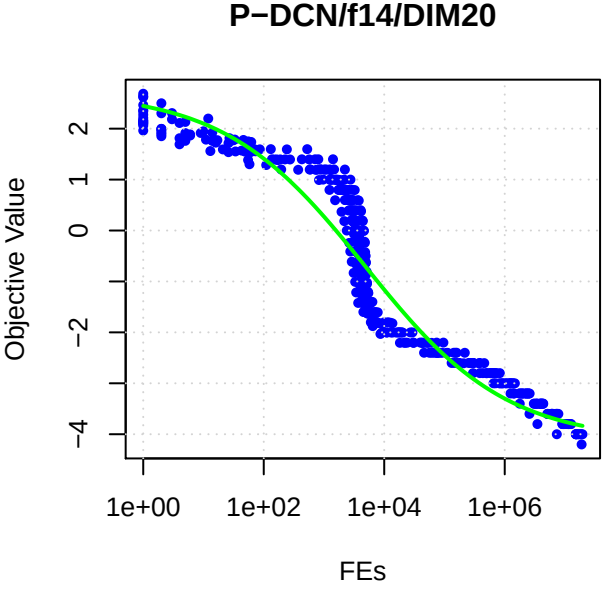
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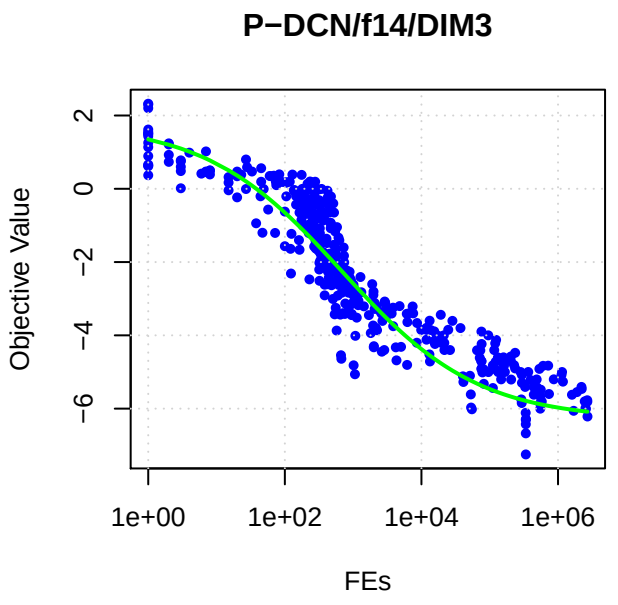
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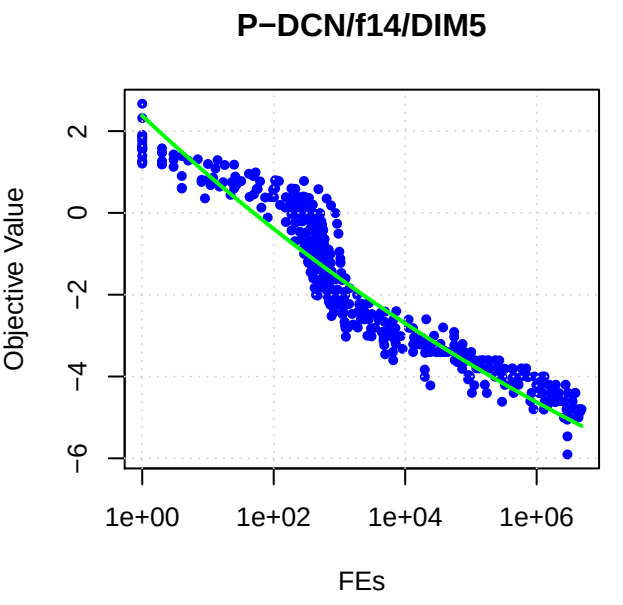
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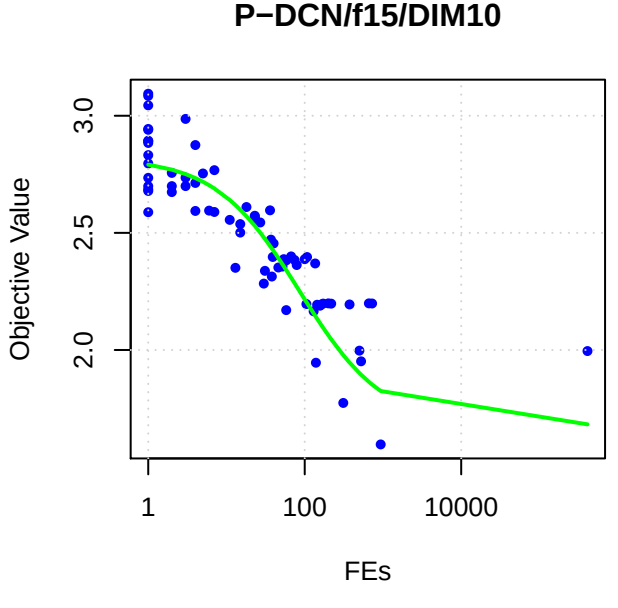
FEs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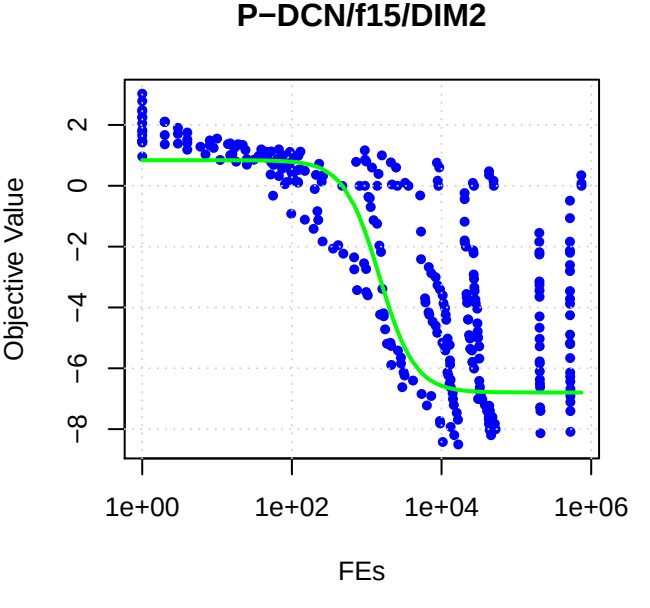
FEs


P−DCN/f15/DIM2
Objective Value
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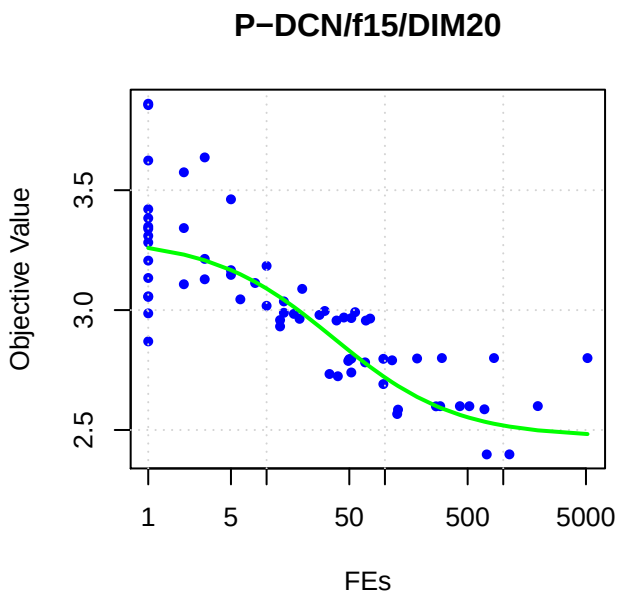
1e+04
1e+06
FEs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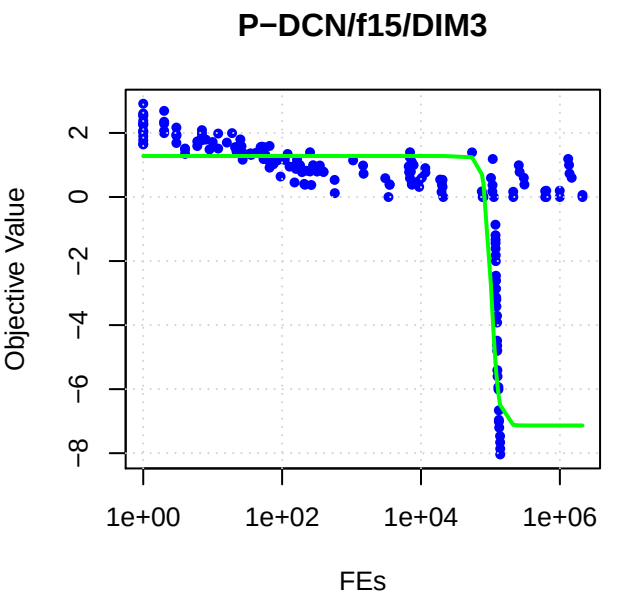
FEs


P−DCN/f15/DIM3
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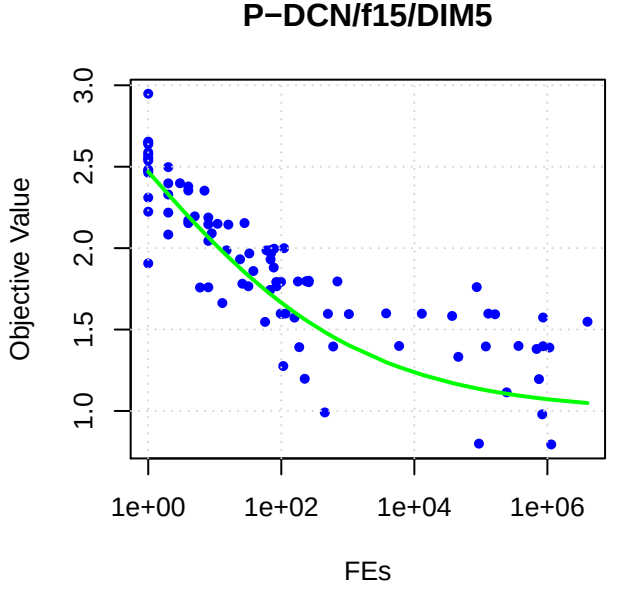
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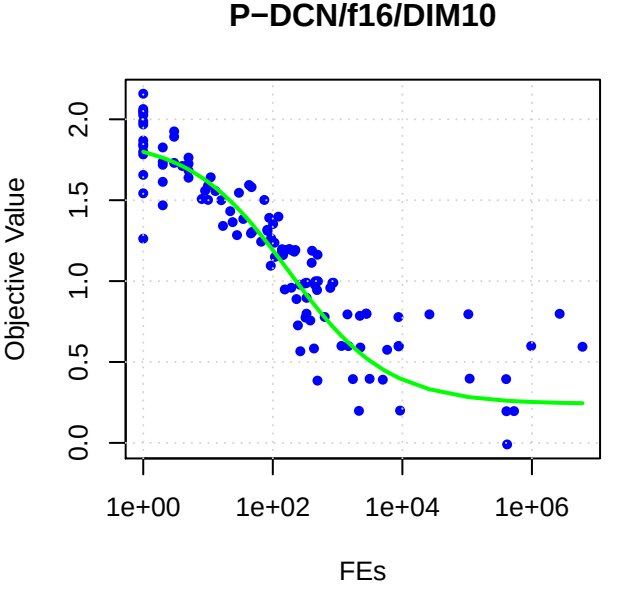
FEs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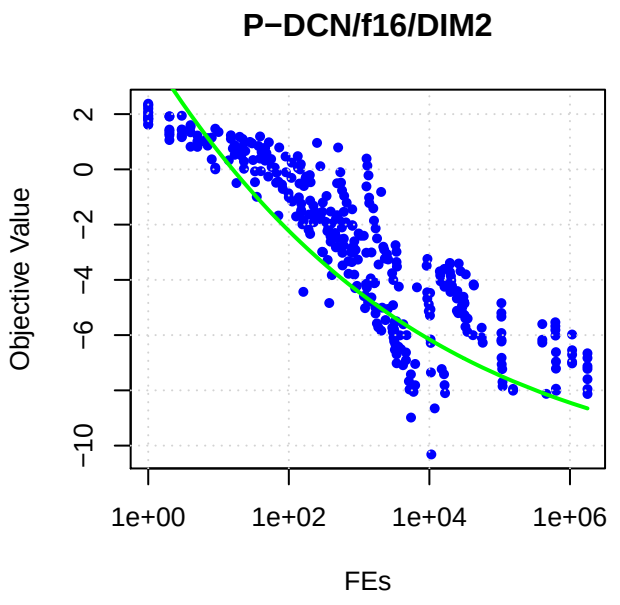
FEs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Objective Value
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1e+04
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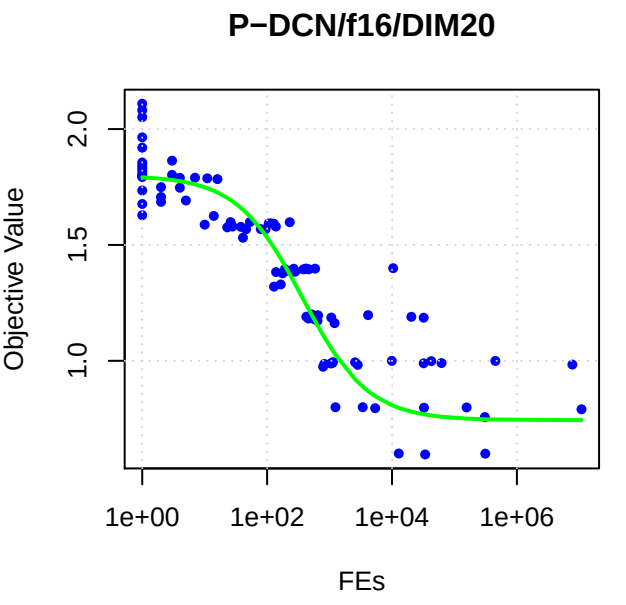
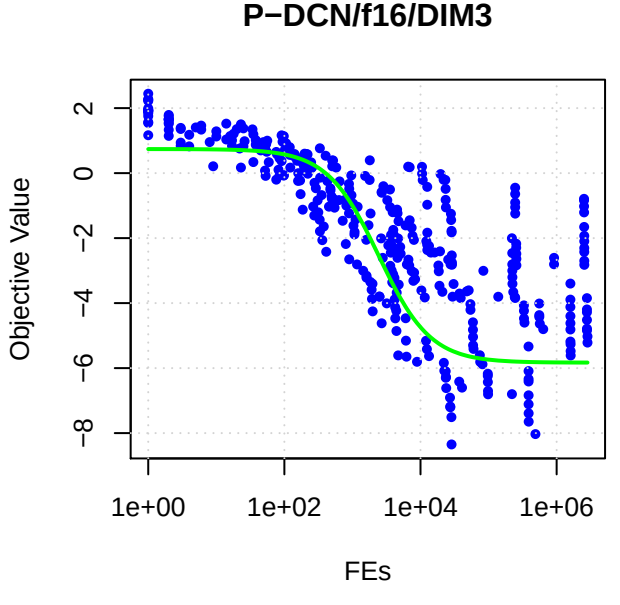
FEs


P−DCN/f16/DIM20
Objective Value
2.0
1.5
1.0
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f16/DIM3
Objective Value
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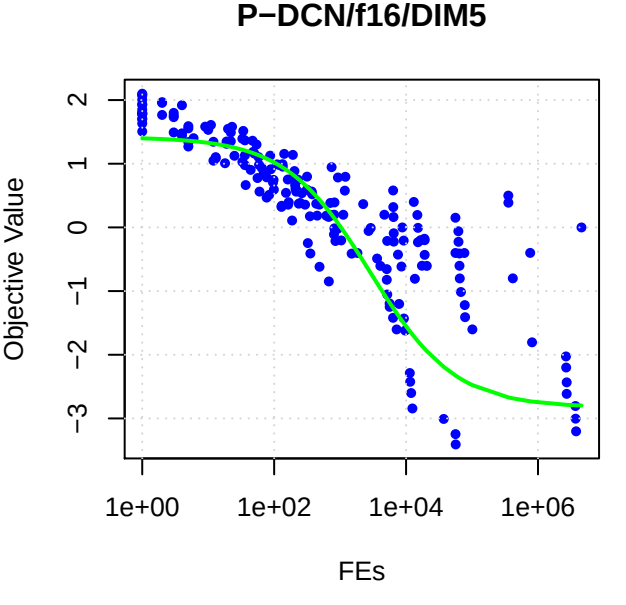
0
−2
−4
−6
−8
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f16/DIM5
Objective Value
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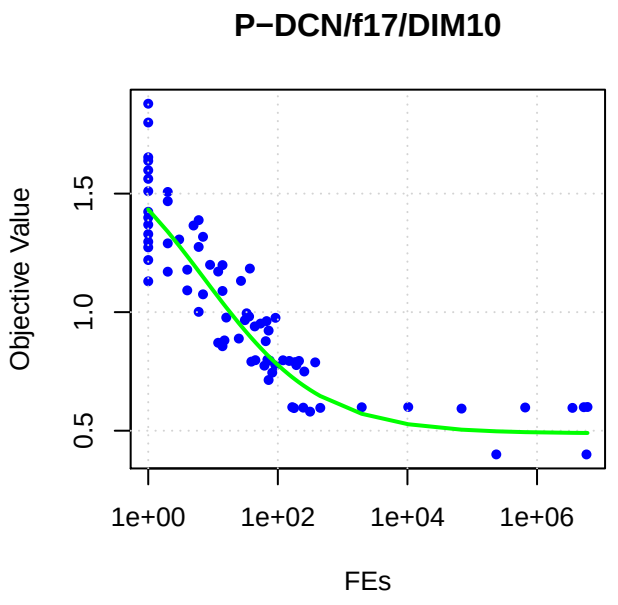
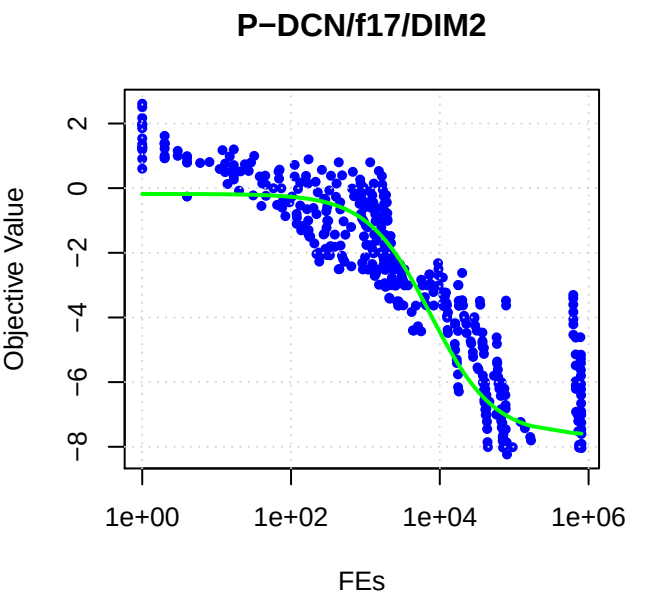
1
0
−1
−2
−3
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f17/DIM10
Objective Value
0.5
1.0
1.5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f17/DIM2
Objective Value
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−2
−4
−6
−8
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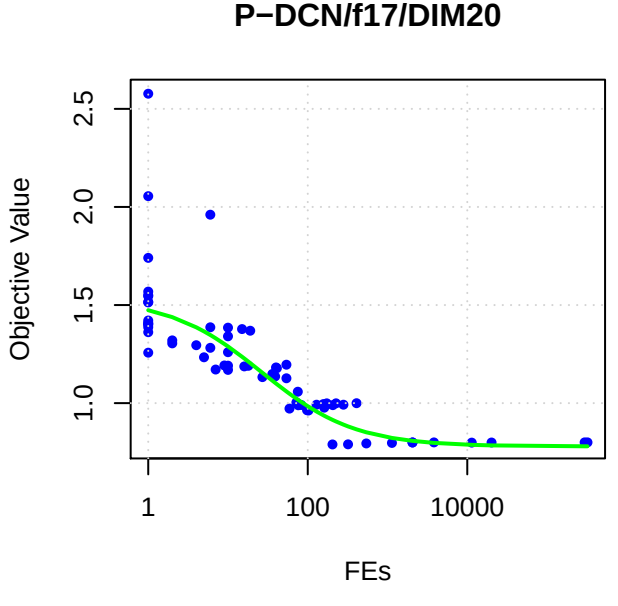
1e+02
1e+04
1e+06
FEs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Objective Value
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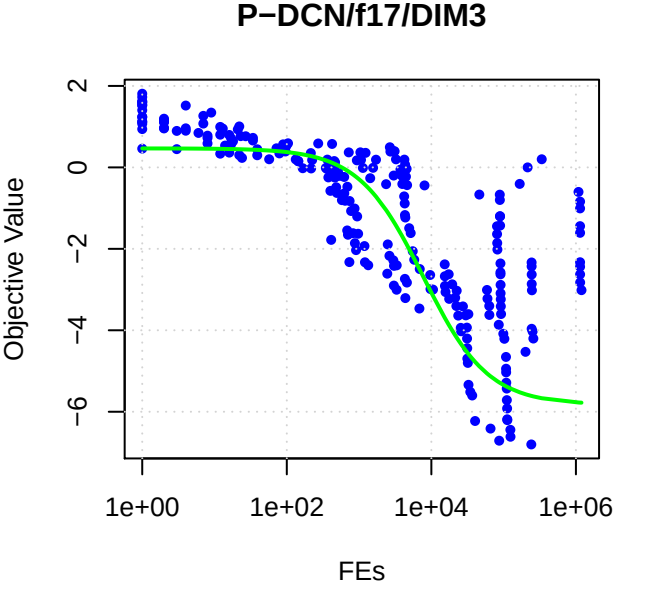
2.0
2.5
1
100
10000
FEs


P−DCN/f17/DIM3
Objective Value
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−2
−4
−6
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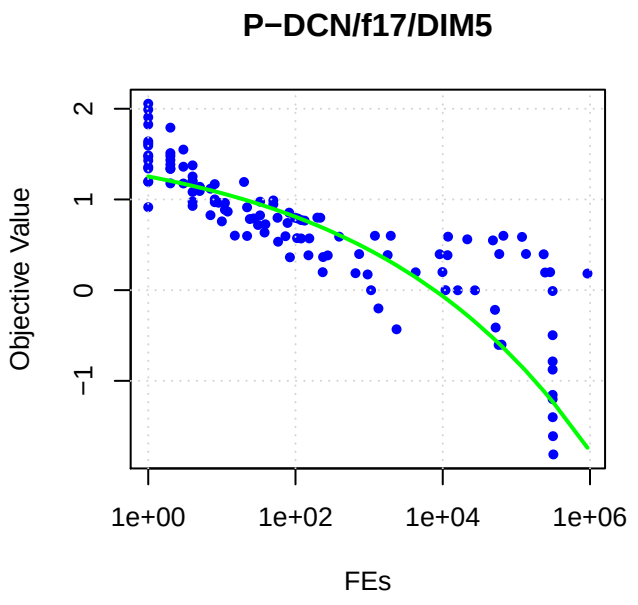
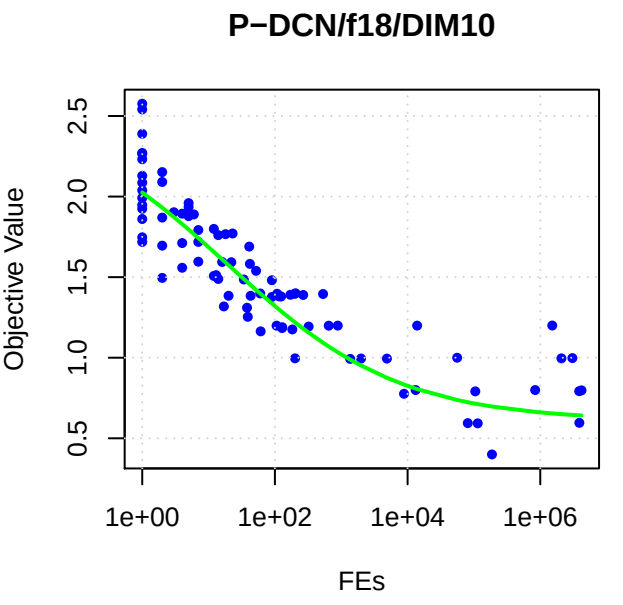
1e+02
1e+04
1e+06
FEs


P−DCN/f17/DIM5
Objective Value
FEs
2
1
0
−1
1e+00
1e+02
1e+04
1e+06


P−DCN/f18/DIM10
Objective Value
FEs
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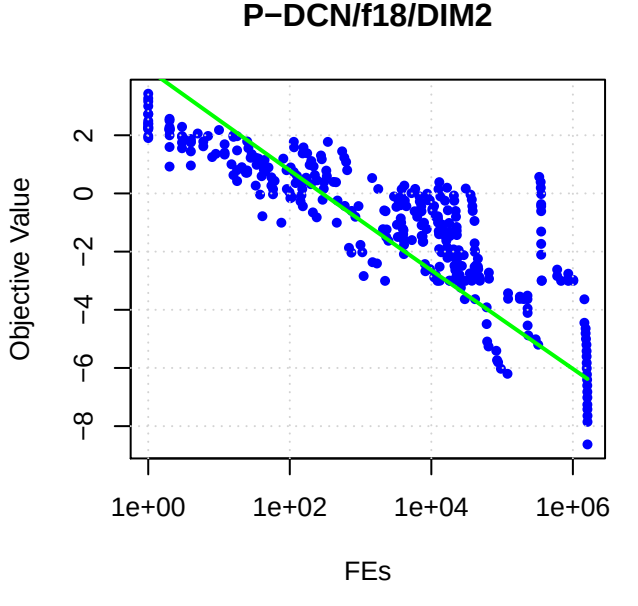
2.0
1.5
1.0
0.5
1e+00
1e+02
1e+04
1e+06


P−DCN/f18/DIM2
Objective Value
FEs
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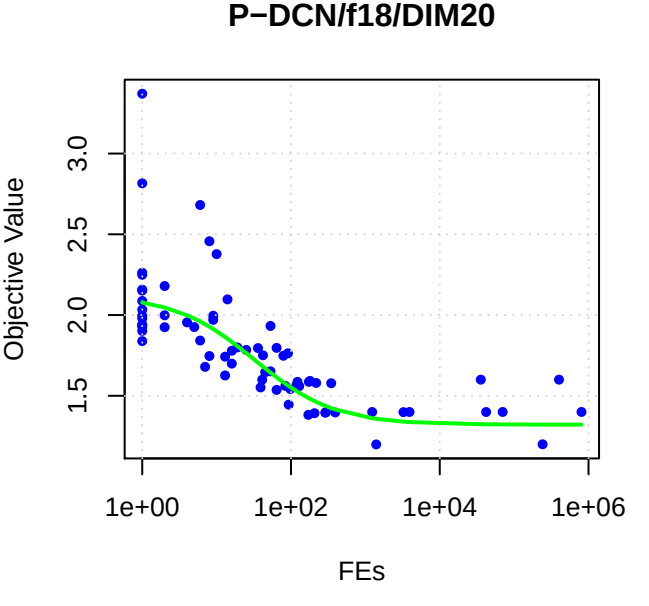
−2
−4
−6
−8
1e+00
1e+02
1e+04
1e+06


P−DCN/f18/DIM20
Objective Value
FEs
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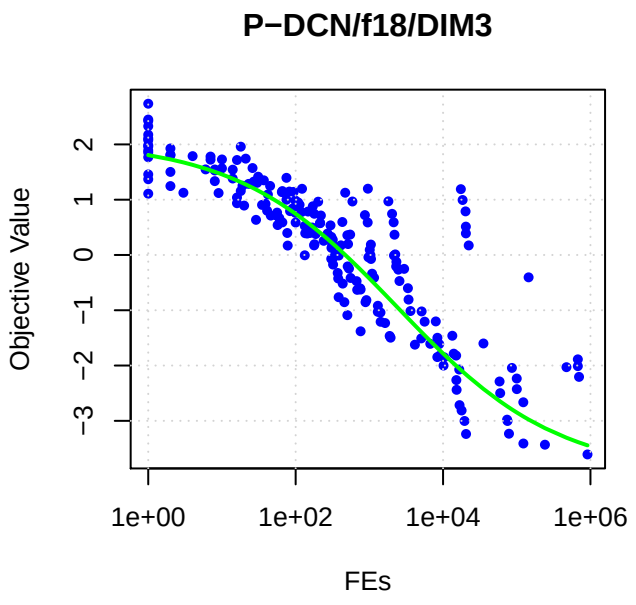
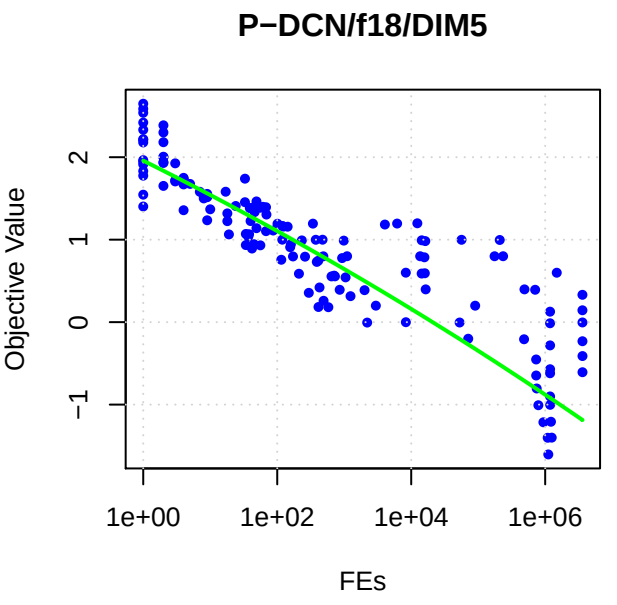
2.5
2.0
1.5
1e+00
1e+02
1e+04
1e+06


P−DCN/f18/DIM3
Objective Value
FEs
1e+00
1e+02
1e+04
1e+06
2
1
0
−1
−2
−3


P−DCN/f18/DIM5
Objective Value
FEs
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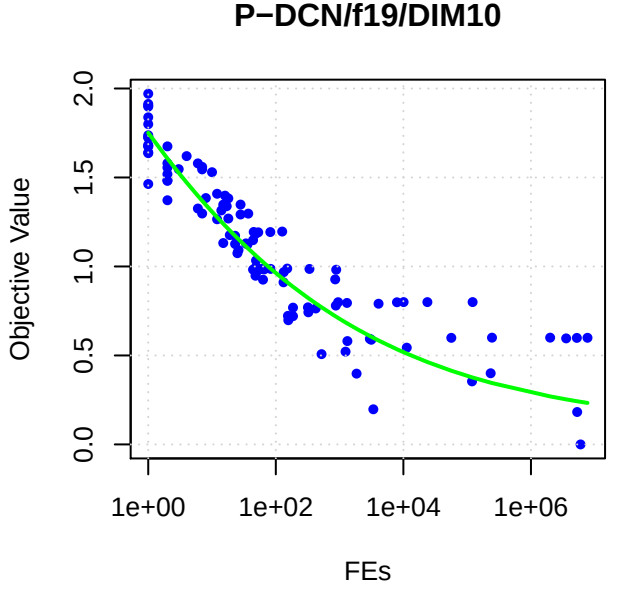
1e+02
1e+04
1e+06
2
1
0
−1


P−DCN/f19/DIM10
Objective Value
FEs
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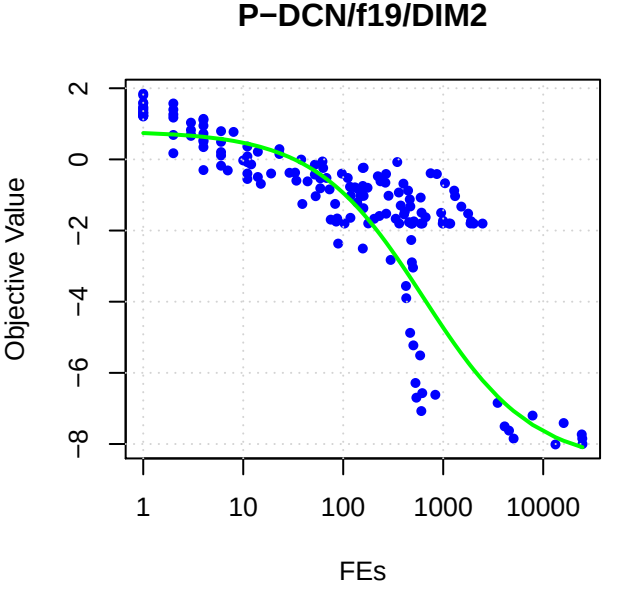
1e+02
1e+04
1e+06
2.0
1.5
1.0
0.5
0.0


P−DCN/f19/DIM2
Objective Value
FEs
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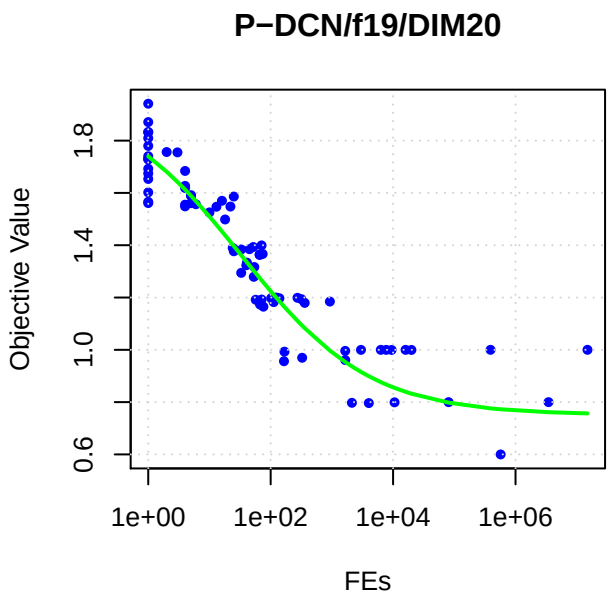
10
100
1000
10000
2
0
−2
−4
−6
−8


P−DCN/f19/DIM20
Objective Value
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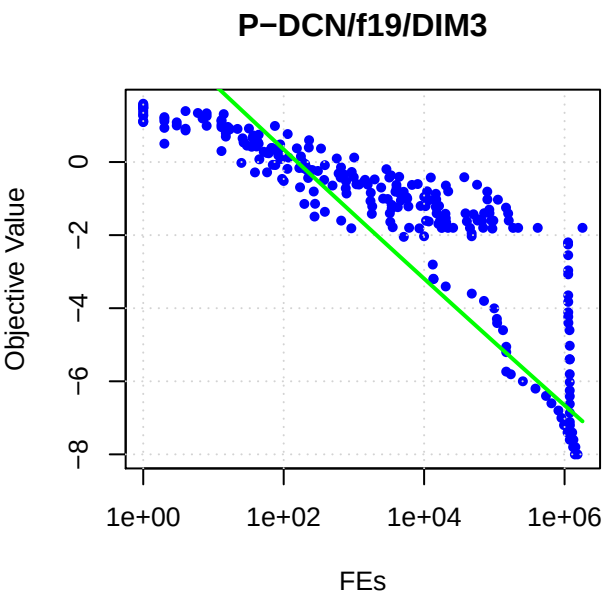
1.4
1.8
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f19/DIM3
Objective Value
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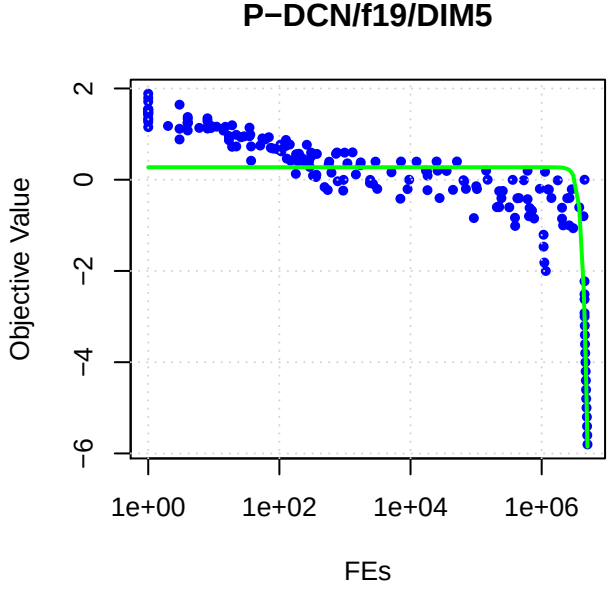
−6
−4
−2
0
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f19/DIM5
Objective Value
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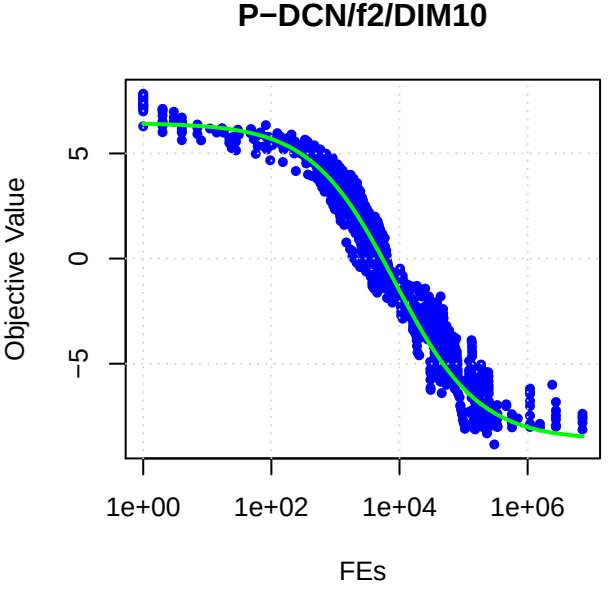
−4
−2
0
2
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f2/DIM10
Objective Value
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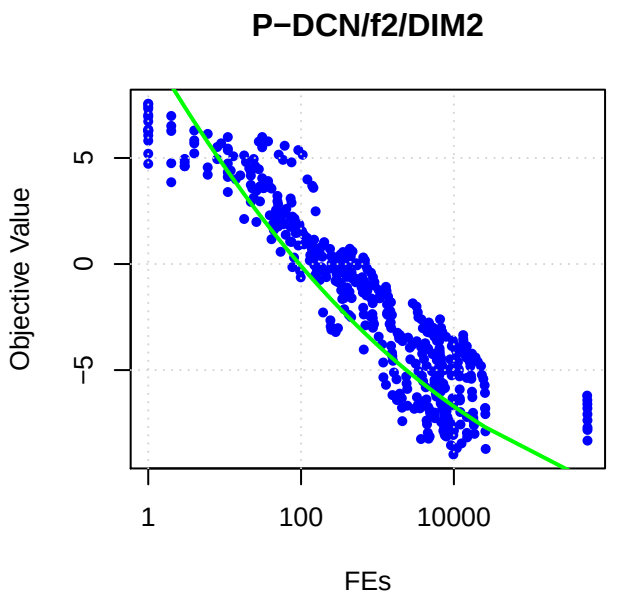
0
5
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f2/DIM2
Objective Value
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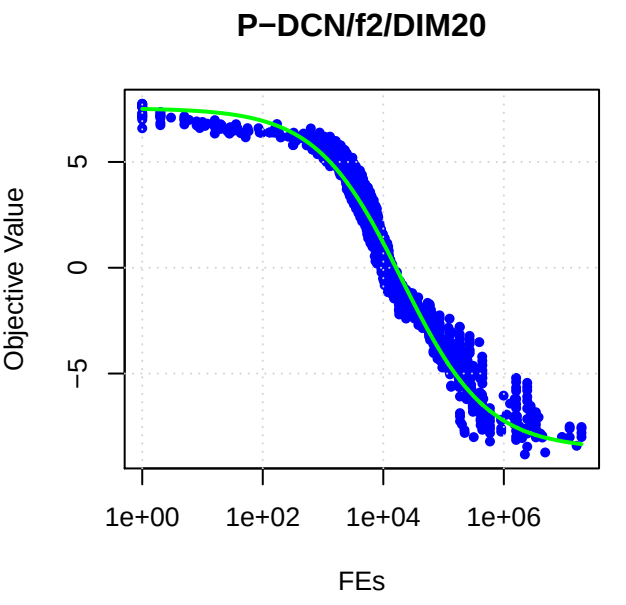
−5
1
100
10000
FEs


P−DCN/f2/DIM20
Objective Value
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−5
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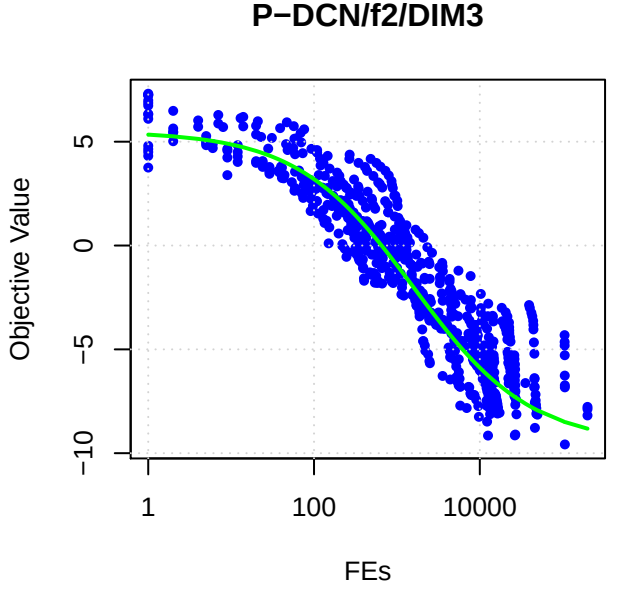
1e+02
1e+04
1e+06
FEs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Objective Value
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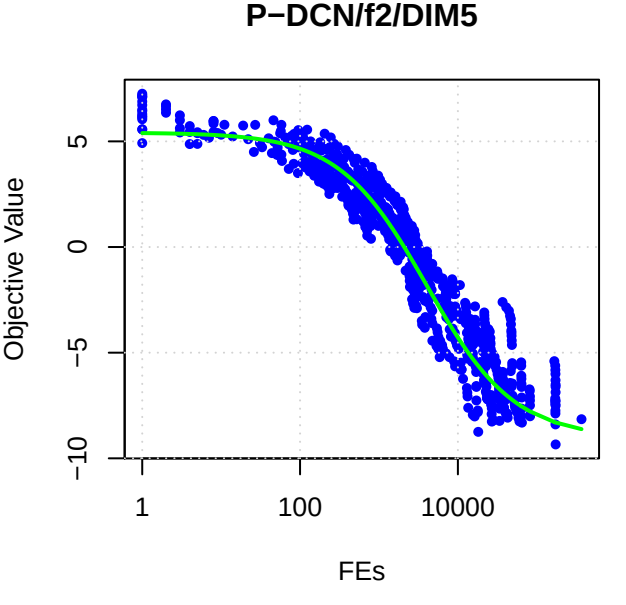
−5
−10
1
100
10000
FEs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Objective Value
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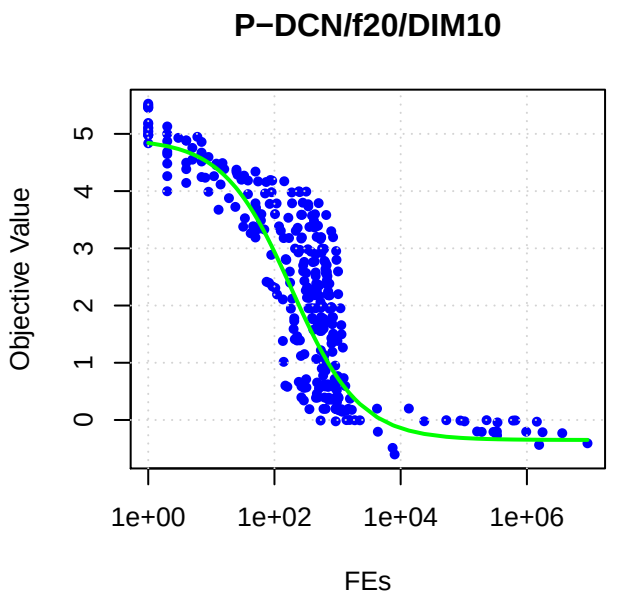
0
−5
−10
1
100
10000
FEs


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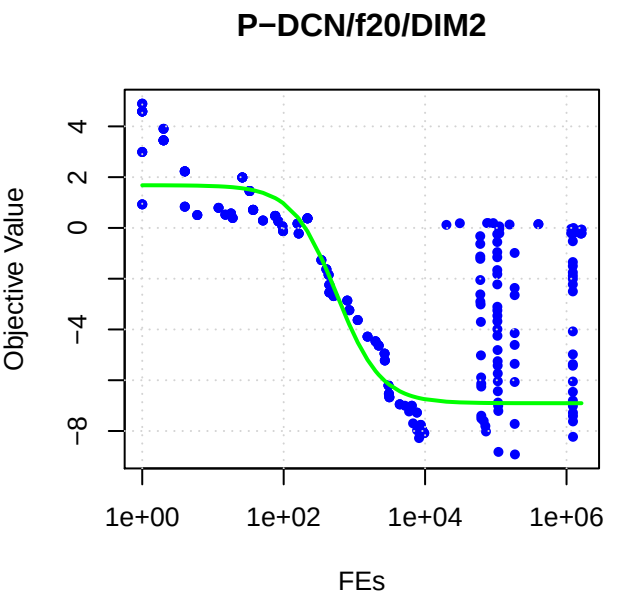
2
3
4
5
1e+00
1e+02
1e+04
1e+06
FEs


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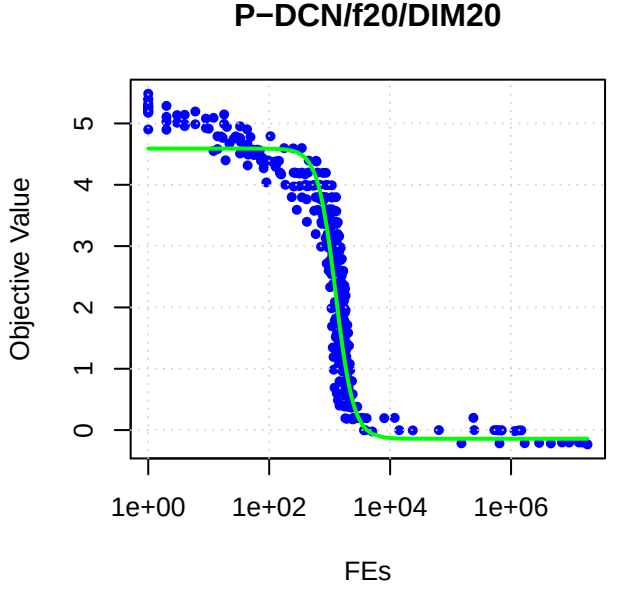
2
4
1e+00
1e+02
1e+04
1e+06
FEs


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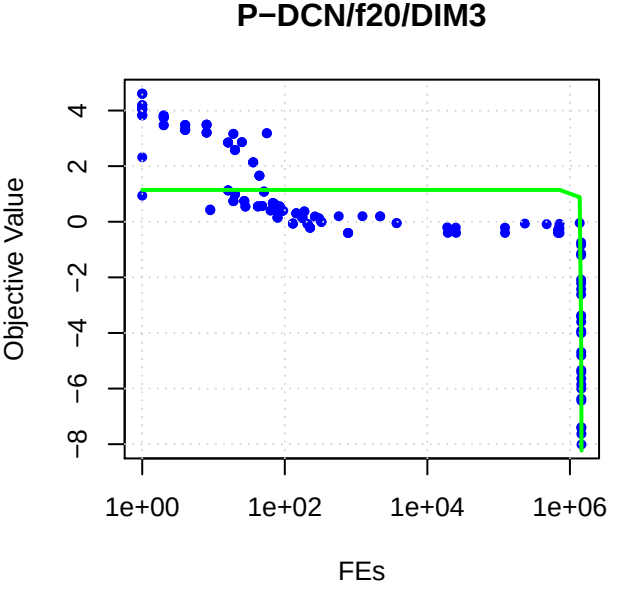
1e+02
1e+04
1e+06
FEs


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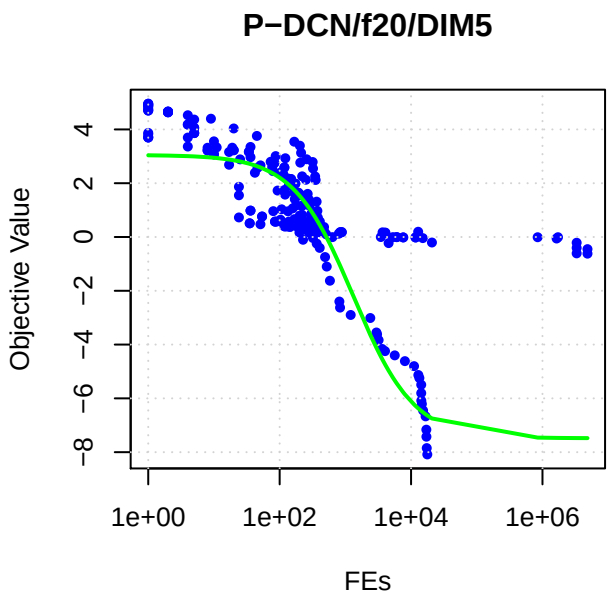
1e+02
1e+04
1e+06
FEs


P−DCN/f20/DIM5
Objective Value
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−4
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−8
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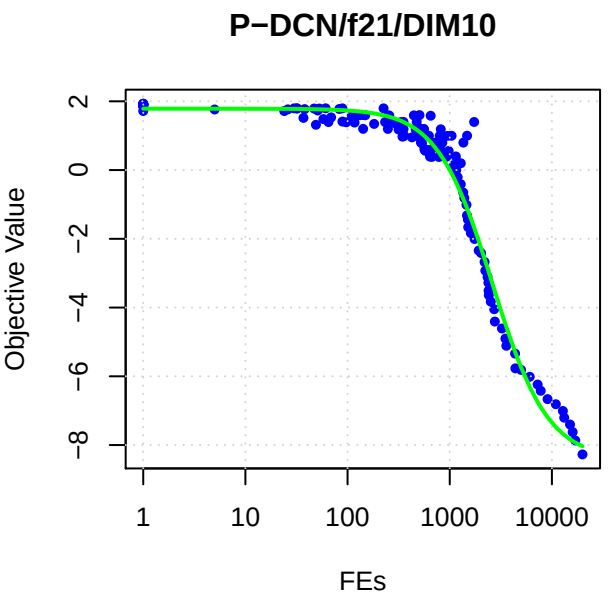
1e+02
1e+04
1e+06
FEs


P−DCN/f21/DIM10
Objective Value
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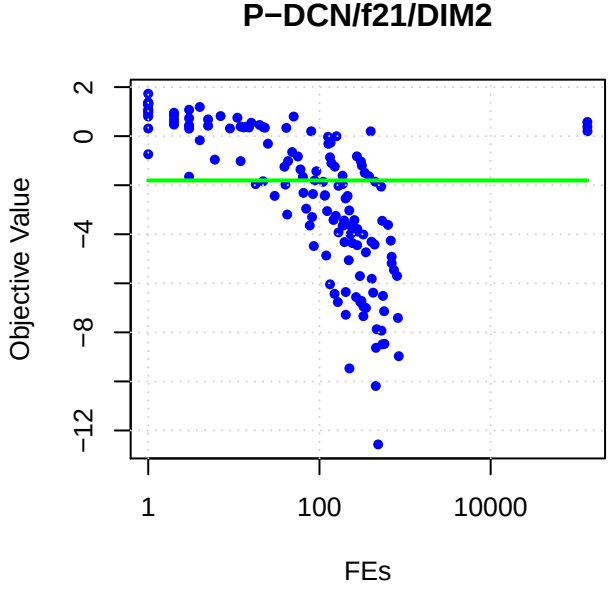
−2
−4
−6
−8
1
10
100
1000
10000
FEs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Objective Value
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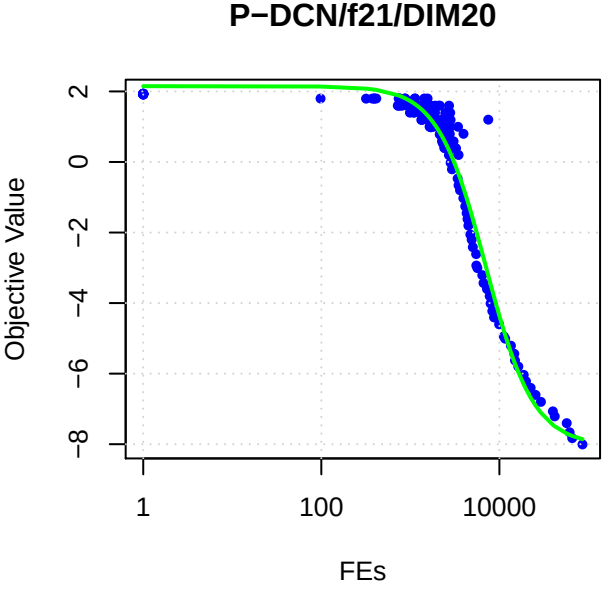
1
100
10000
FEs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Objective Value
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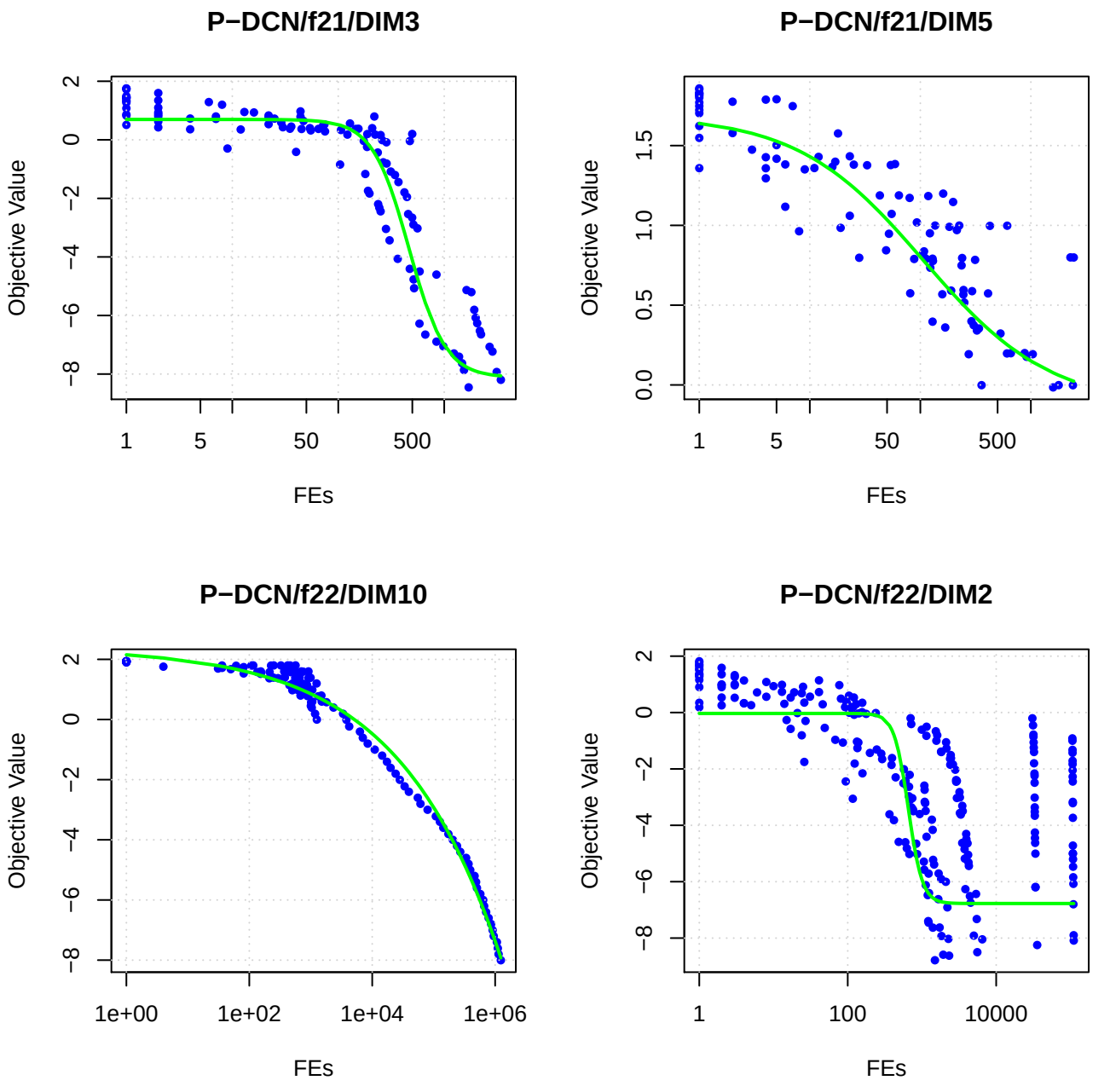
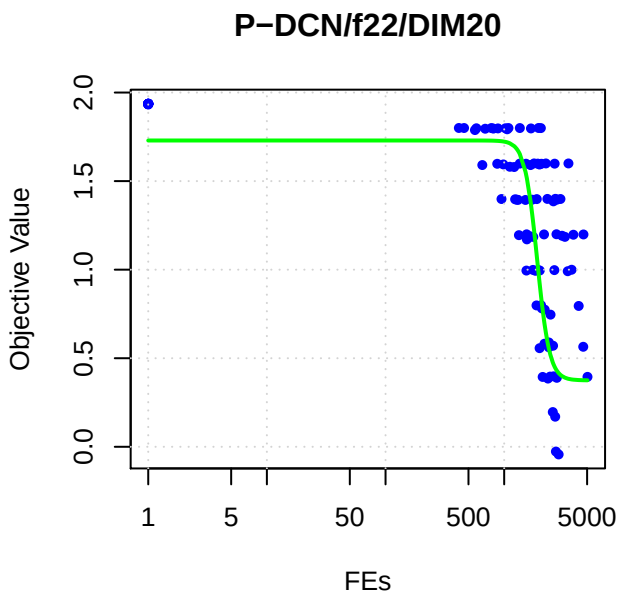
FEs


P−DCN/f21/DIM3
Objective Value
FEs
P−DCN/f21/DIM5
Objective Value
FEs
P−DCN/f22/DIM10
Objective Value
FEs
P−DCN/f22/DIM2
Objective Value
FEs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Objective Value
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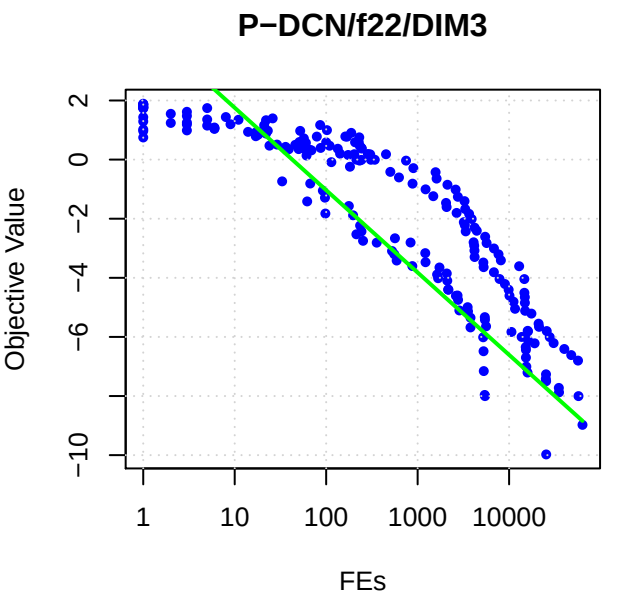
1.5
2.0
1
5
50
500
5000
FEs


P−DCN/f22/DIM3
Objective Value
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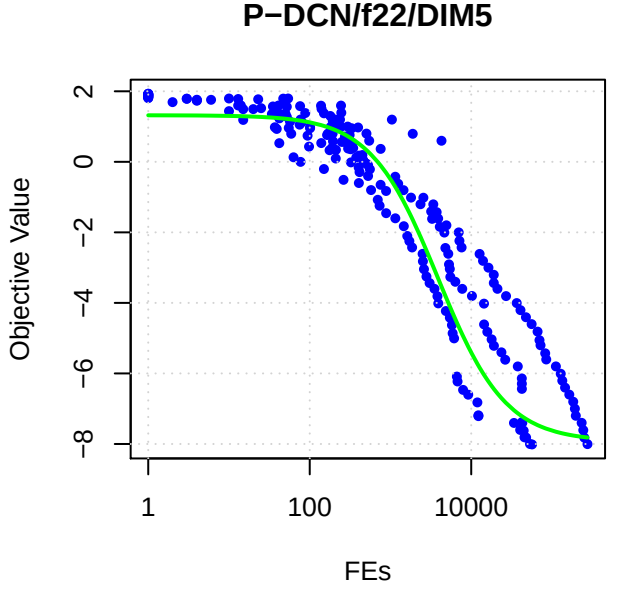
100
1000
10000
FEs


P−DCN/f22/DIM5
Objective Value
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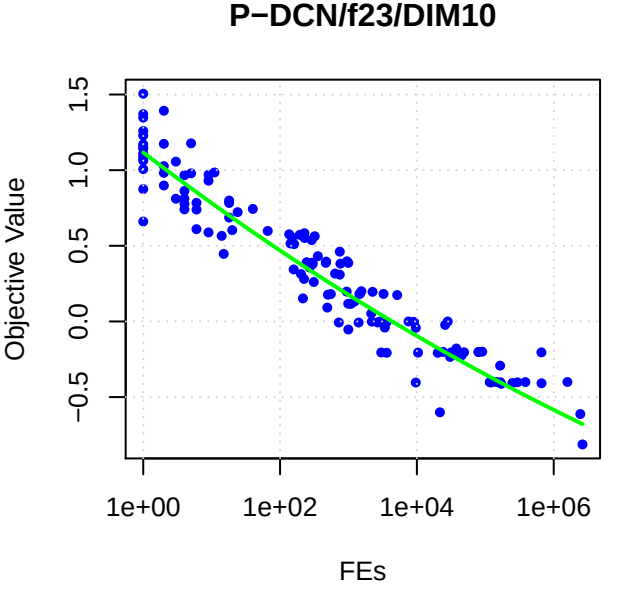
−8
1
100
10000
FEs


P−DCN/f23/DIM10
Objective Value
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0.0
−0.5
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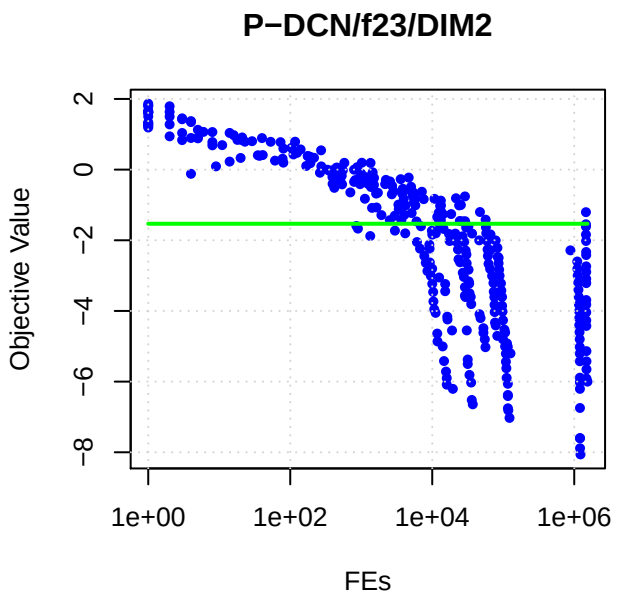
1e+02
1e+04
1e+06
FEs


P−DCN/f23/DIM2
Objective Value
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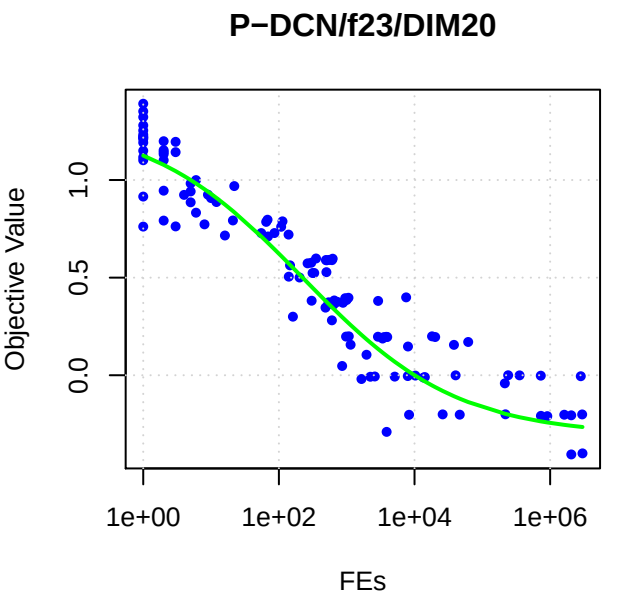
−2
−4
−6
−8
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f23/DIM20
Objective Value
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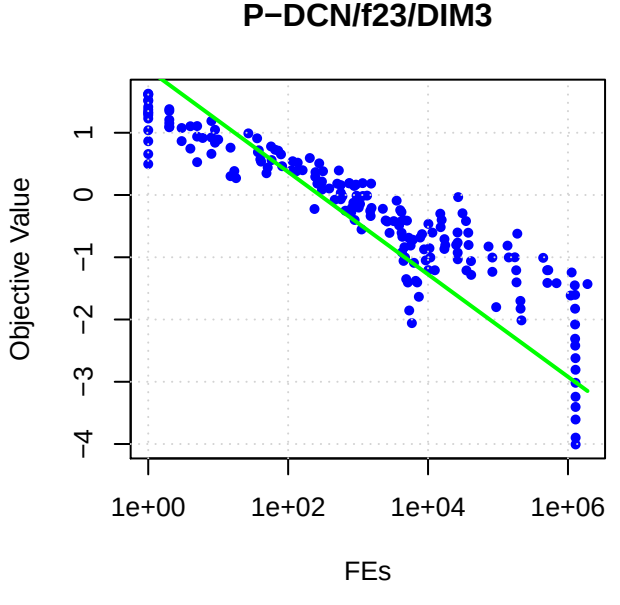
0.0
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f23/DIM3
Objective Value
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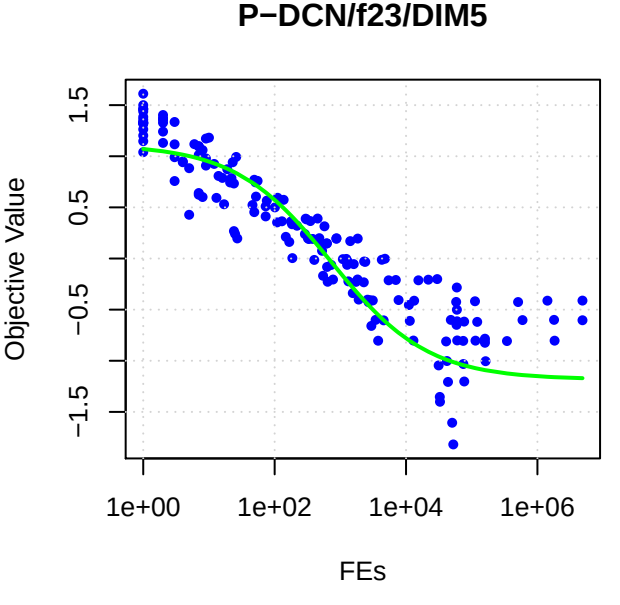
−2
−3
−4
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f23/DIM5
Objective Value
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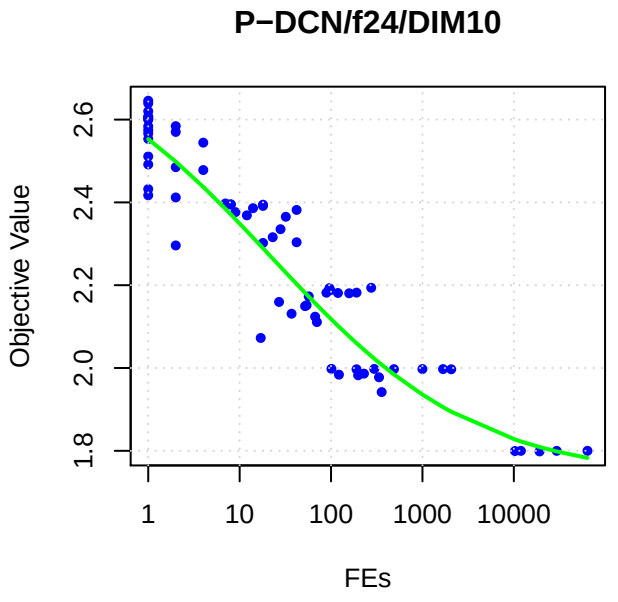
0.5
−0.5
−1.5
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
FEs
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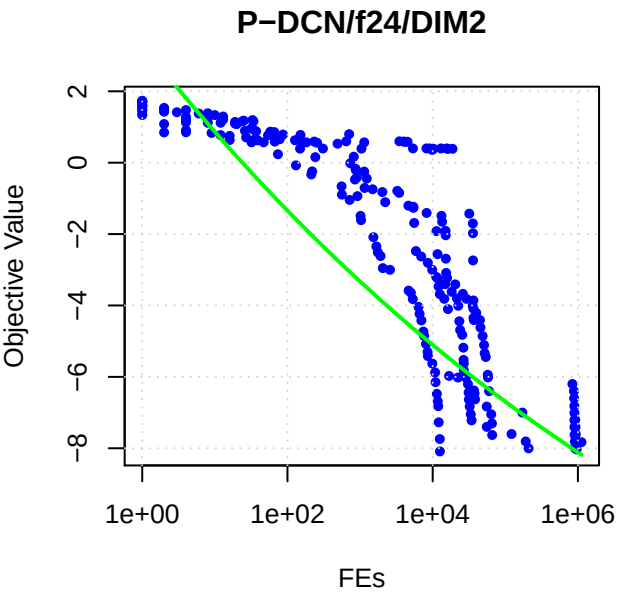
2.0
2.2
2.4
2.6
1
10
100
1000
10000


P−DCN/f24/DIM2
Objective Value
FEs
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−6
−4
−2
0
2
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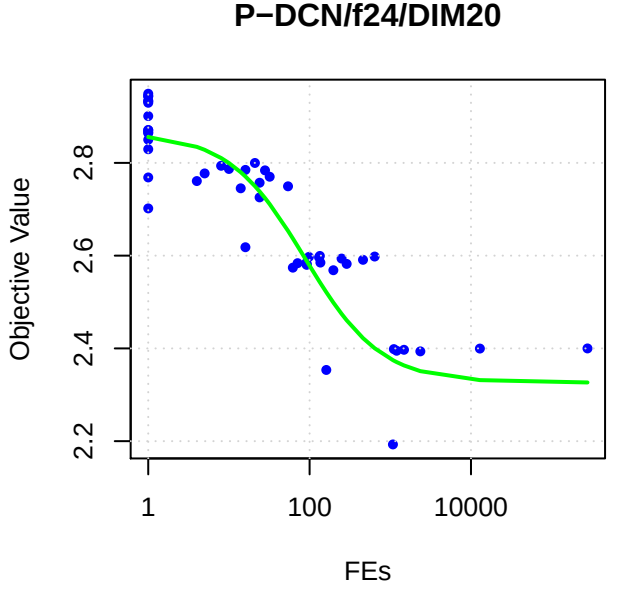
1e+02
1e+04
1e+06


P−DCN/f24/DIM20
Objective Value
FEs
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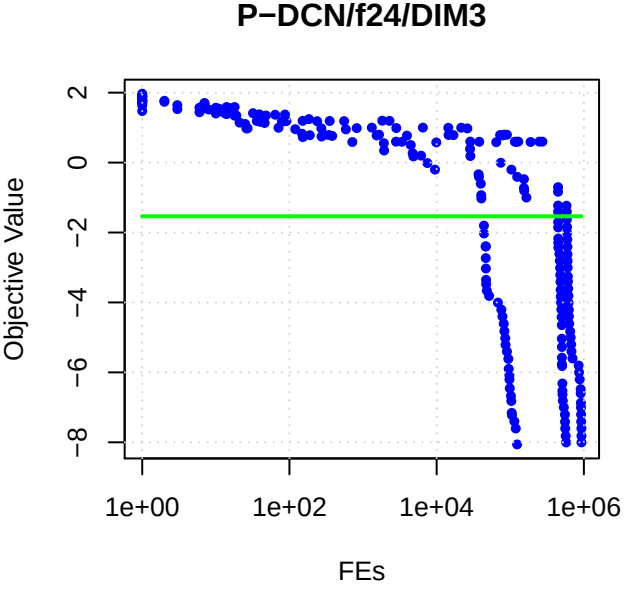
2.4
2.6
2.8
1
100
10000


P−DCN/f24/DIM3
Objective Value
FEs
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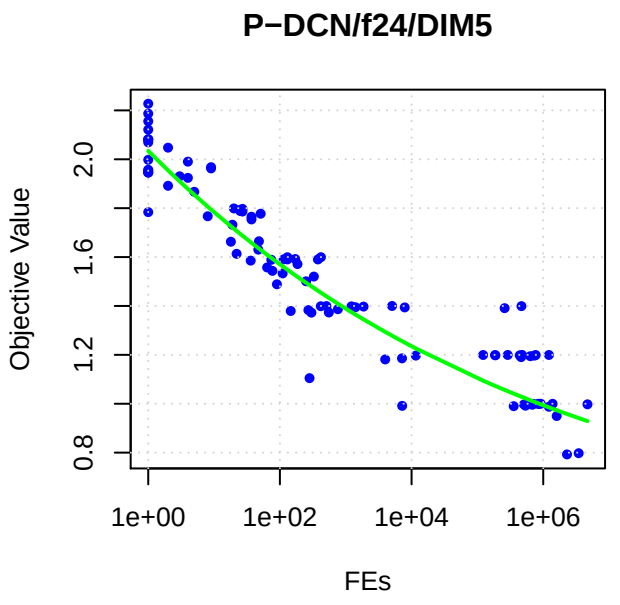
−6
−4
−2
0
2
1e+00
1e+02
1e+04
1e+06


P−DCN/f24/DIM5
Objective Value
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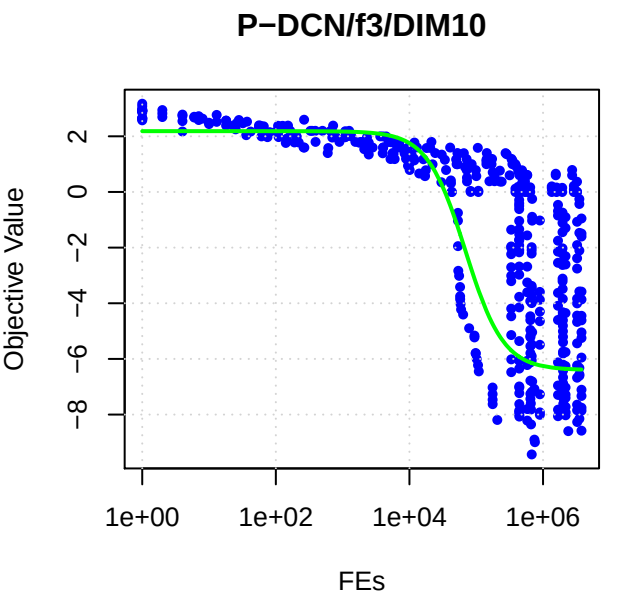
1.2
1.6
2.0
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f3/DIM10
Objective Value
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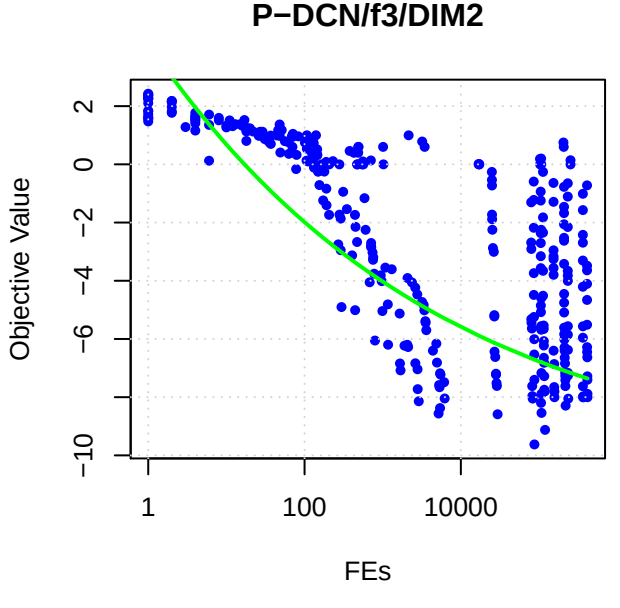
1e+06
FEs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Objective Value
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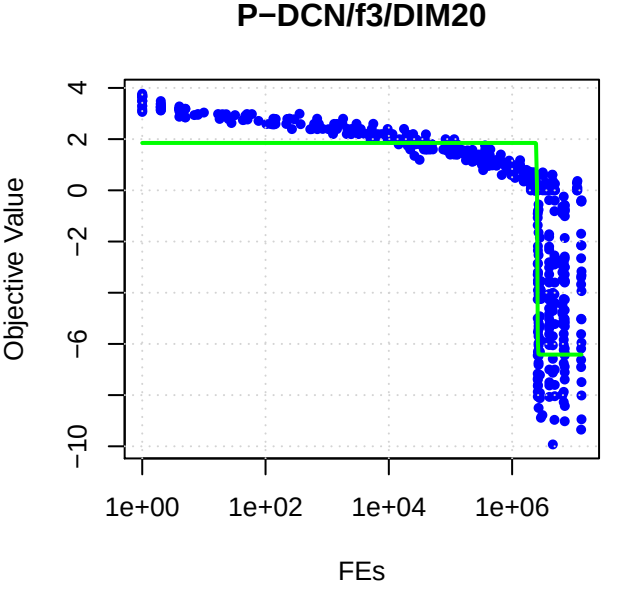
100
10000
FEs


P−DCN/f3/DIM20
Objective Value
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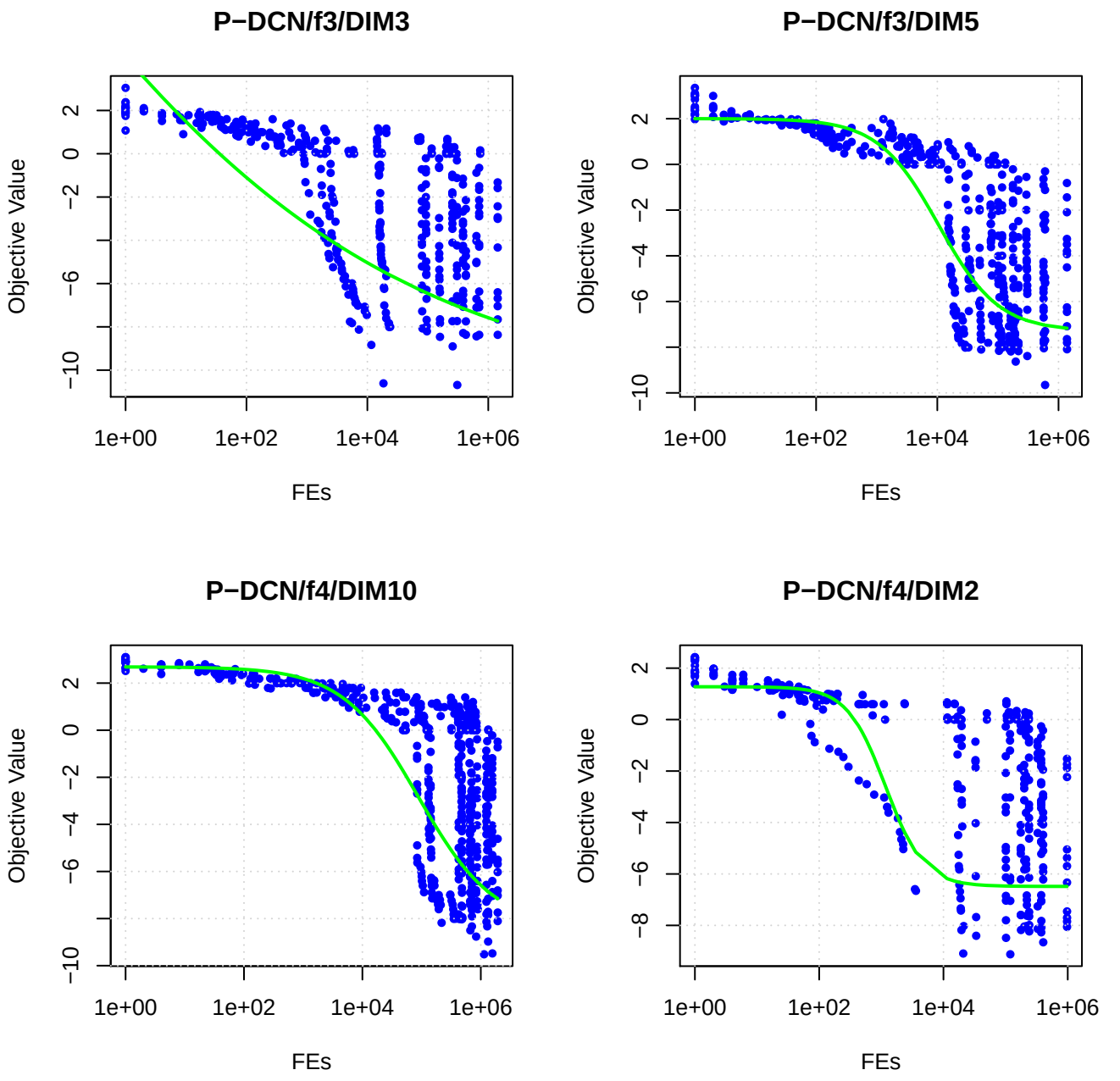
1e+04
1e+06
FEs


P−DCN/f3/DIM3
P−DCN/f3/DIM5
P−DCN/f4/DIM10
P−DCN/f4/DIM2
Objective Value
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1e+02
1e+04
1e+06
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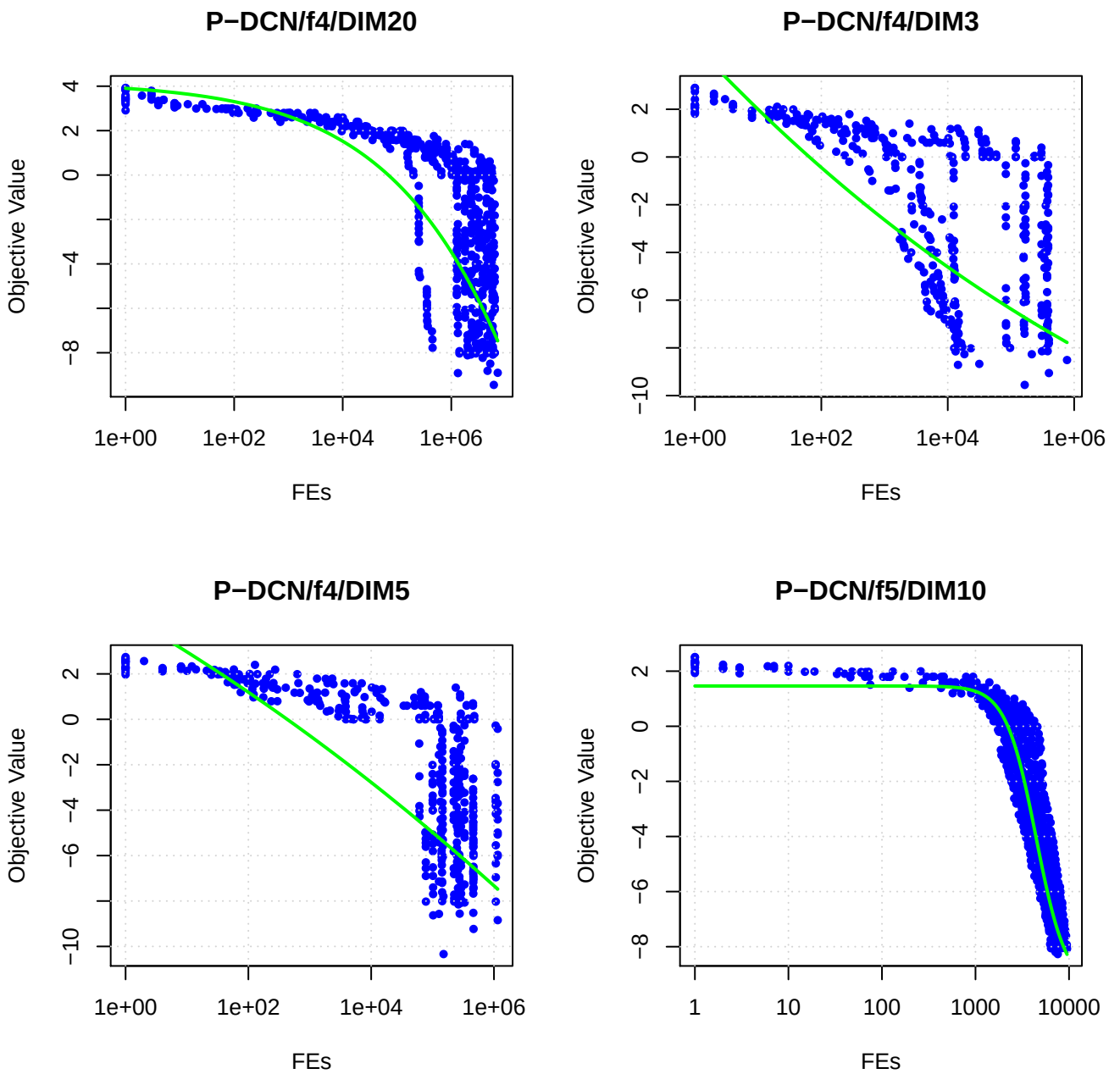
0
−2
−4
−6
−8
−10


P−DCN/f4/DIM20
Objective Value
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2
0
−4
−8
1e+00
1e+02
1e+04
1e+06
FEs
P−DCN/f4/DIM3
Objective Value
2
0
−2
−4
−6
−10
1e+00
1e+02
1e+04
1e+06
FEs
P−DCN/f4/DIM5
Objective Value
2
0
−2
−4
−6
−10
1e+00
1e+02
1e+04
1e+06
FEs
P−DCN/f5/DIM10
Objective Value
2
0
−2
−4
−6
−8
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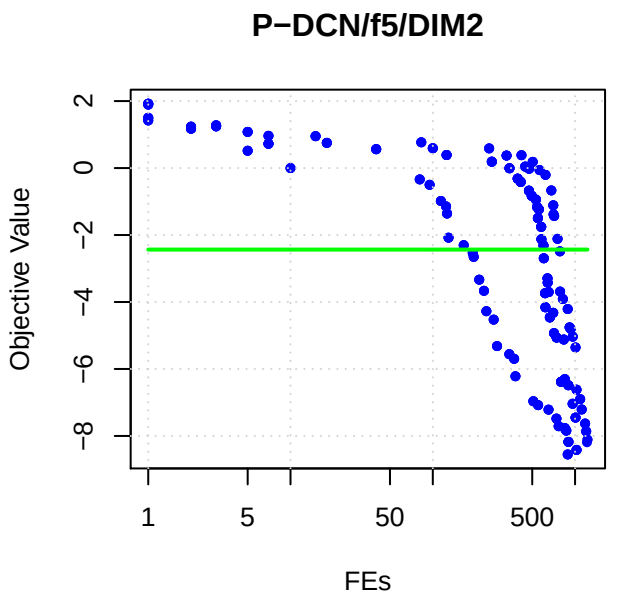
100
1000
10000
FEs


P−DCN/f5/DIM2
Objective Value
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−6
−8
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5
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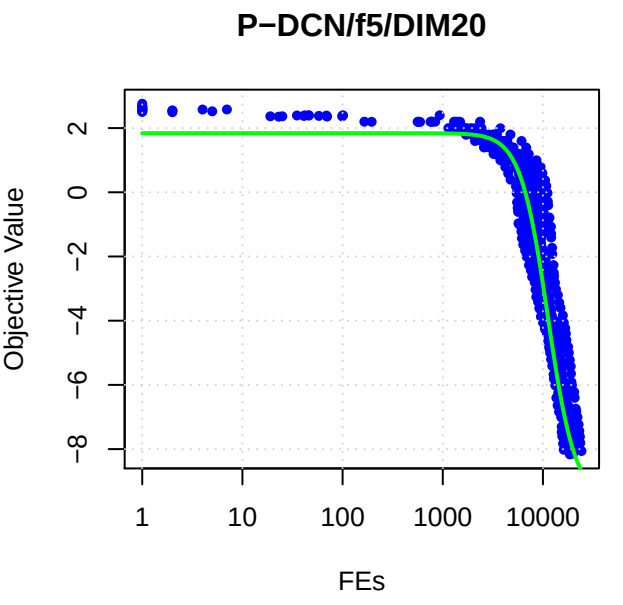
500
FEs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Objective Value
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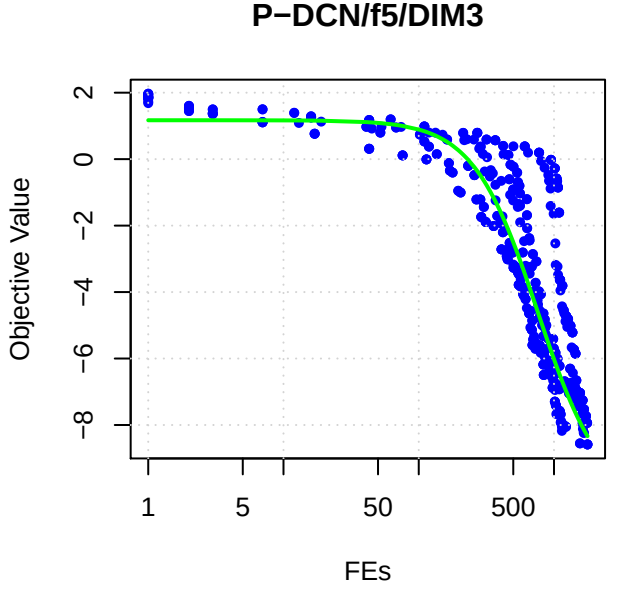
1000
10000
FEs


P−DCN/f5/DIM3
Objective Value
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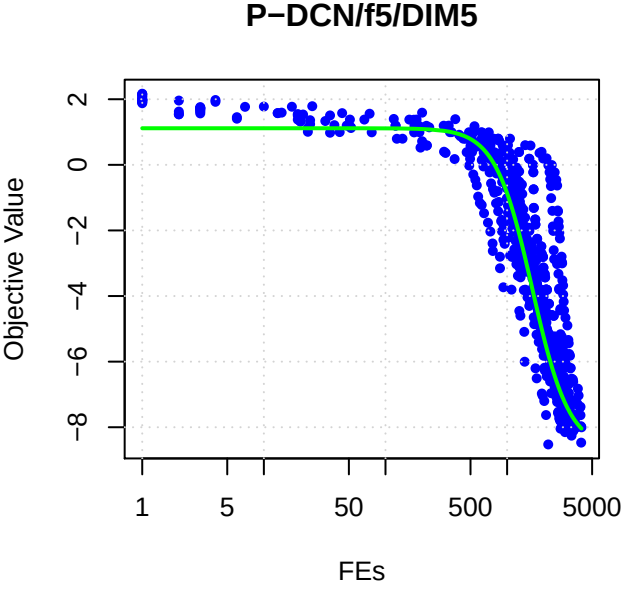
FEs


P−DCN/f5/DIM5
Objective Value
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−6
−8
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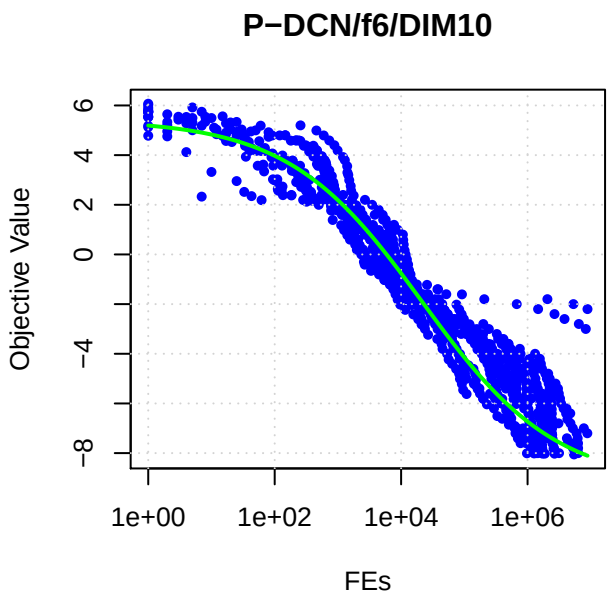
50
500
5000
FEs


P−DCN/f6/DIM10
Objective Value
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−4
−8
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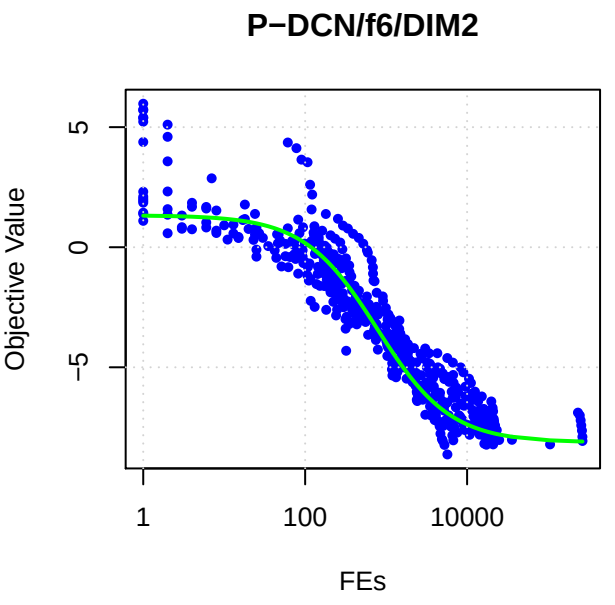
1e+02
1e+04
1e+06
FEs


P−DCN/f6/DIM2
Objective Value
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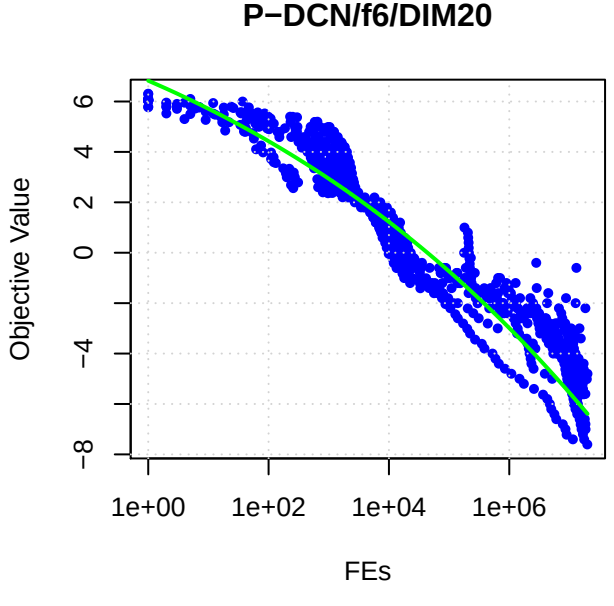
−5
1
100
10000
FEs


P−DCN/f6/DIM20
Objective Value
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2
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−4
−8
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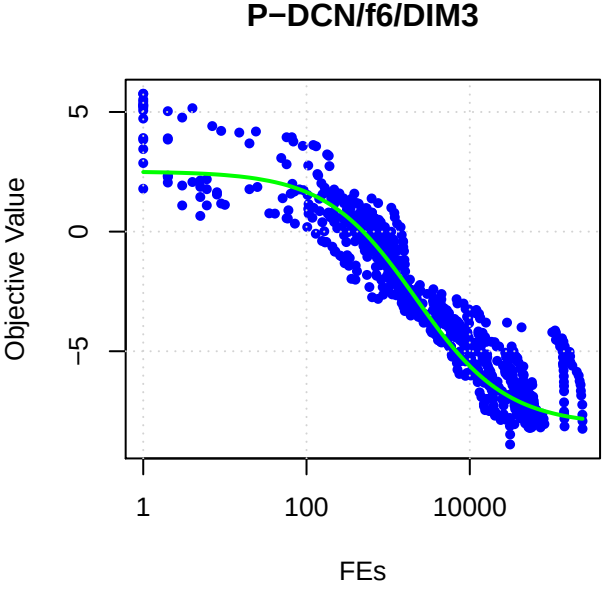
1e+02
1e+04
1e+06
FEs


P−DCN/f6/DIM3
Objective Value
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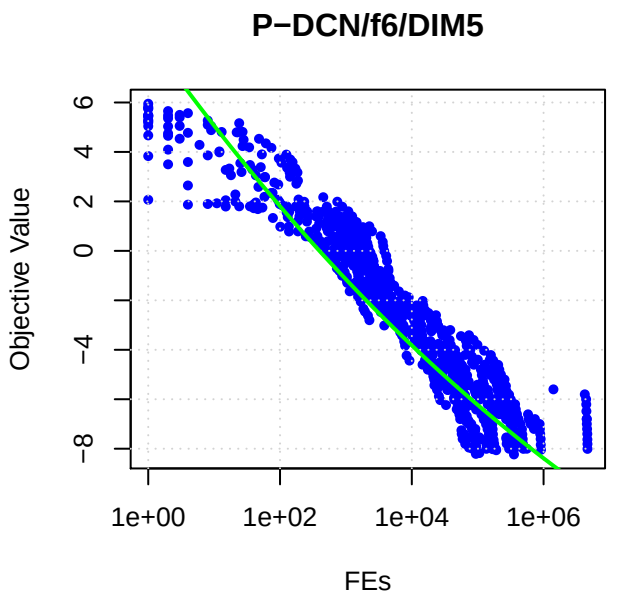
−5
1
100
10000
FEs


P−DCN/f6/DIM5
Objective Value
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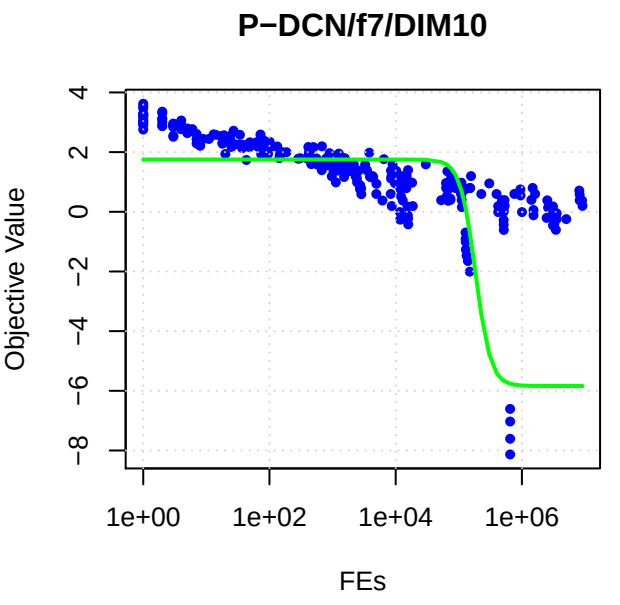
4
2
0
−4
−8
1e+00
1e+02
1e+04
1e+06
FEs


P−DCN/f7/DIM10
Objective Value
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0
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−4
−6
−8
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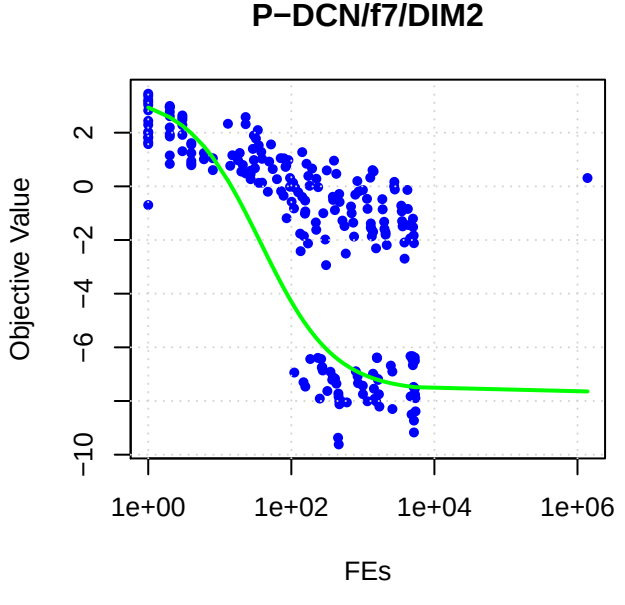
1e+02
1e+04
1e+06
FEs


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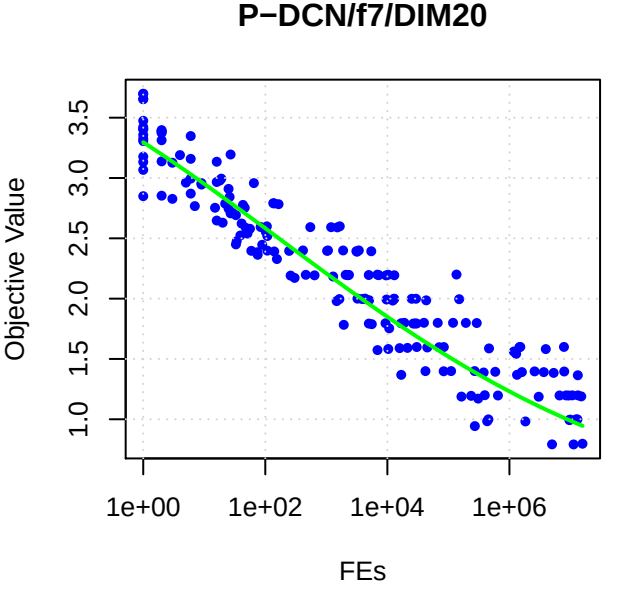
1e+02
1e+04
1e+06
FEs


P−DCN/f7/DIM20
Objective Value
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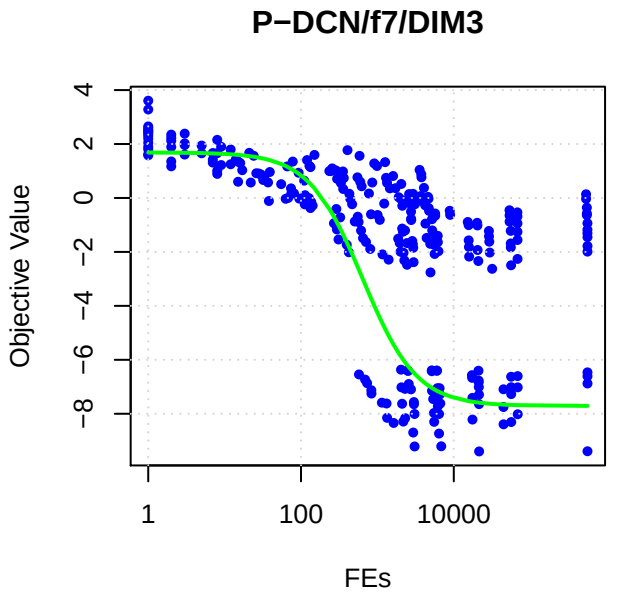
2.5
2.0
1.5
1.0
1e+00
1e+02
1e+04
1e+06
FEs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Objective Value
FEs
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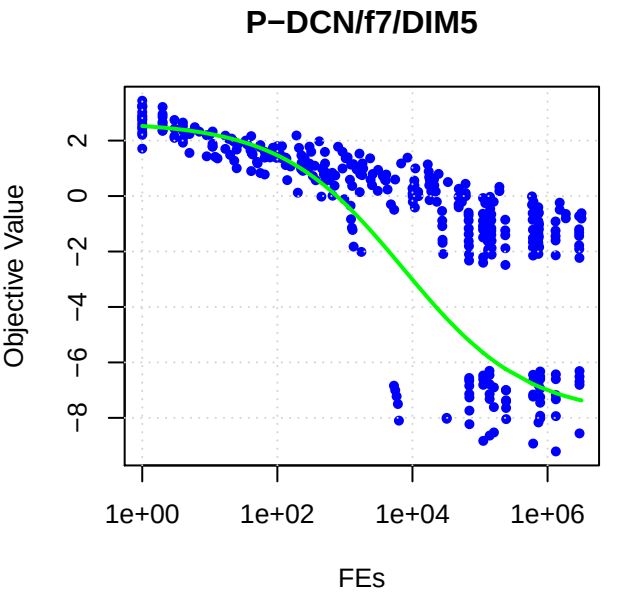
0
−2
−4
−6
−8
1
100
10000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Objective Value
FEs
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−6
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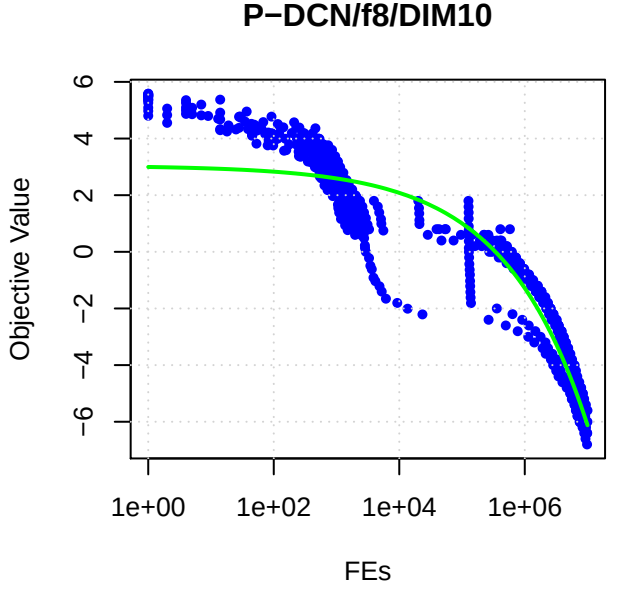
1e+02
1e+04
1e+06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Objective Value
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1e+04
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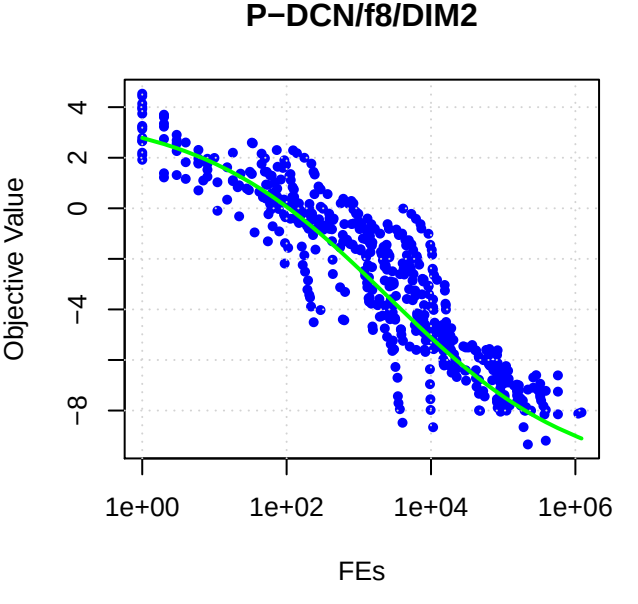
P−DCN/f8/DIM2
Objective Value
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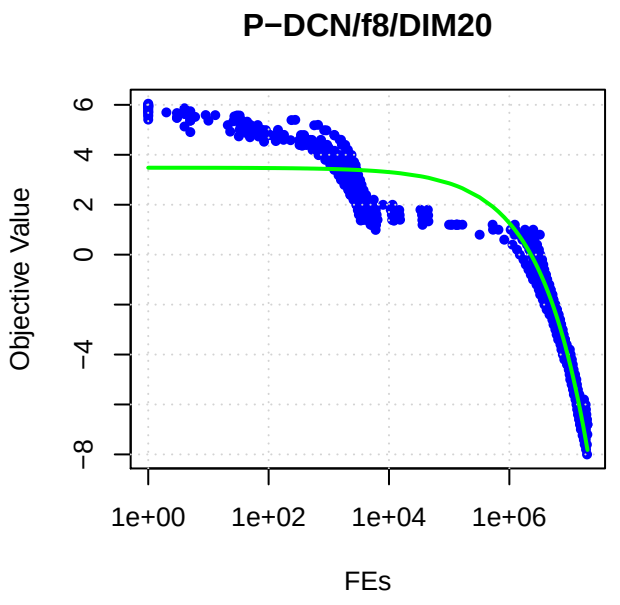
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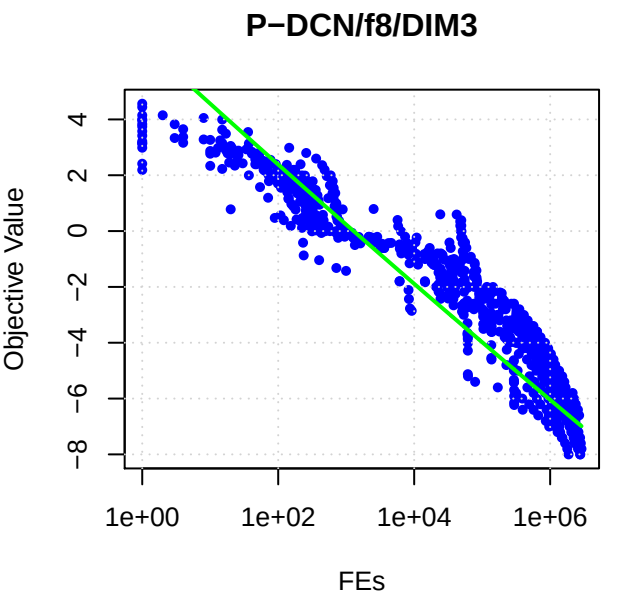
1e+02
1e+04
1e+06
FEs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Objective Value
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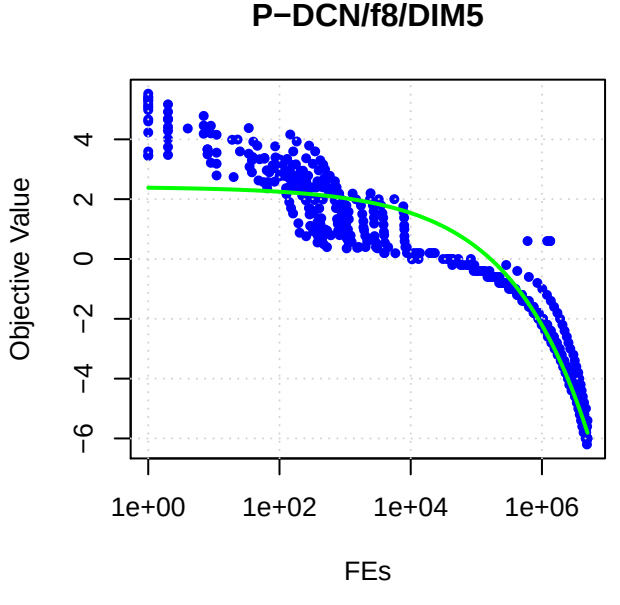
1e+04
1e+06
FEs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Objective Value
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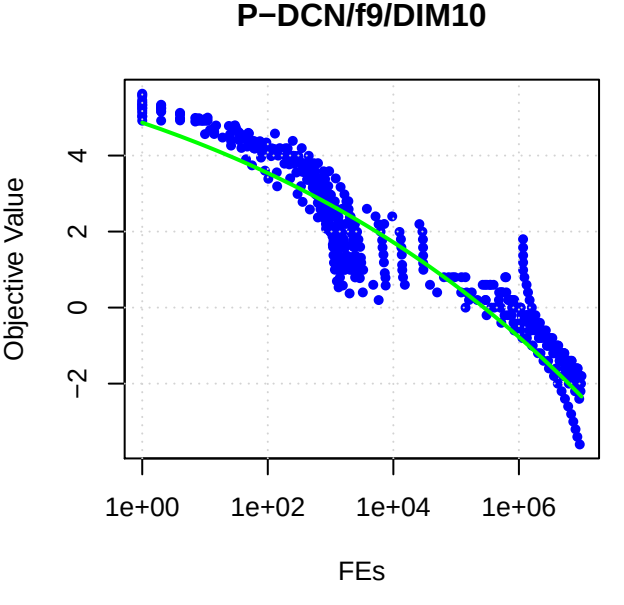
1e+02
1e+04
1e+06
FEs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Objective Value
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1e+04
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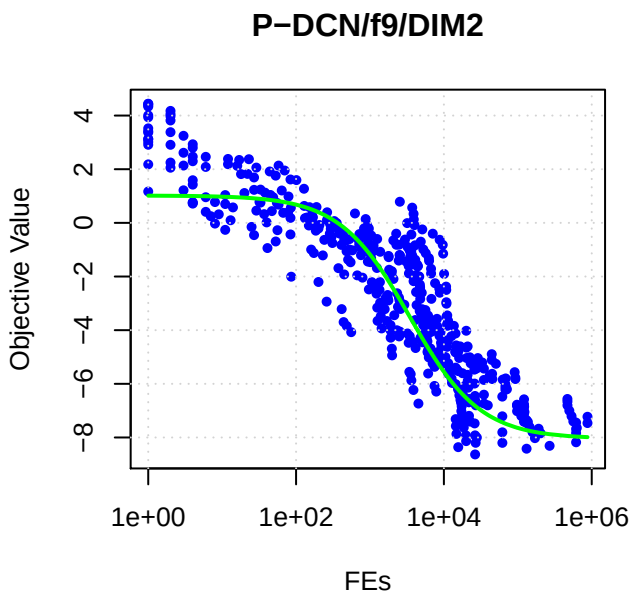
FEs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Objective Value
FEs
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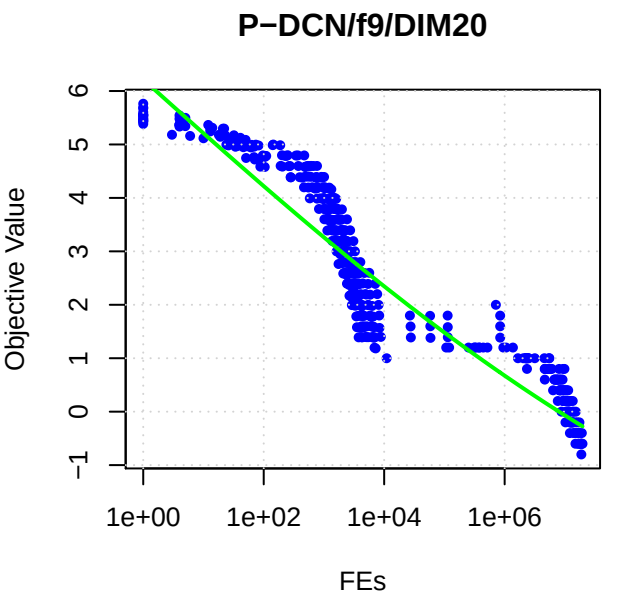
−2
−4
−6
−8


P−DCN/f9/DIM20
Objective Value
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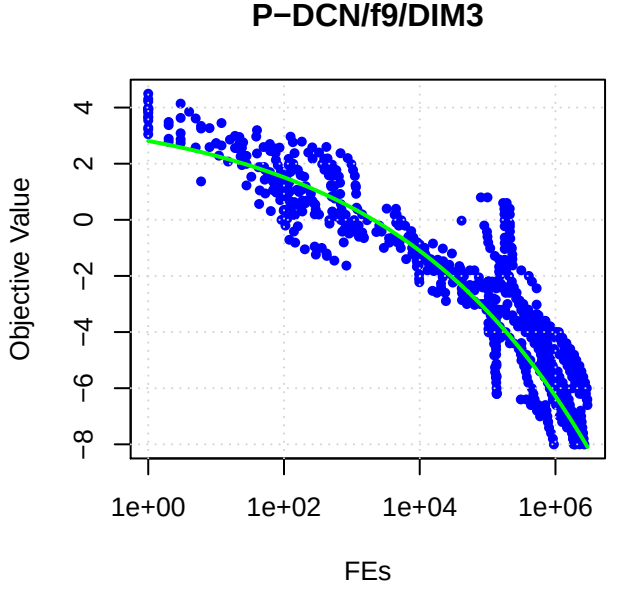
P−DCN/f9/DIM3
Objective Value
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−6
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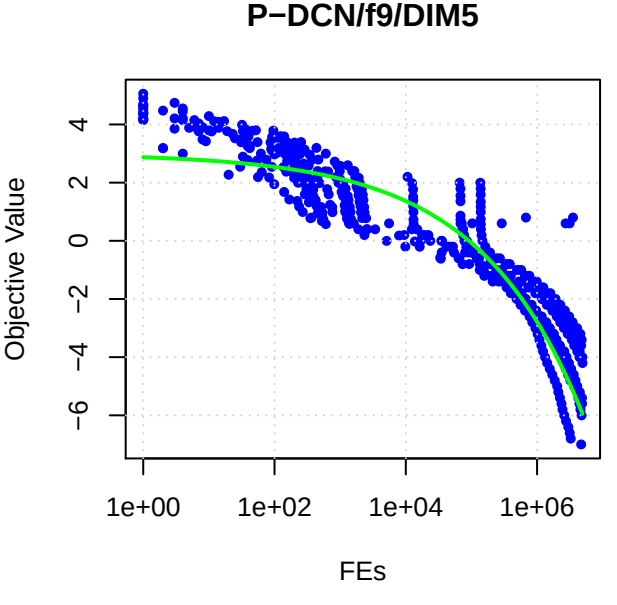
P−DCN/f9/DIM5
Objective Value
FEs
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1e+04
1e+06
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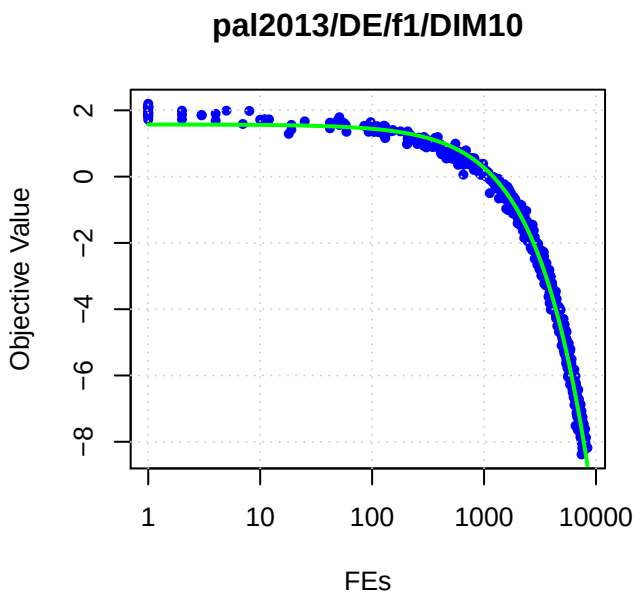
−2
−4
−6


pal2013/DE/f1/DIM10
Objective Value
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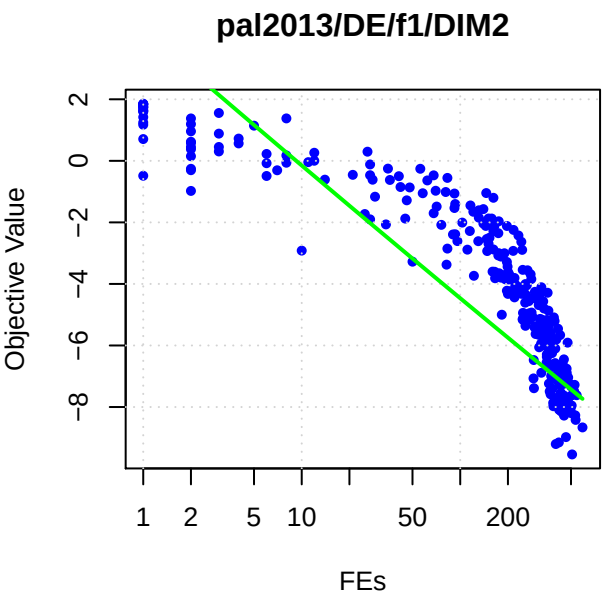
−2
−4
−6
−8
1
10
100
1000
10000
FEs


pal2013/DE/f1/DIM2
Objective Value
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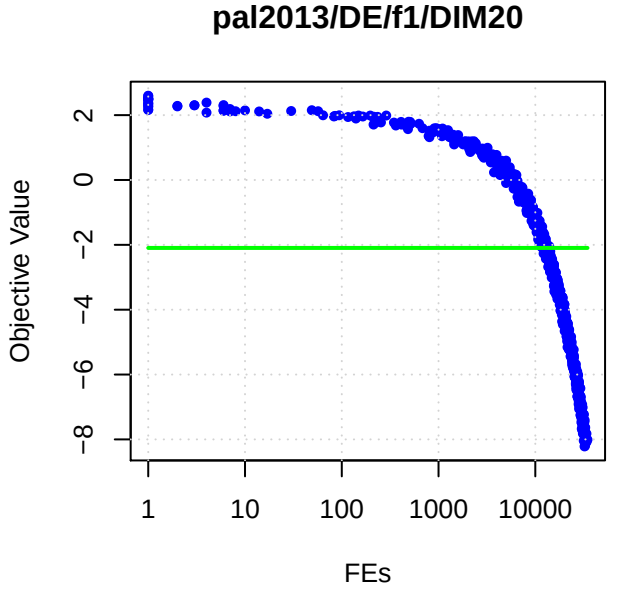
−6
−8
1
2
5
10
50
200
FEs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Objective Value
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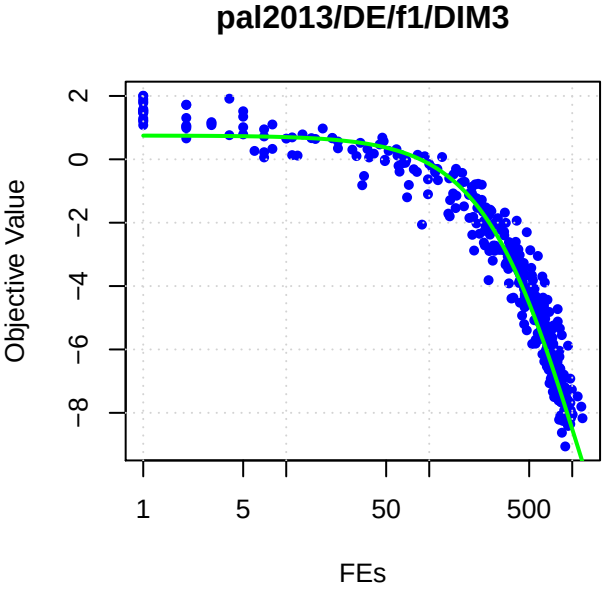
100
1000
10000
FEs


pal2013/DE/f1/DIM3
Objective Value
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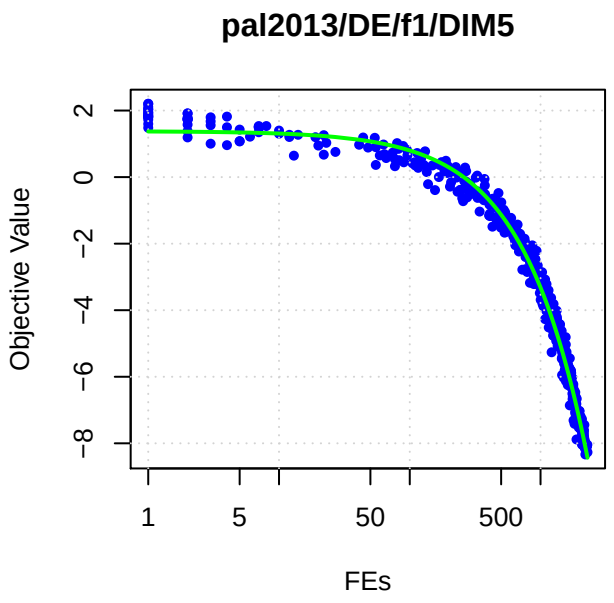
−4
−6
−8
1
5
50
500
FEs


pal2013/DE/f1/DIM5
Objective Value
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−2
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−6
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1
5
50
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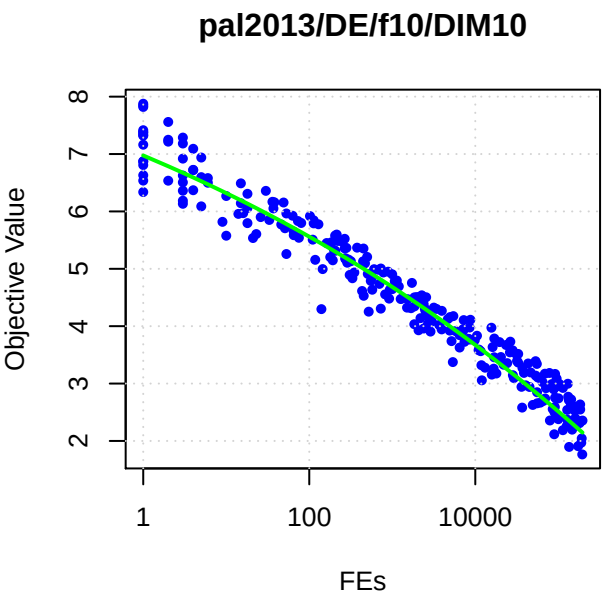
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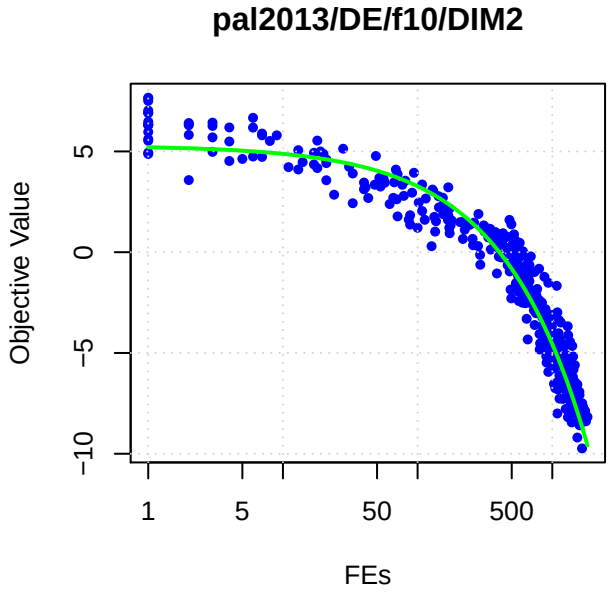
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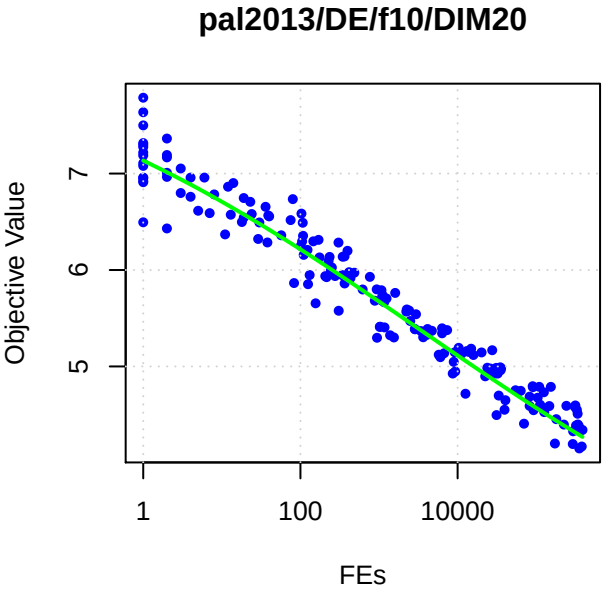
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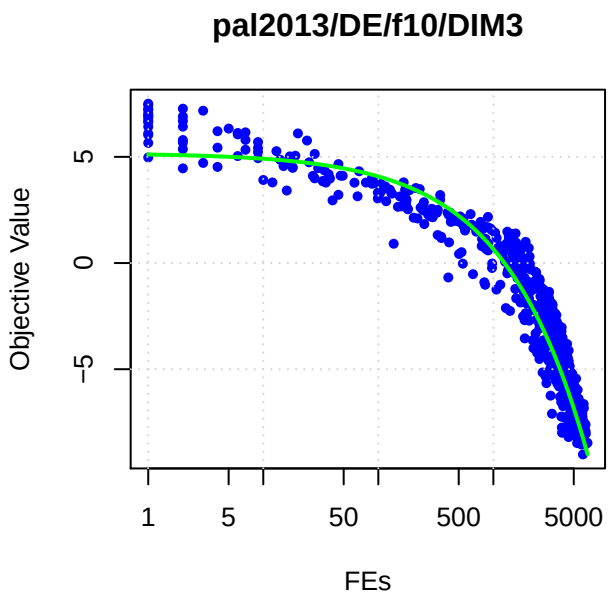
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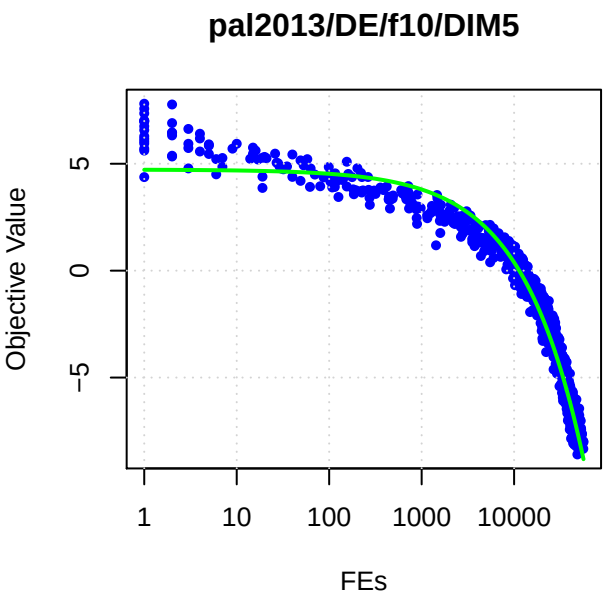
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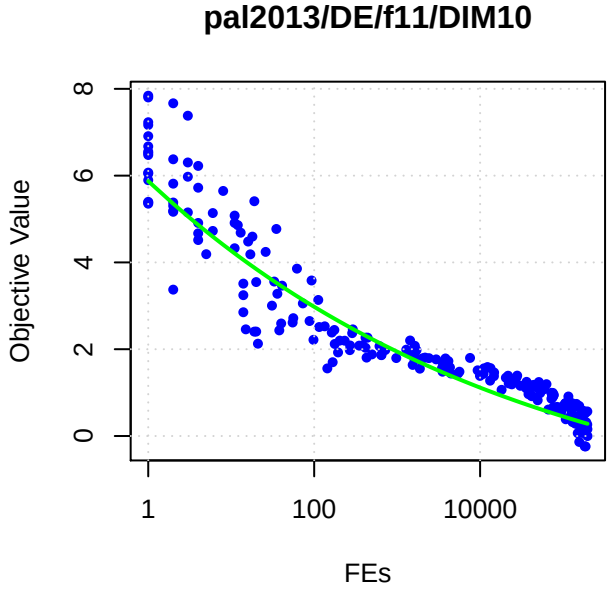
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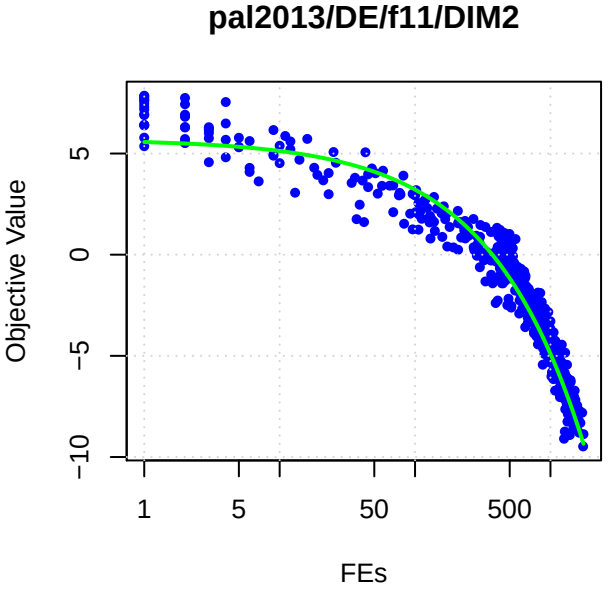
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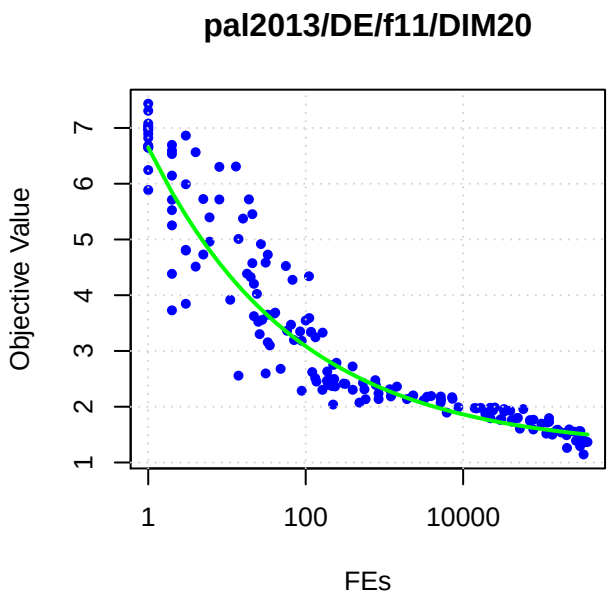
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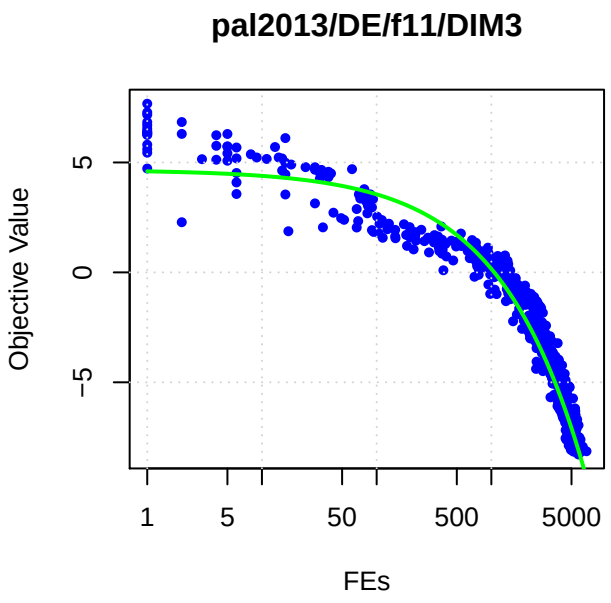
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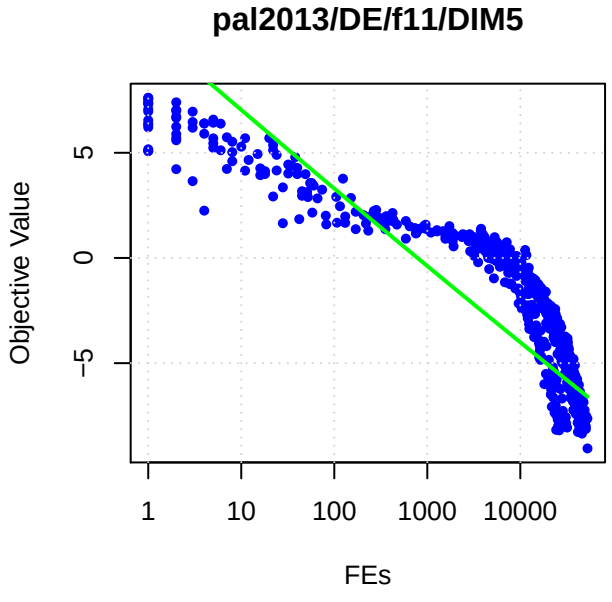
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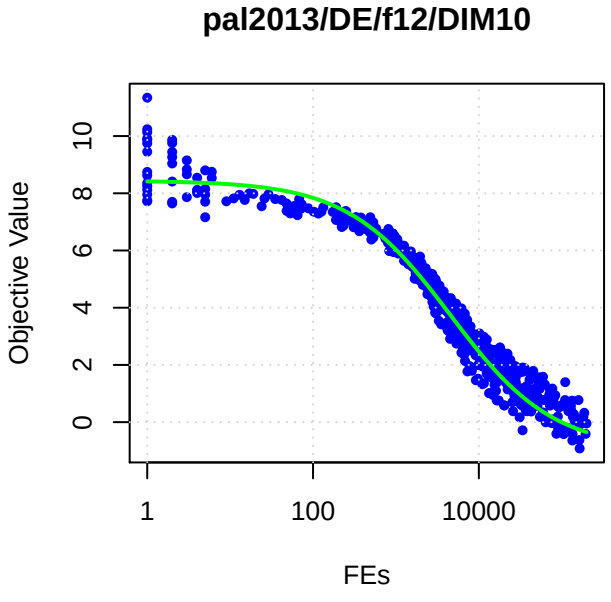
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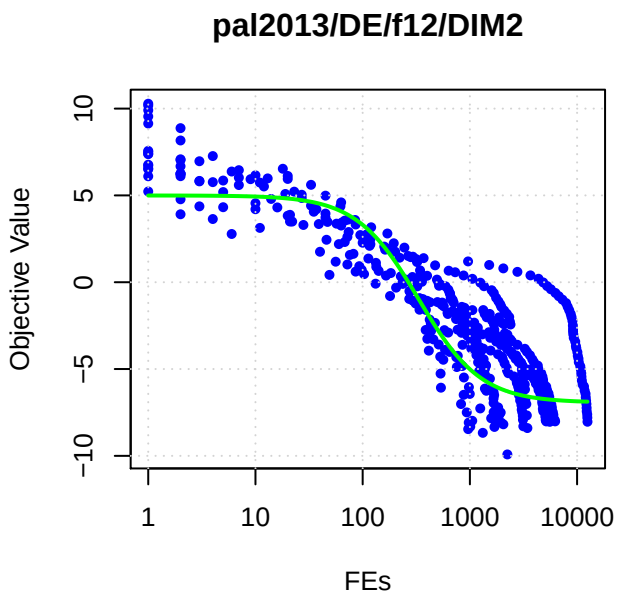
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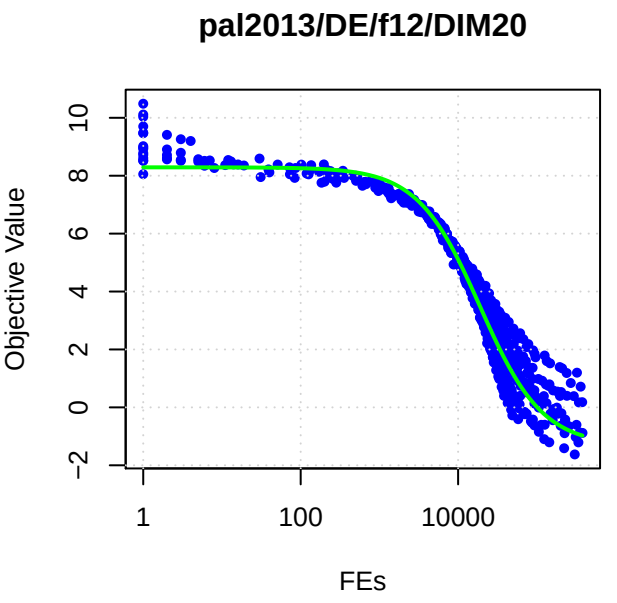
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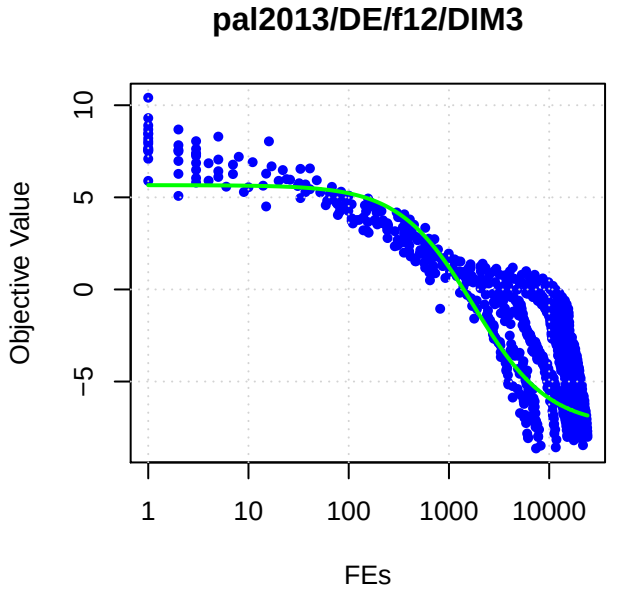
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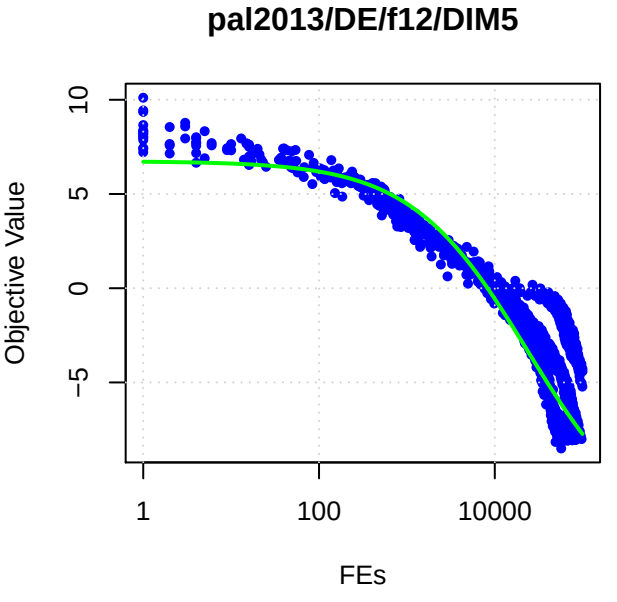
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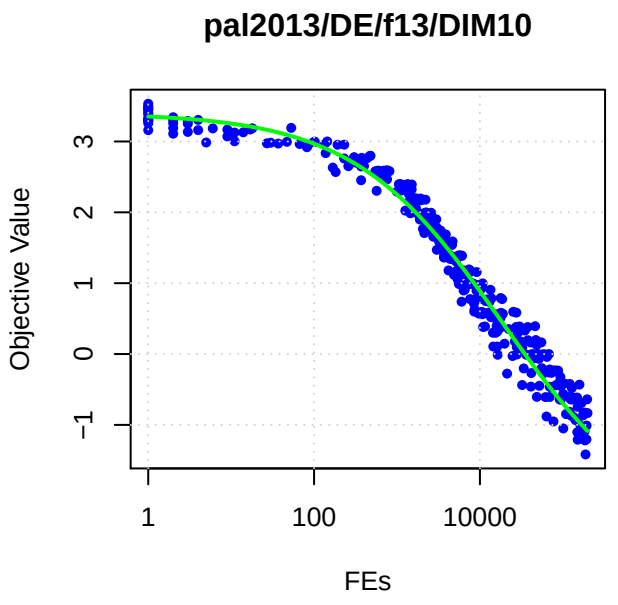
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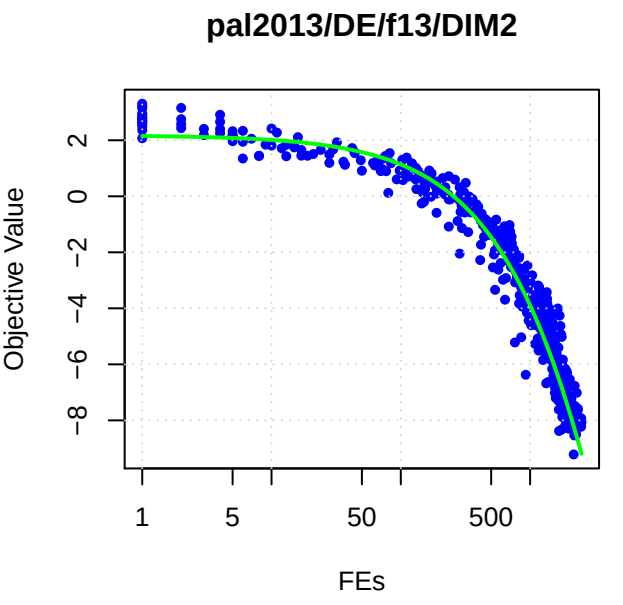
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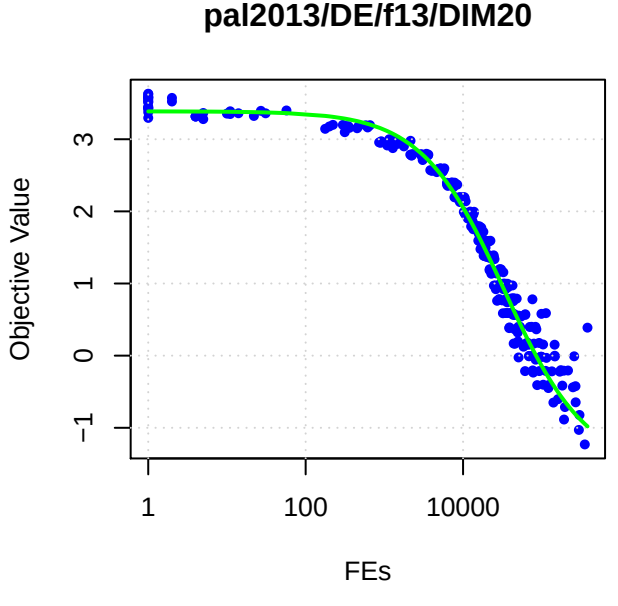
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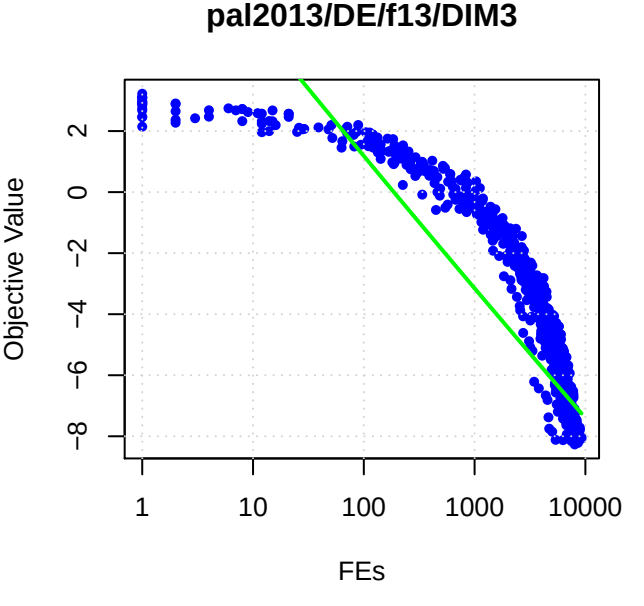
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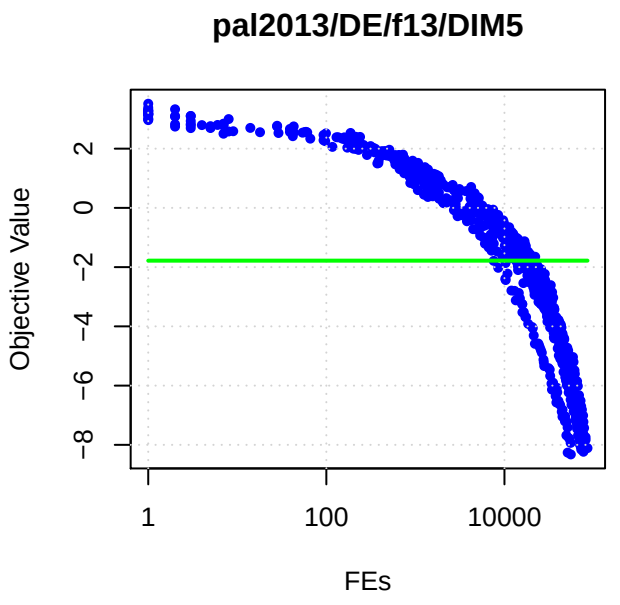
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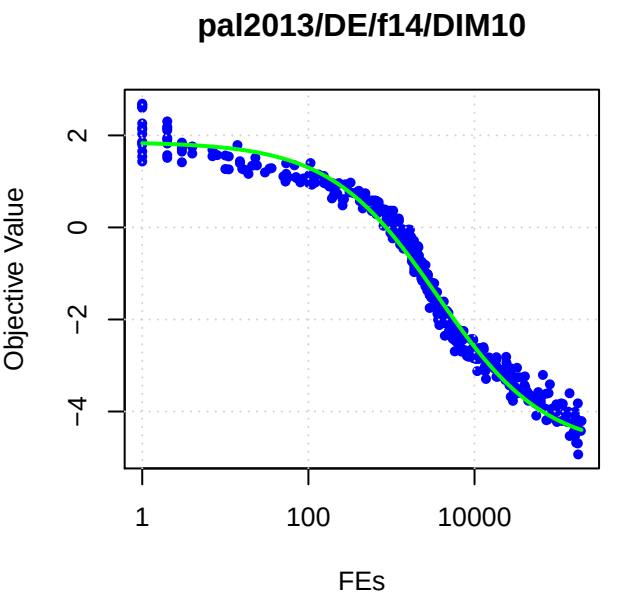
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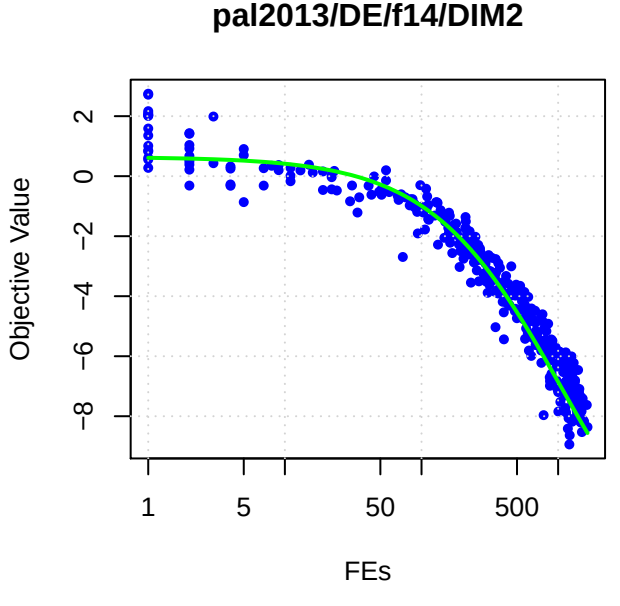
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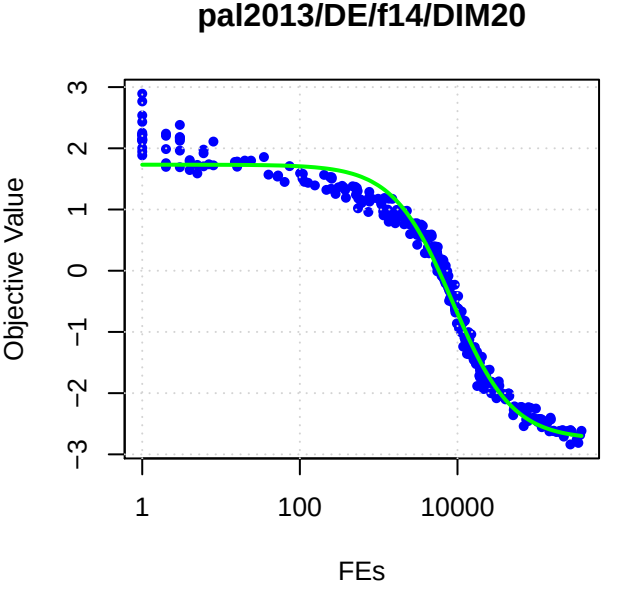
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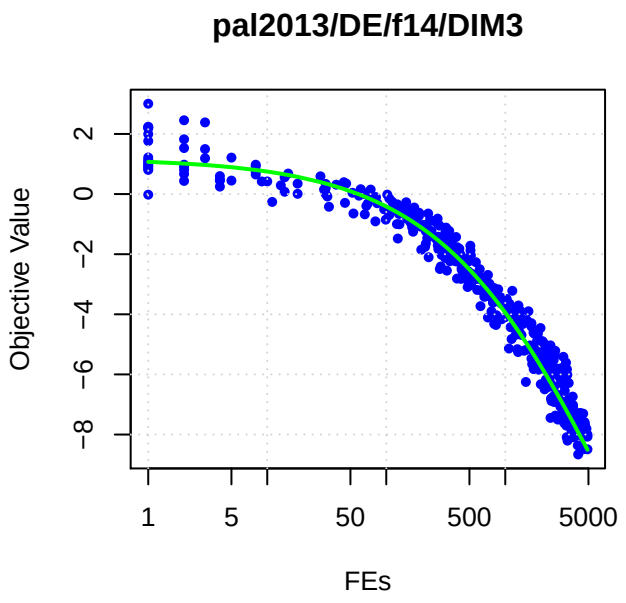
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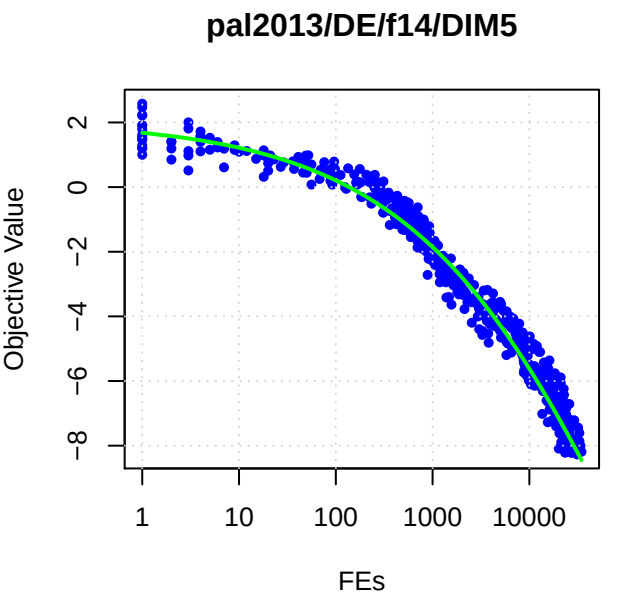
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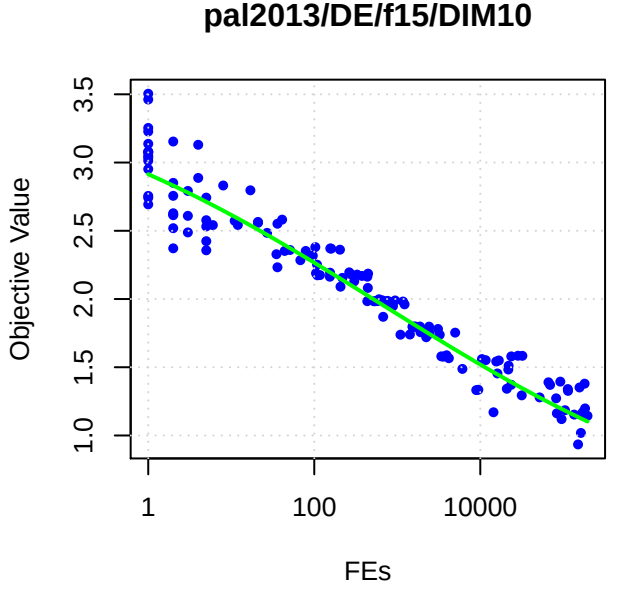
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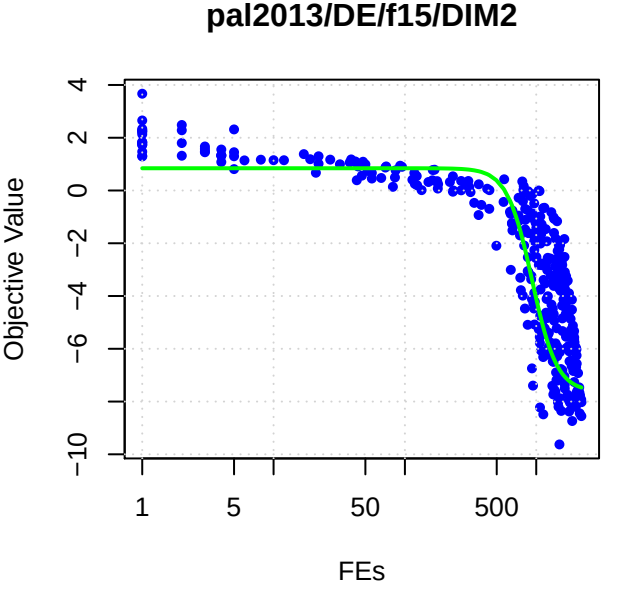
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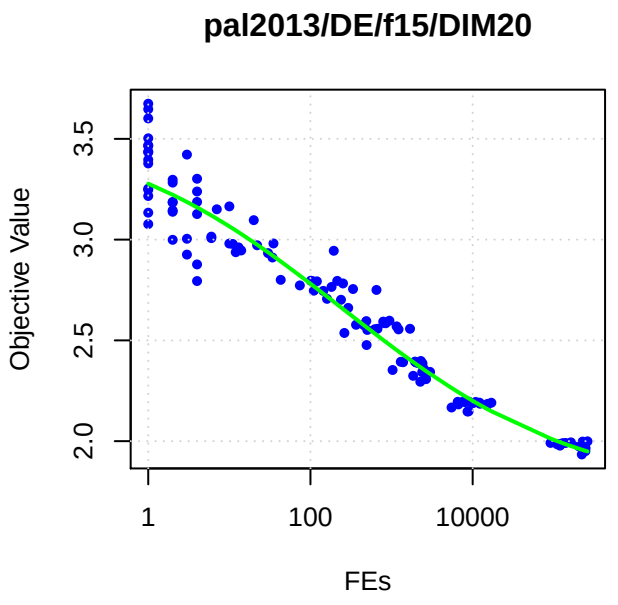
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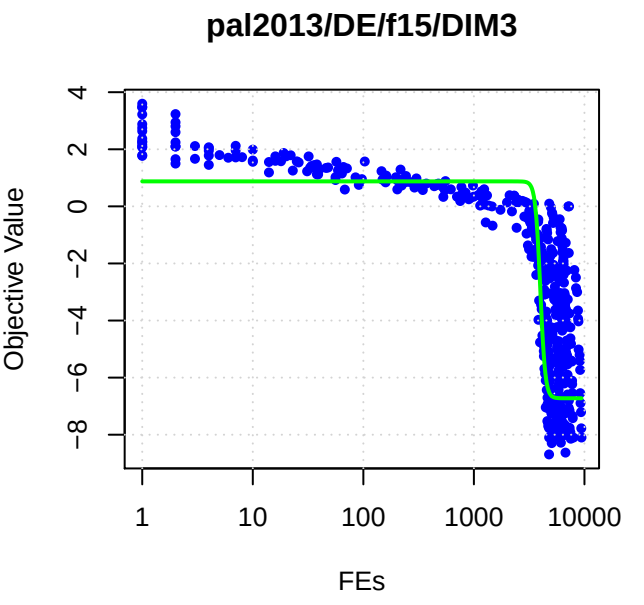
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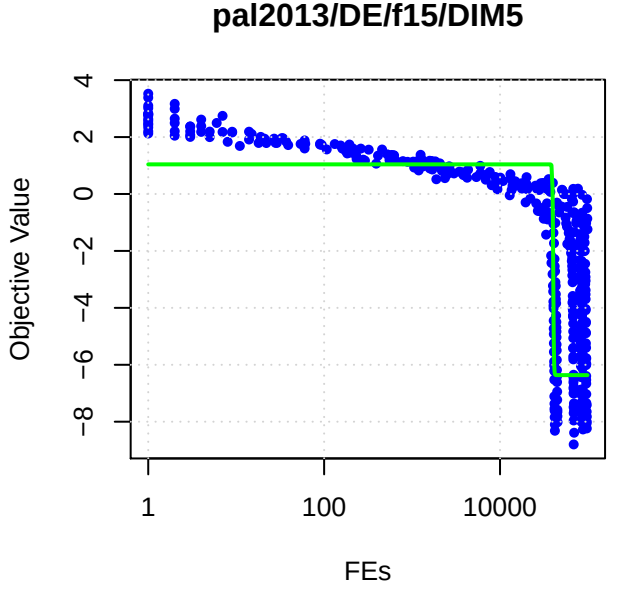
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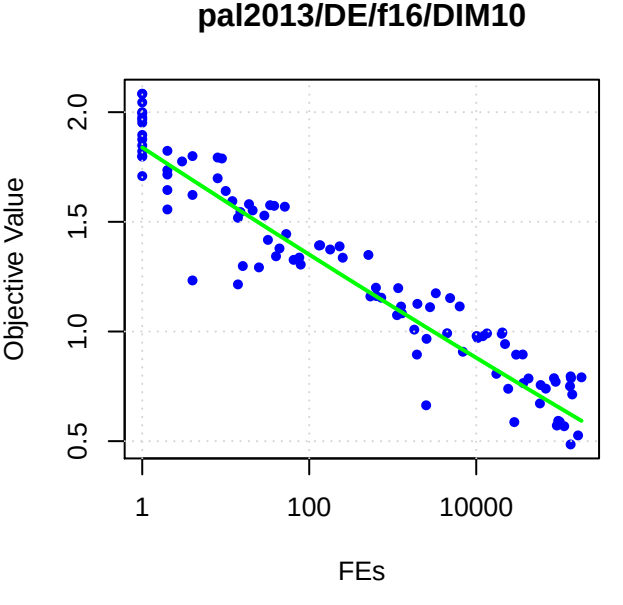
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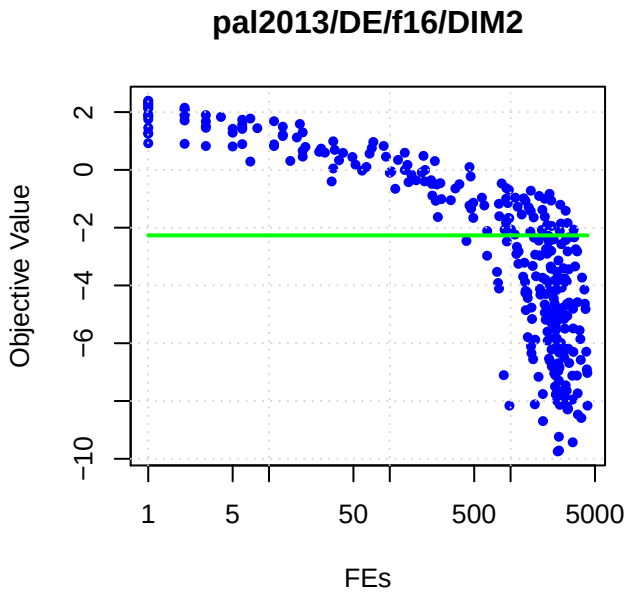
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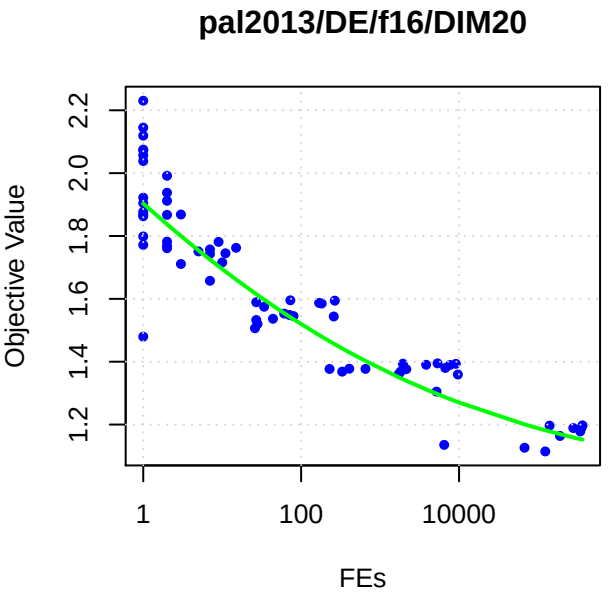
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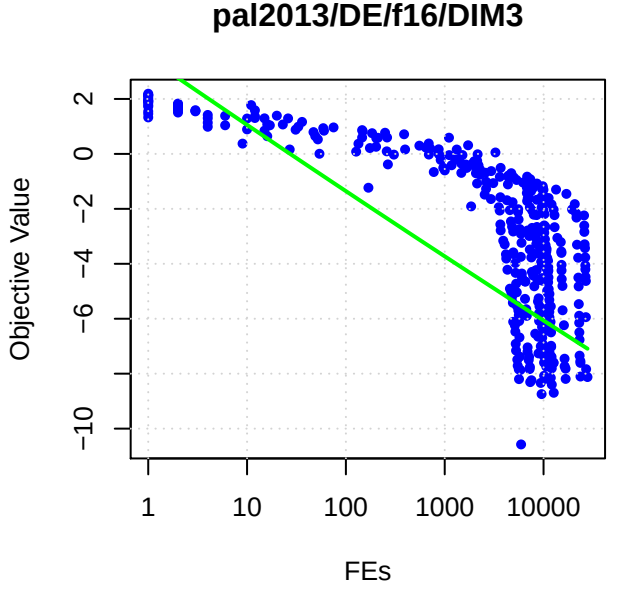
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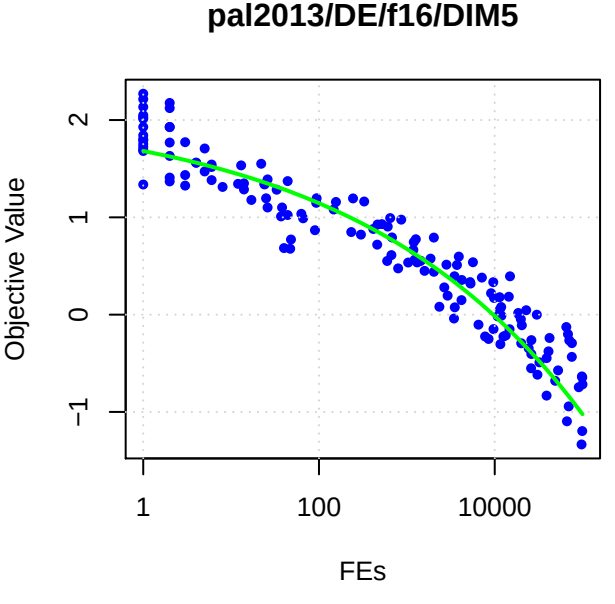
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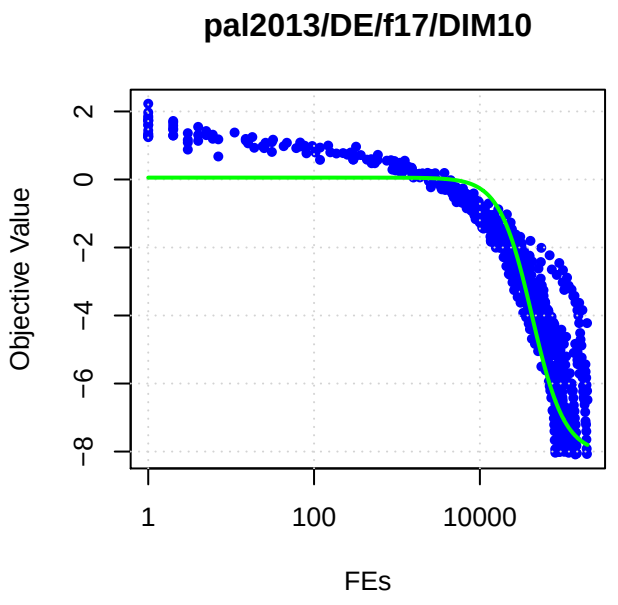
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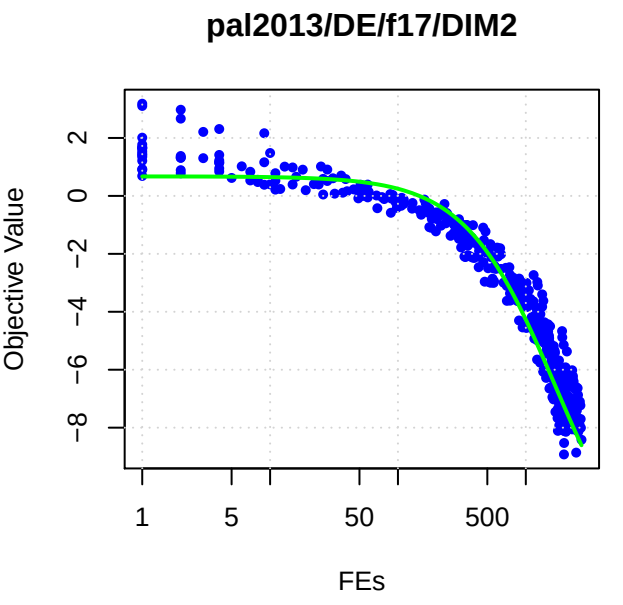
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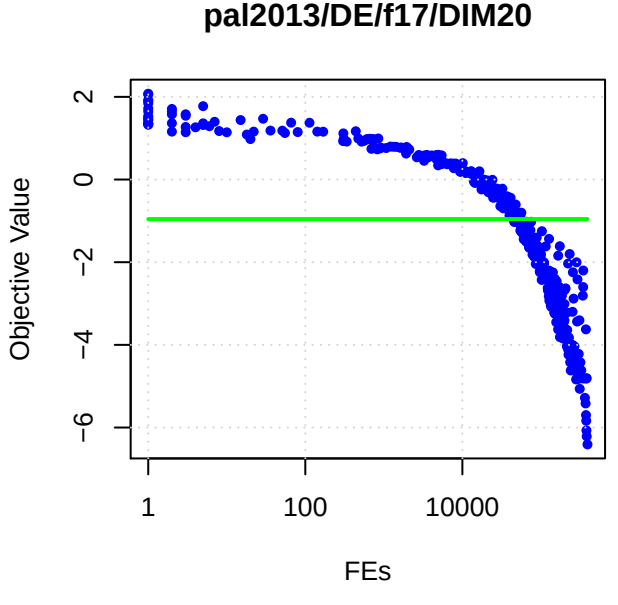
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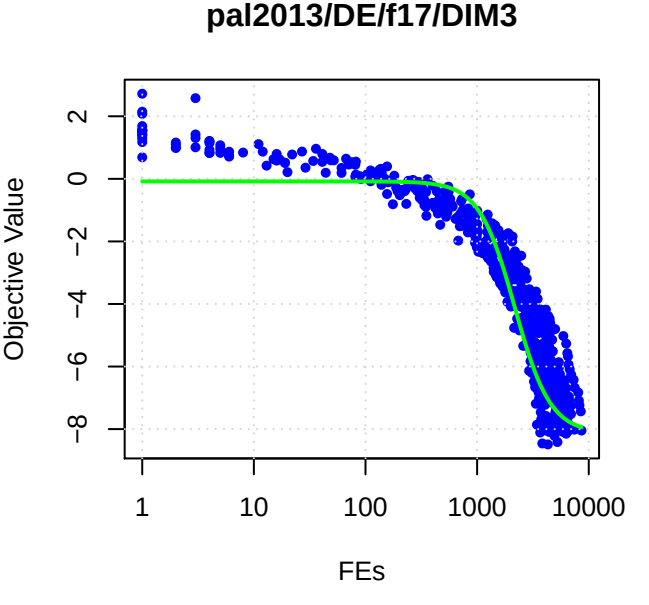
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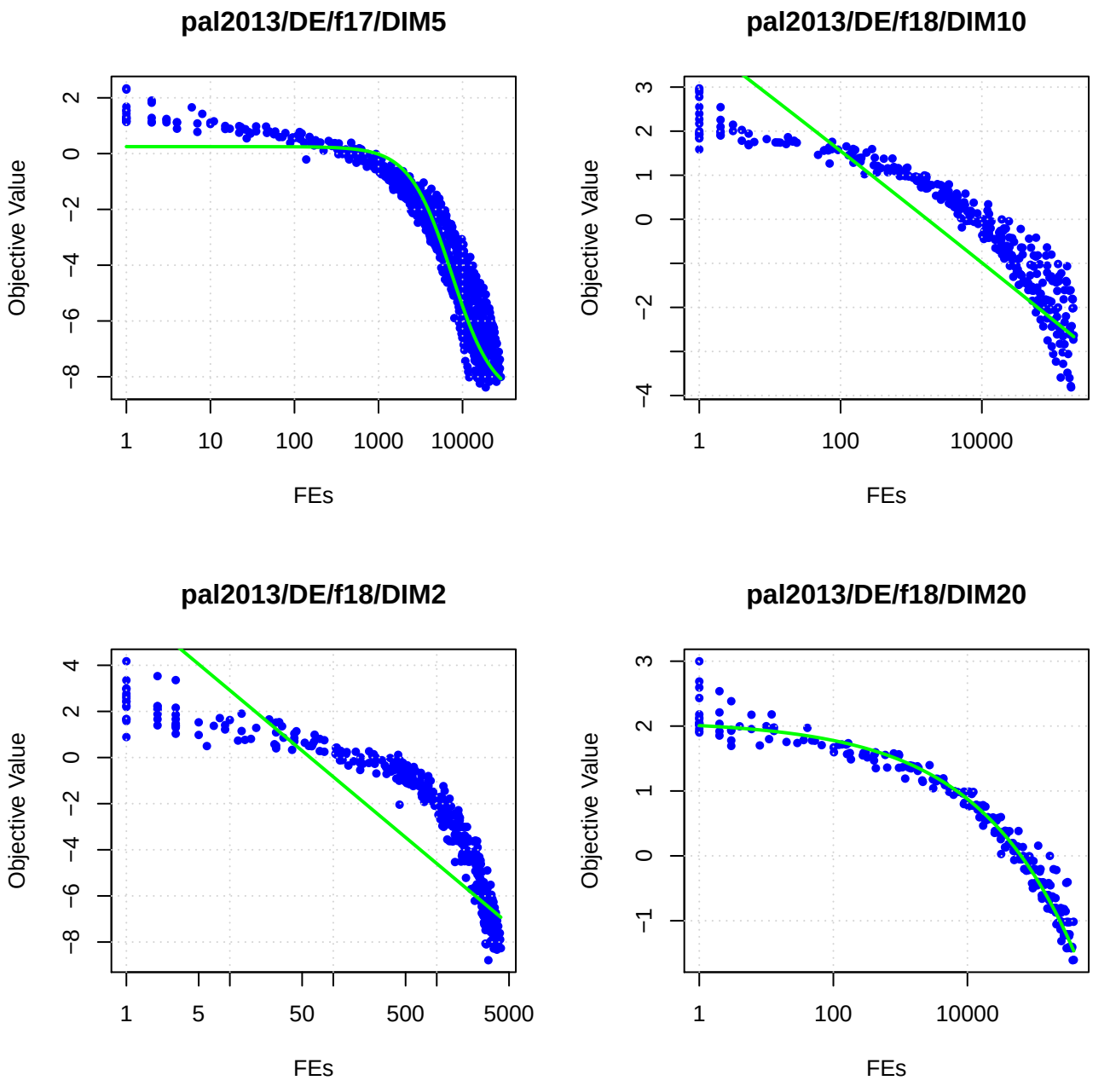
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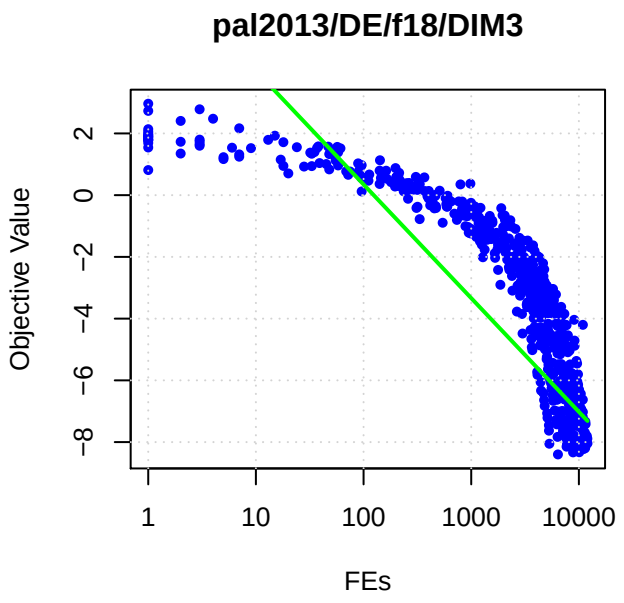
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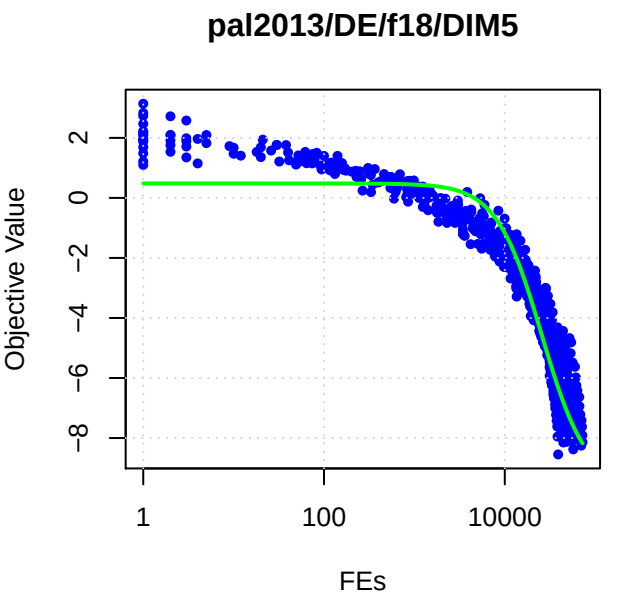
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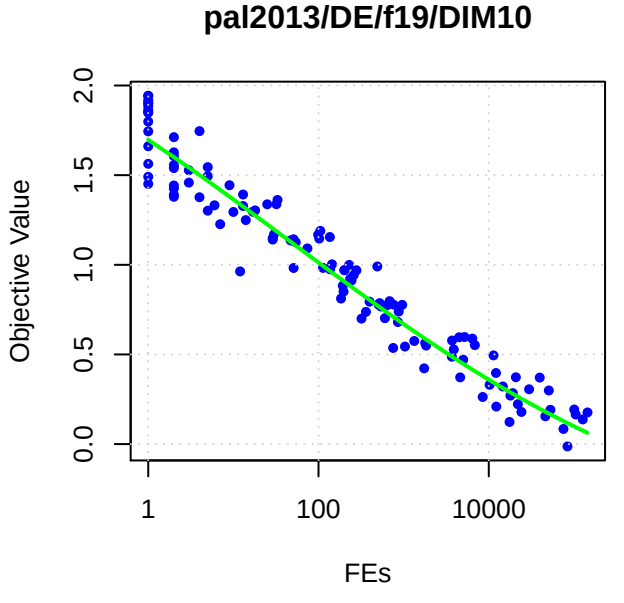
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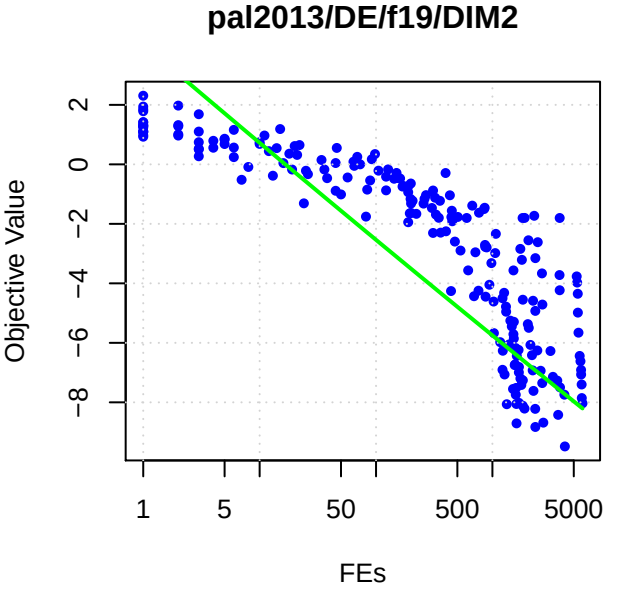
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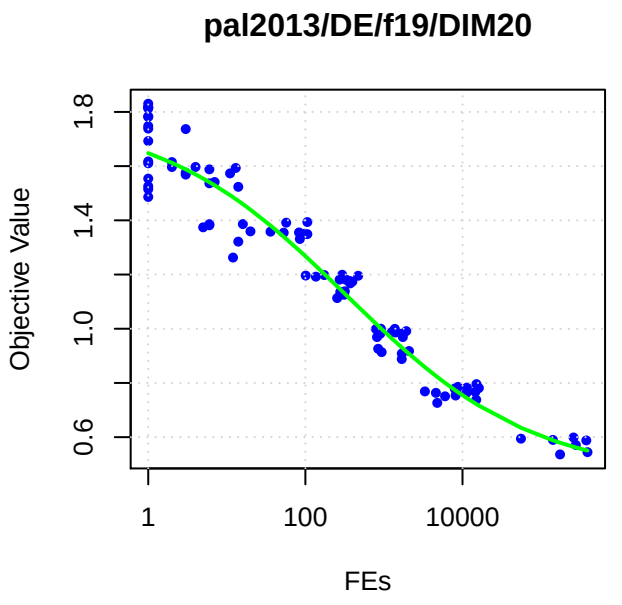
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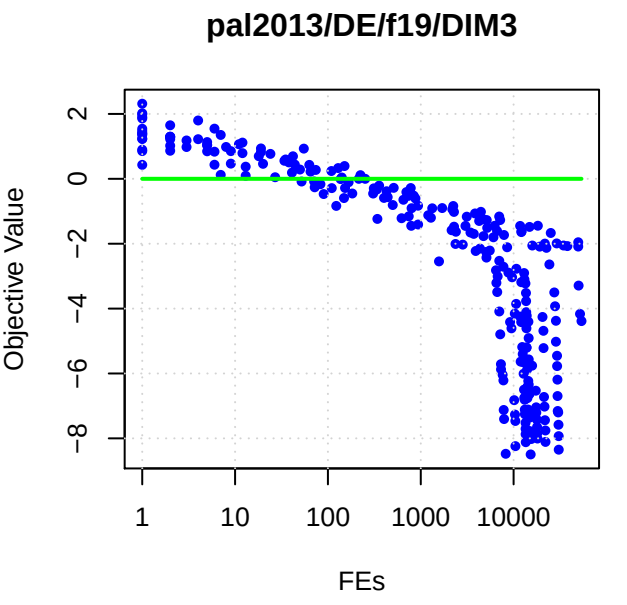
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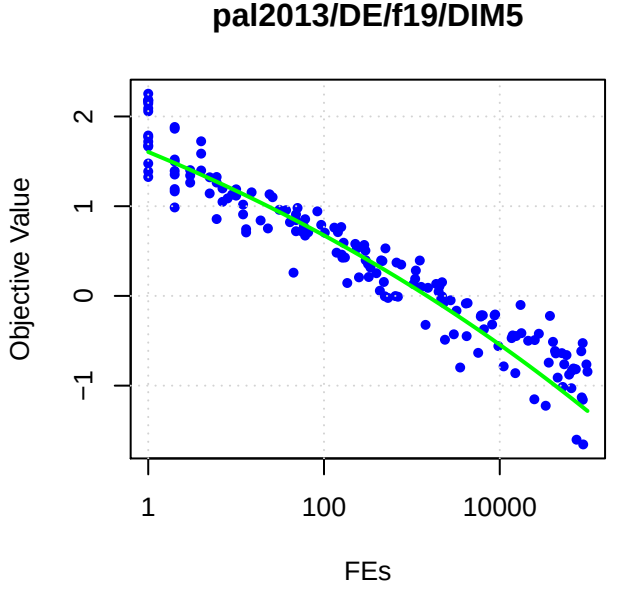
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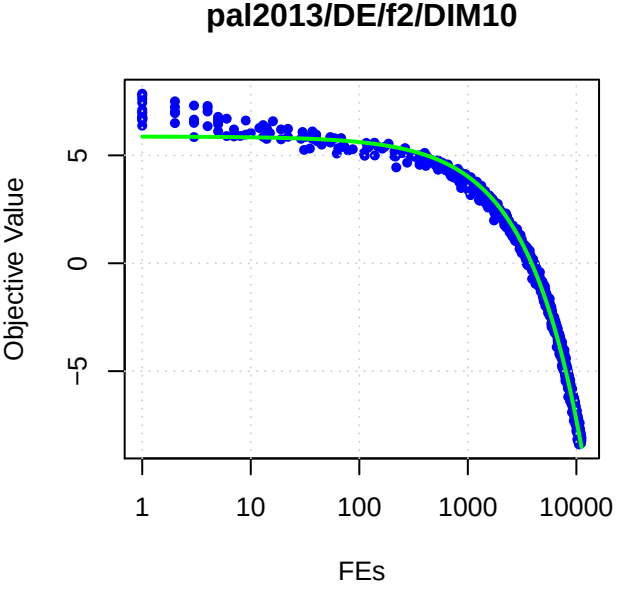
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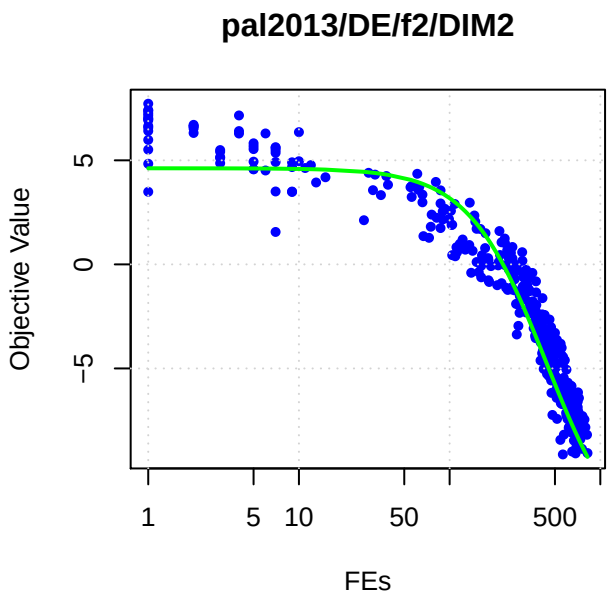
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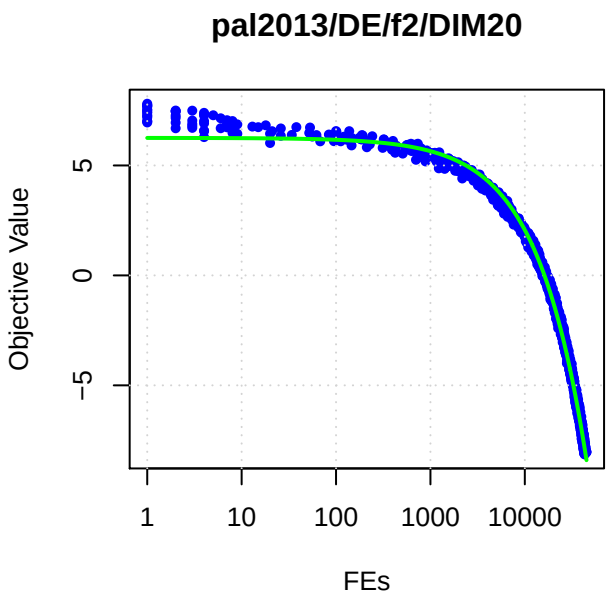
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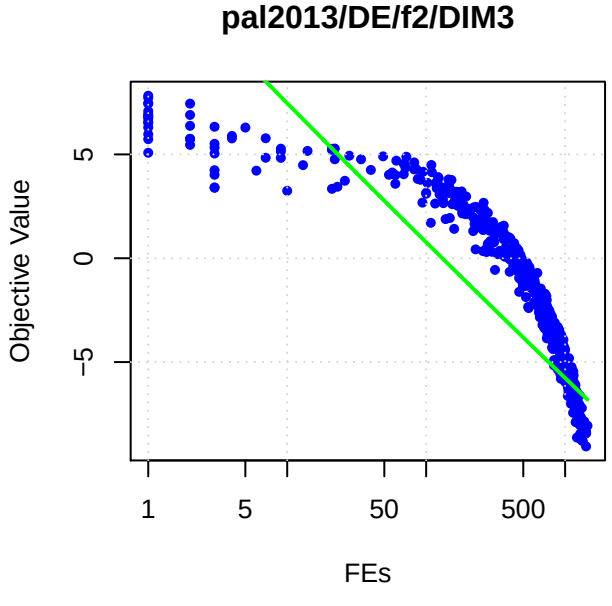
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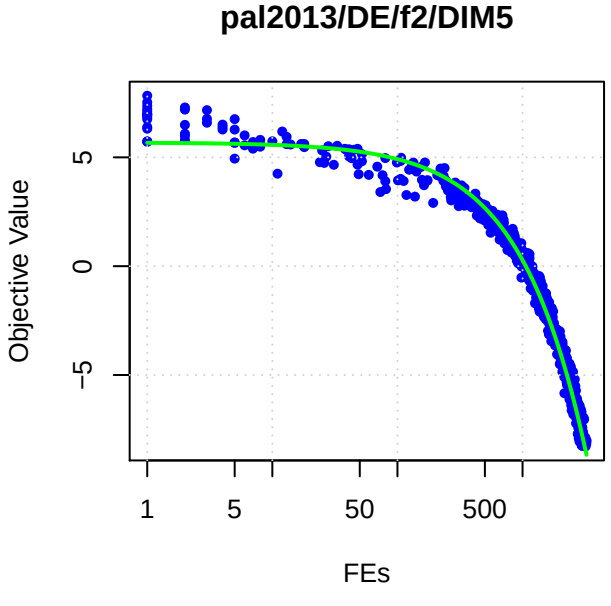
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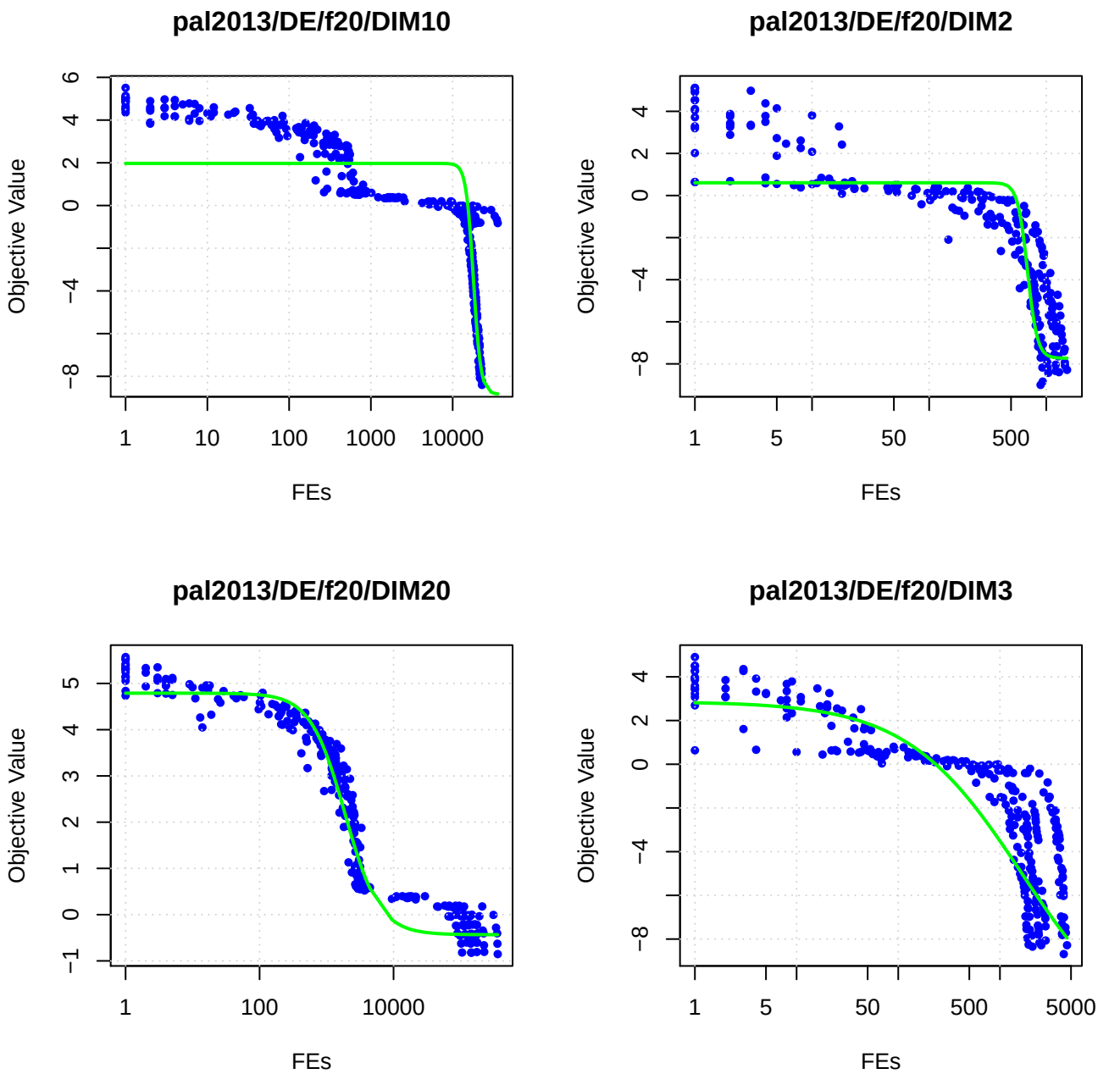
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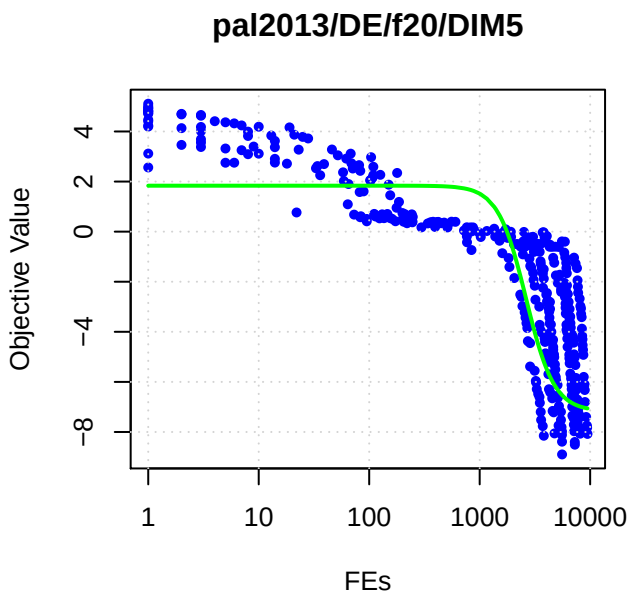
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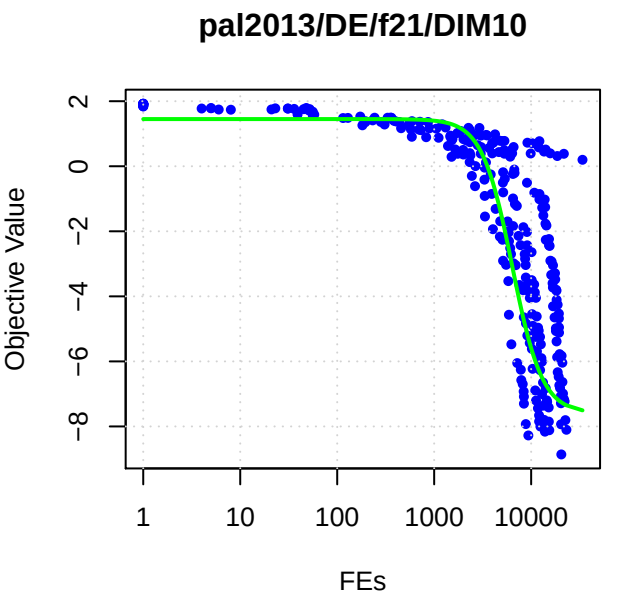
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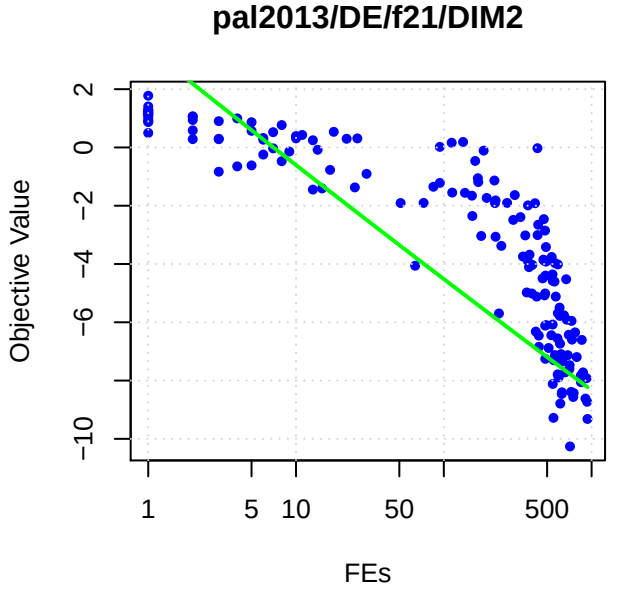
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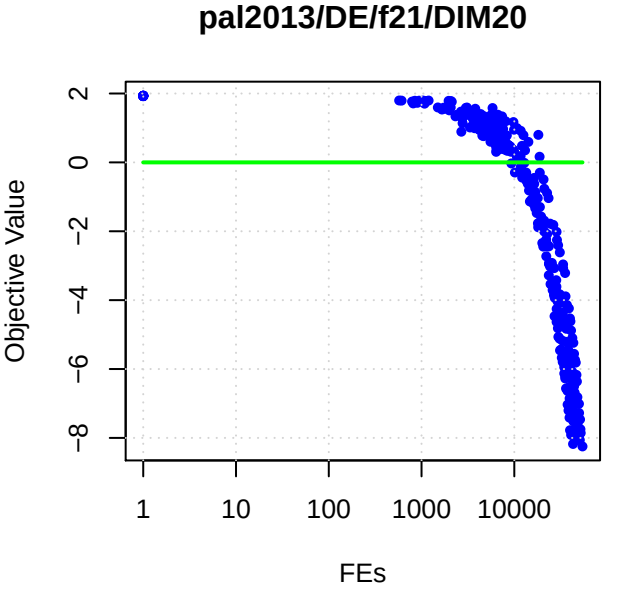
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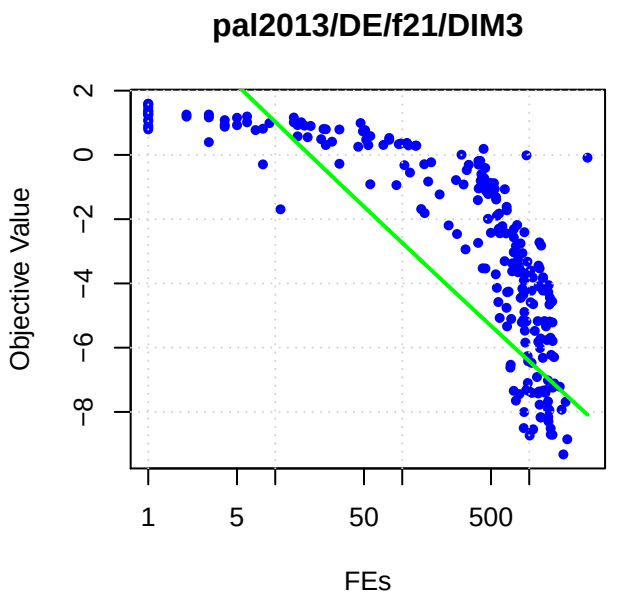
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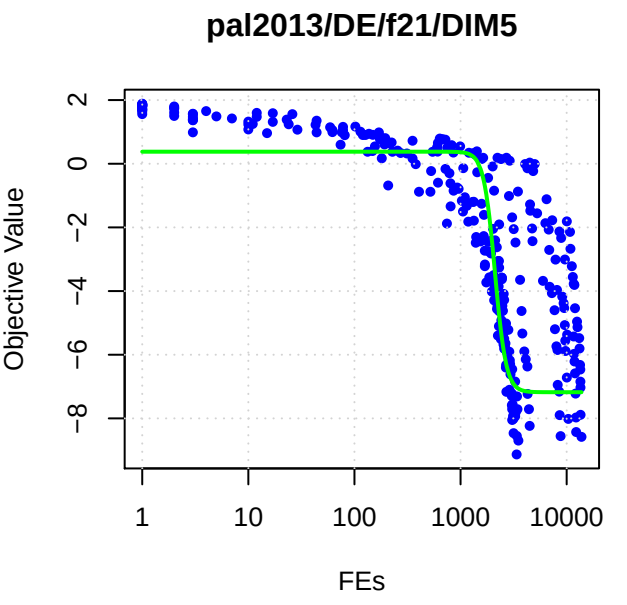
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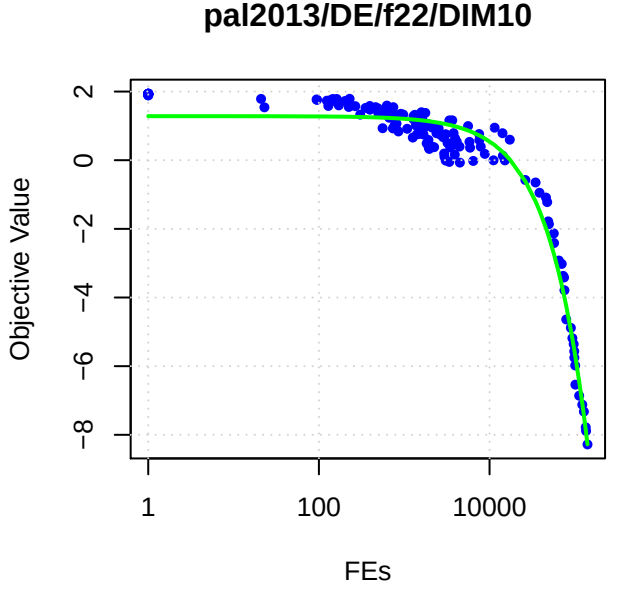
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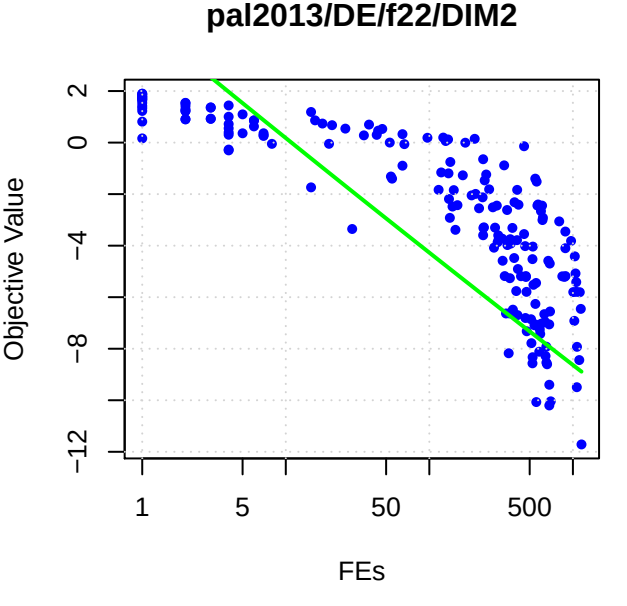
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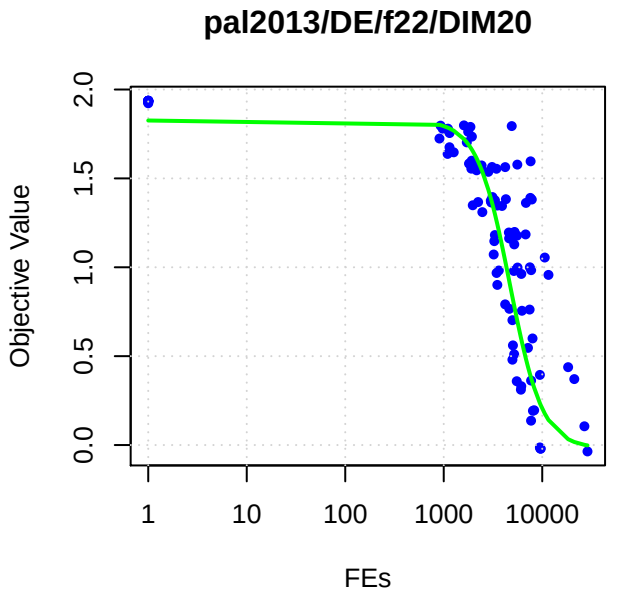
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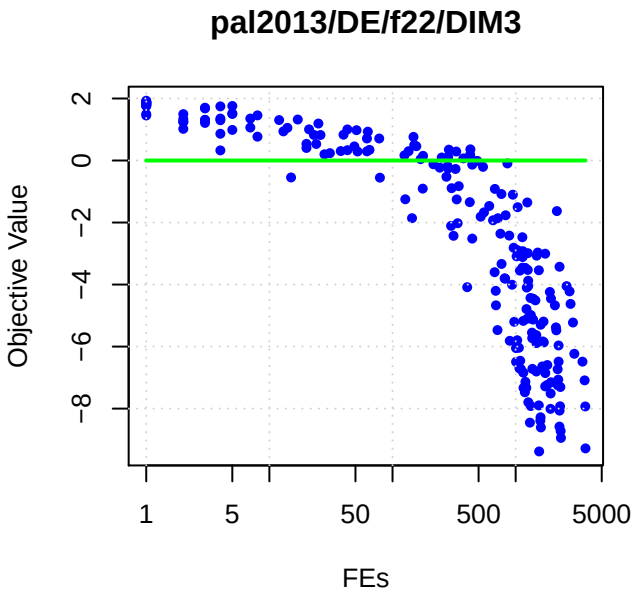
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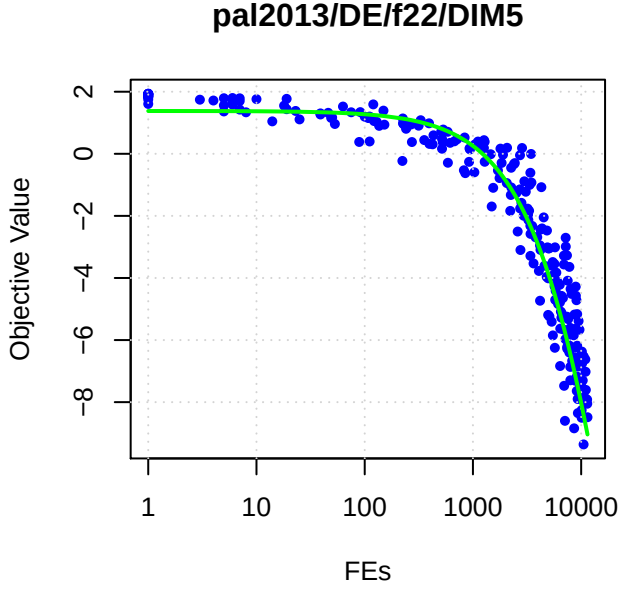
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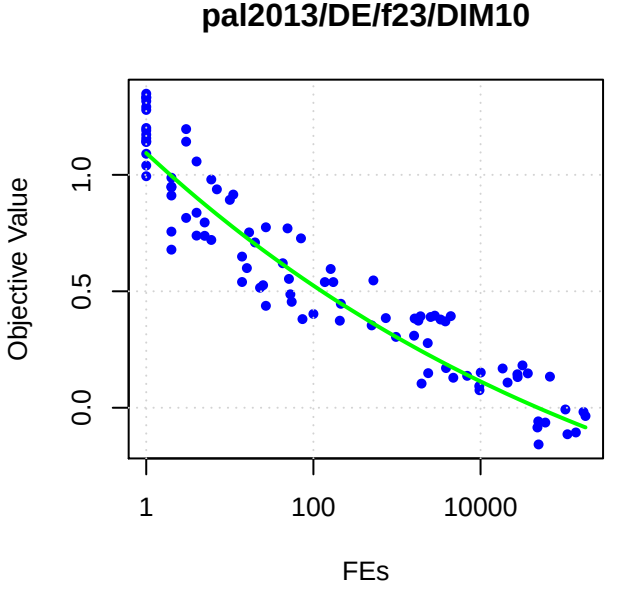
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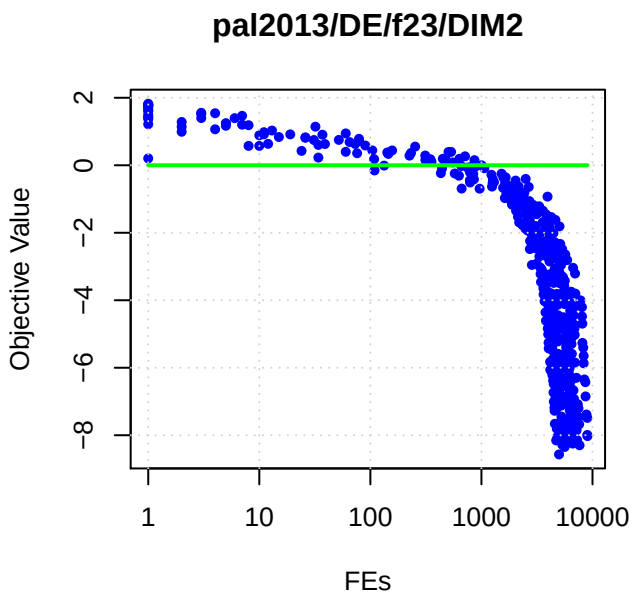
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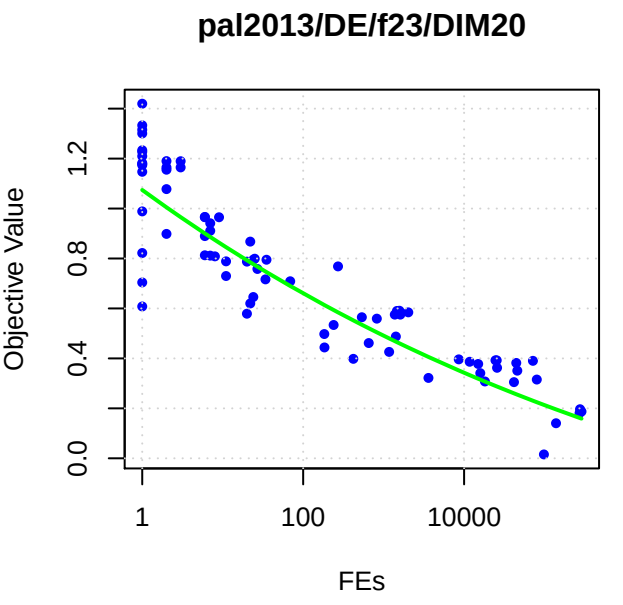
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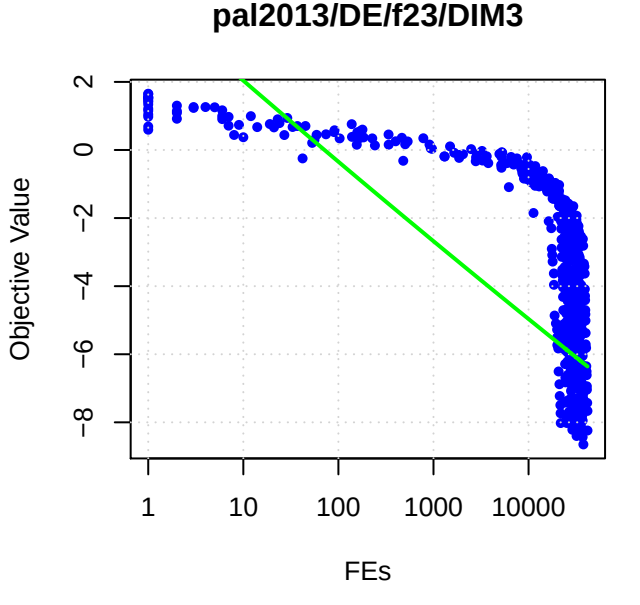
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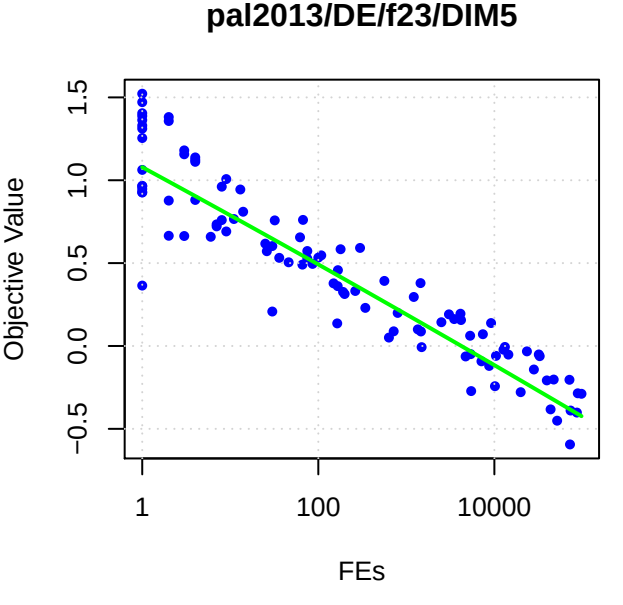
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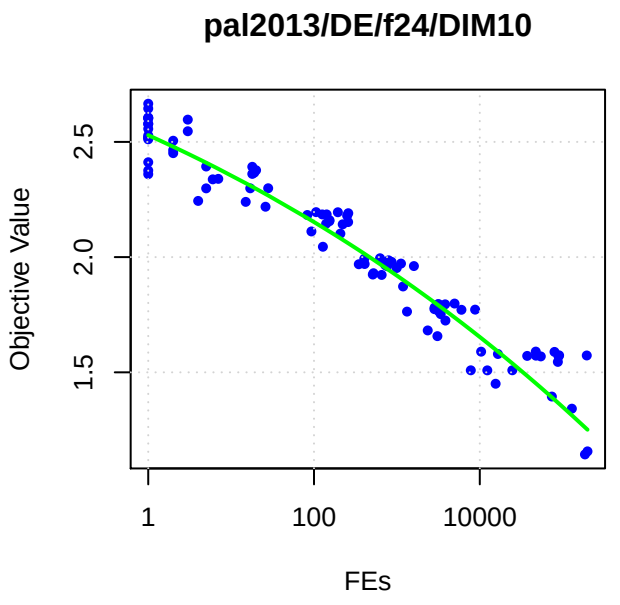
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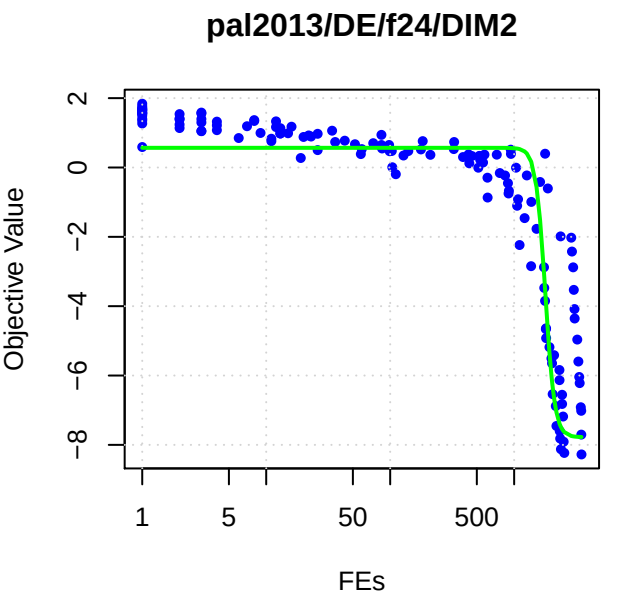
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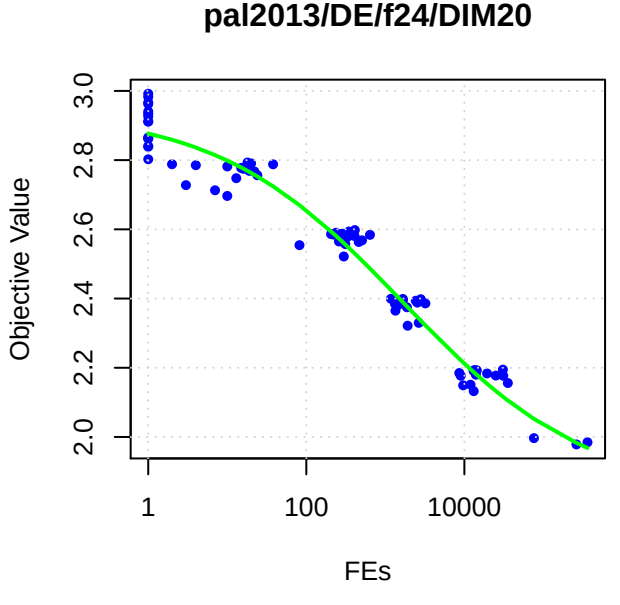
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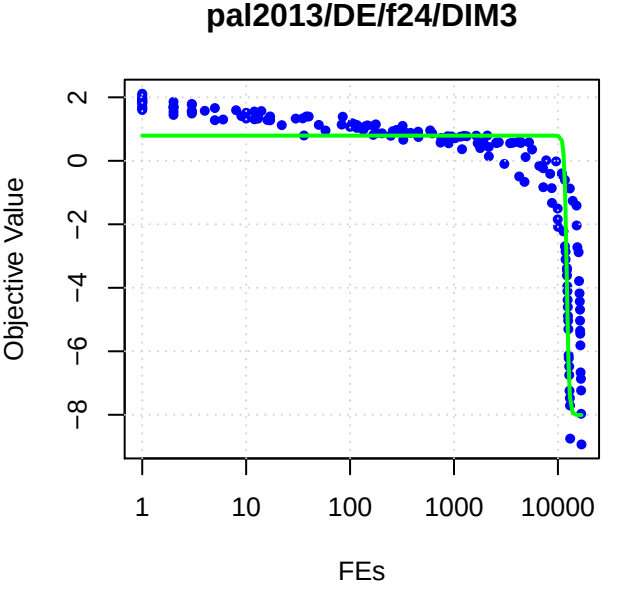
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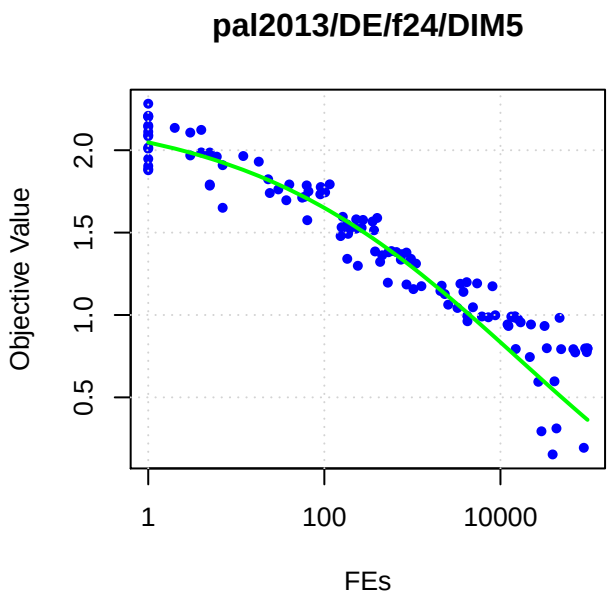
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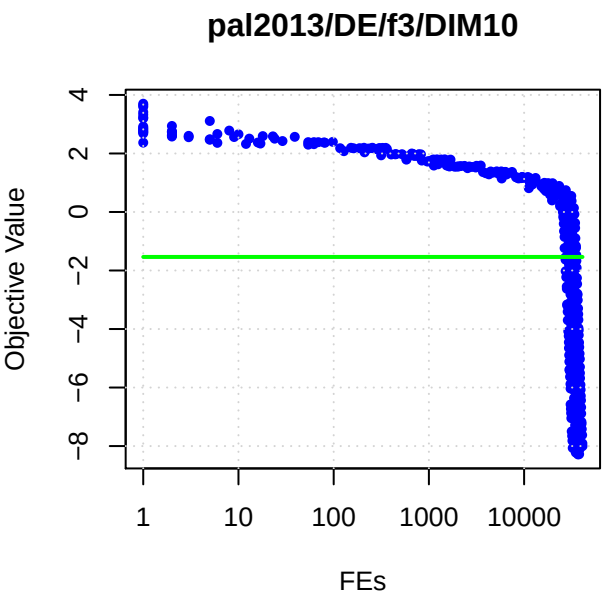
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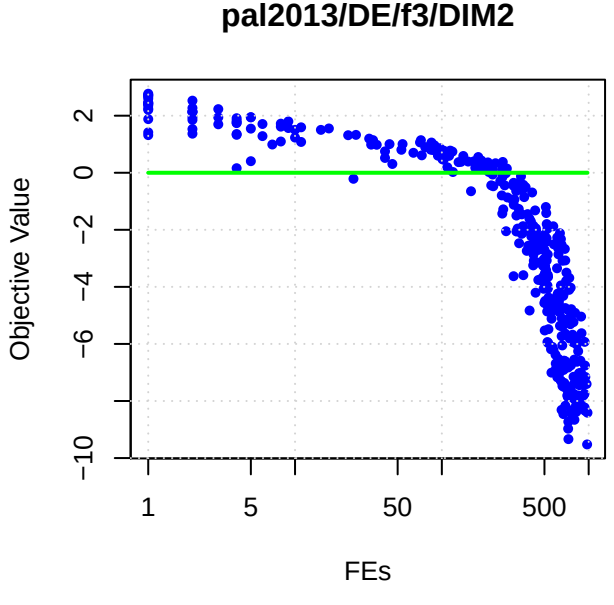
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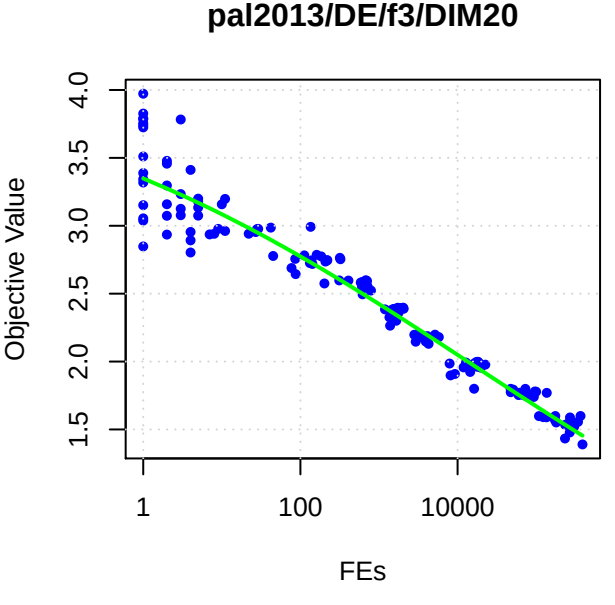
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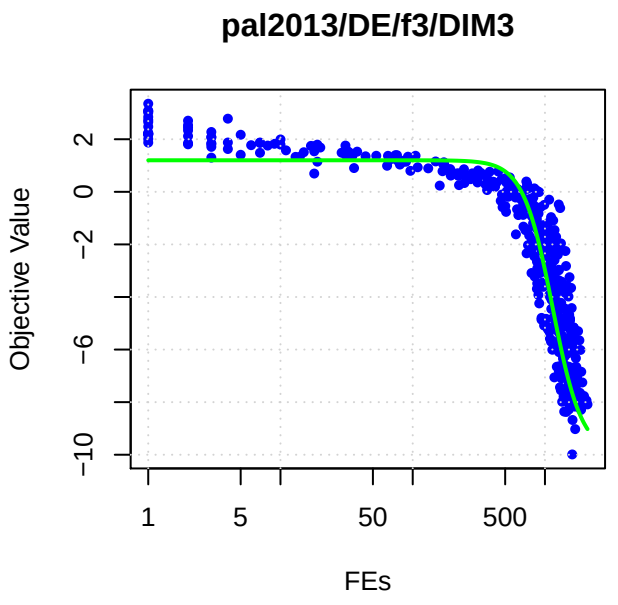
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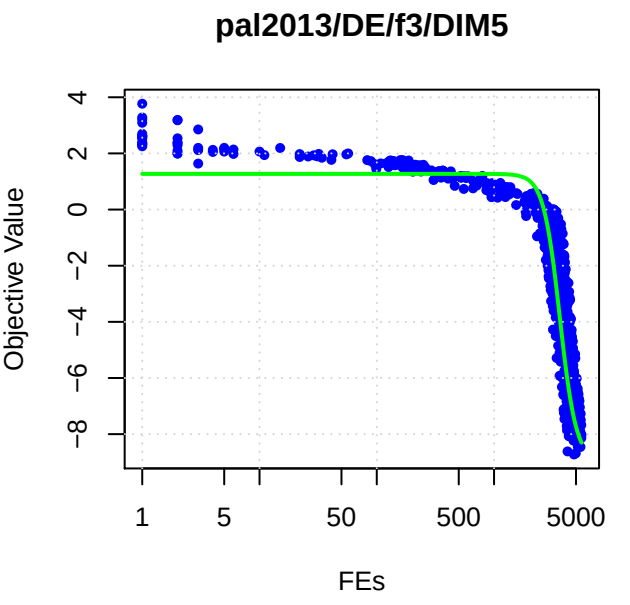
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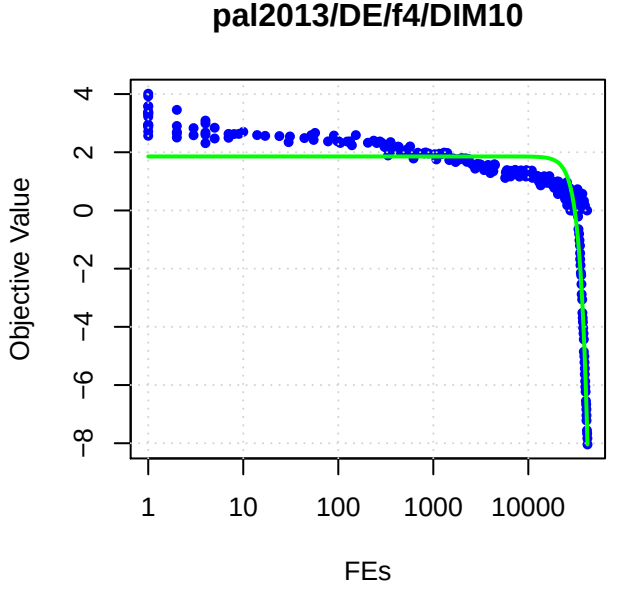
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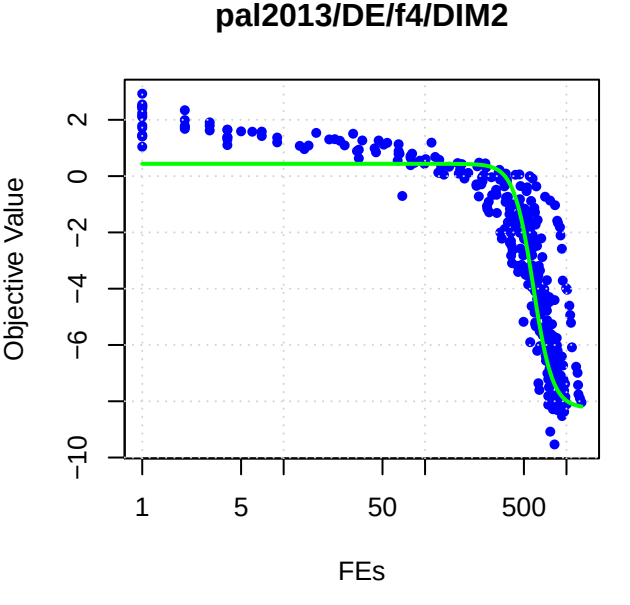
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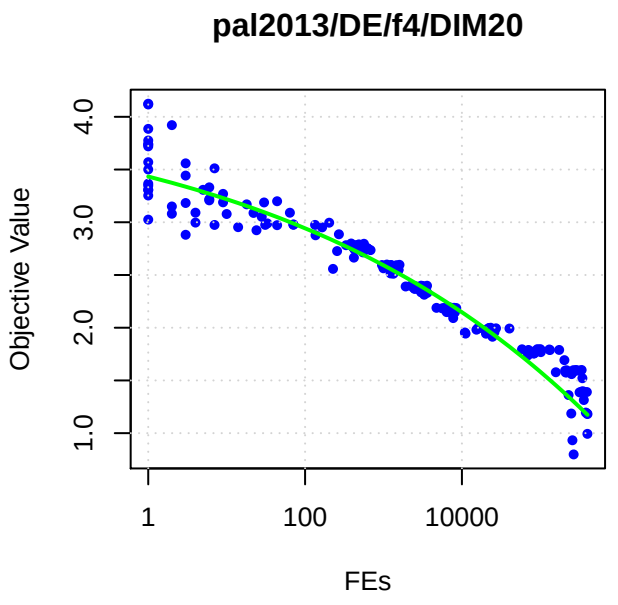
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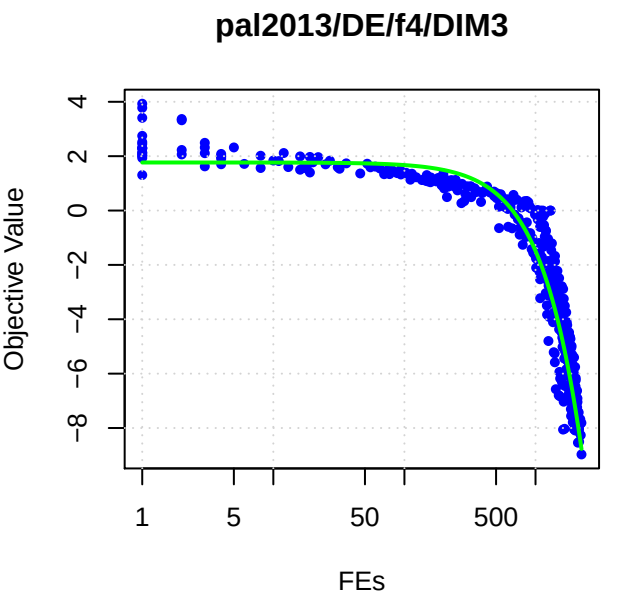
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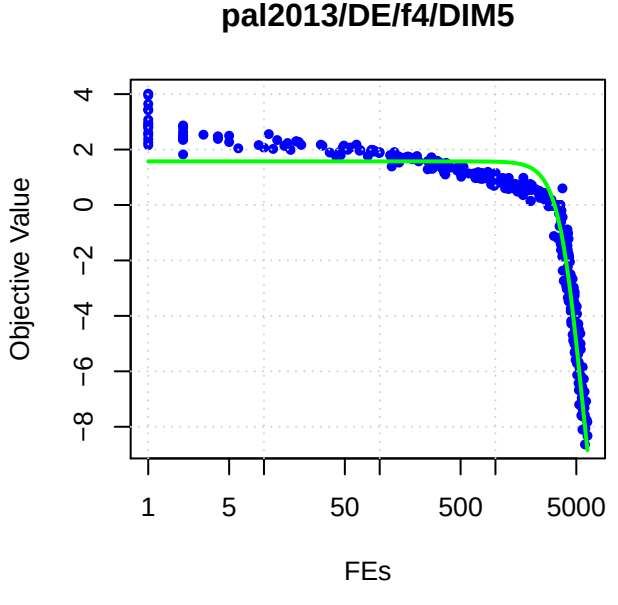
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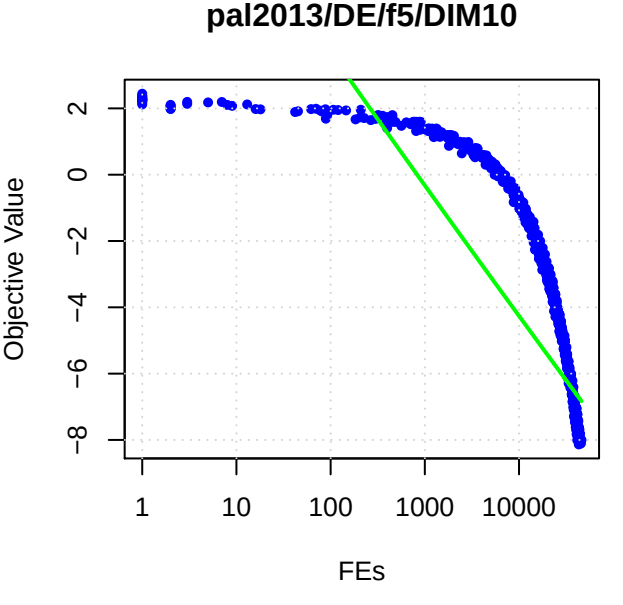
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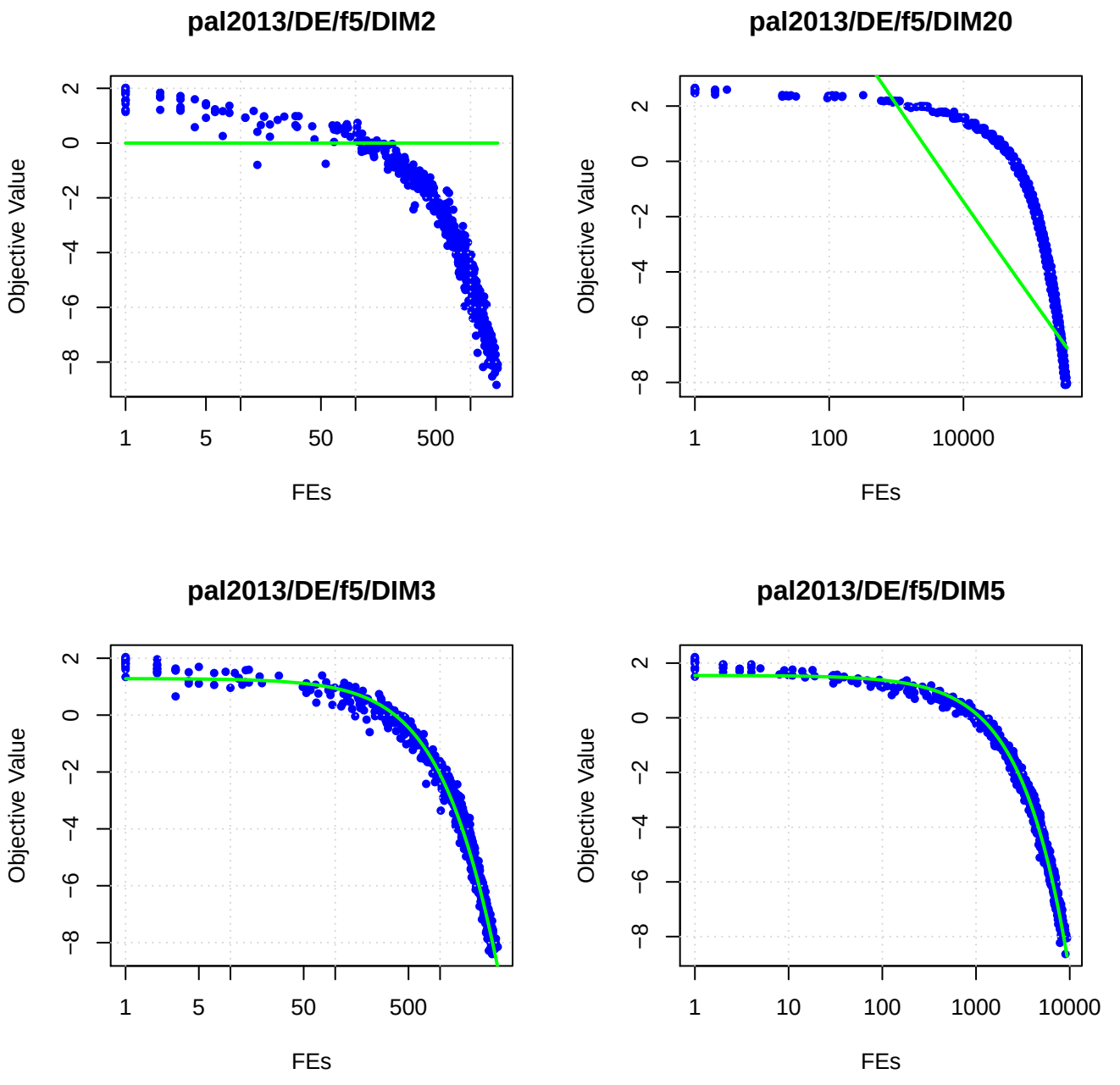
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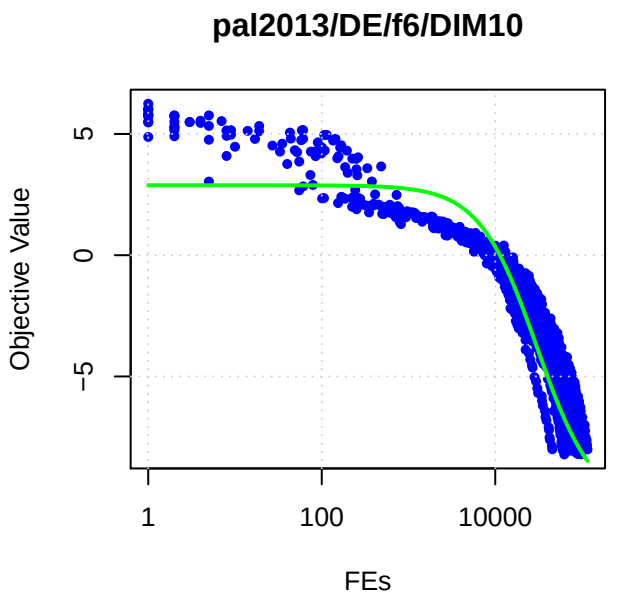
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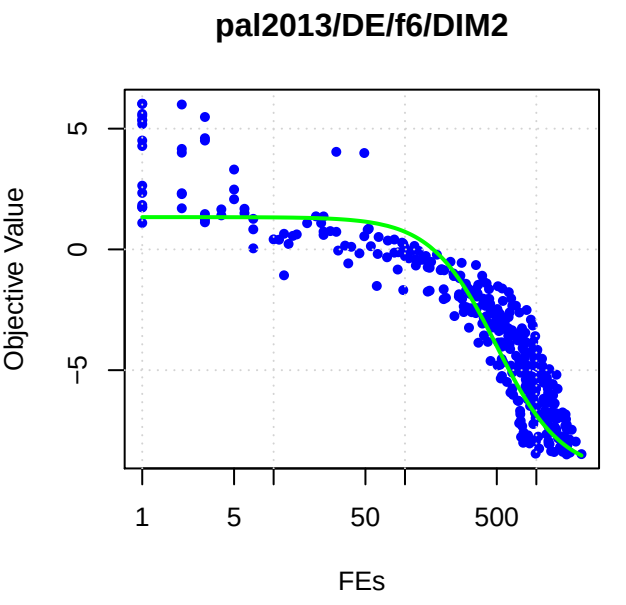
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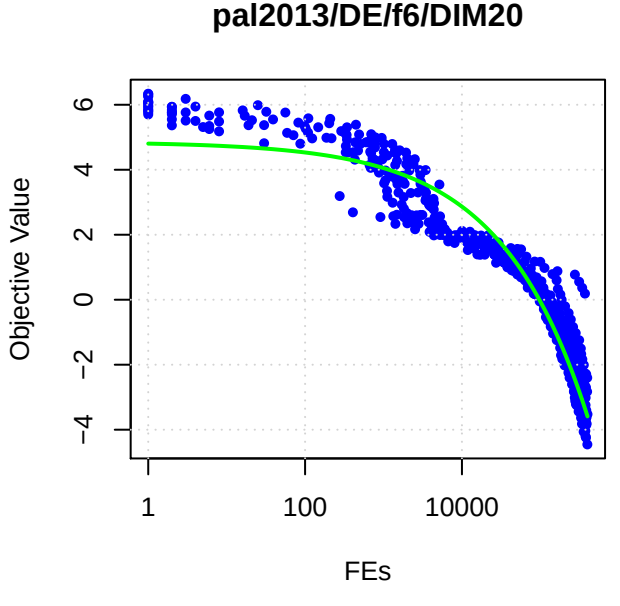
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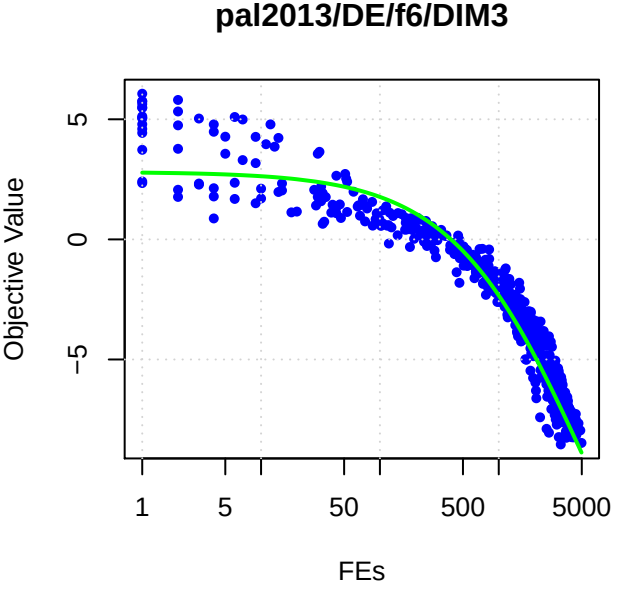
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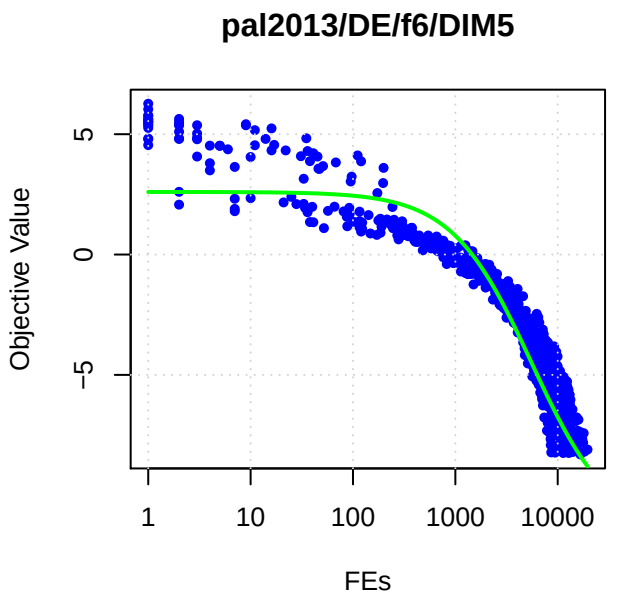
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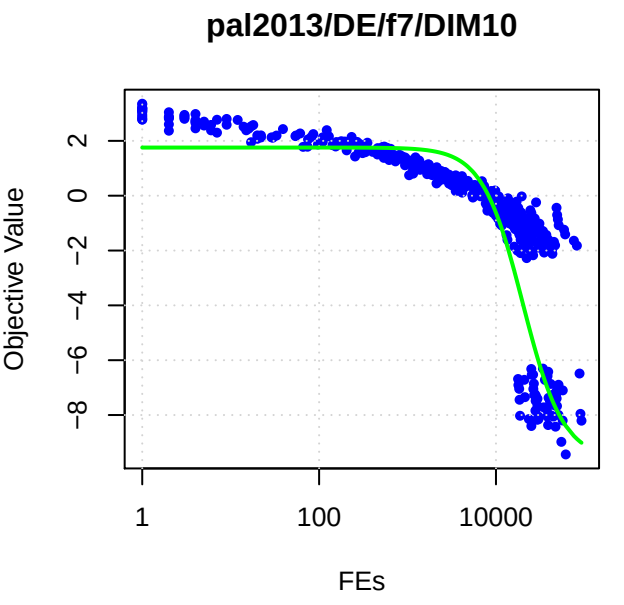
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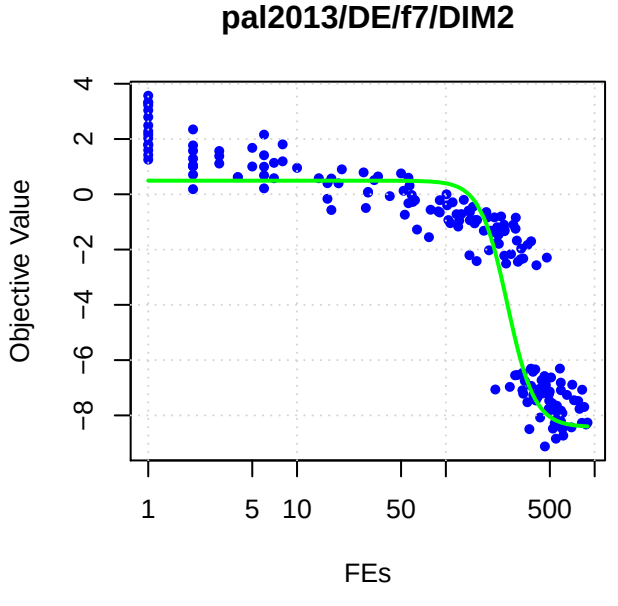
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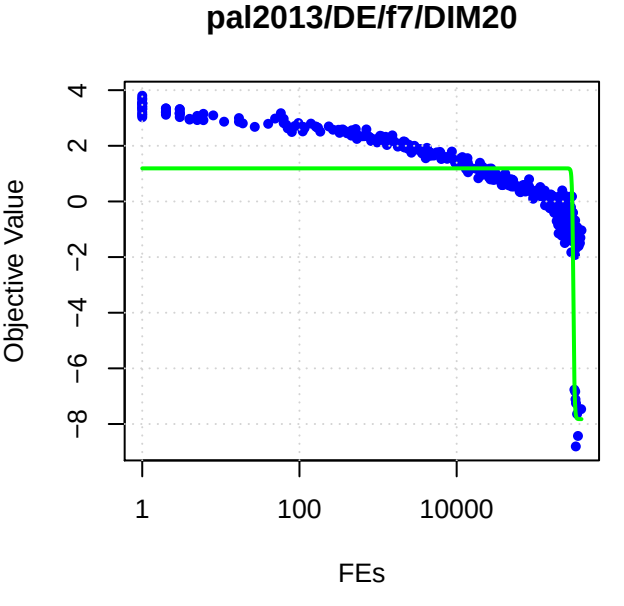
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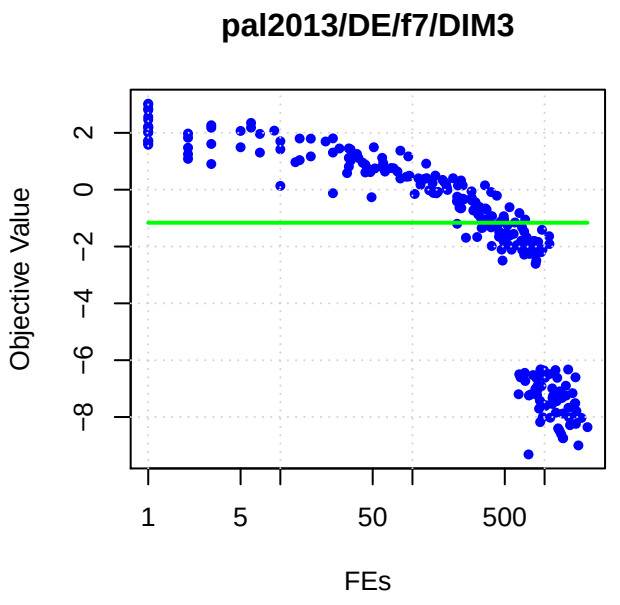
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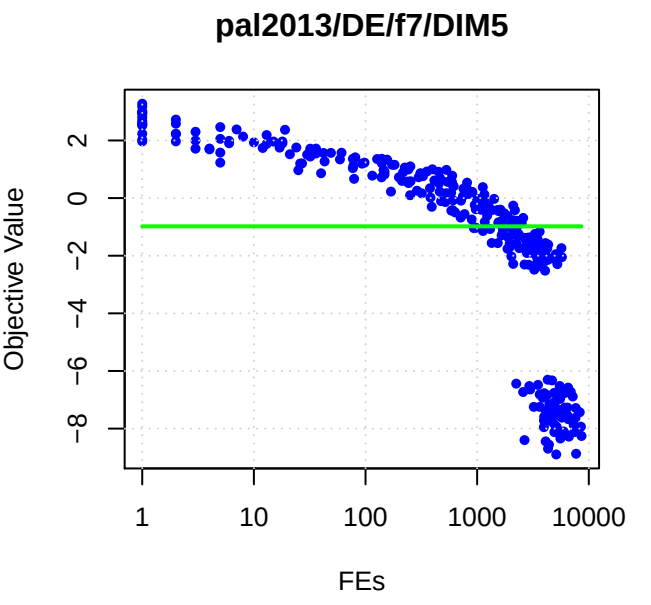
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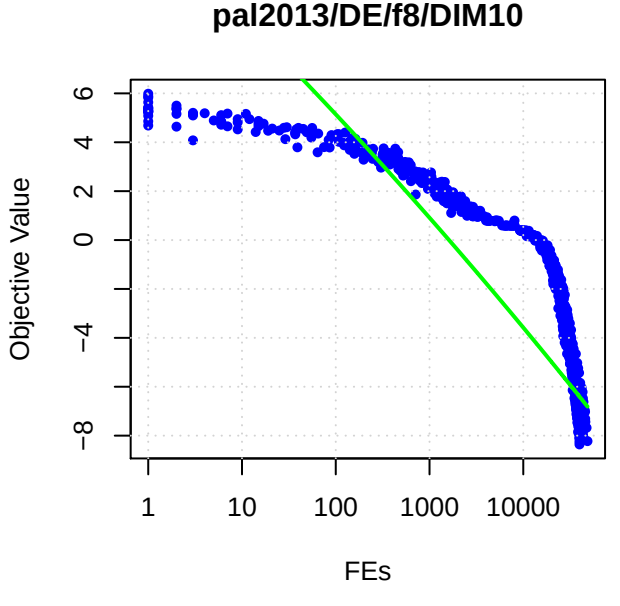
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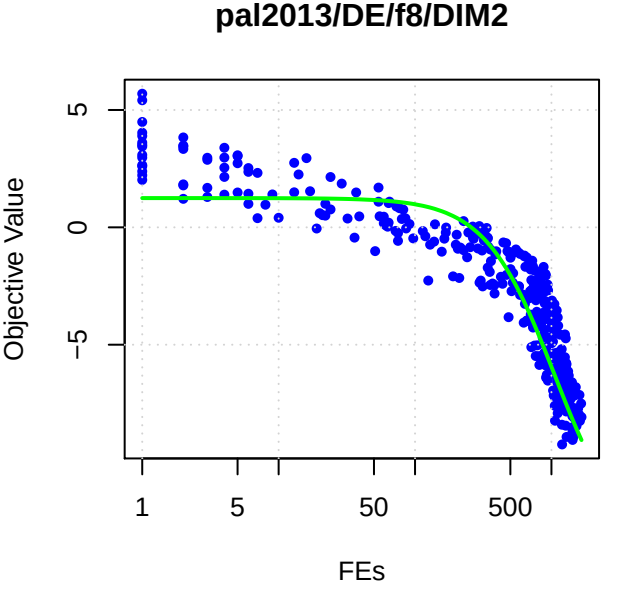
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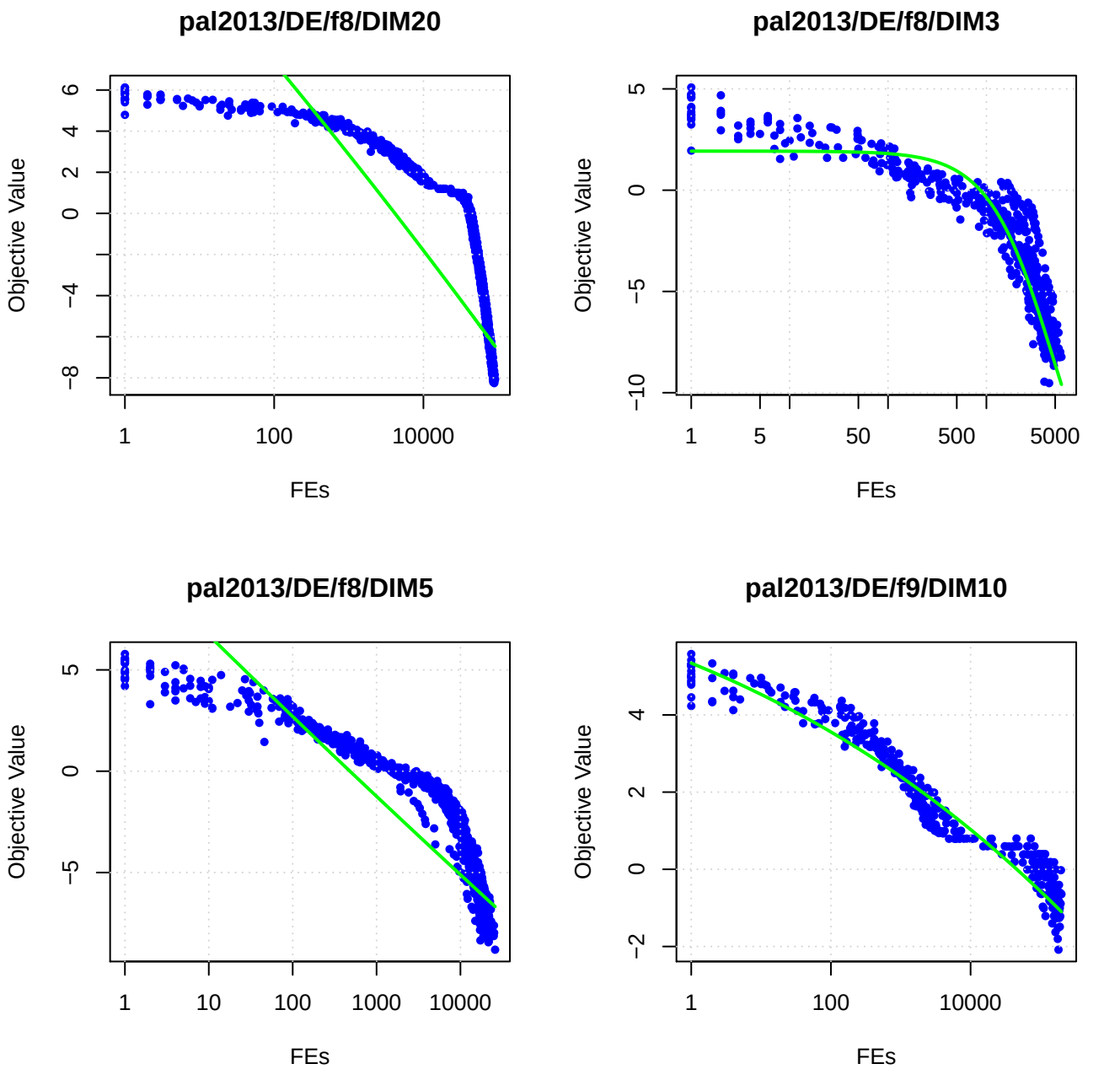
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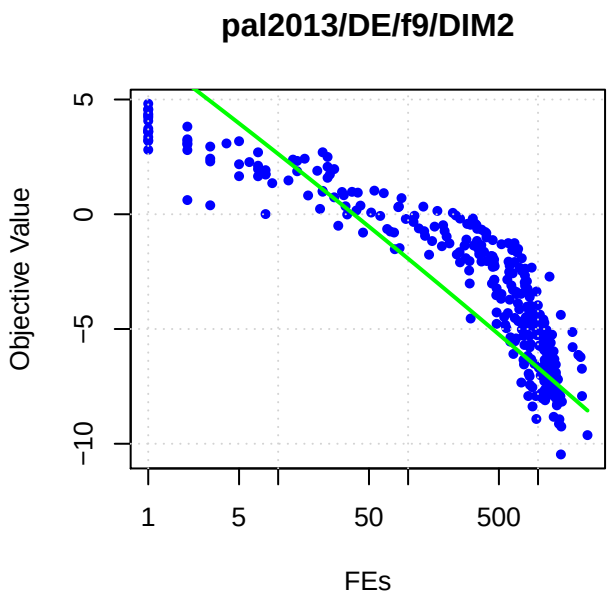
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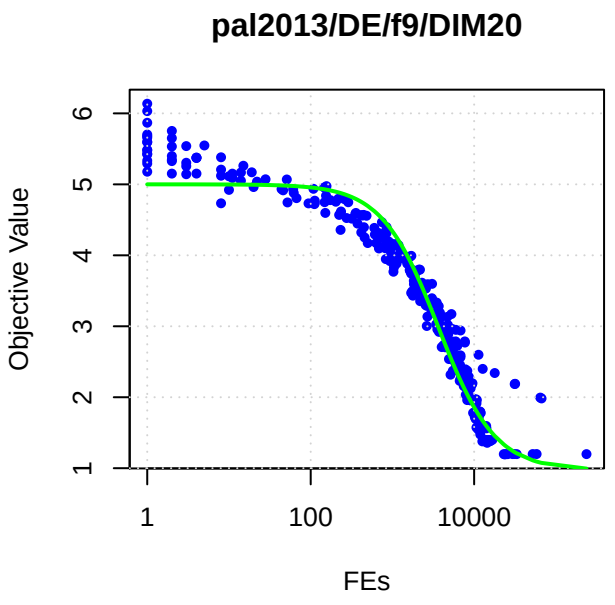
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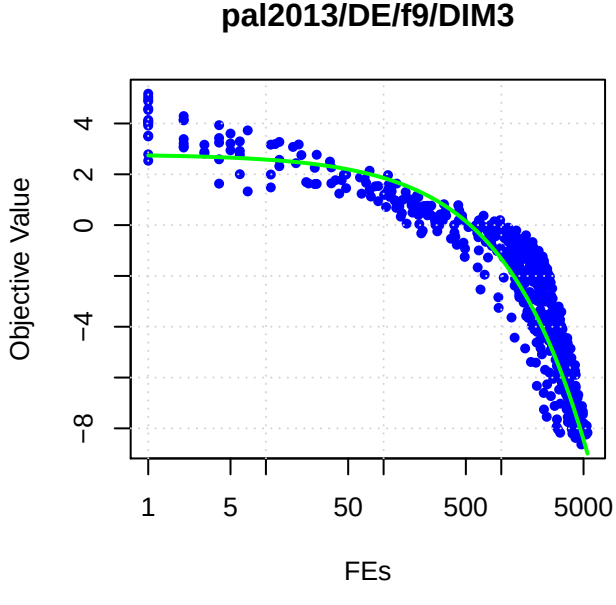
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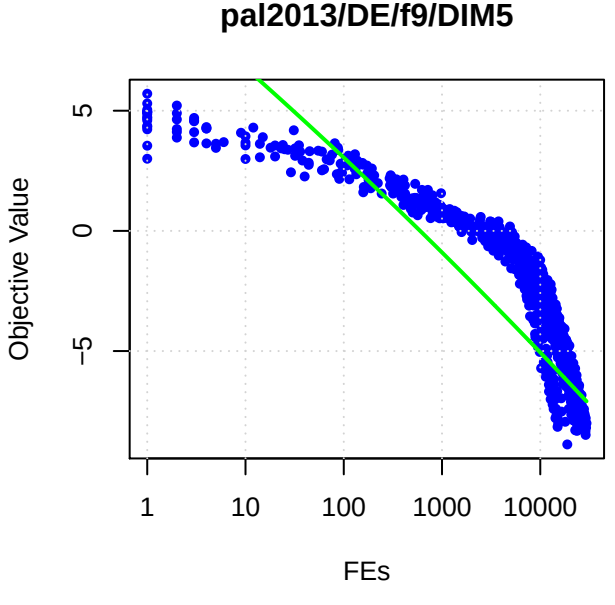
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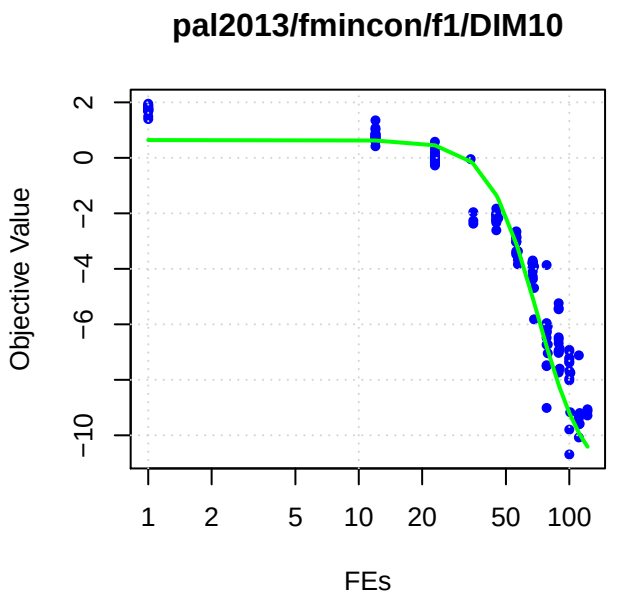
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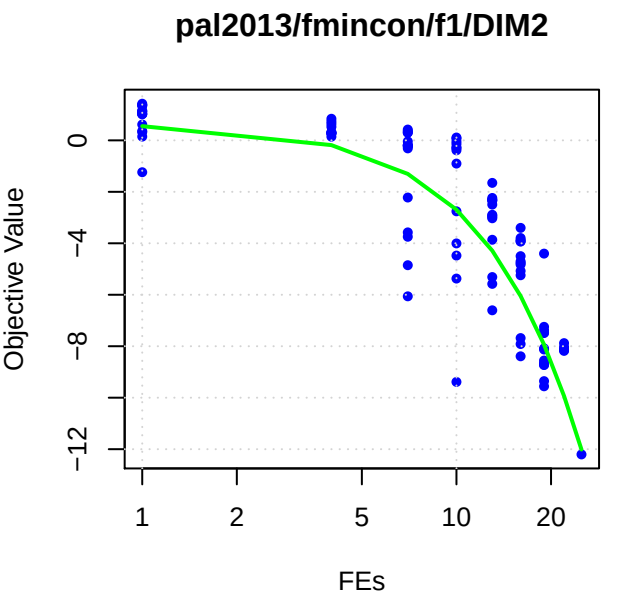
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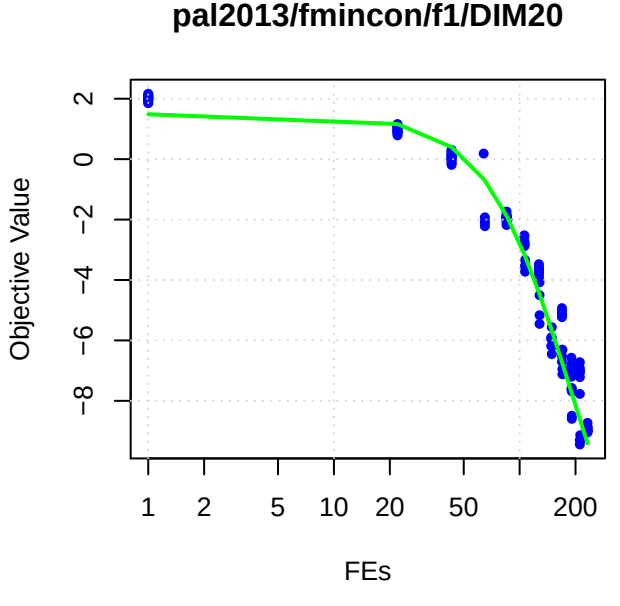
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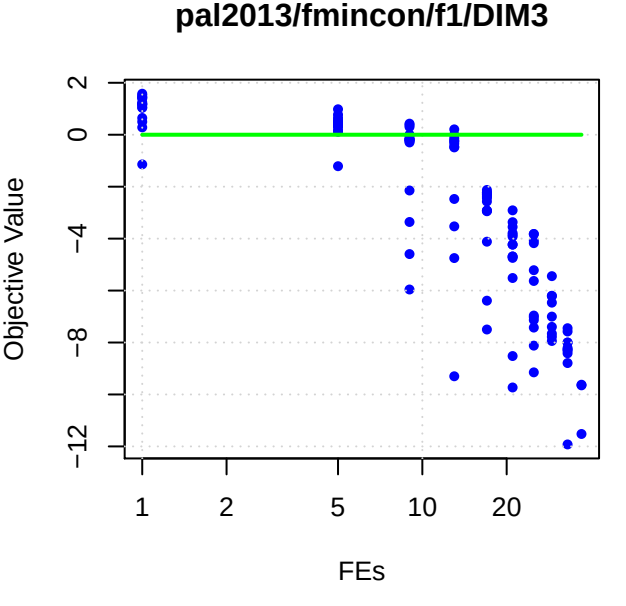
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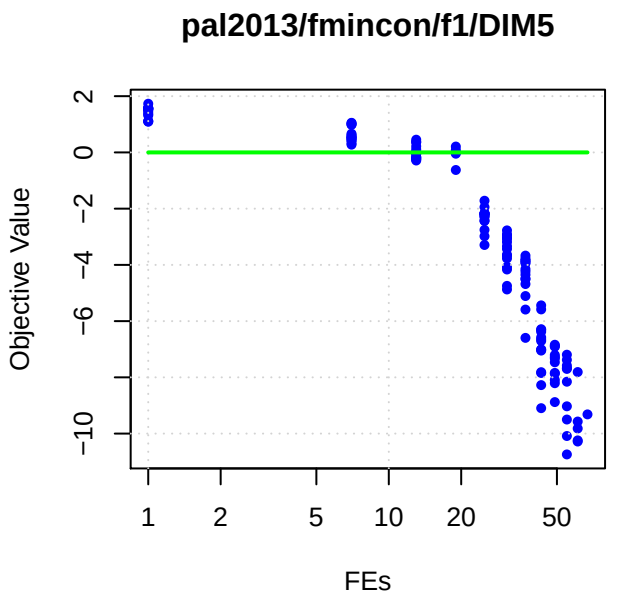
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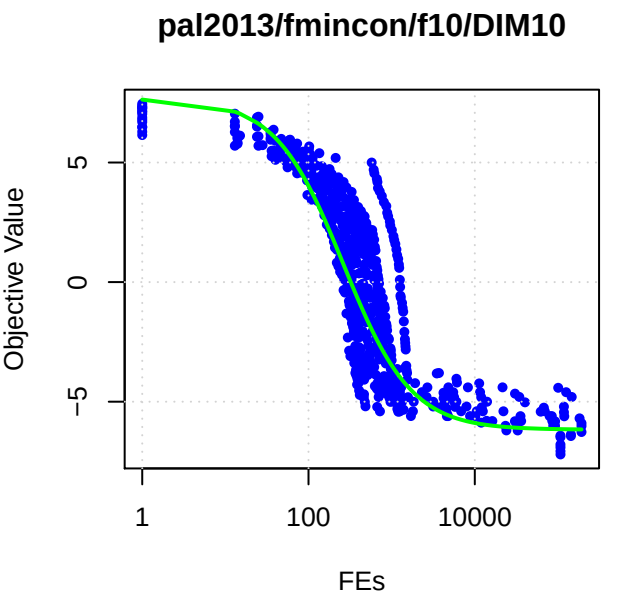
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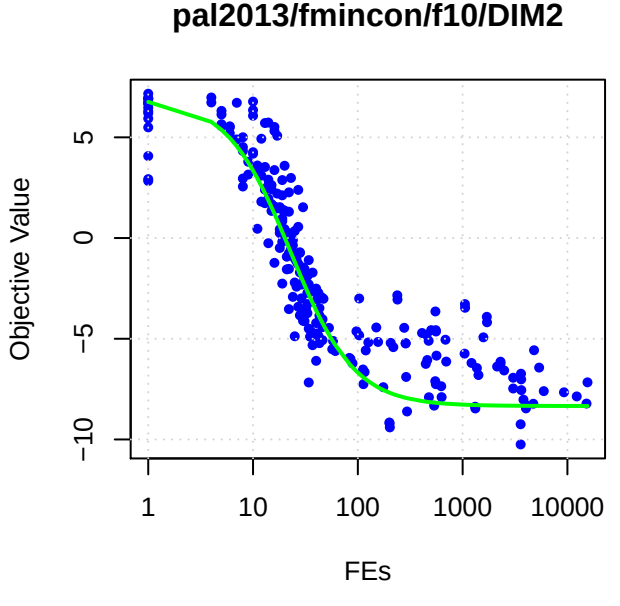
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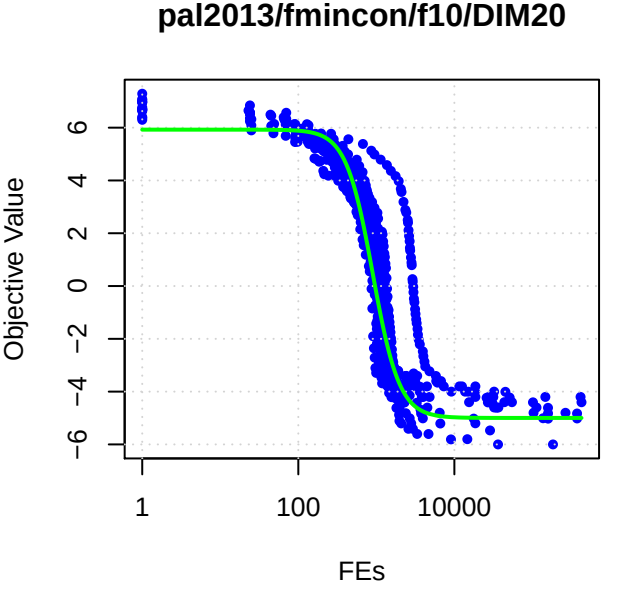
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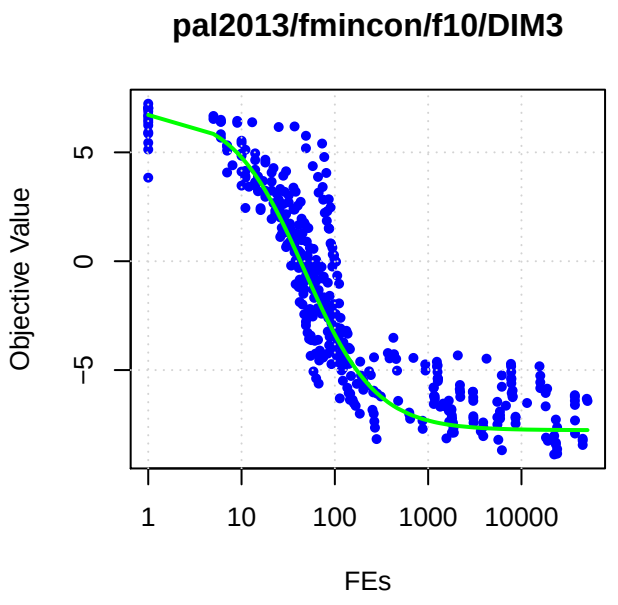
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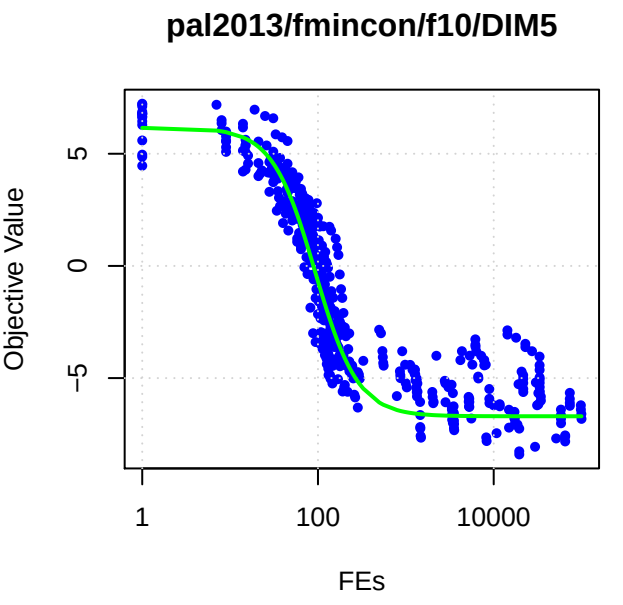
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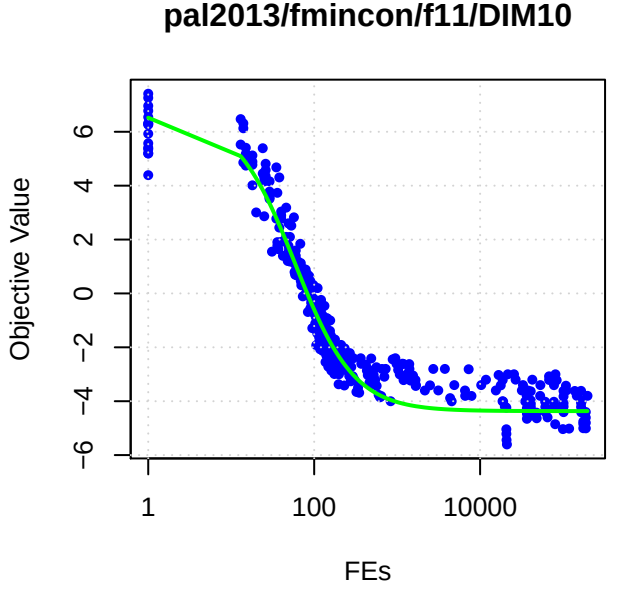
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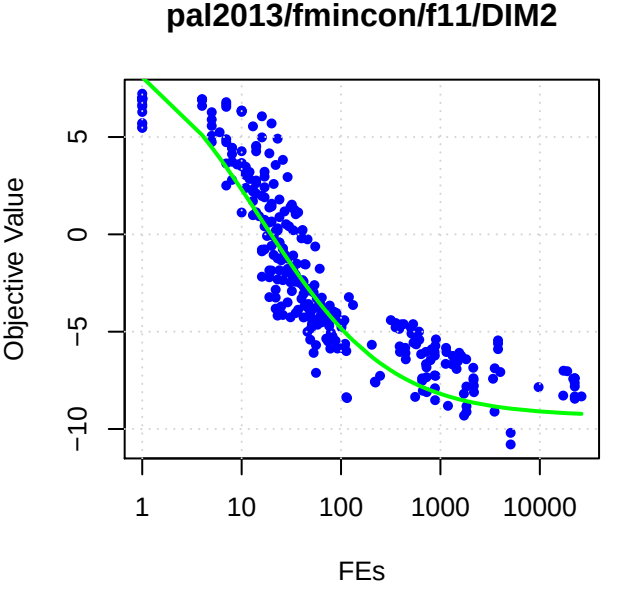
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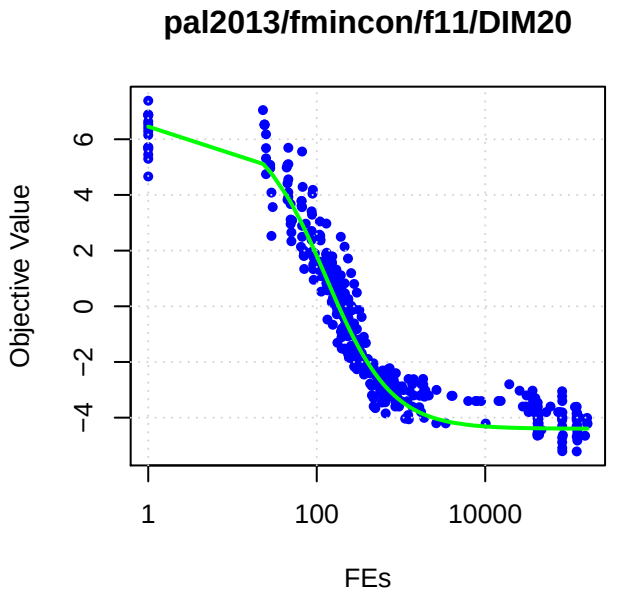
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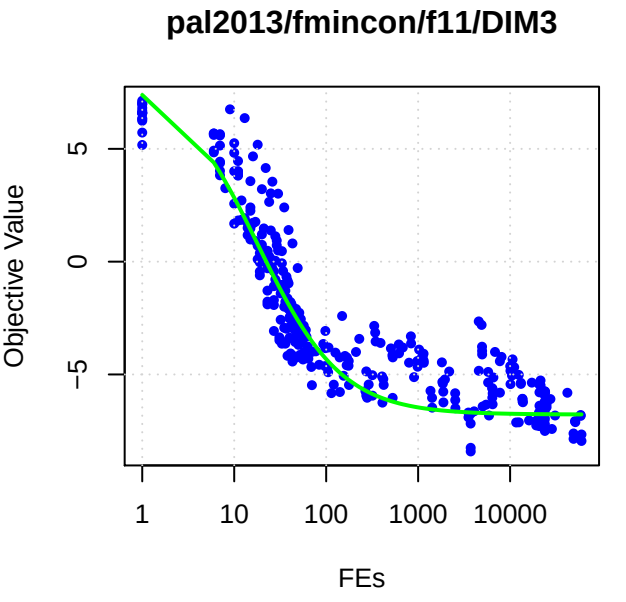
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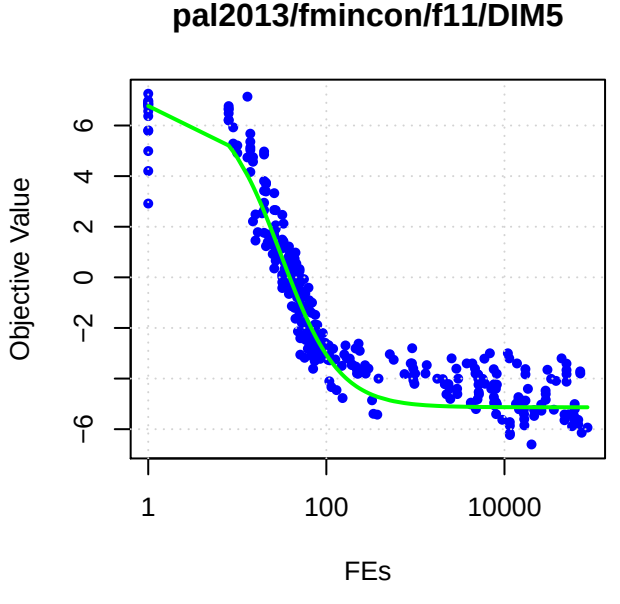
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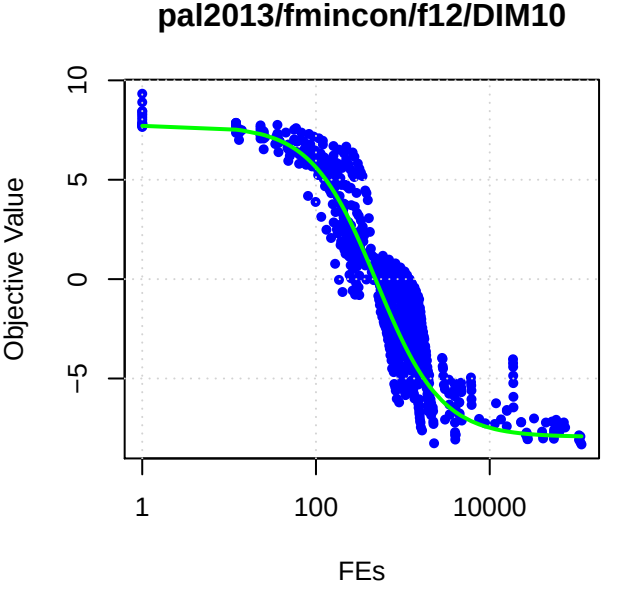
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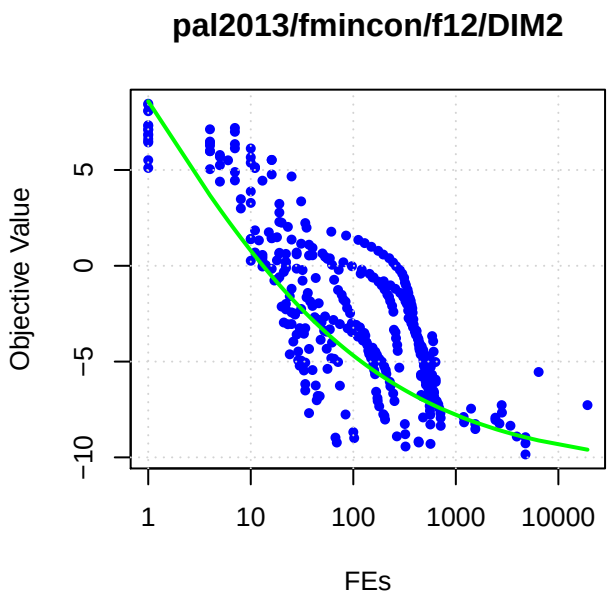
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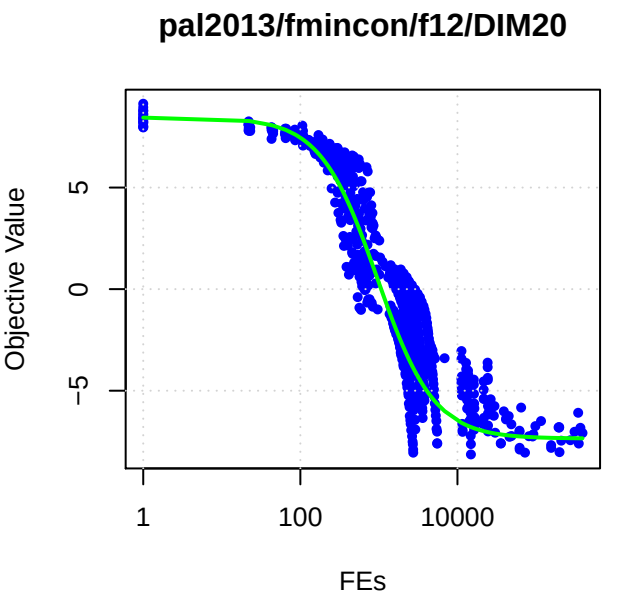
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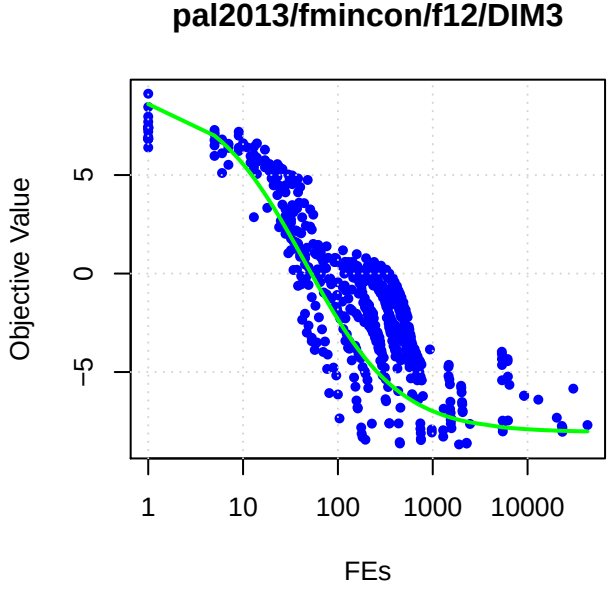
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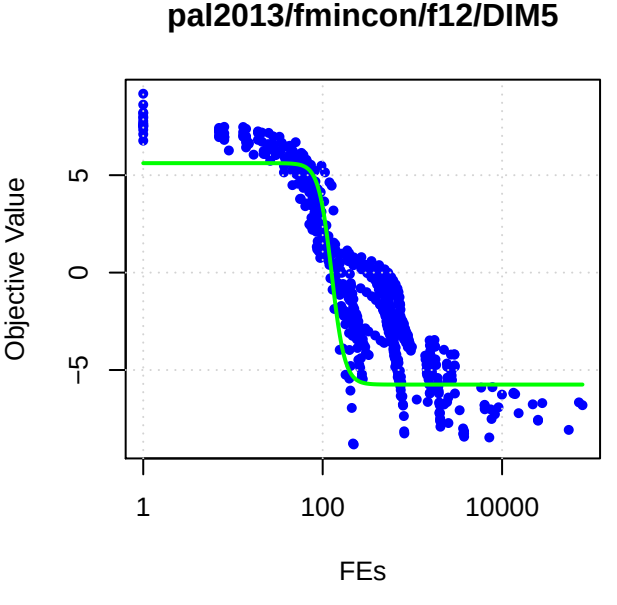
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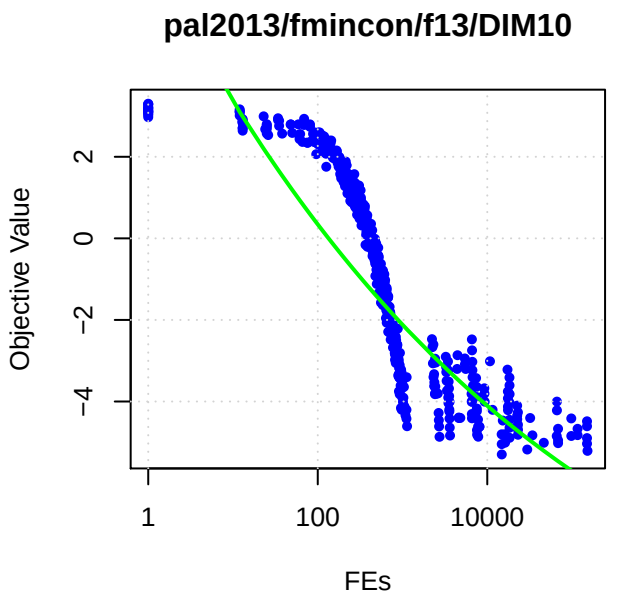
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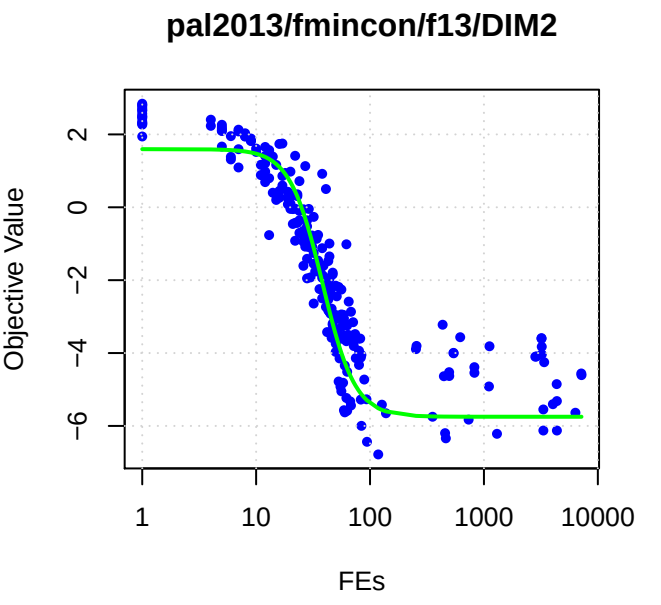
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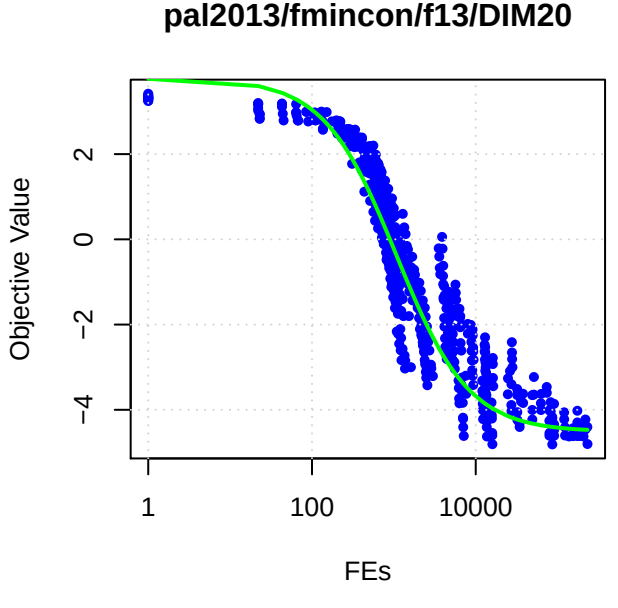
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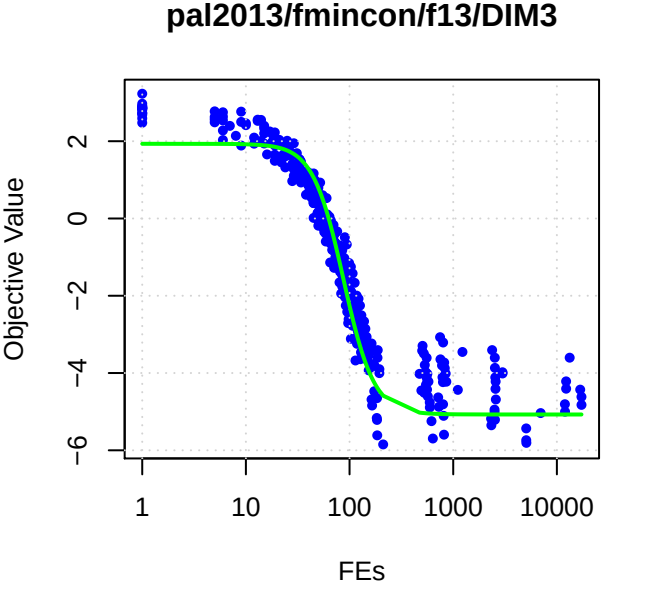
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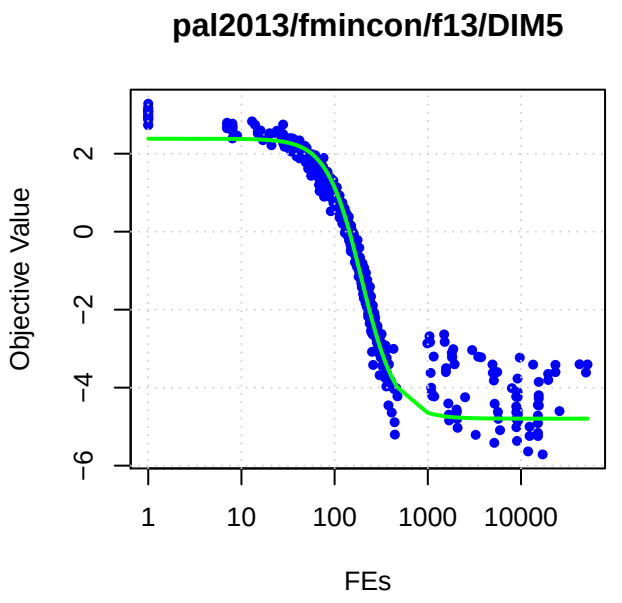
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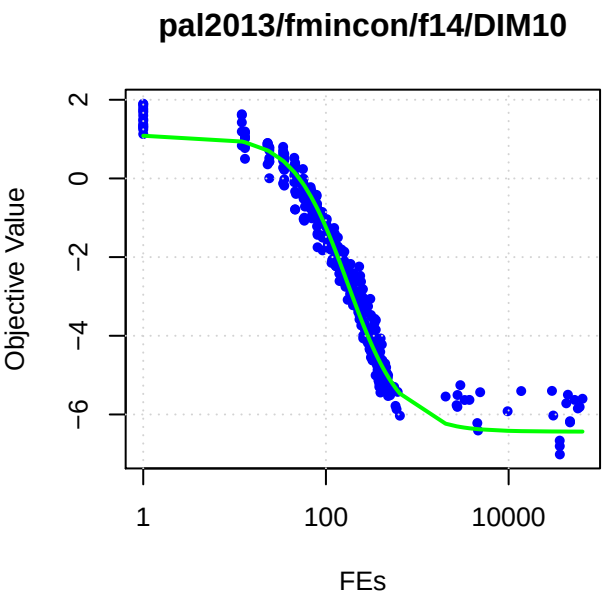
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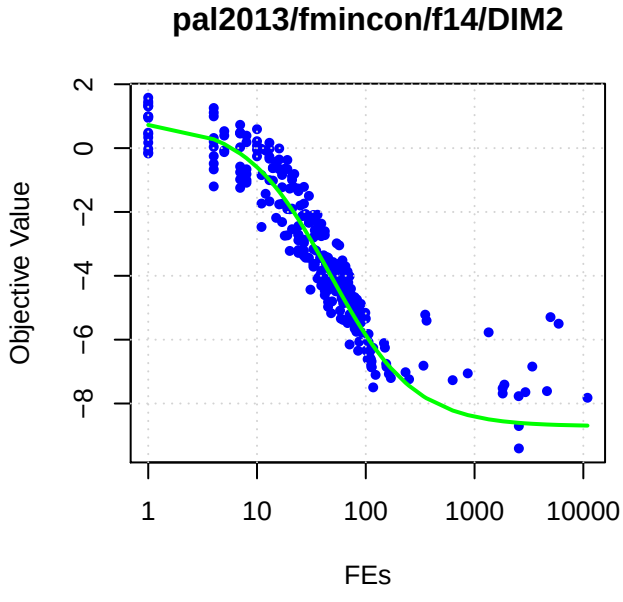
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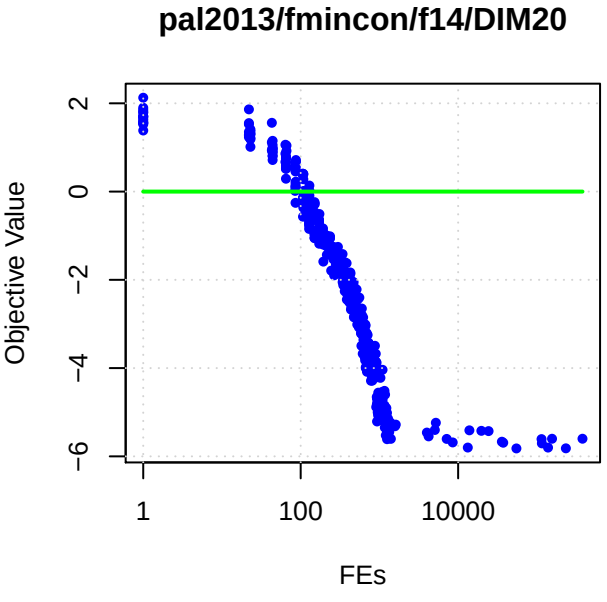
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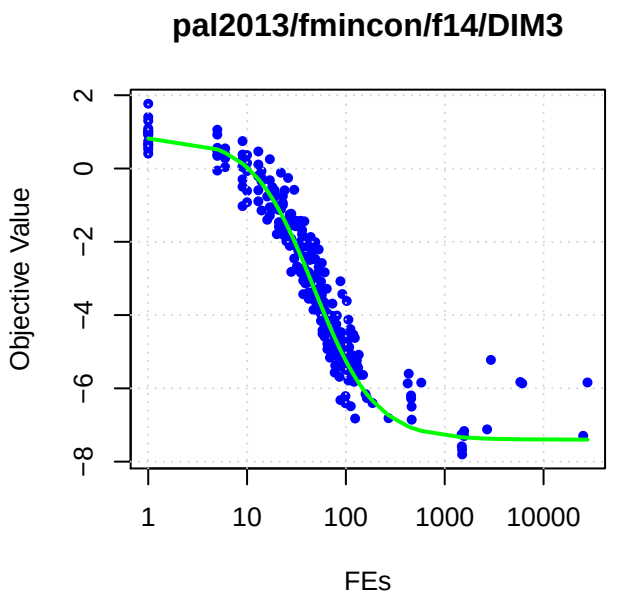
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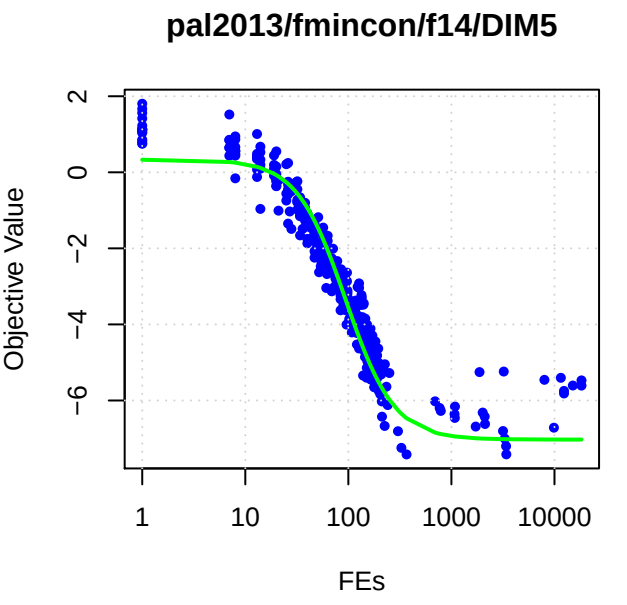
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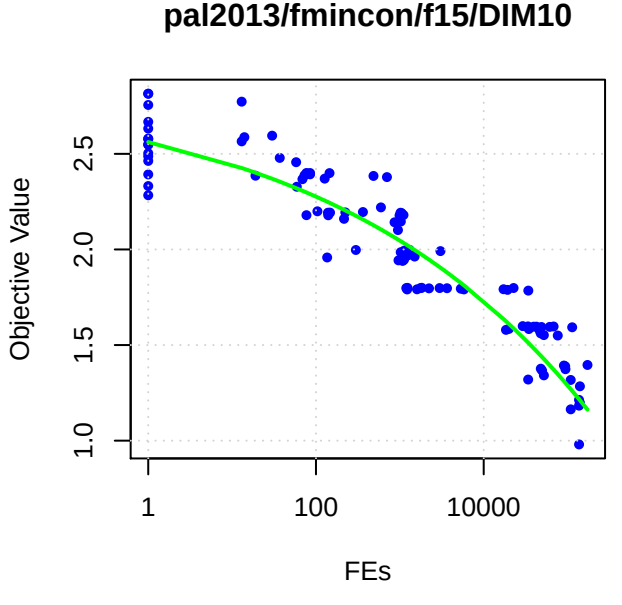
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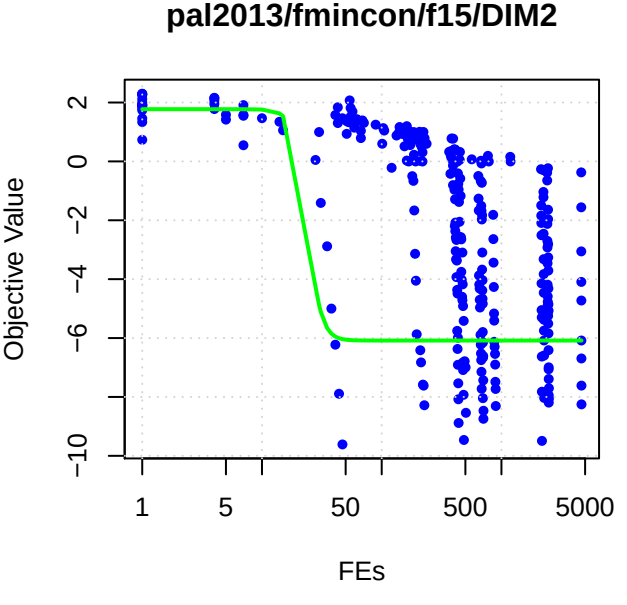
FEs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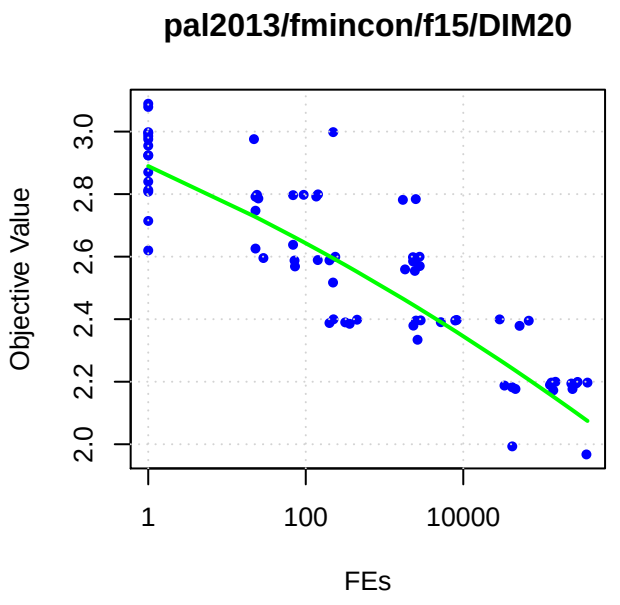
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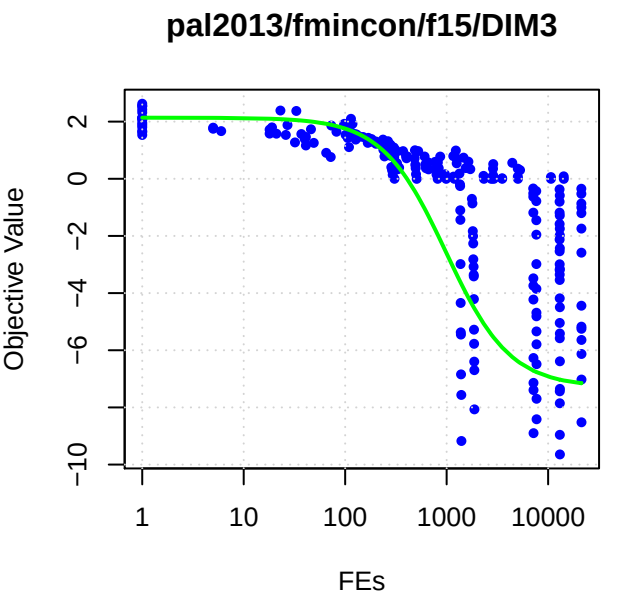
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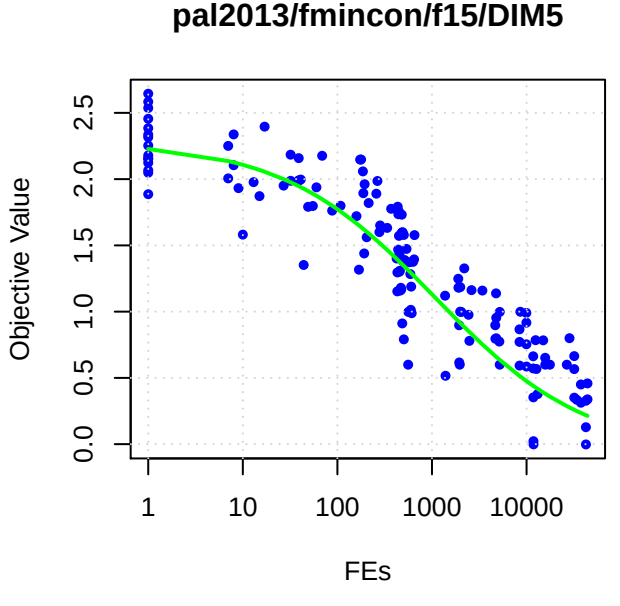
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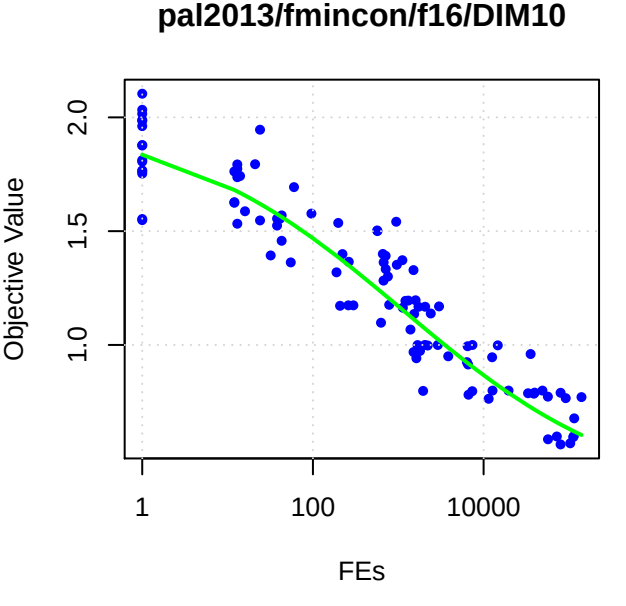
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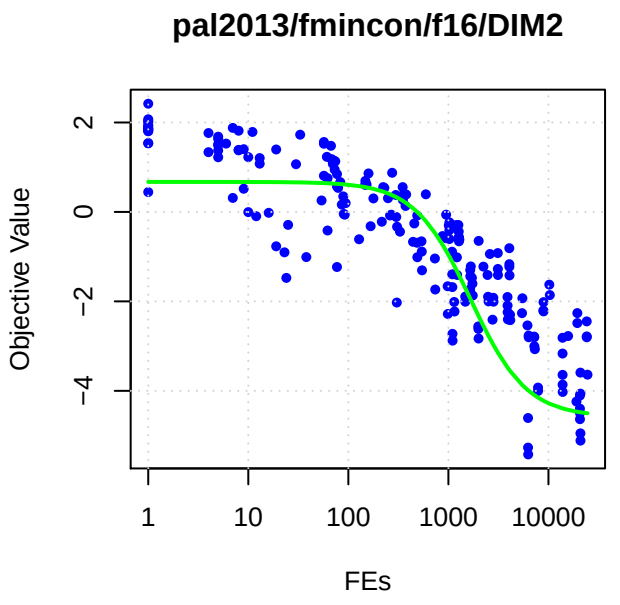
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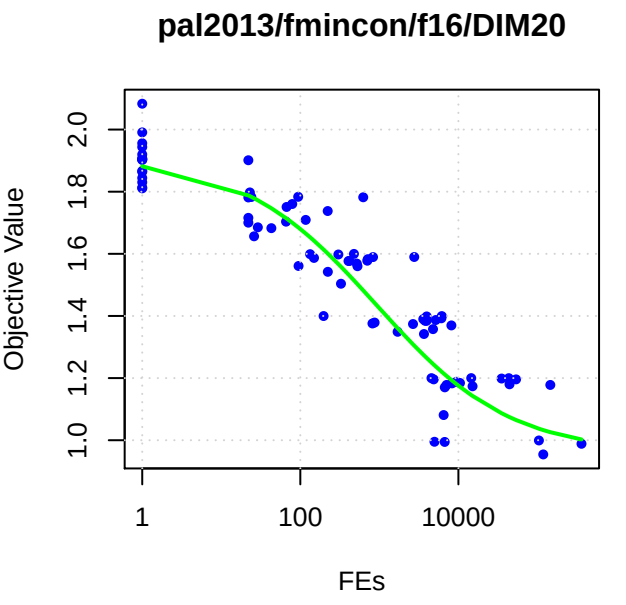
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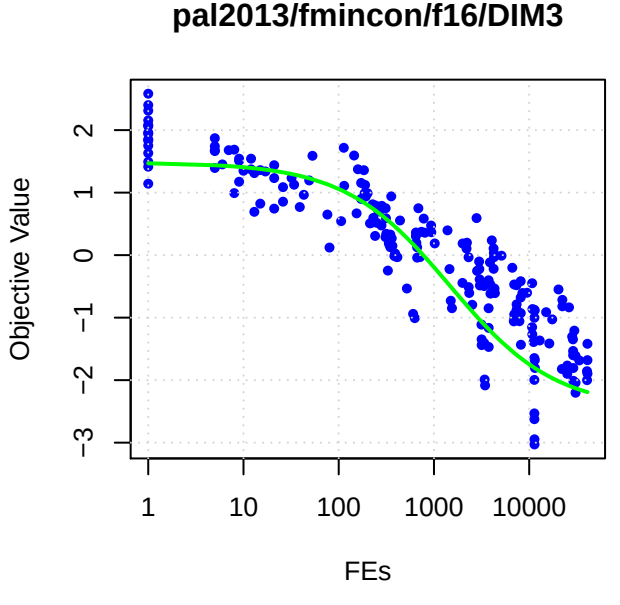
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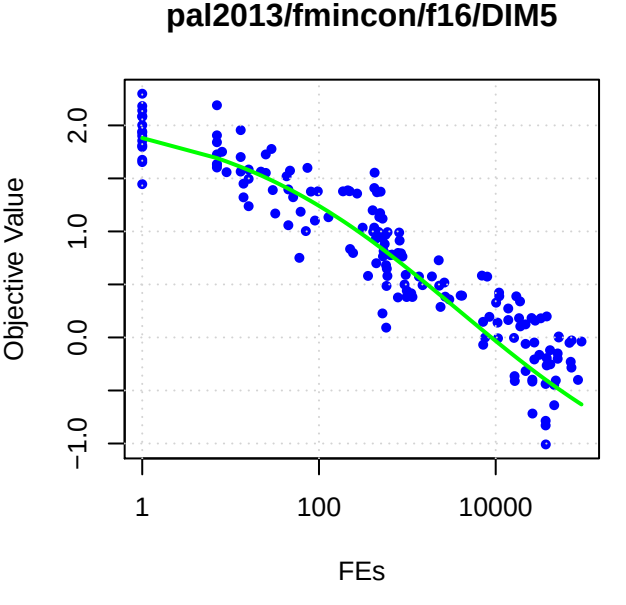
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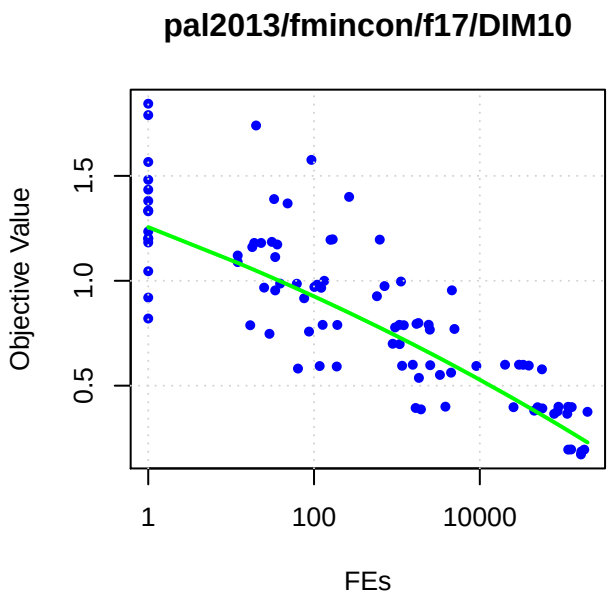
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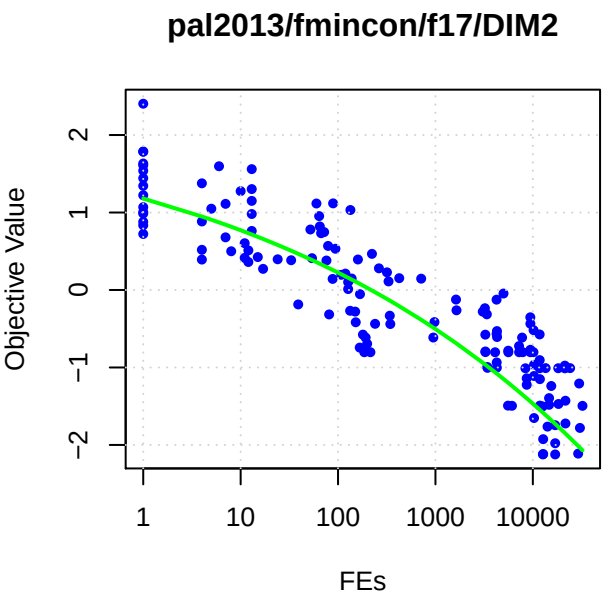
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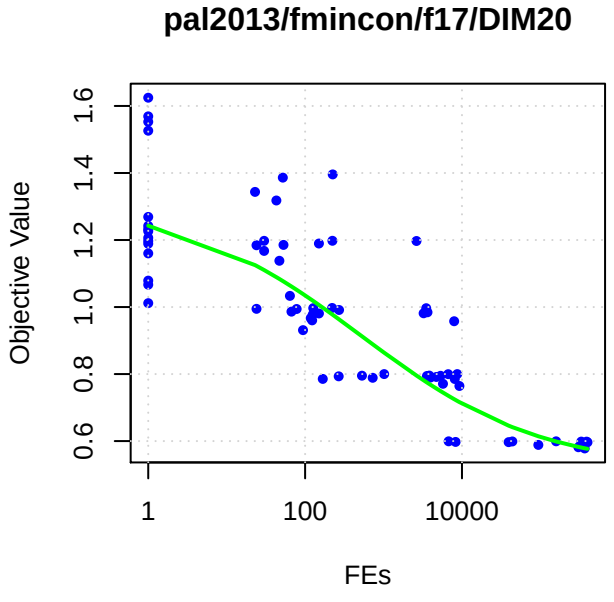
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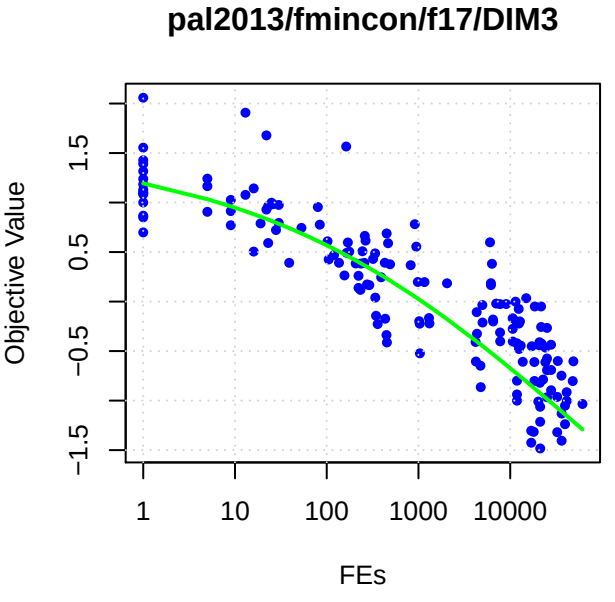
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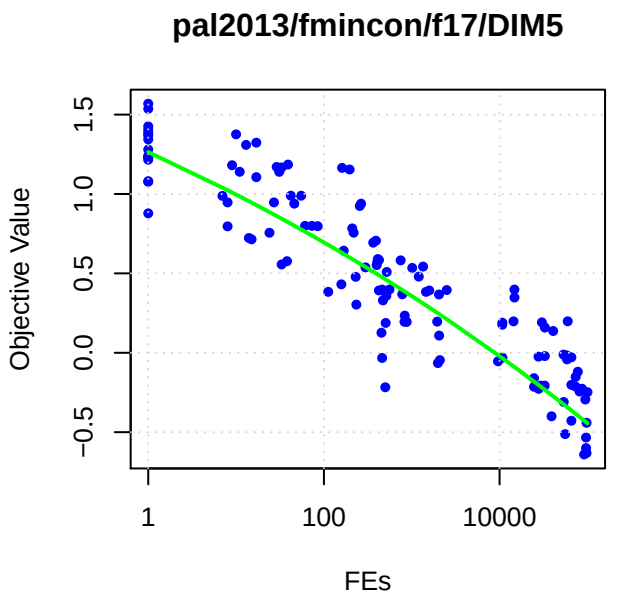
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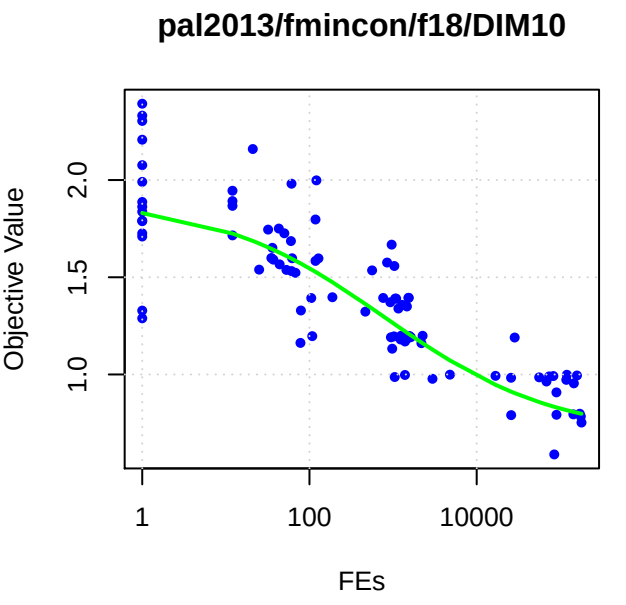
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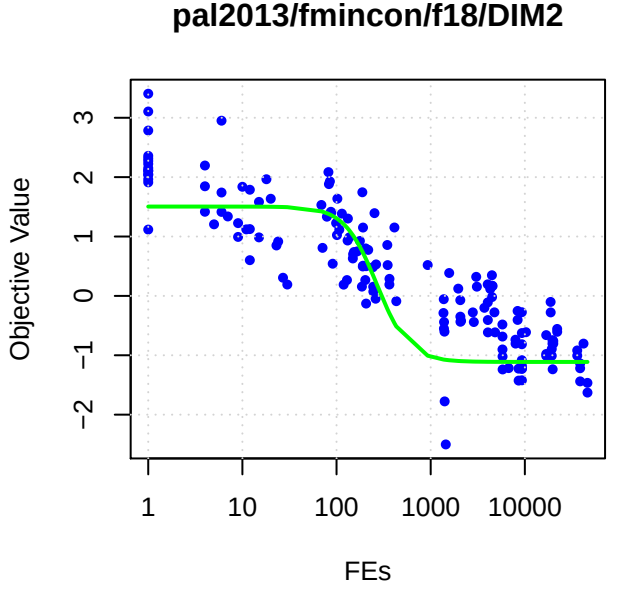
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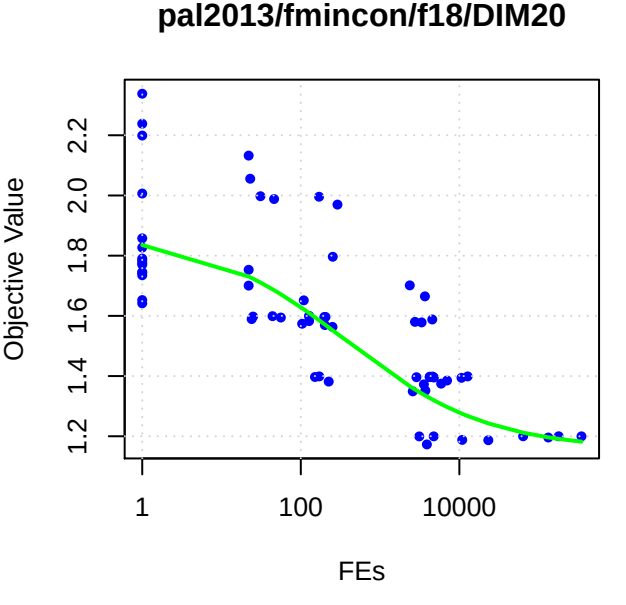
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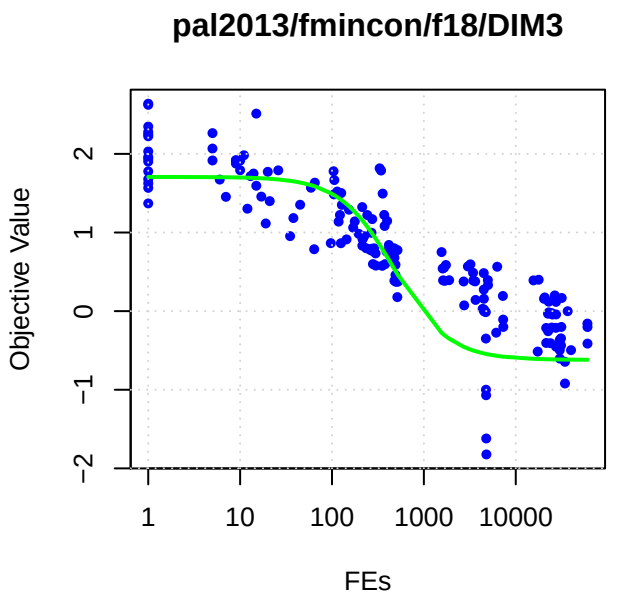
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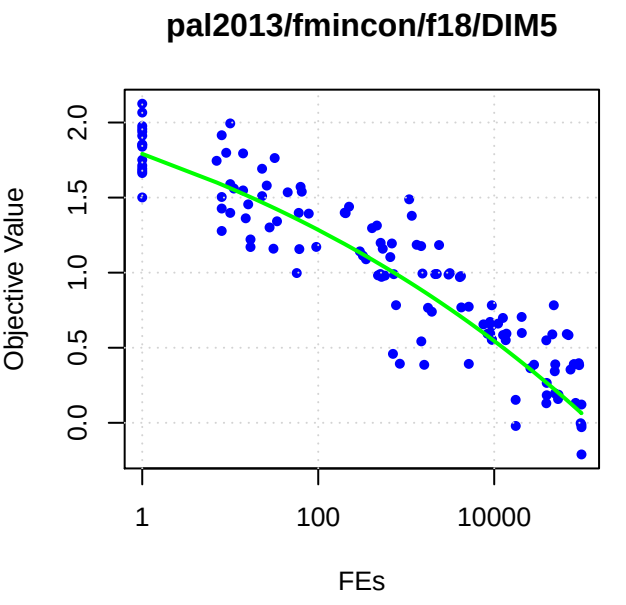
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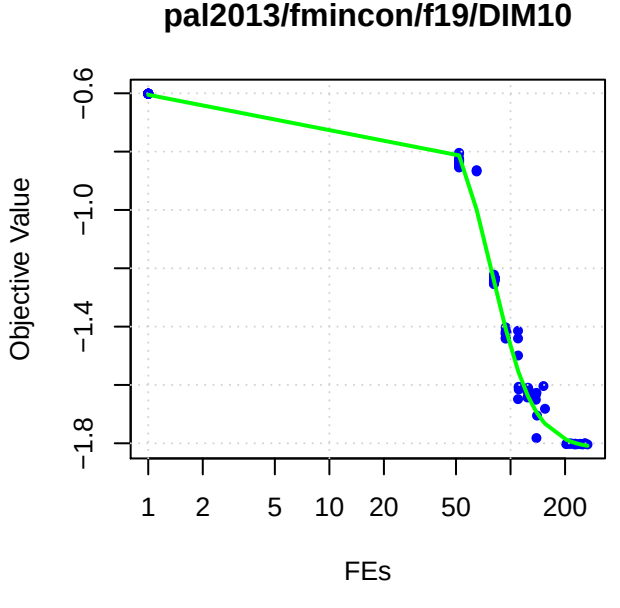
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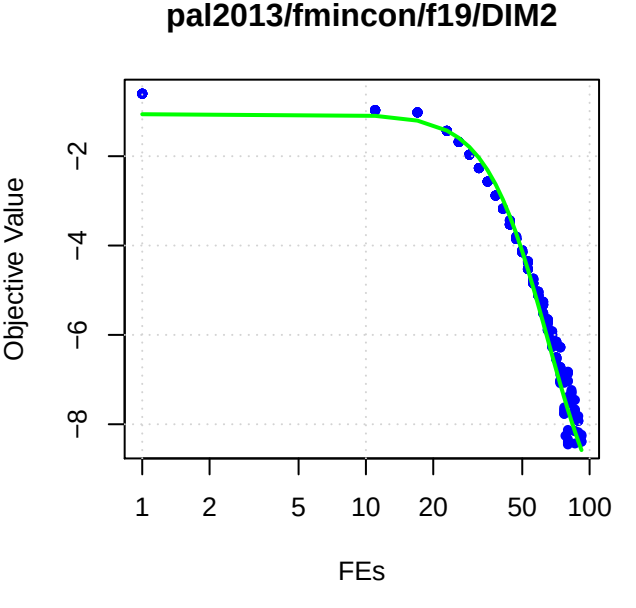
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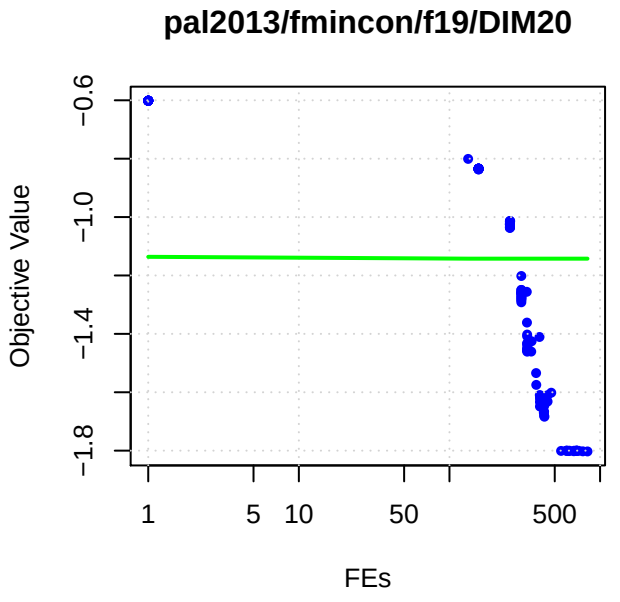
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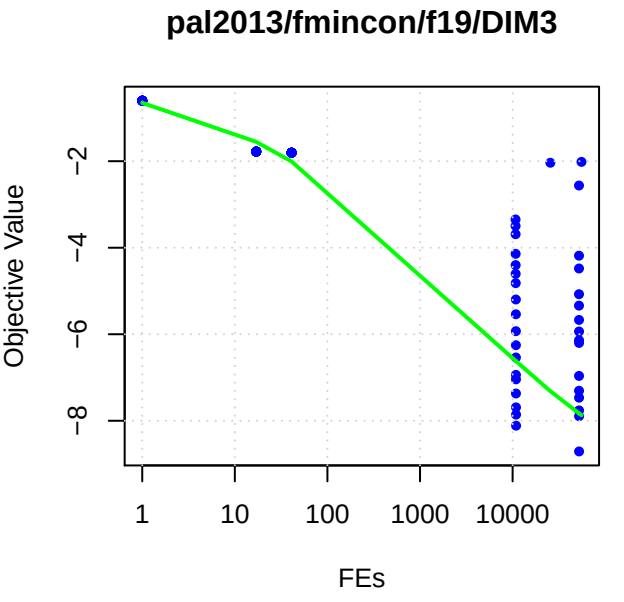
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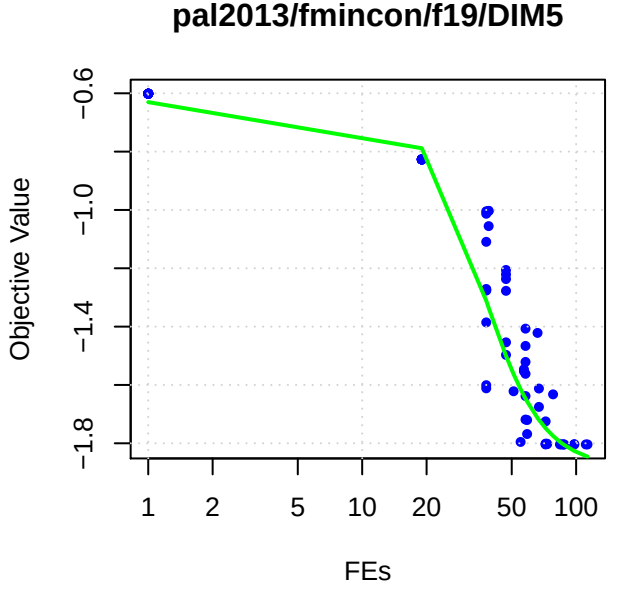
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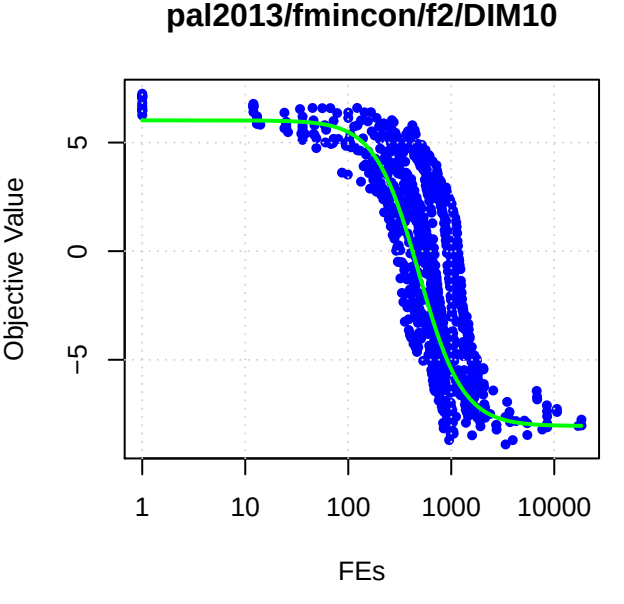
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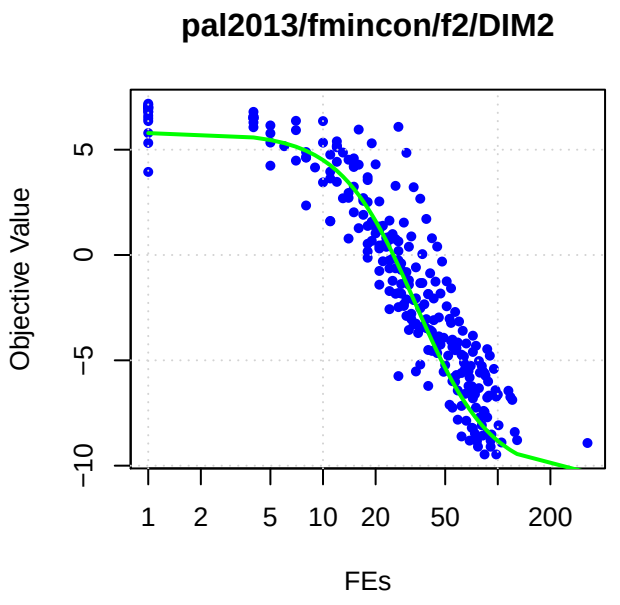
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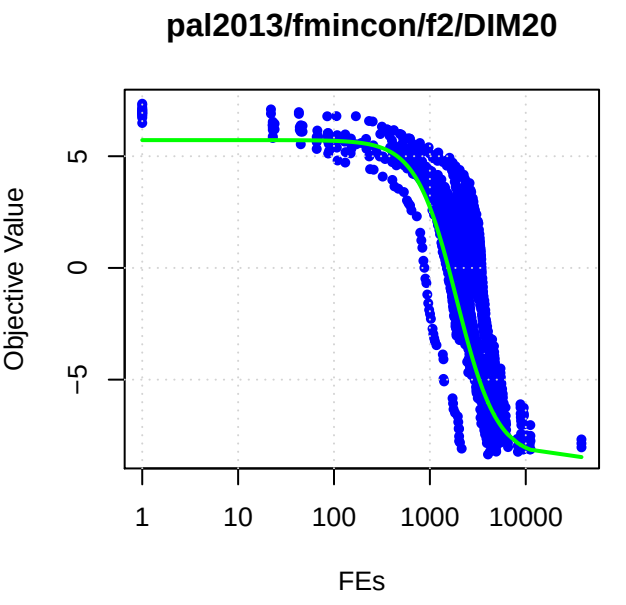
FEs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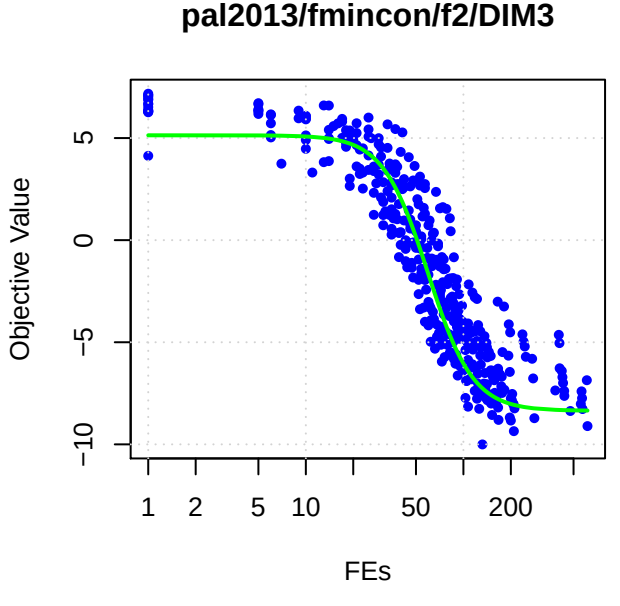
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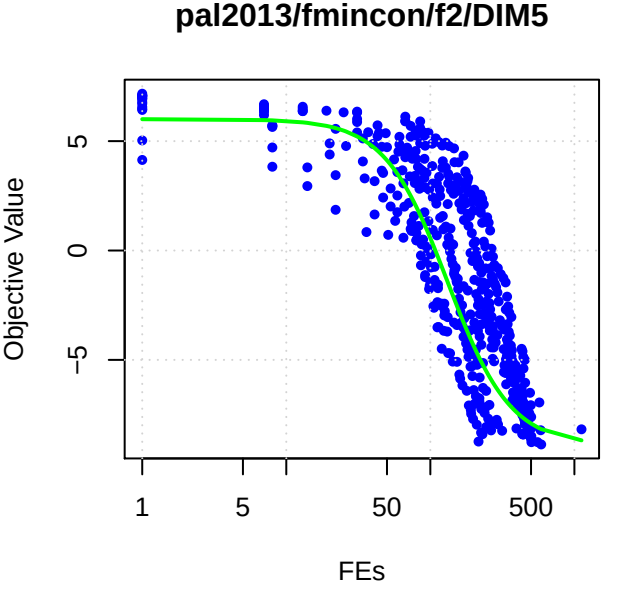
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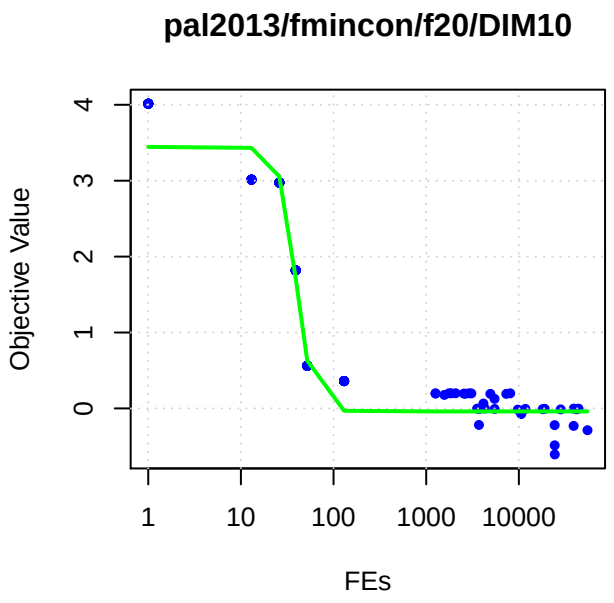
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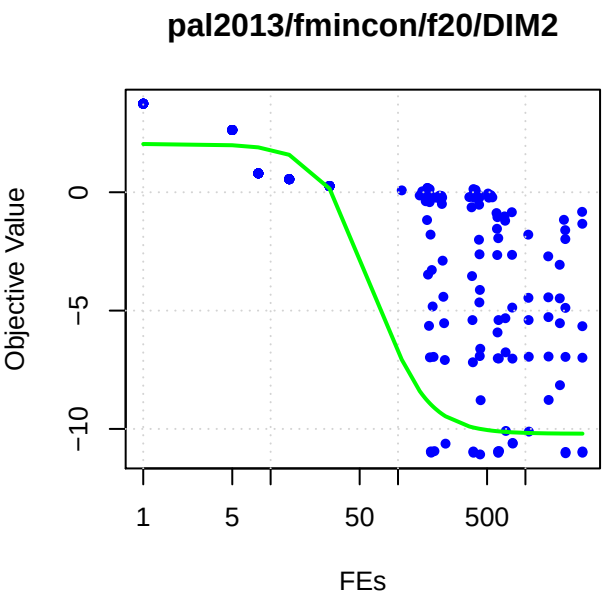
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FEs
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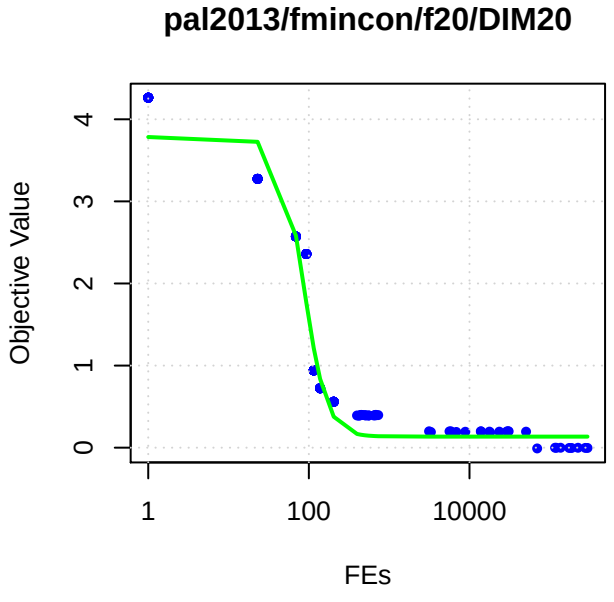
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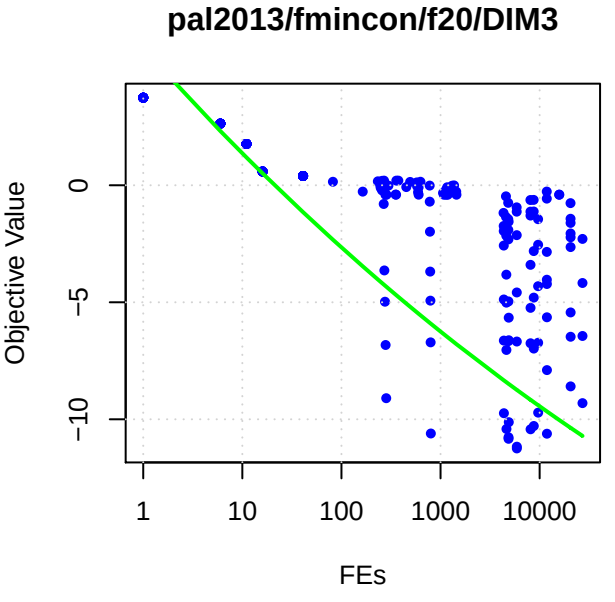
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Objective Value
FEs
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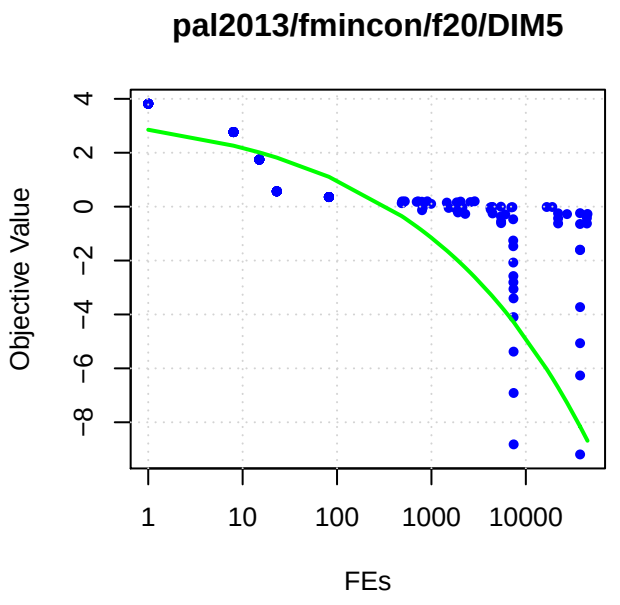
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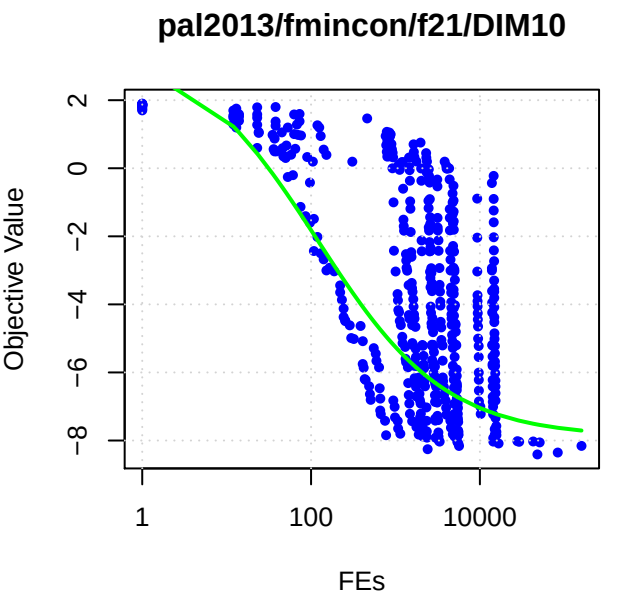
FEs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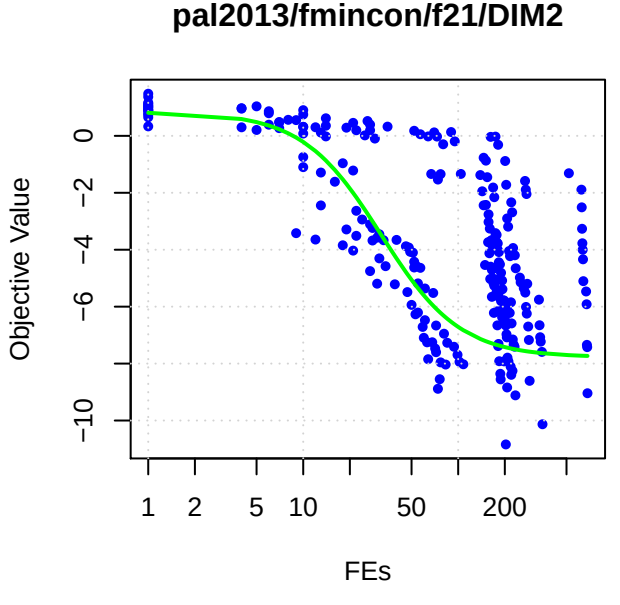
FEs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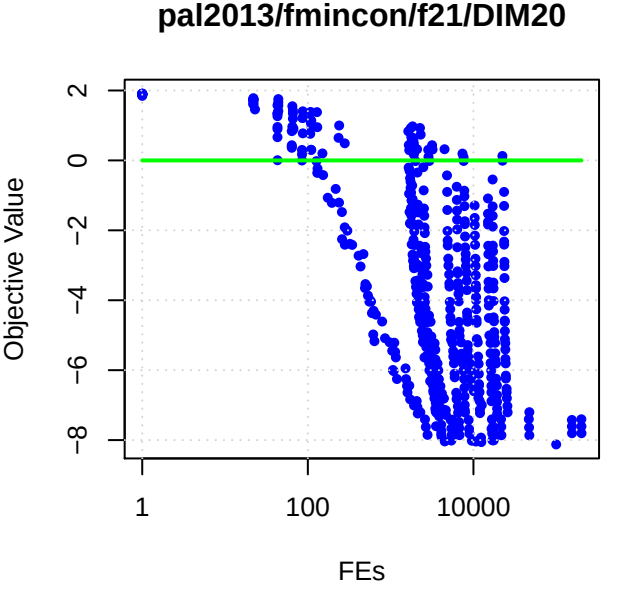
FEs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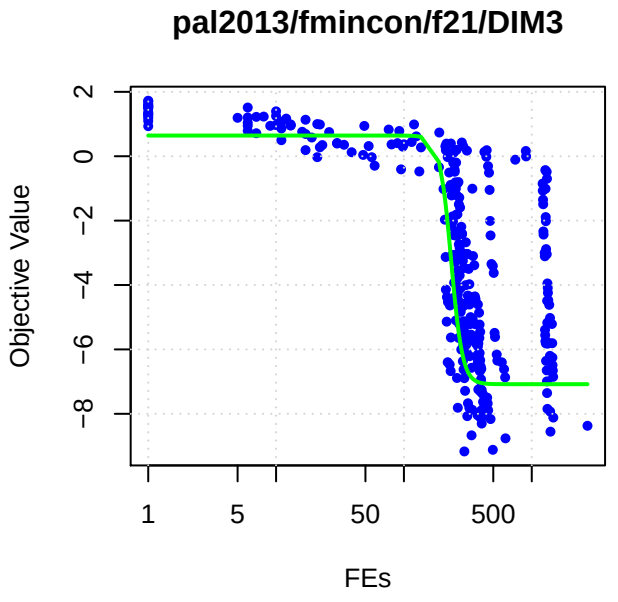
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Objective Value
FEs
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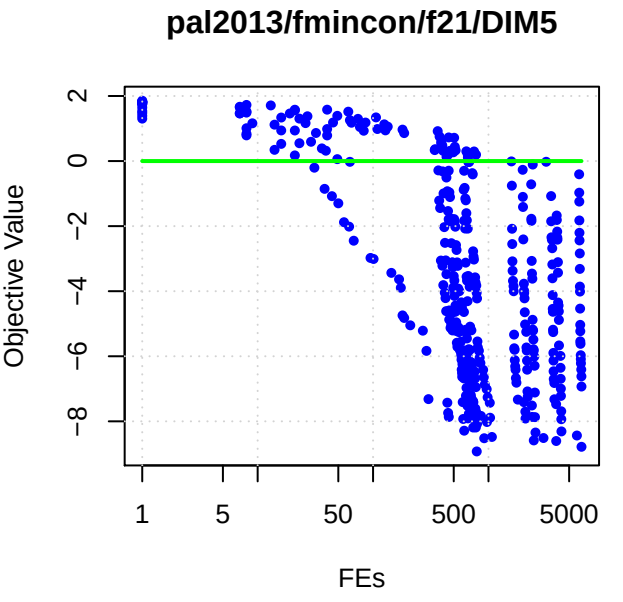
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FEs
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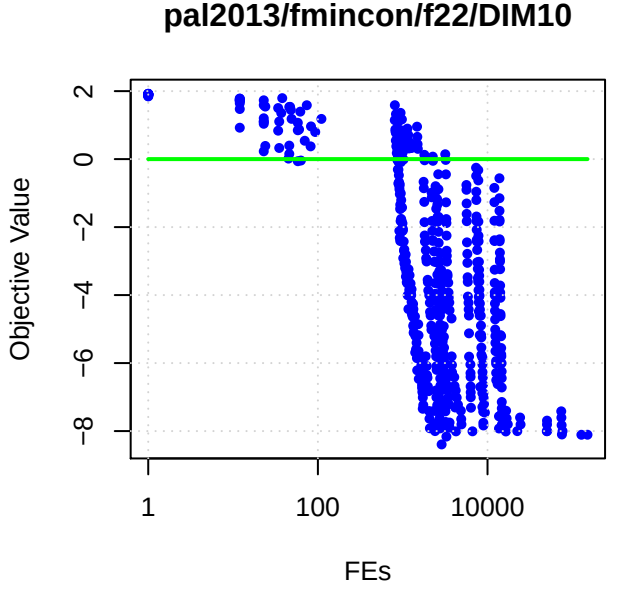
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Objective Value
FEs
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100
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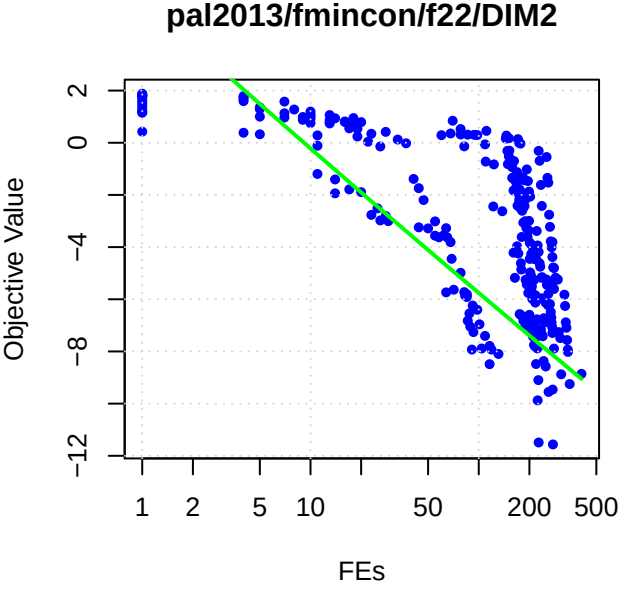
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FEs
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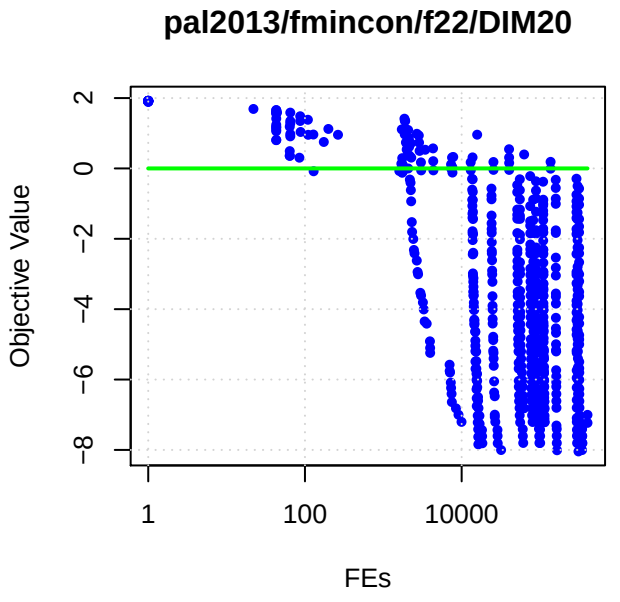
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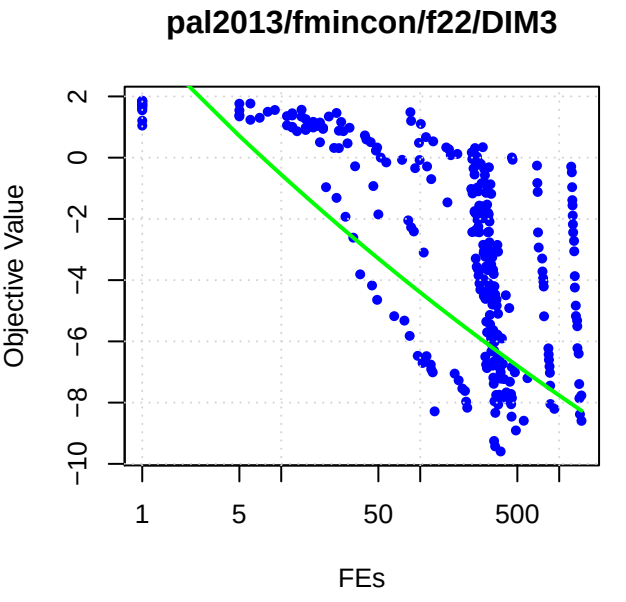
FEs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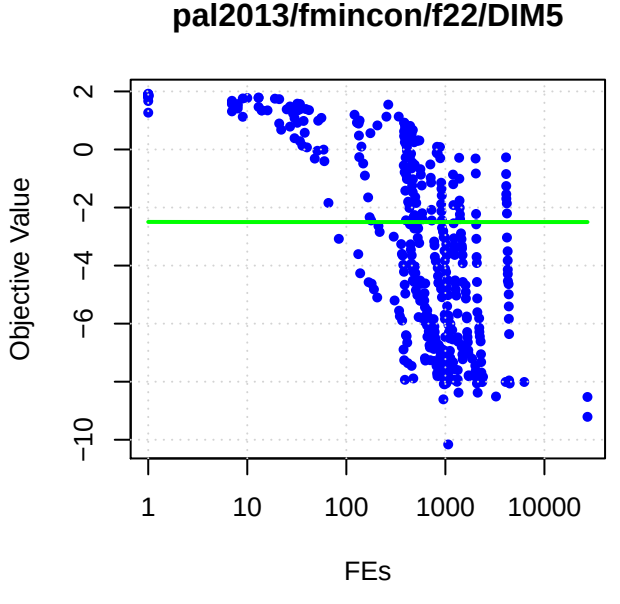
500
FEs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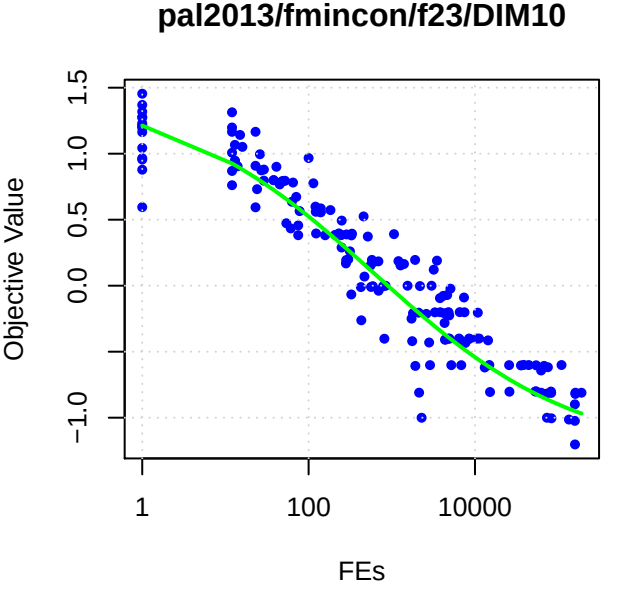
1000
10000
FEs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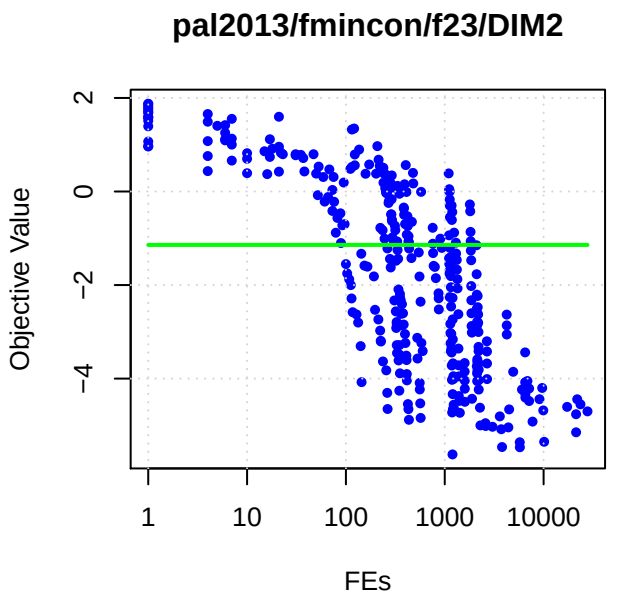
100
10000
FEs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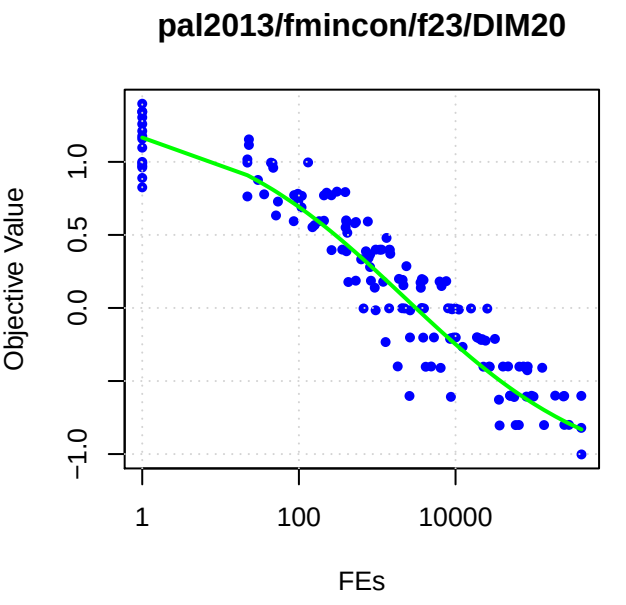
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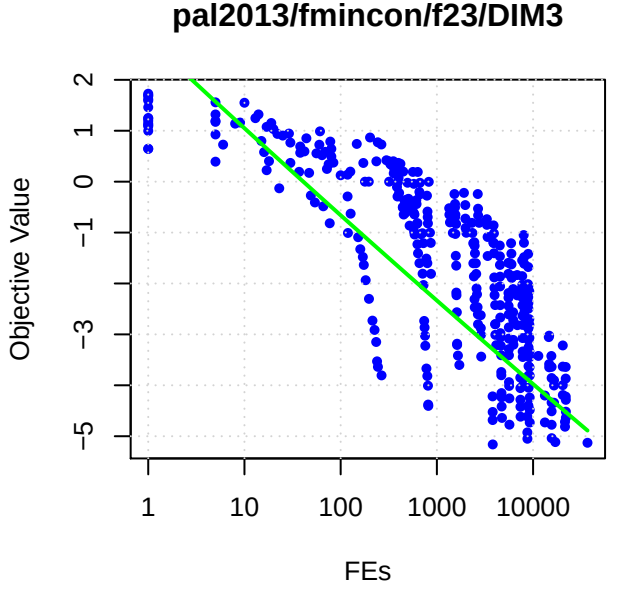
FEs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100
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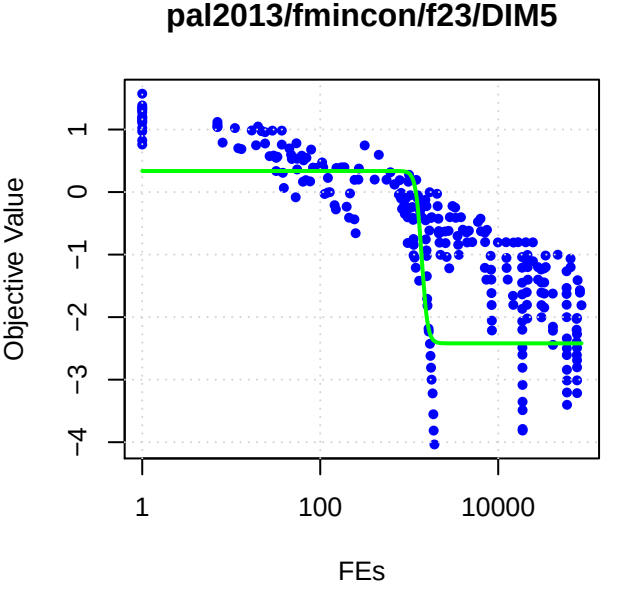
10000
FEs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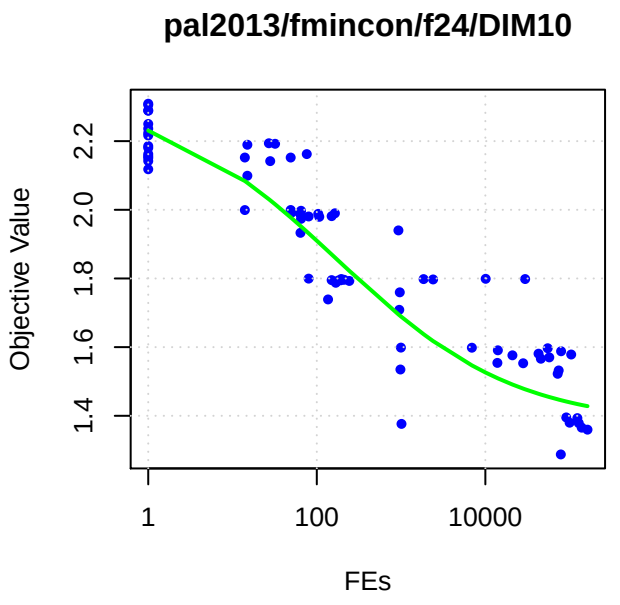
FEs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100
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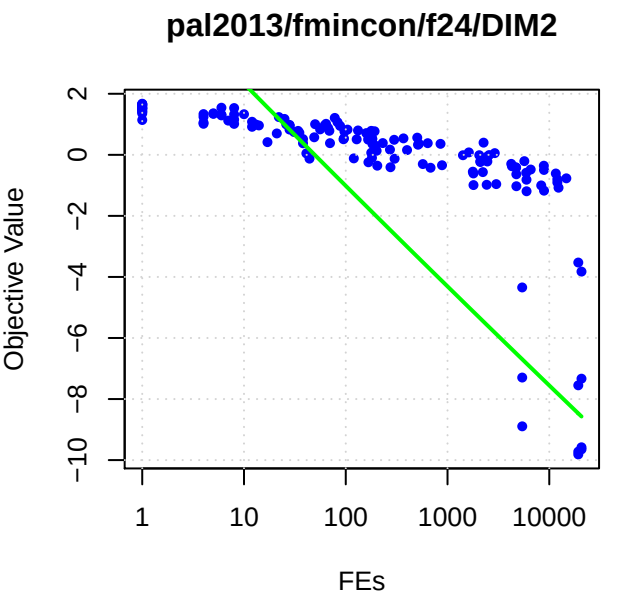
FEs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Objective Value
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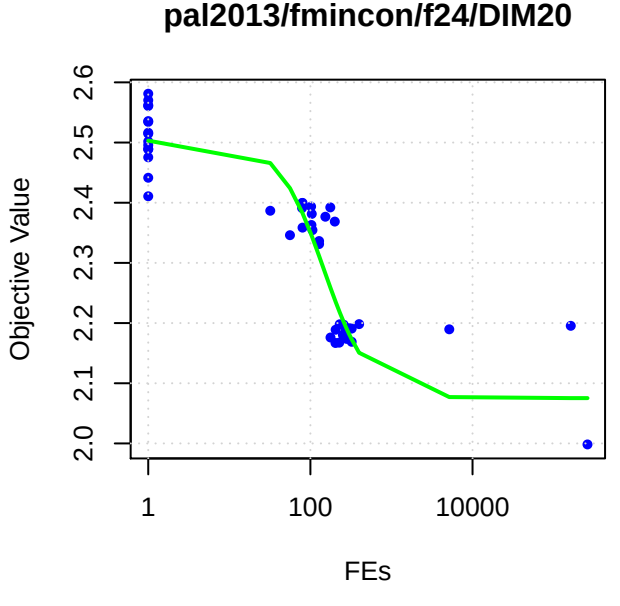
1
10
100
1000
10000
FEs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2.2
2.3
2.4
2.5
2.6
1
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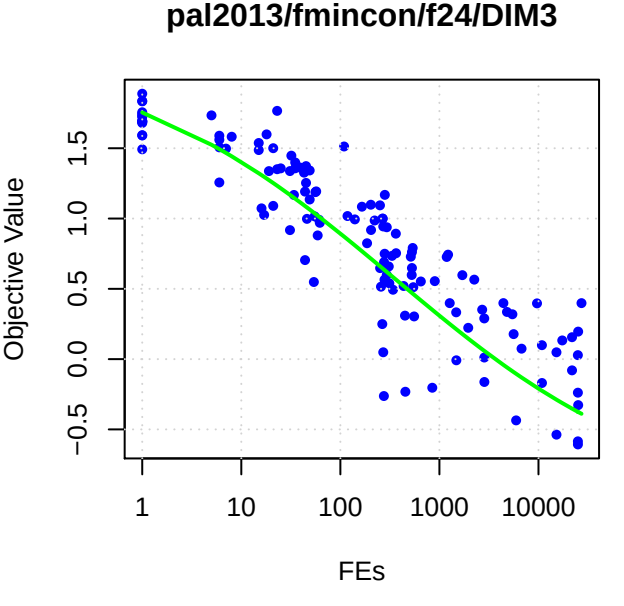
10000
FEs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0.5
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1.5
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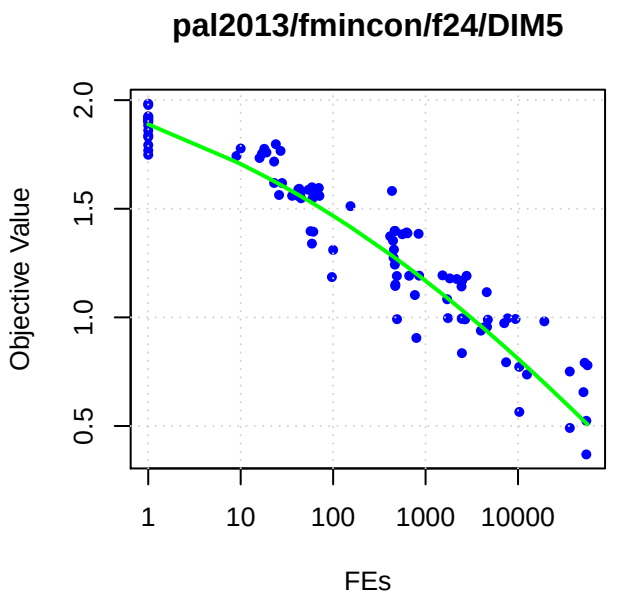
1000
10000
FEs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1.5
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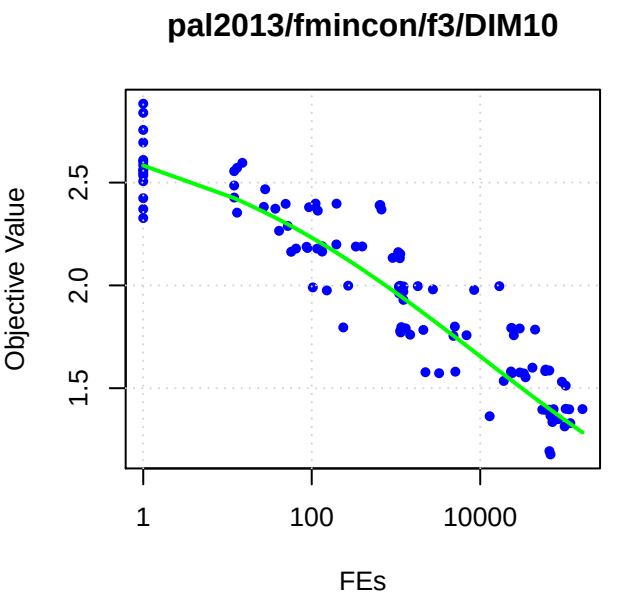
FEs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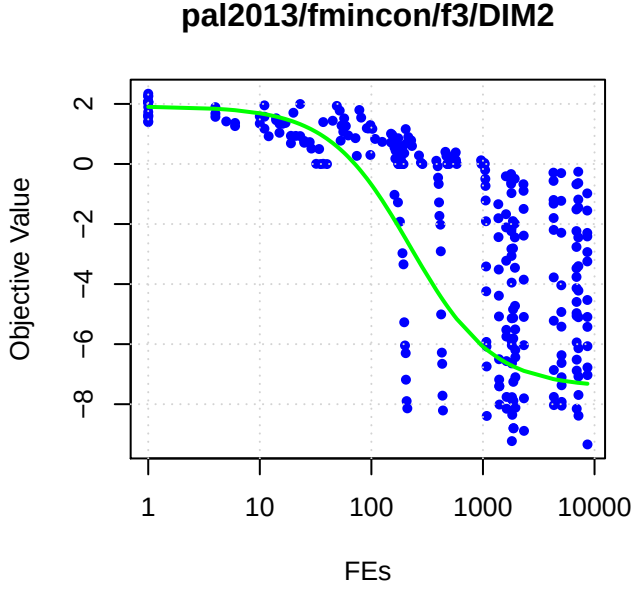
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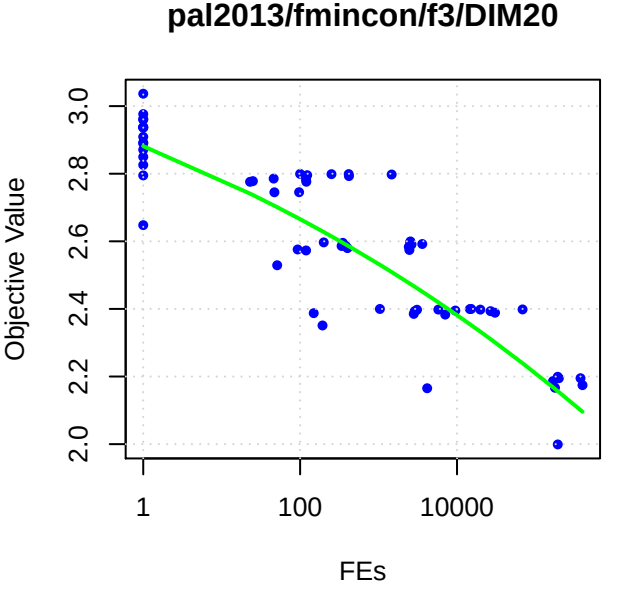
FEs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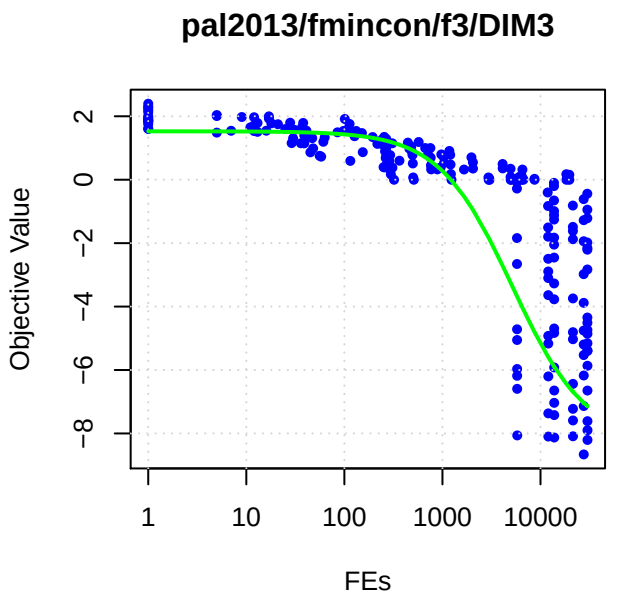
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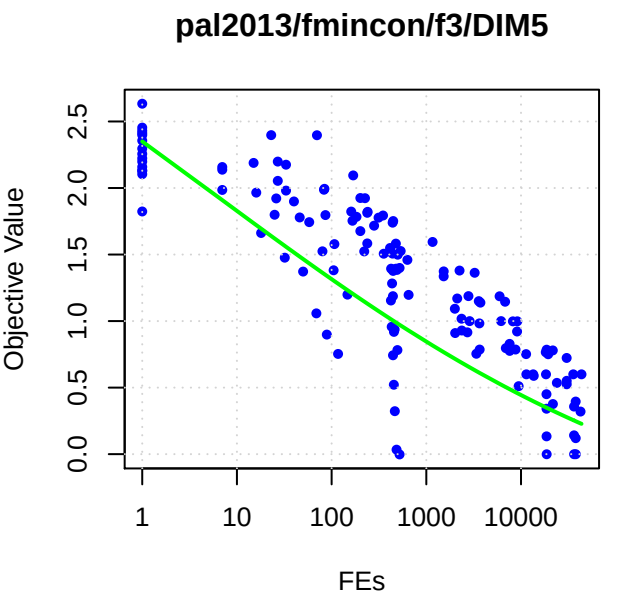
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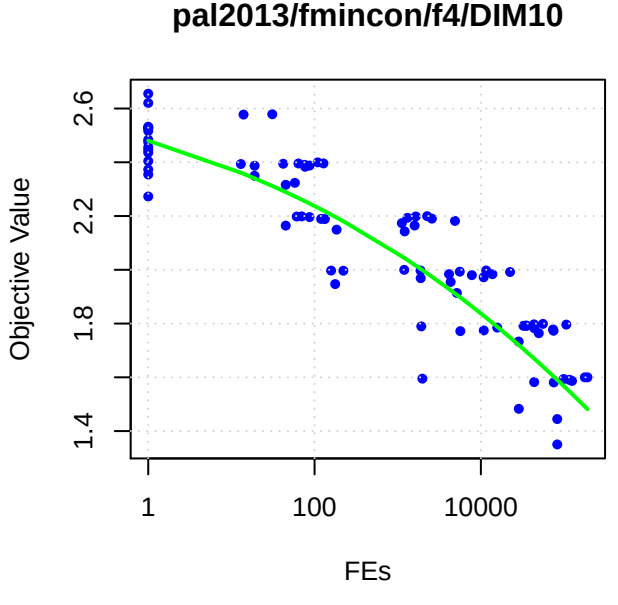
FEs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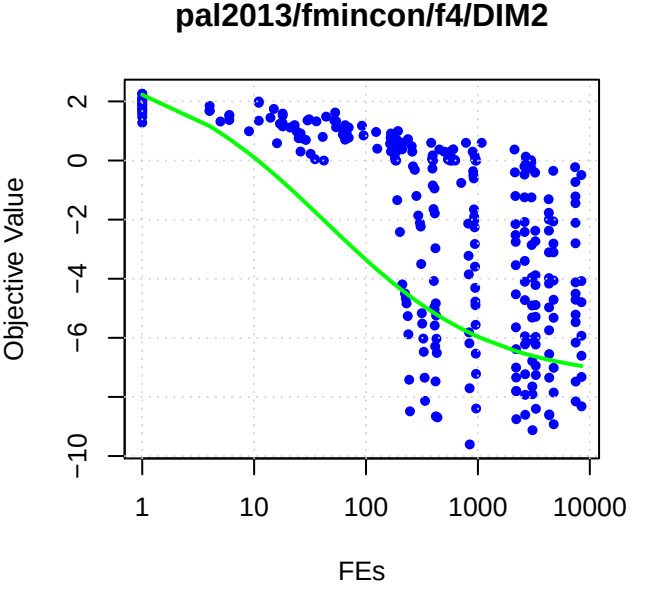
FEs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Objective Value
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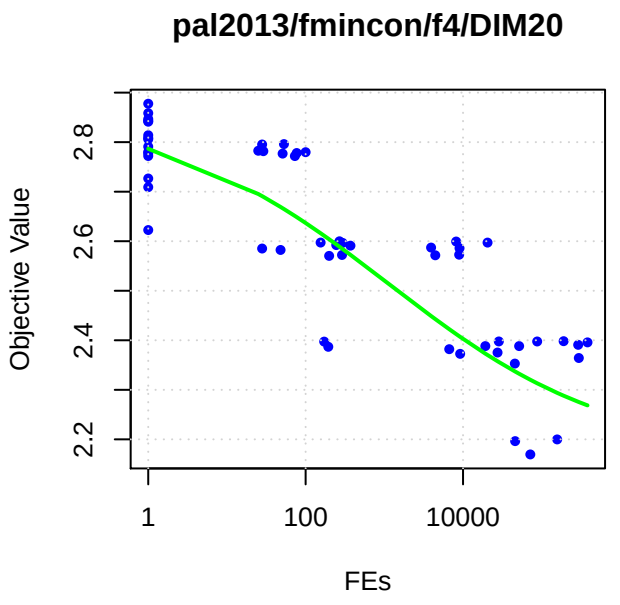
10000
FEs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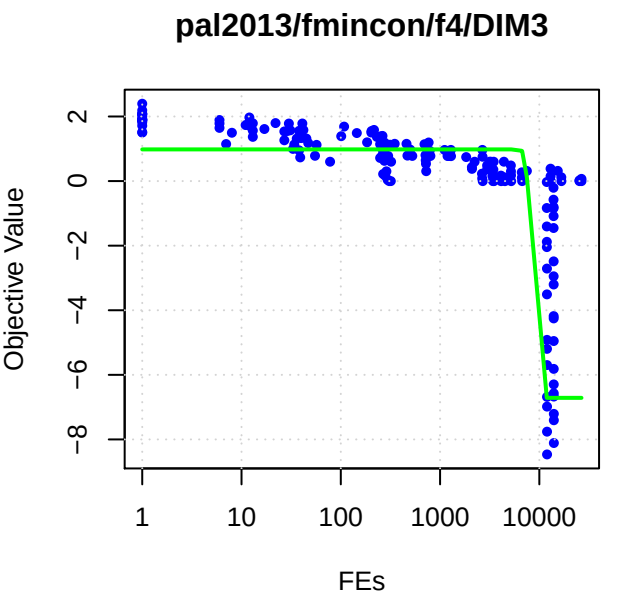
FEs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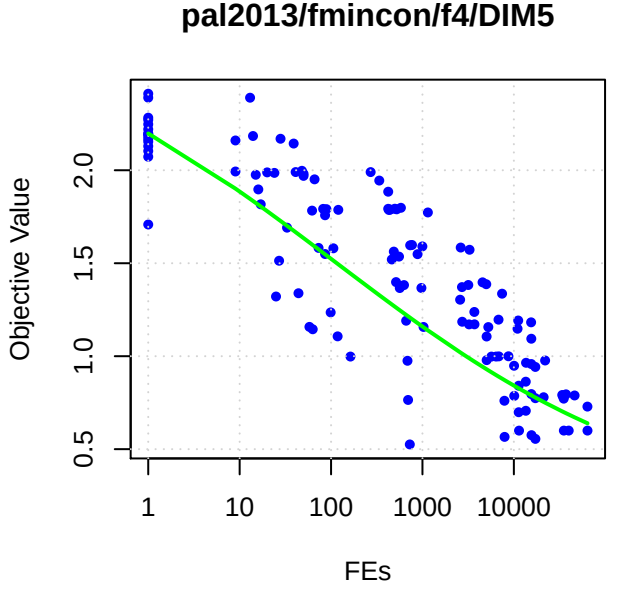
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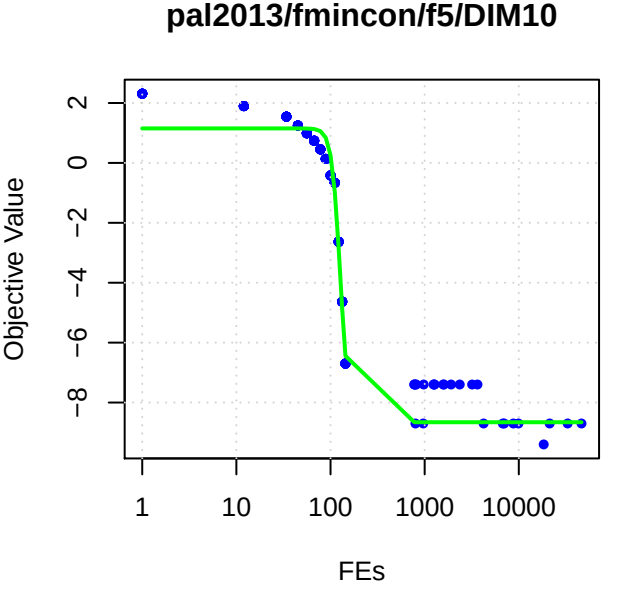
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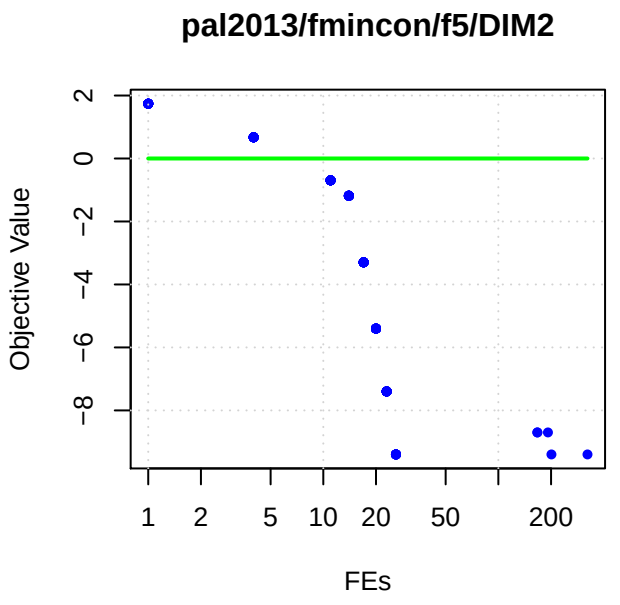
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Objective Value
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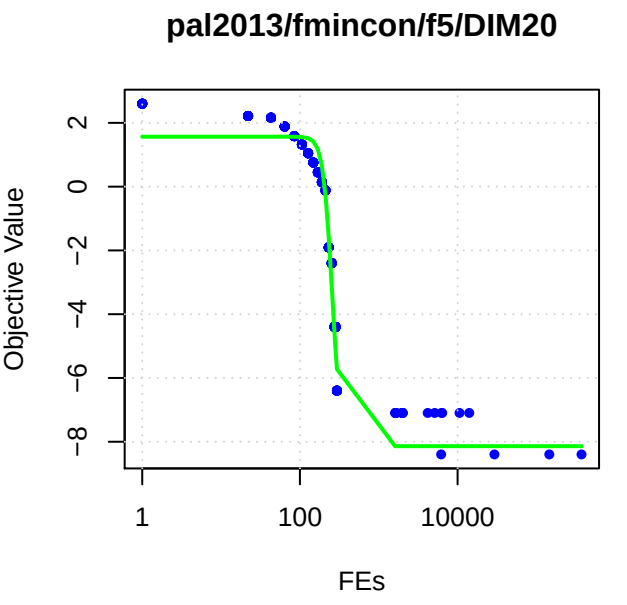
FEs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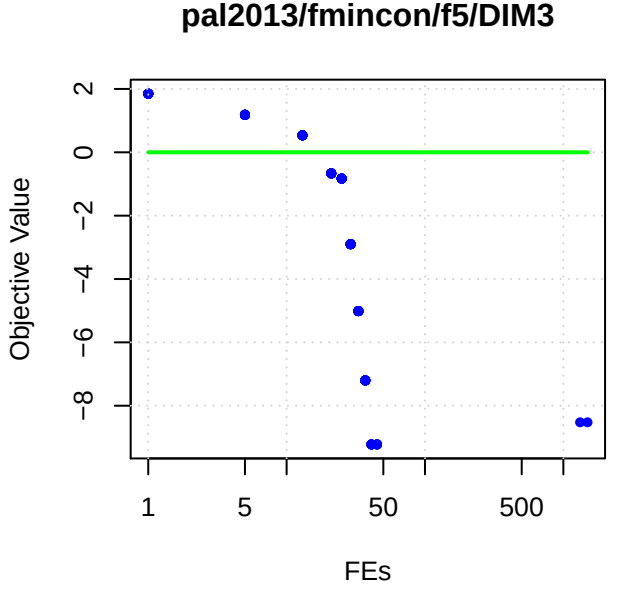
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Objective Value
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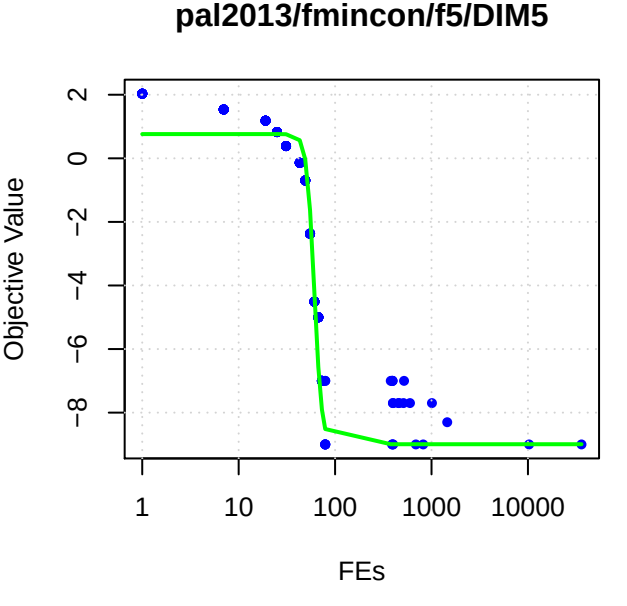
FEs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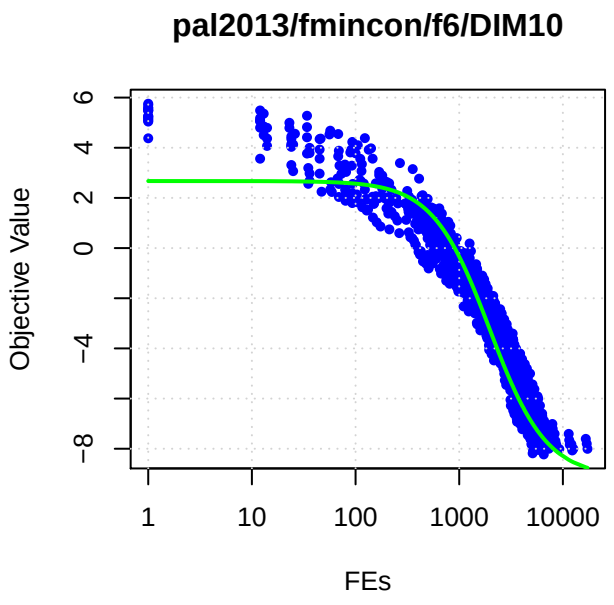
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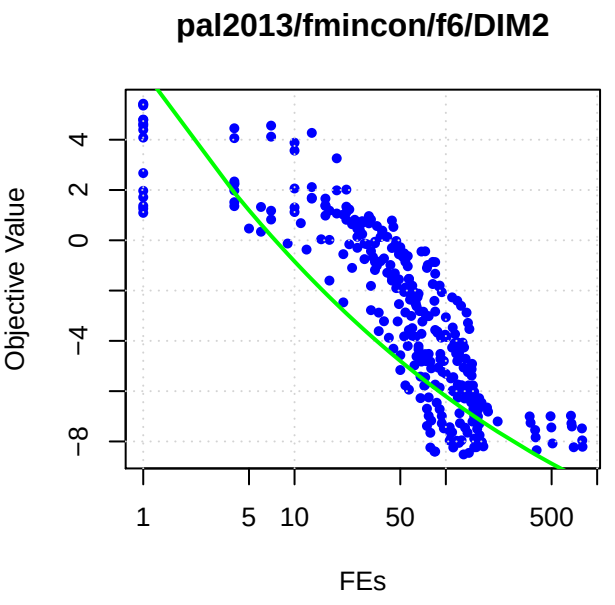
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Objective Value
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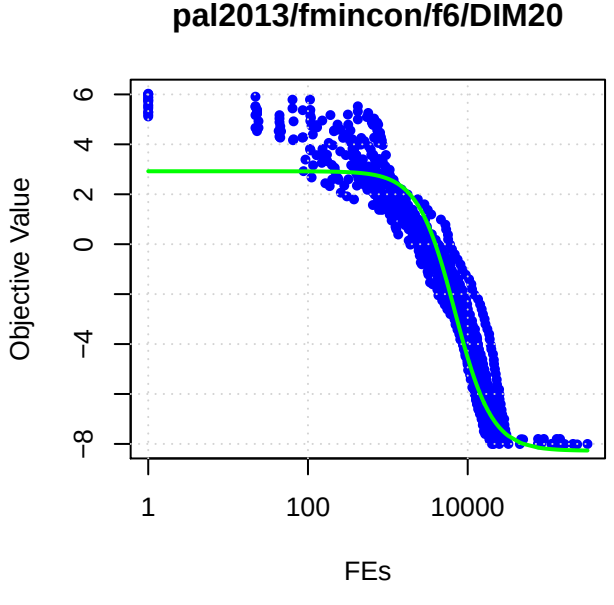
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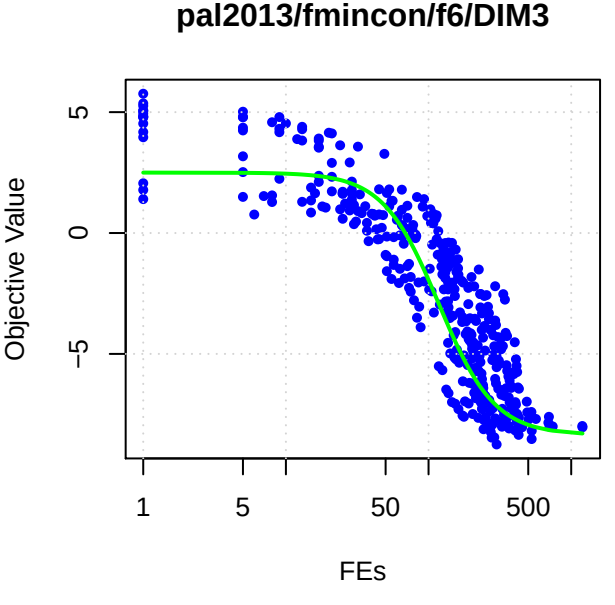
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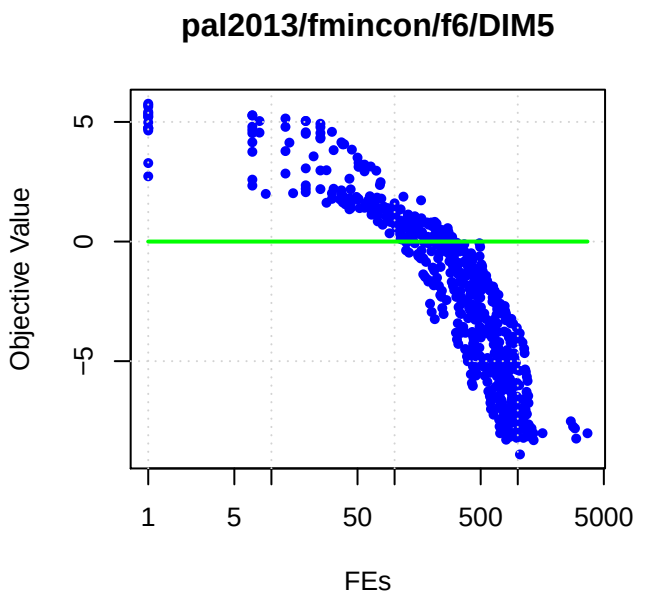
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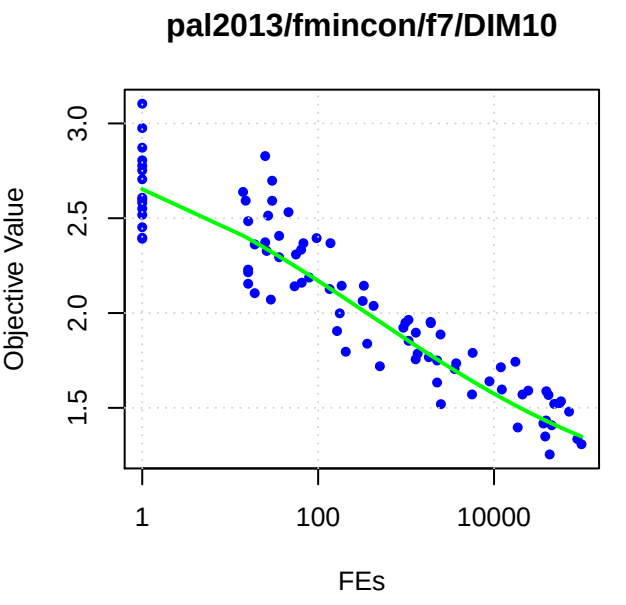
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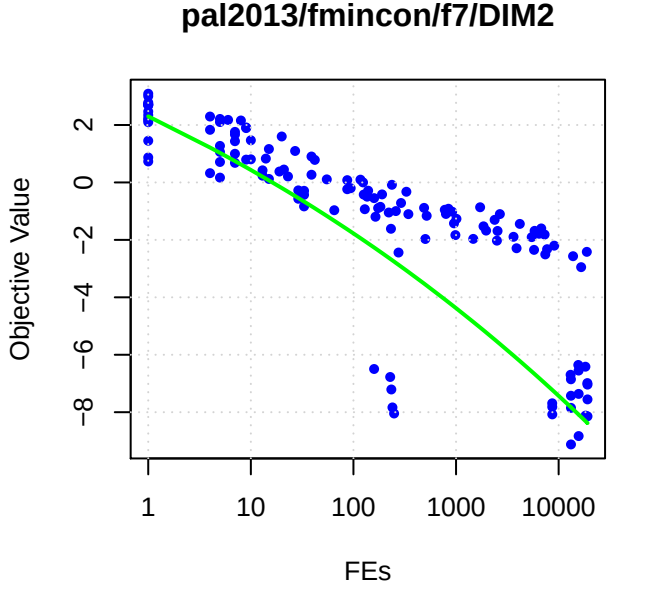
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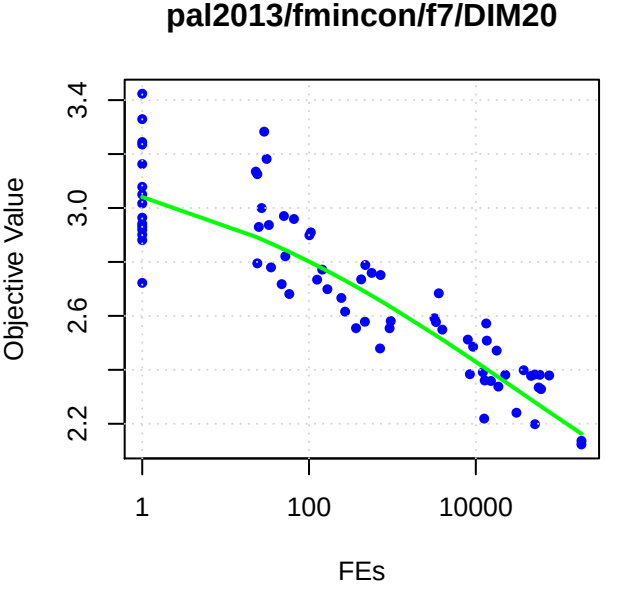
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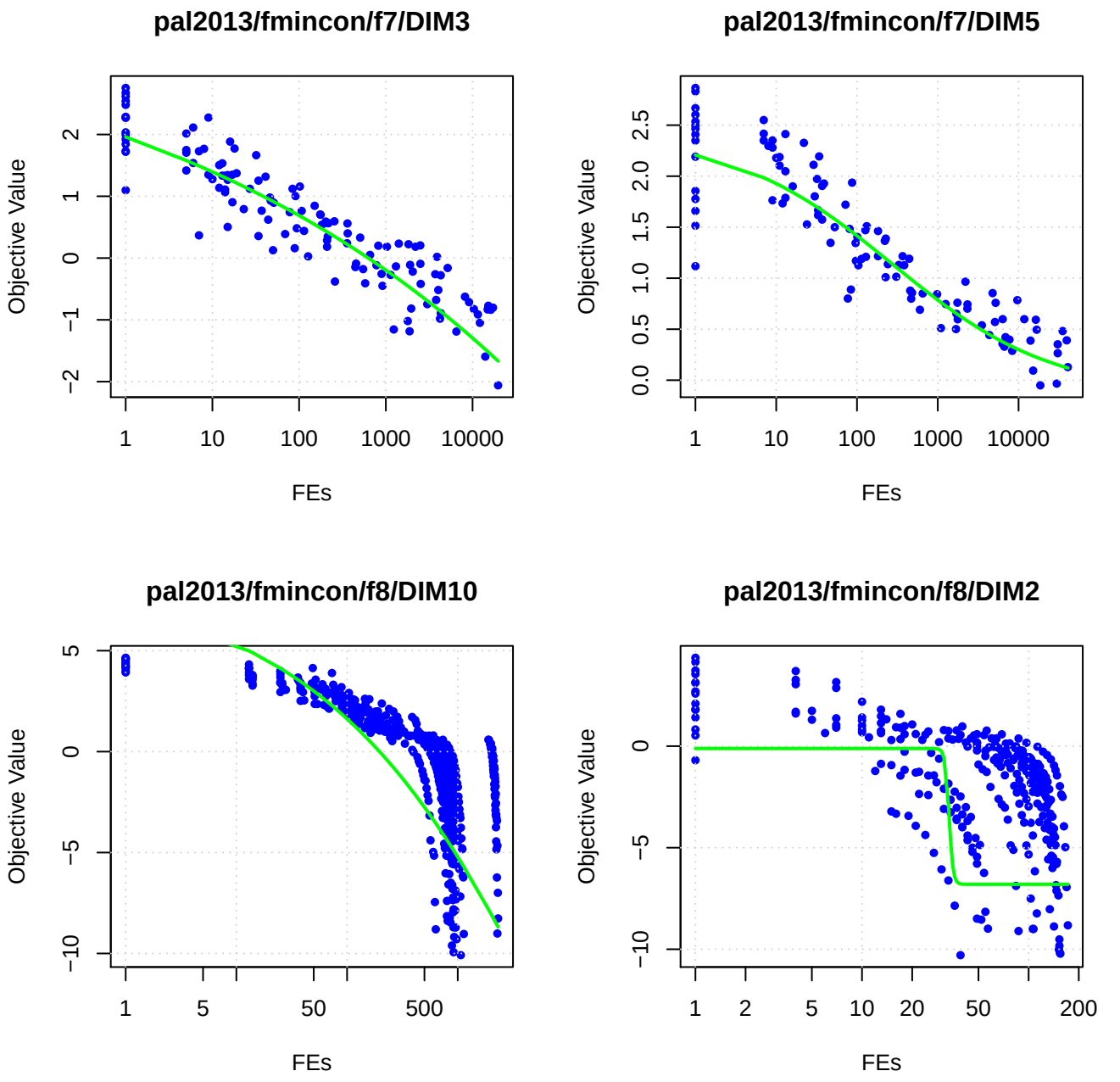
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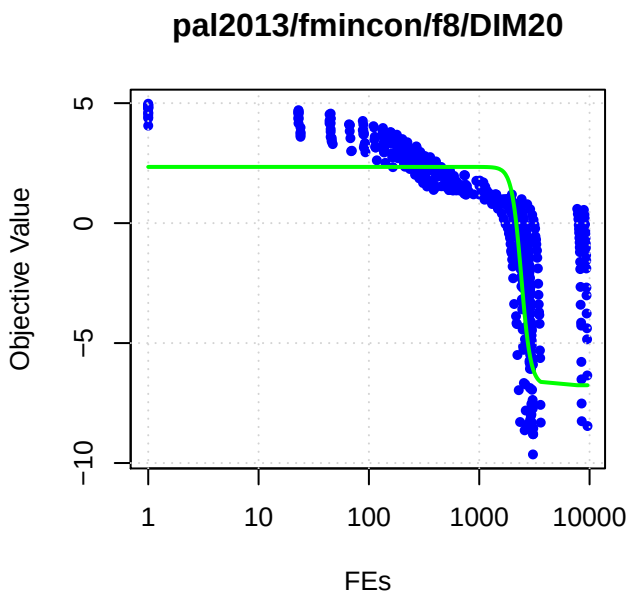
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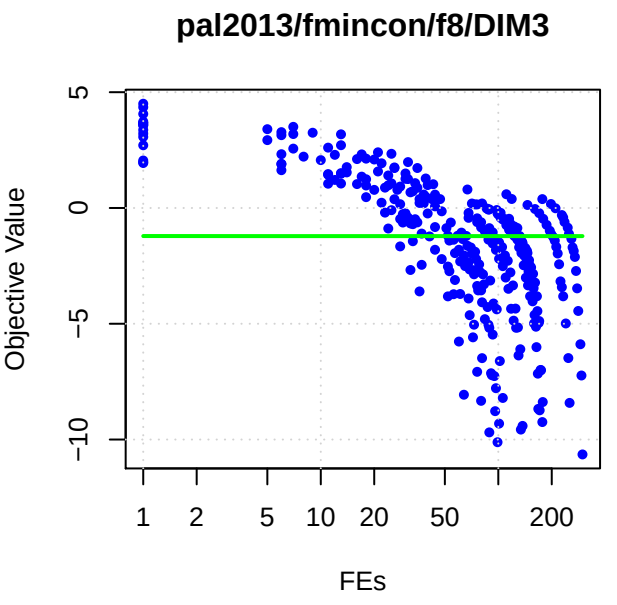
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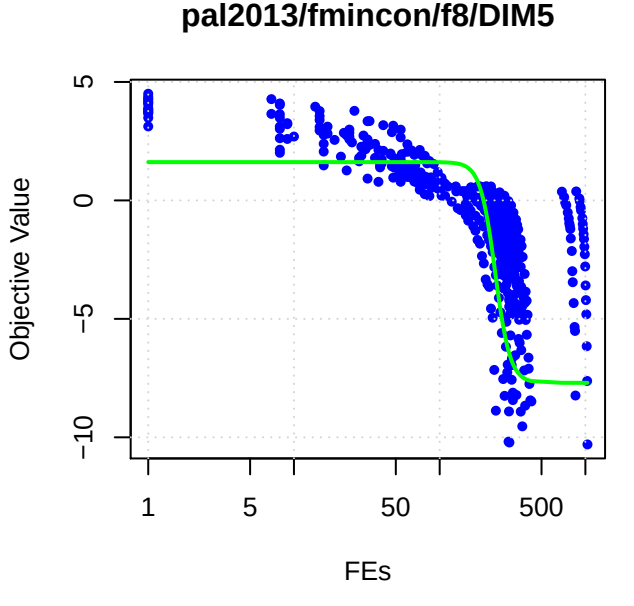
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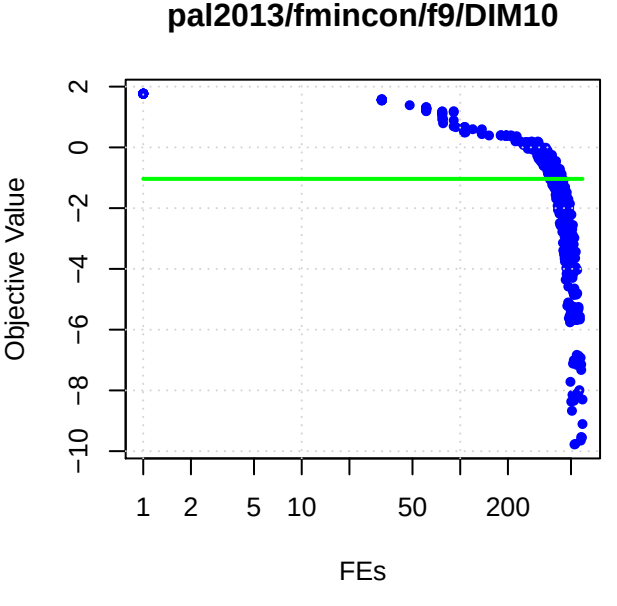
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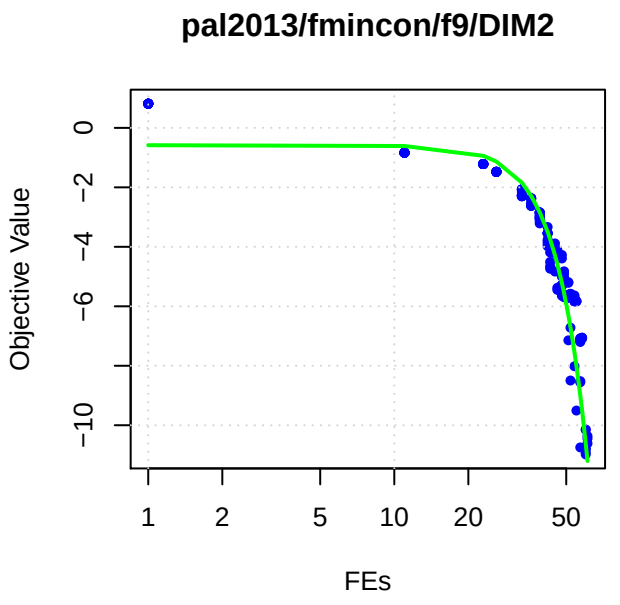
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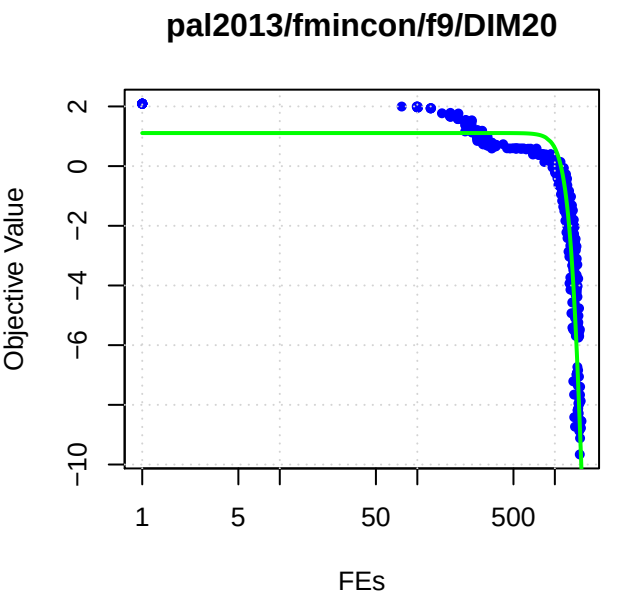
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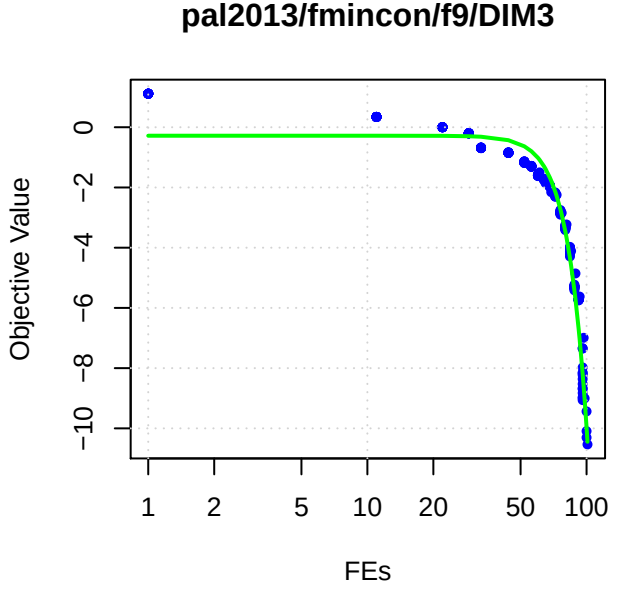
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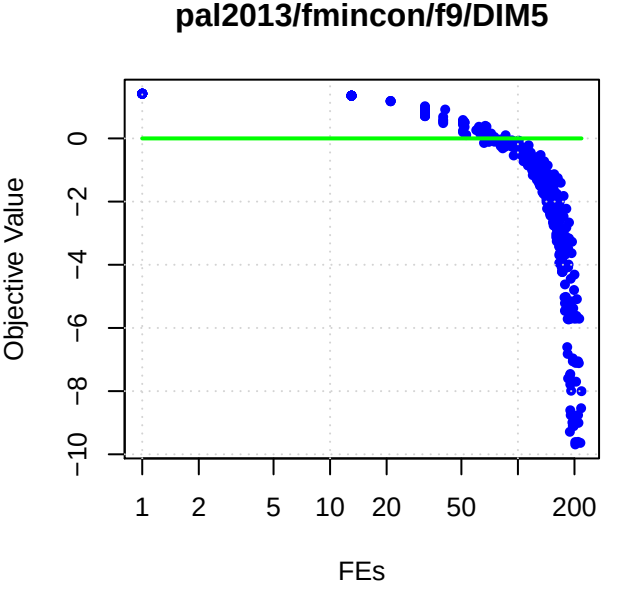
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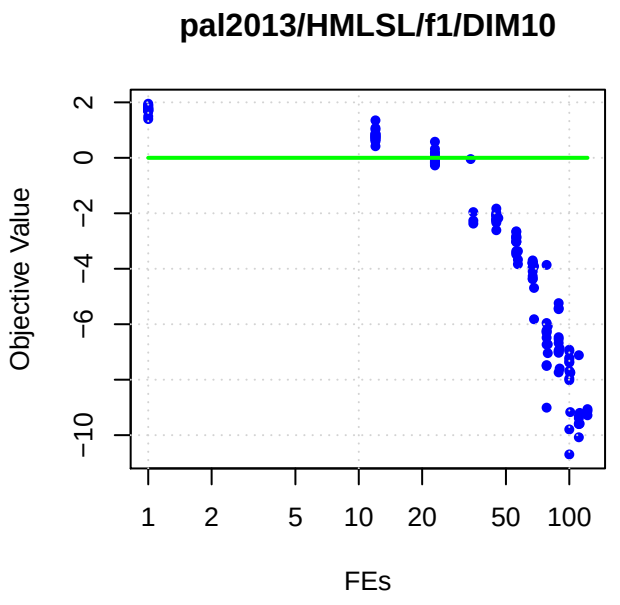
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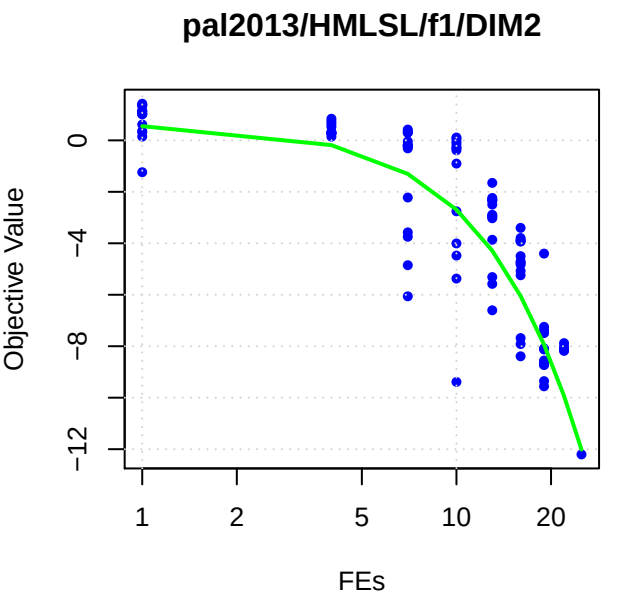
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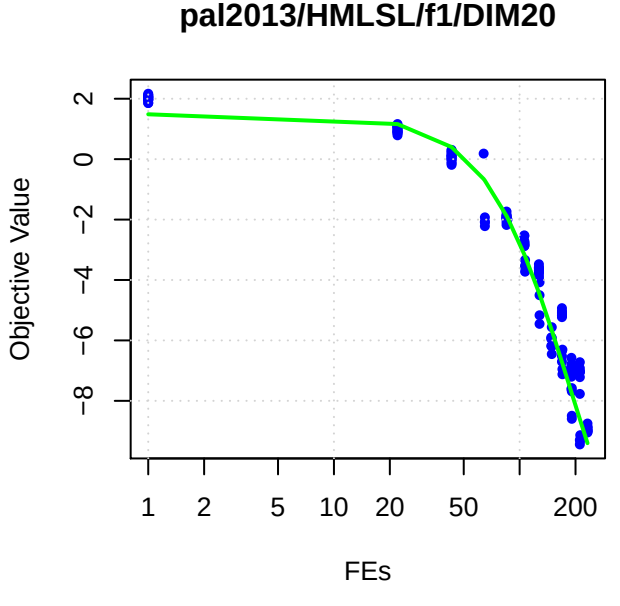
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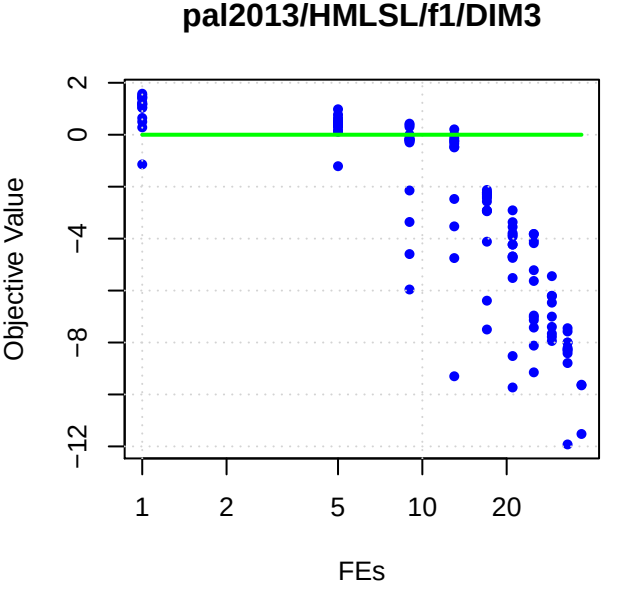
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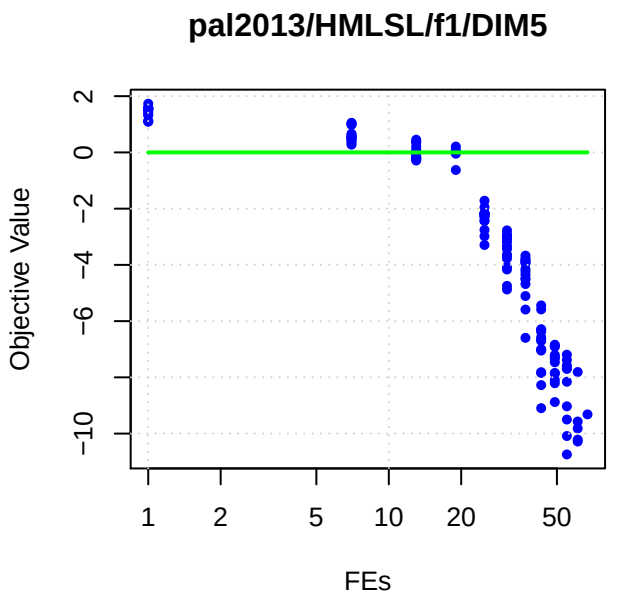
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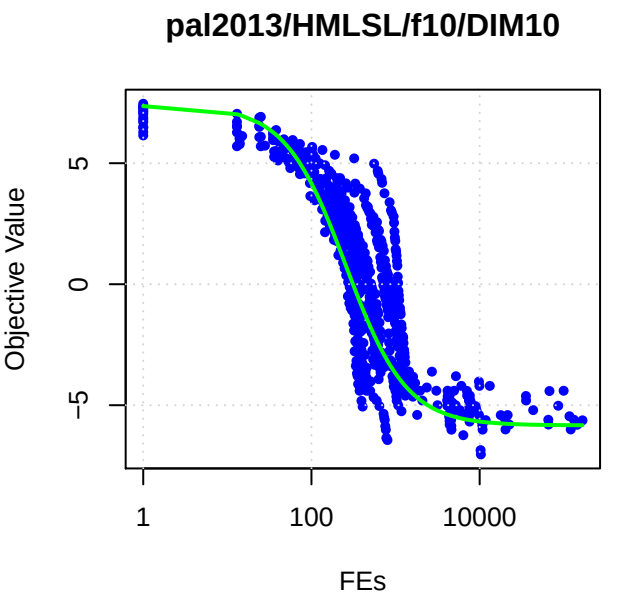
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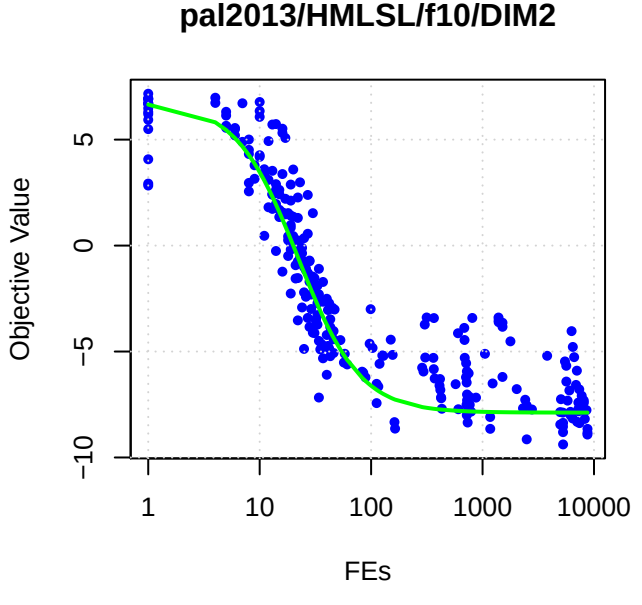
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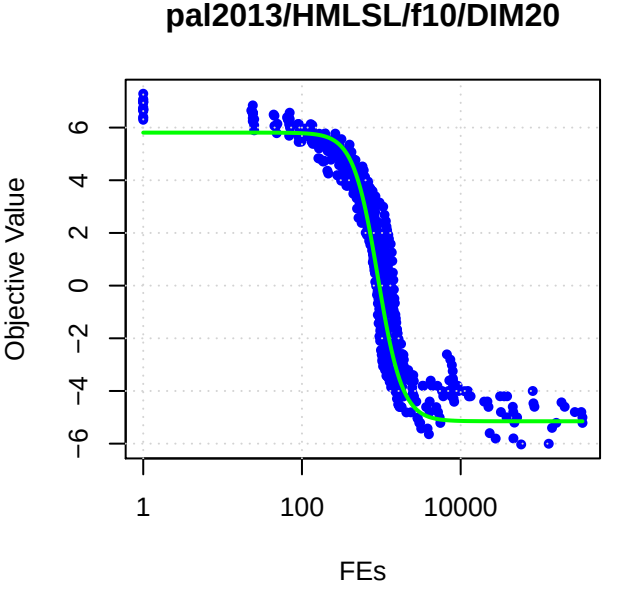
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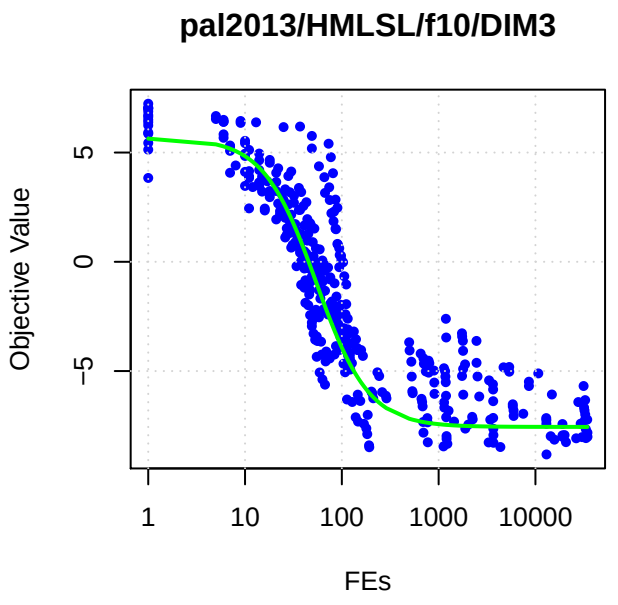
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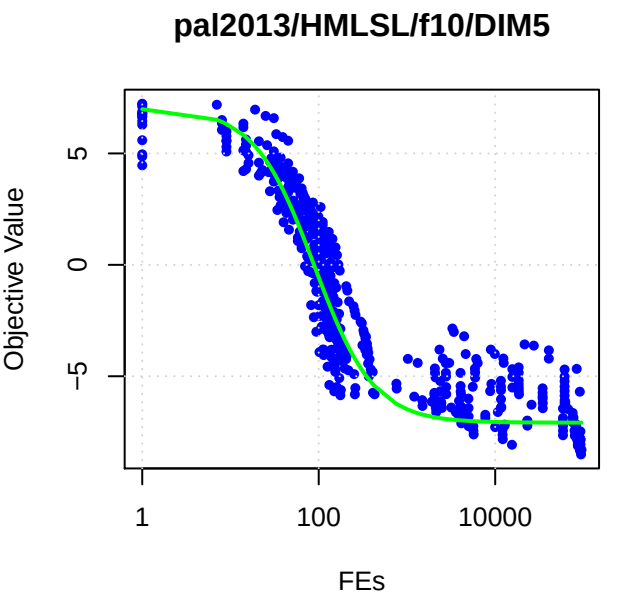
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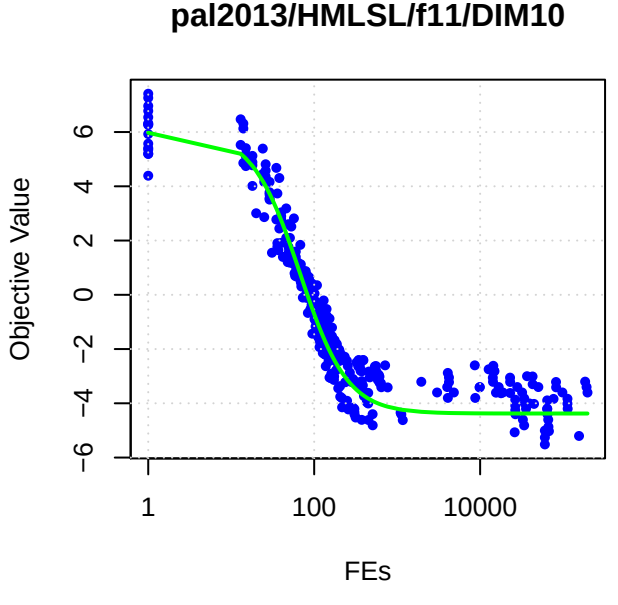
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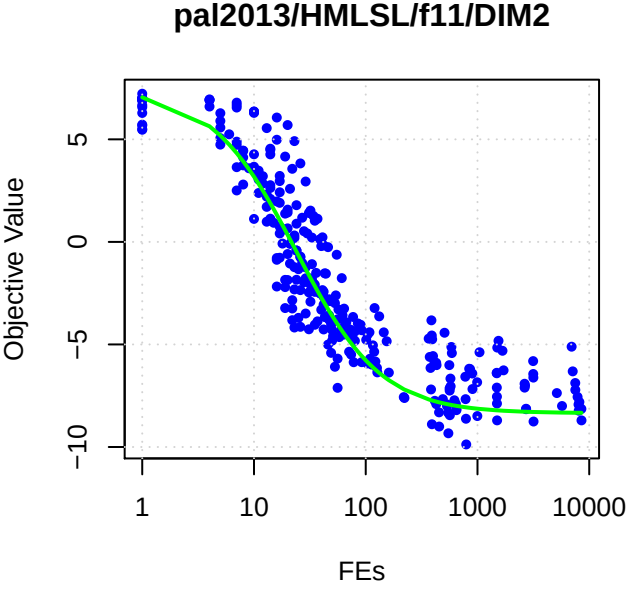
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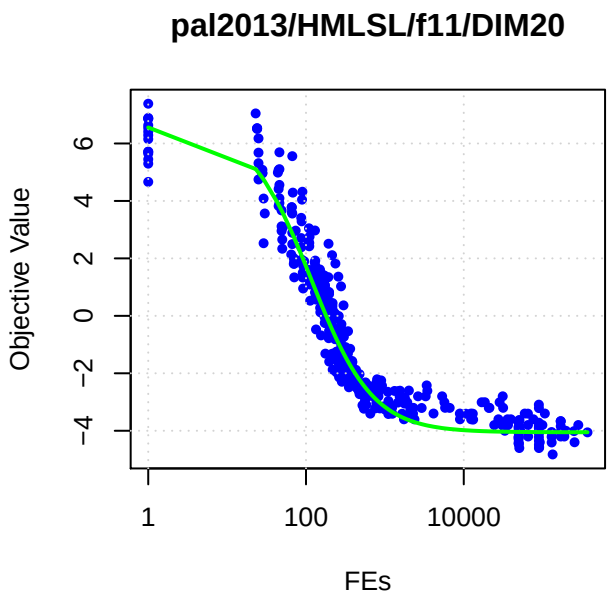
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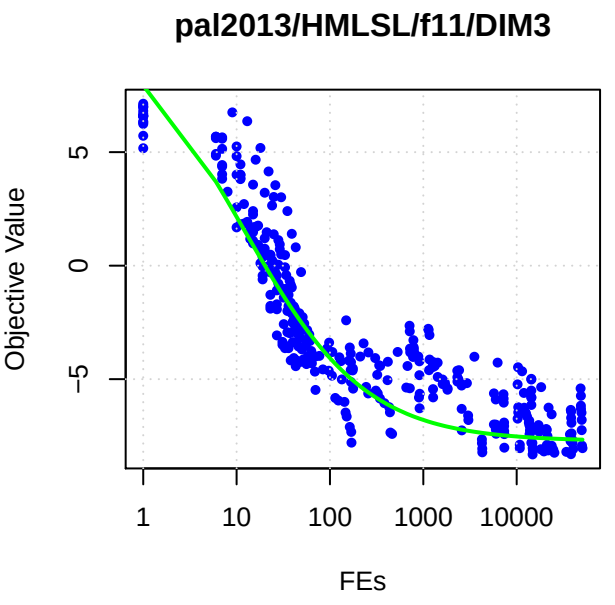
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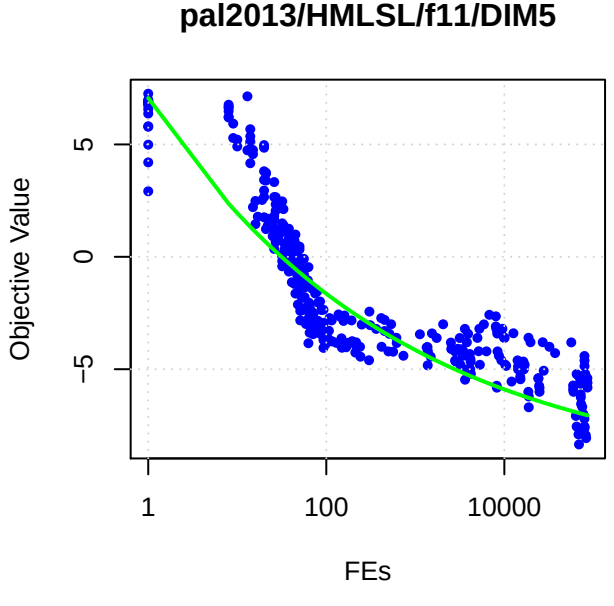
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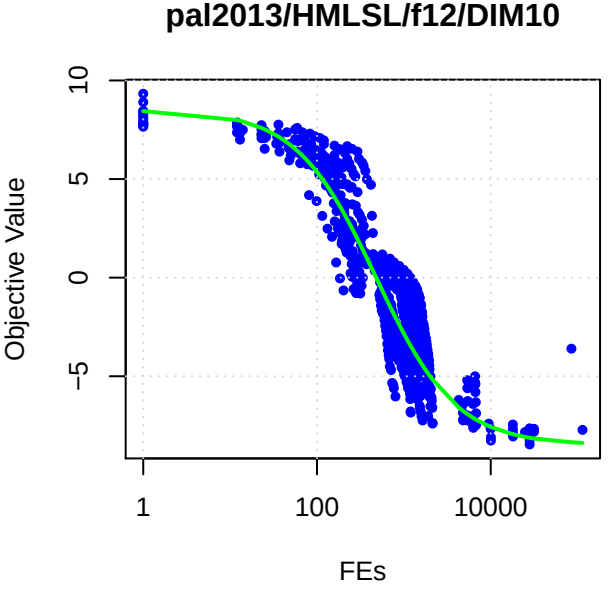
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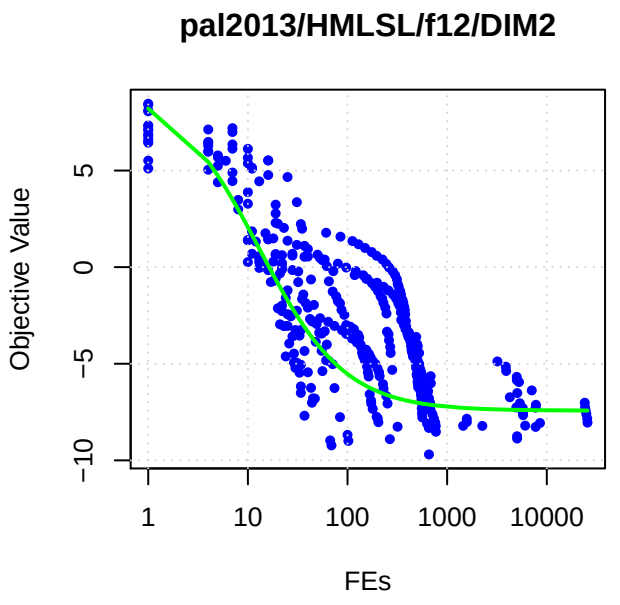
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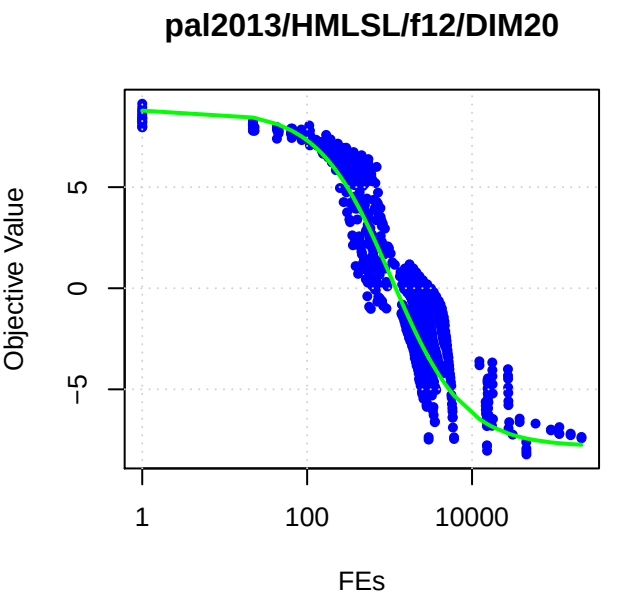
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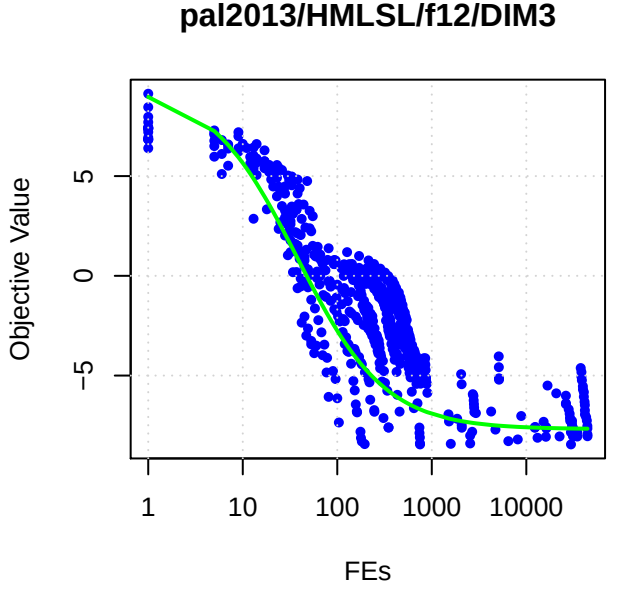
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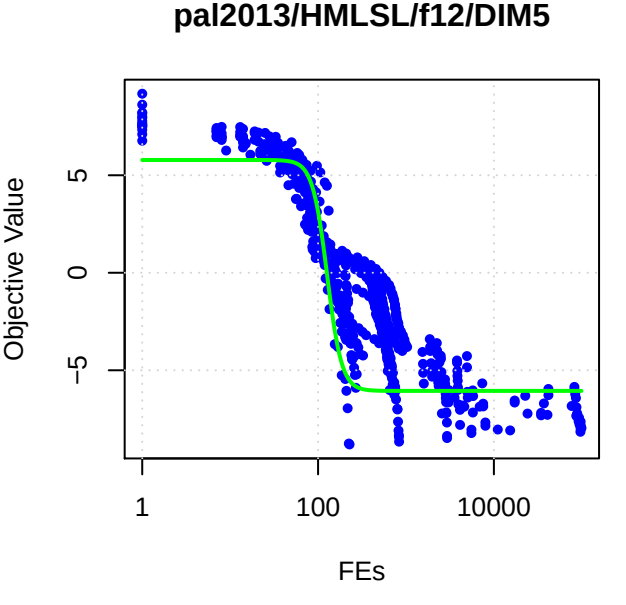
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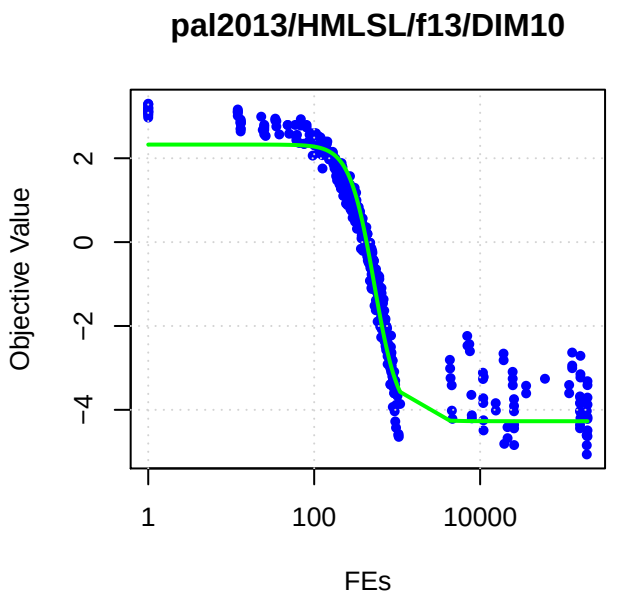
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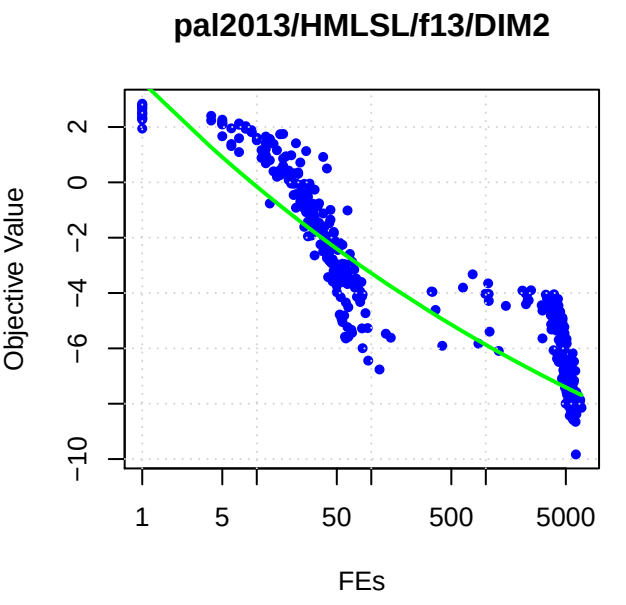
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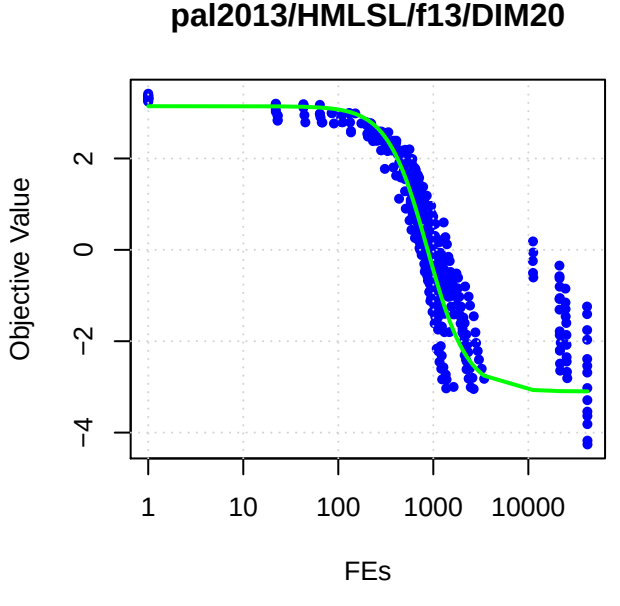
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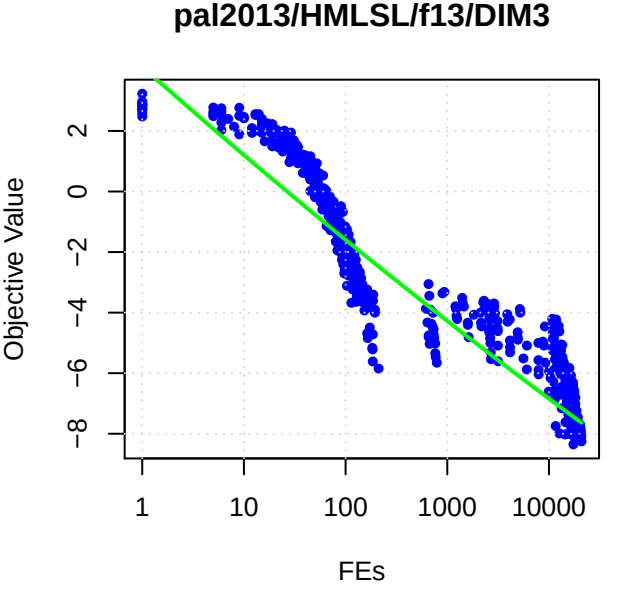
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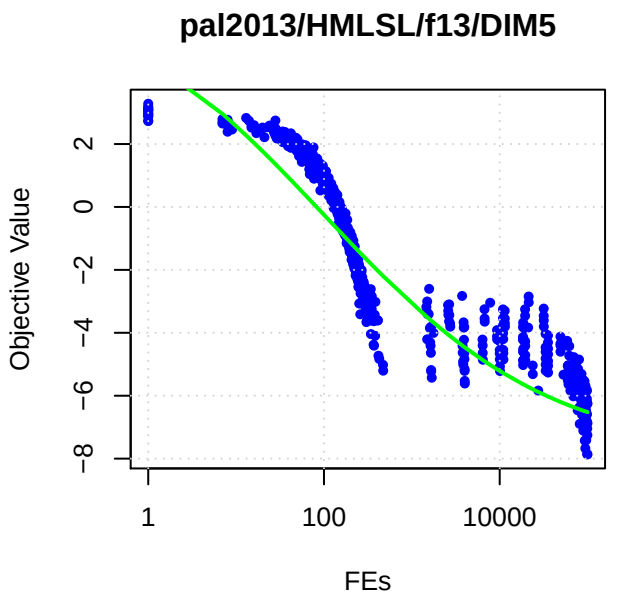
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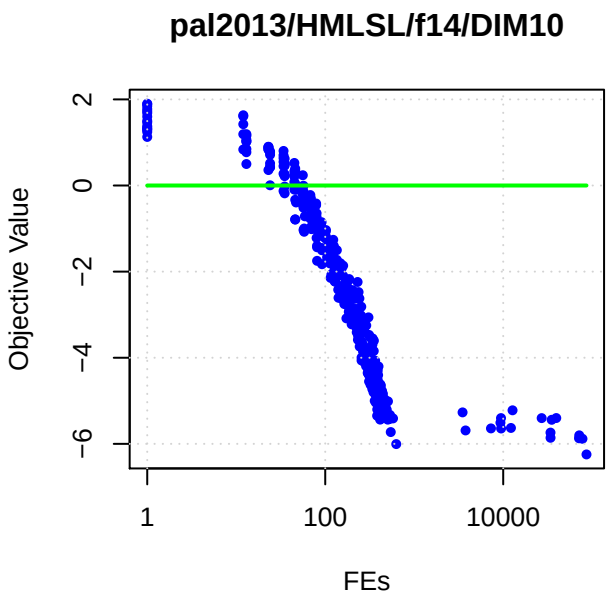
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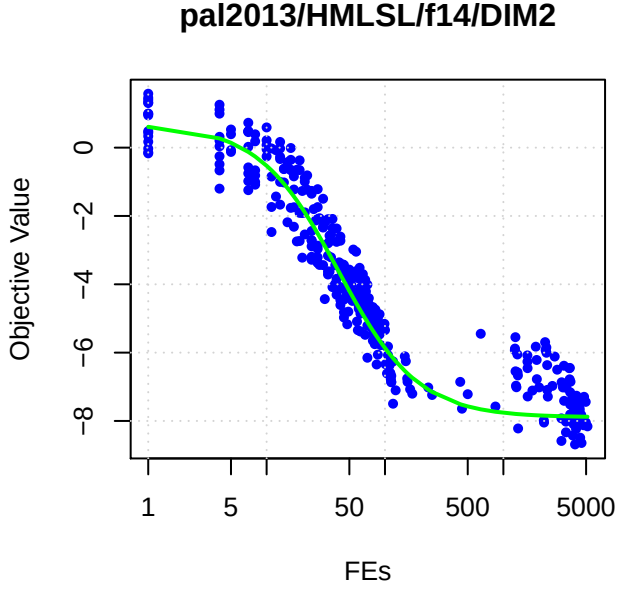
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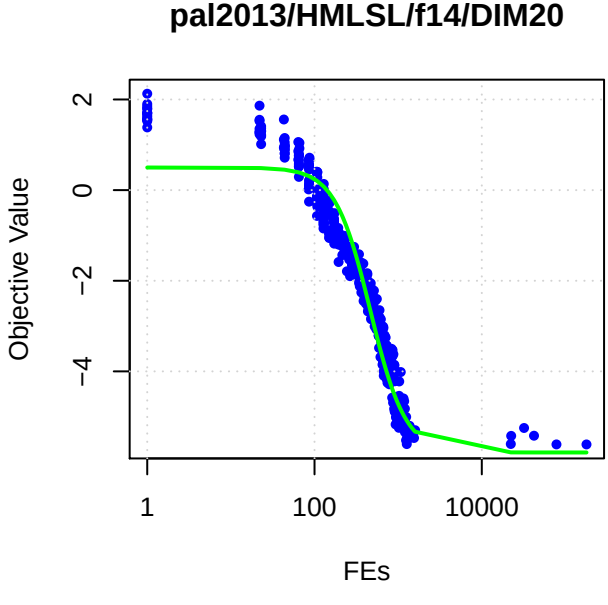
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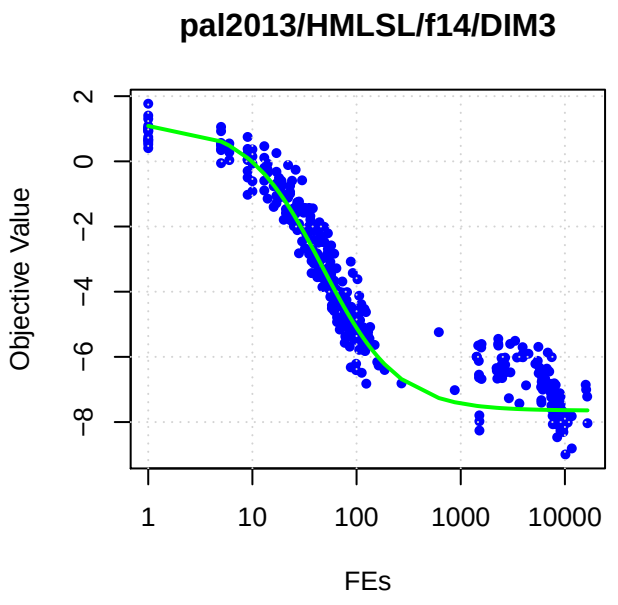
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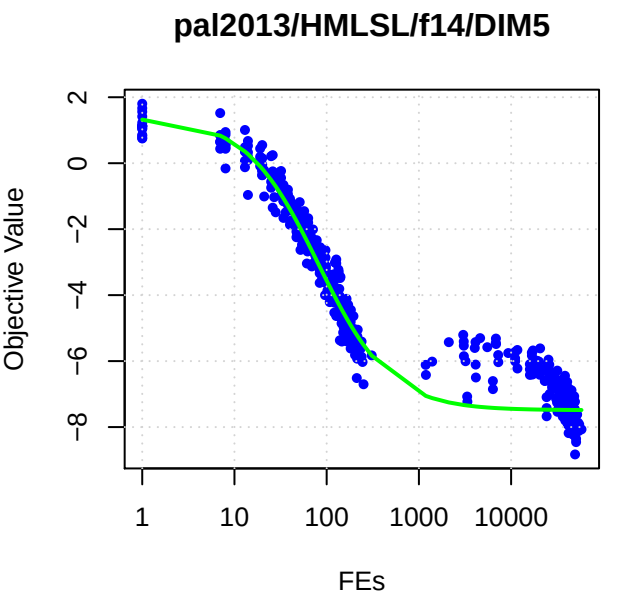
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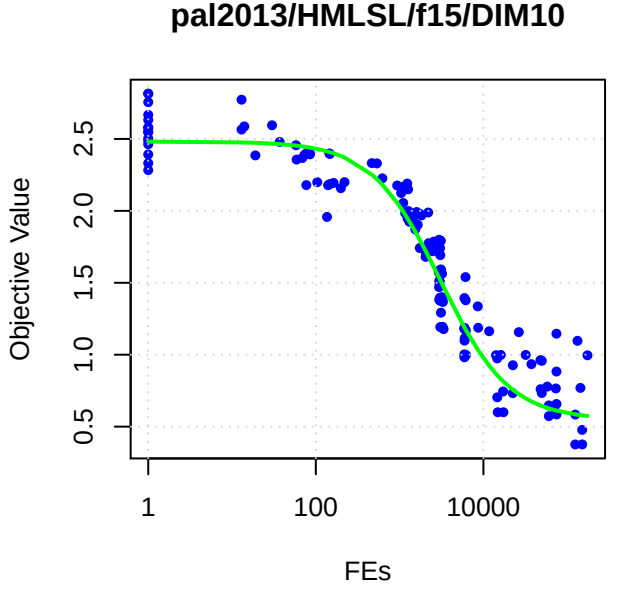
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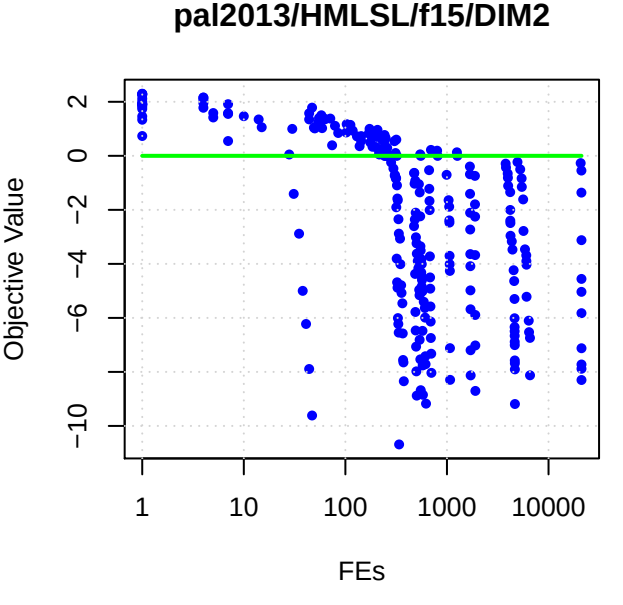
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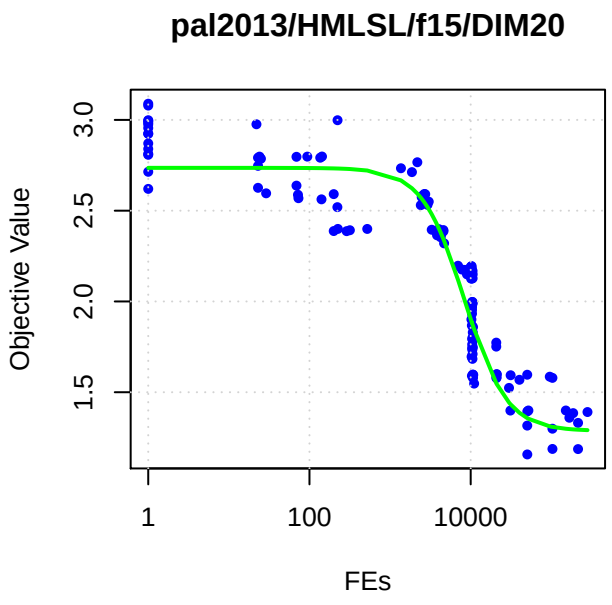
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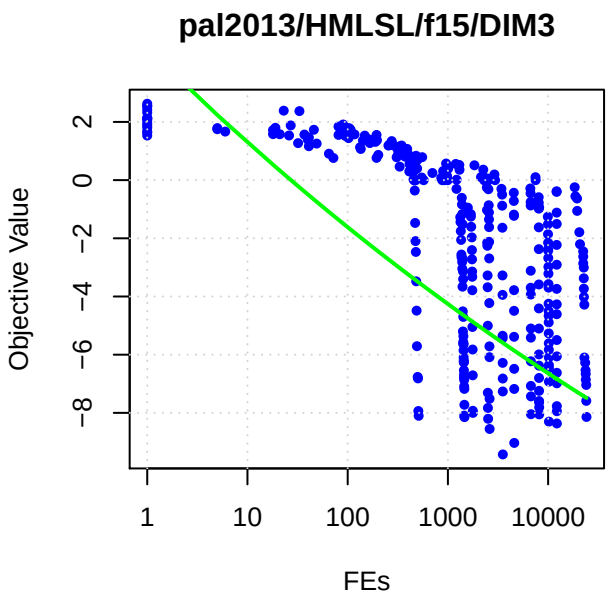
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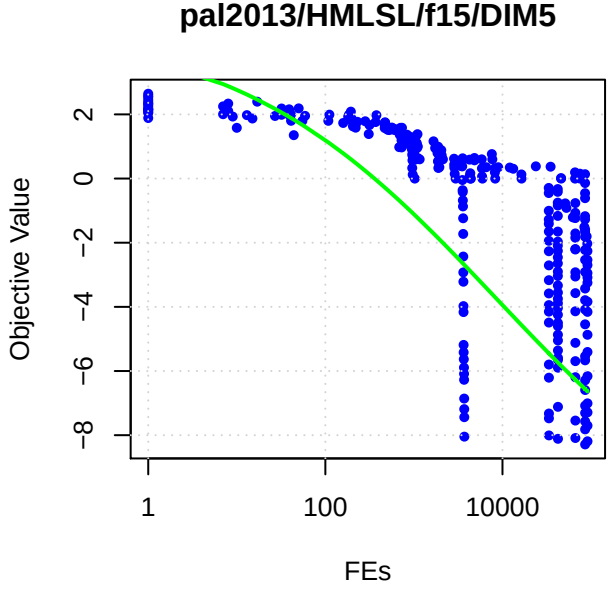
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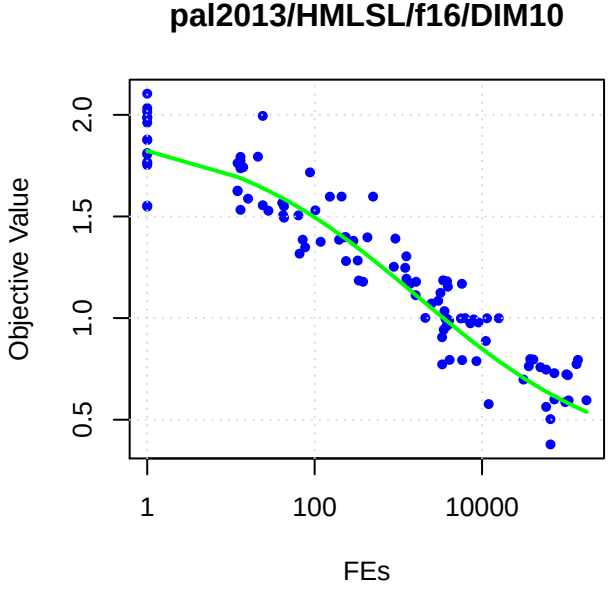
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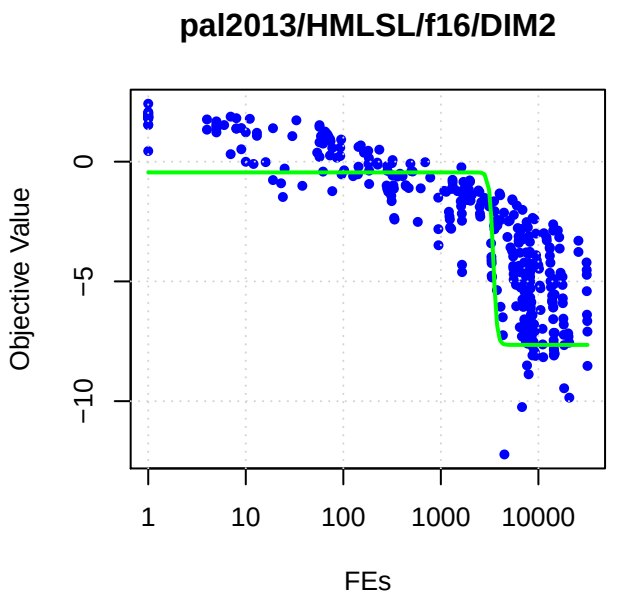
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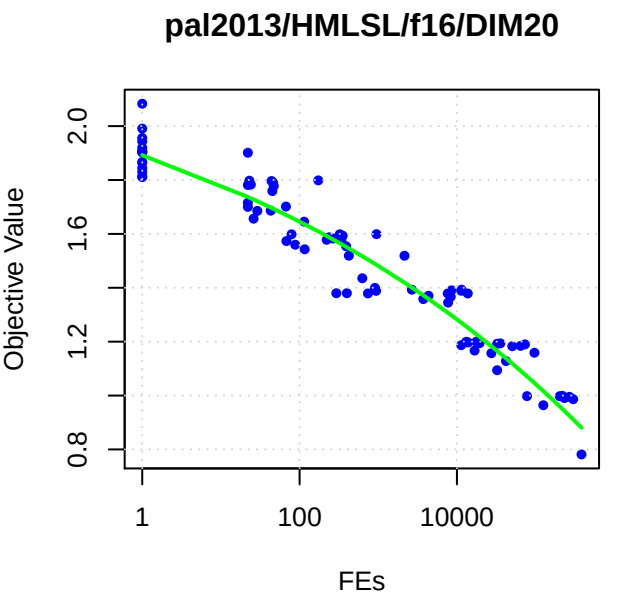
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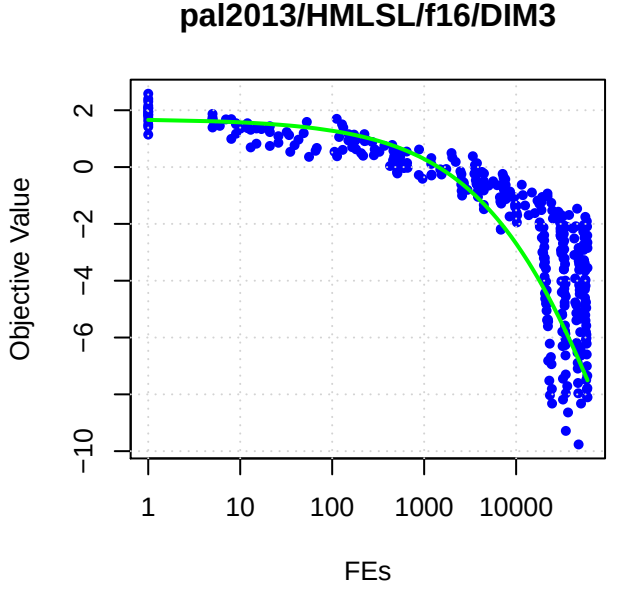
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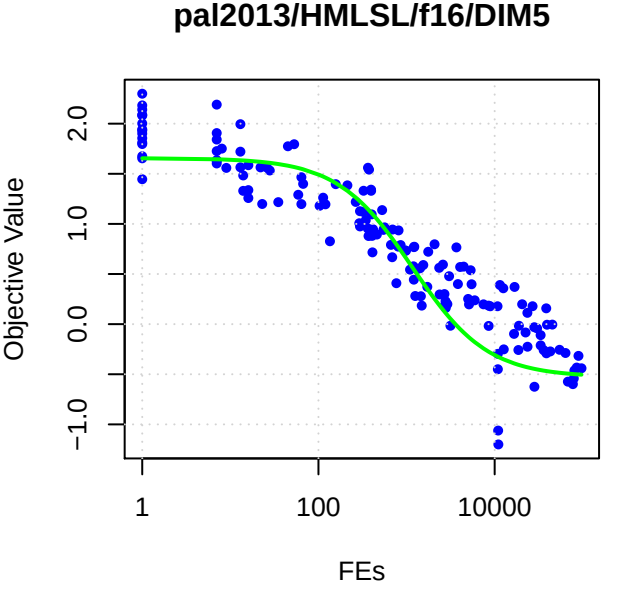
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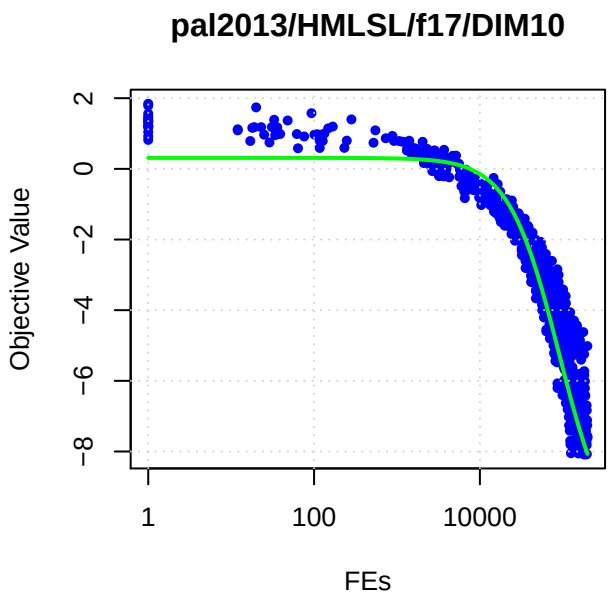
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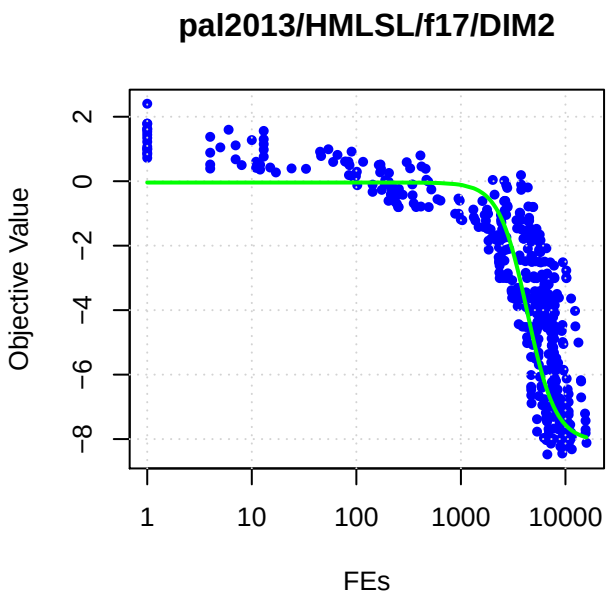
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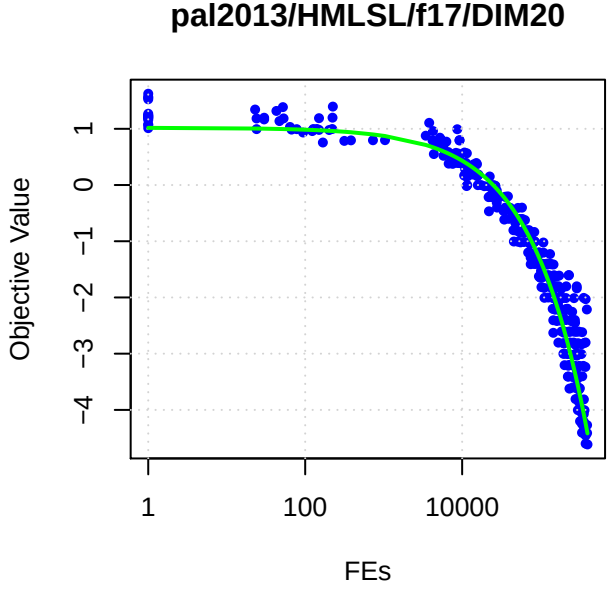
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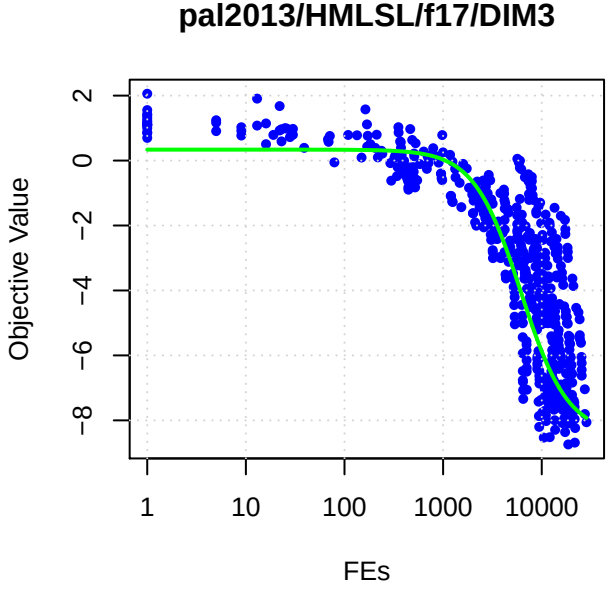
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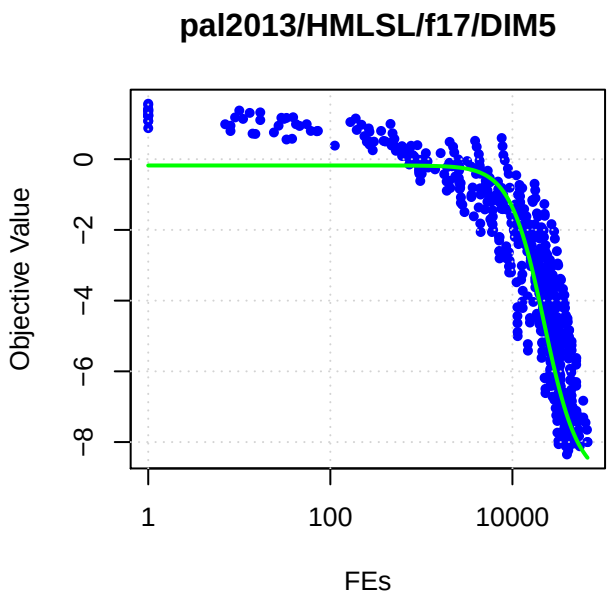
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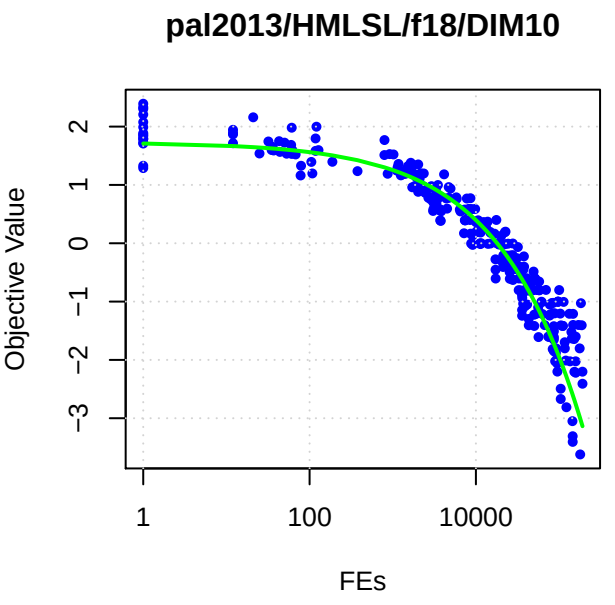
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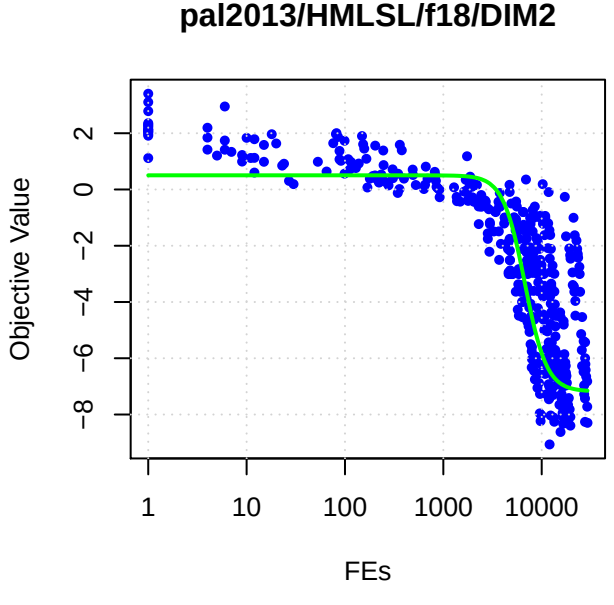
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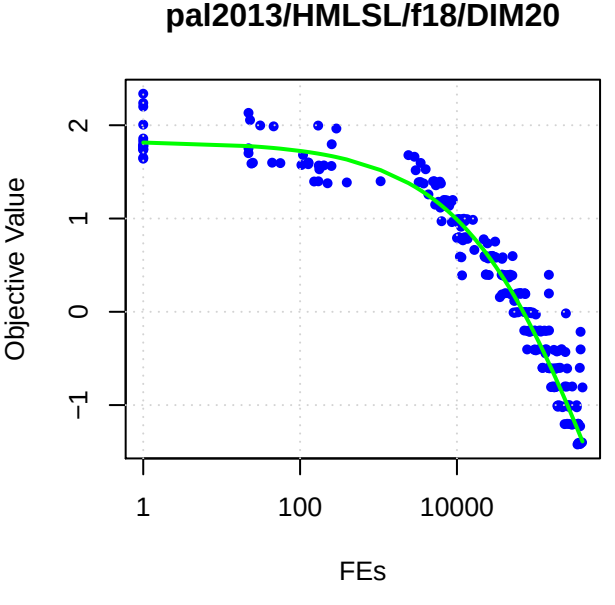
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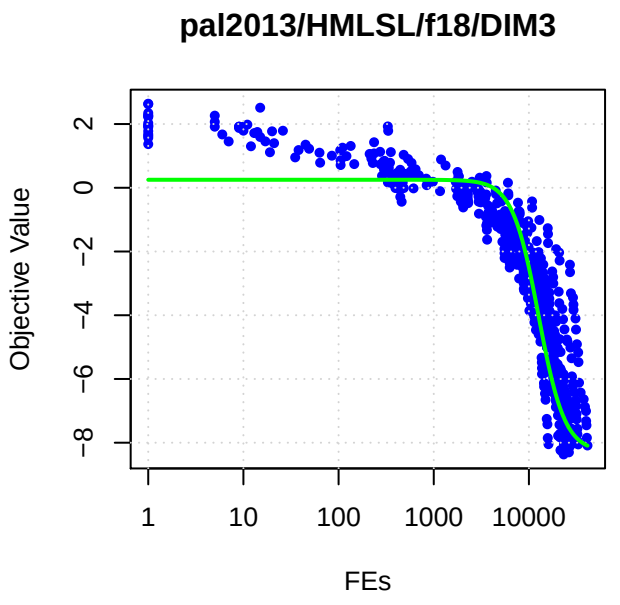
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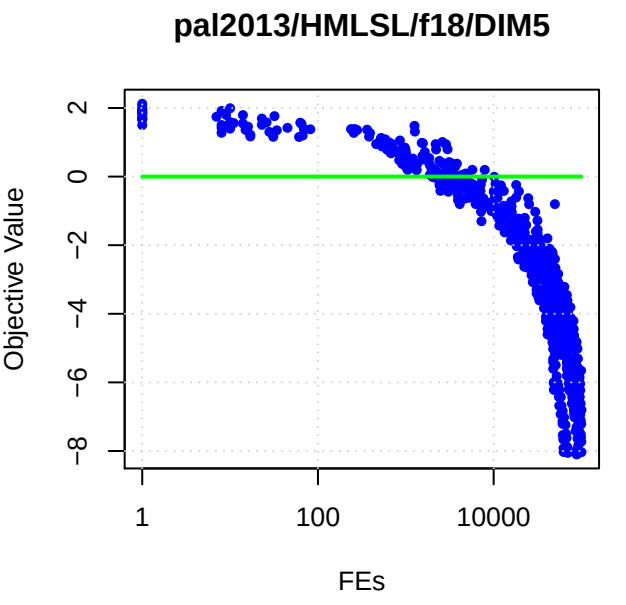
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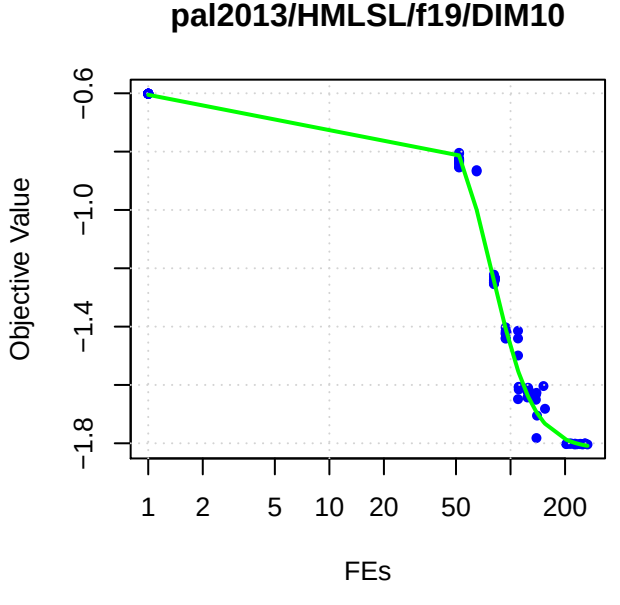
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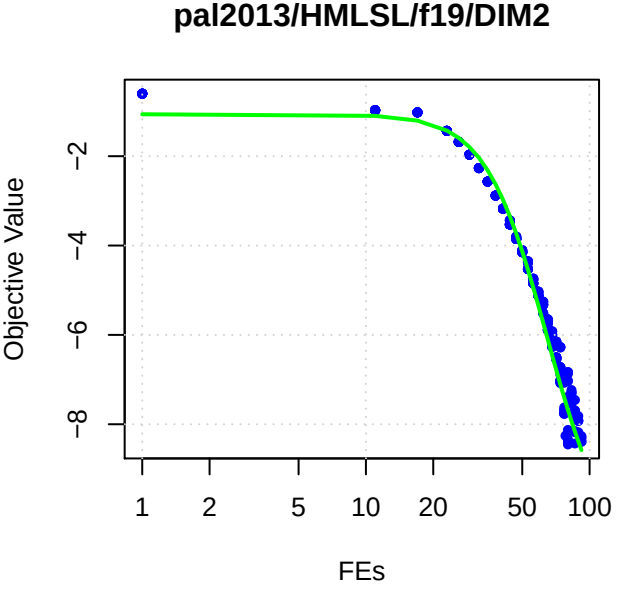
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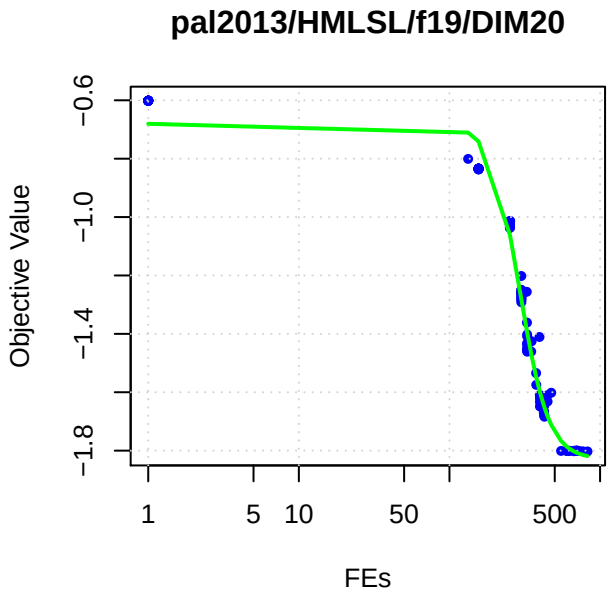
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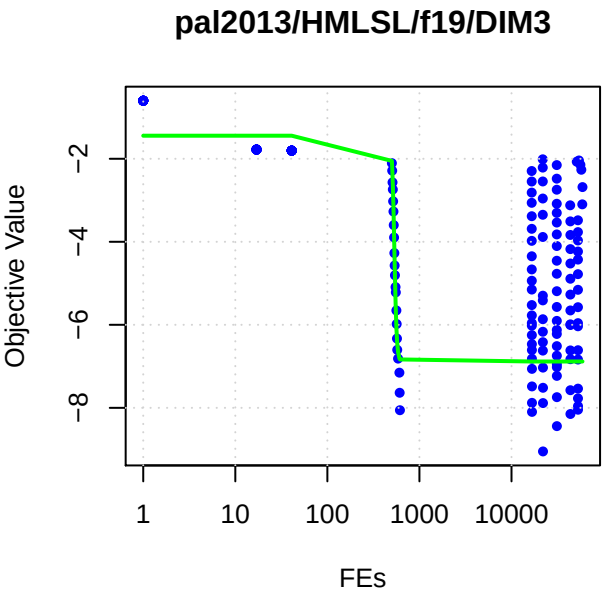
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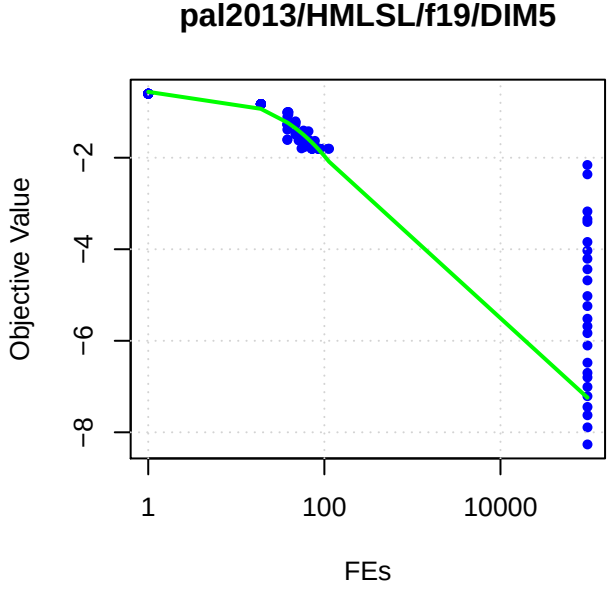
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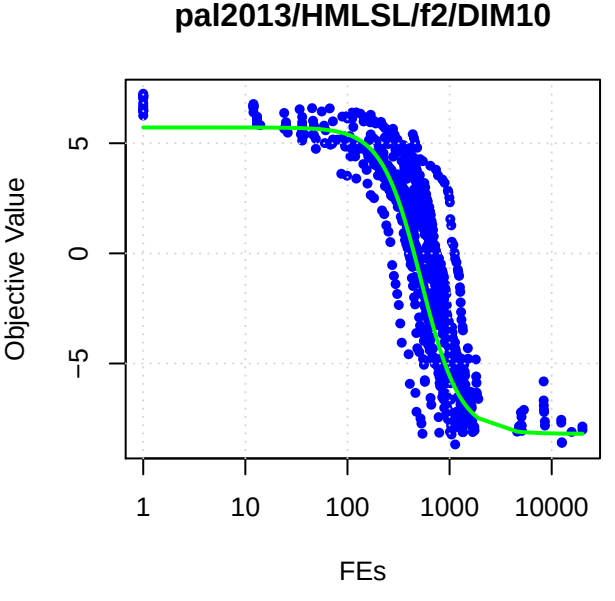
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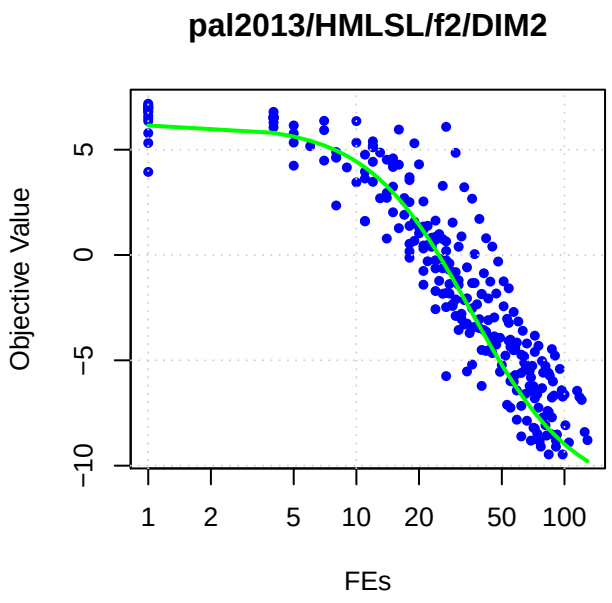
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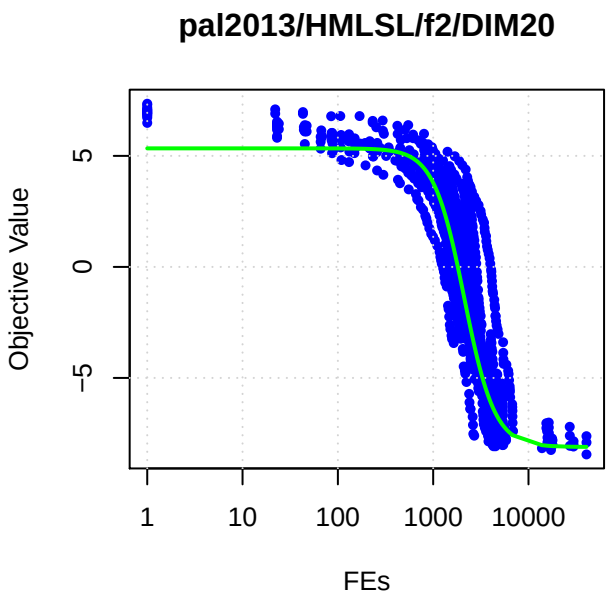
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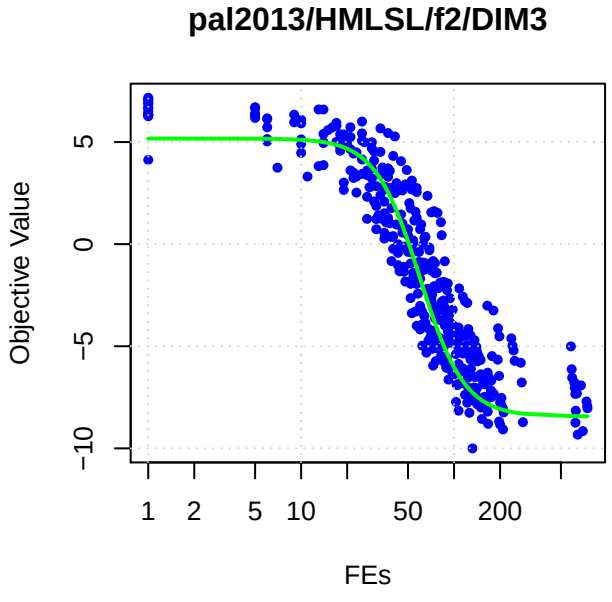
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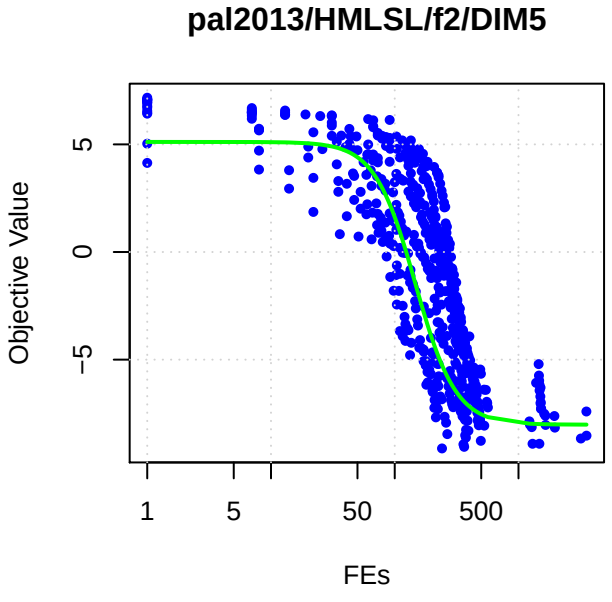
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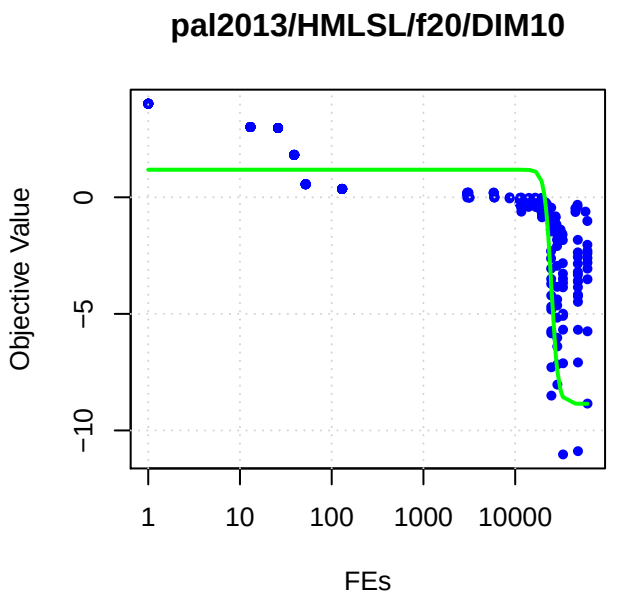
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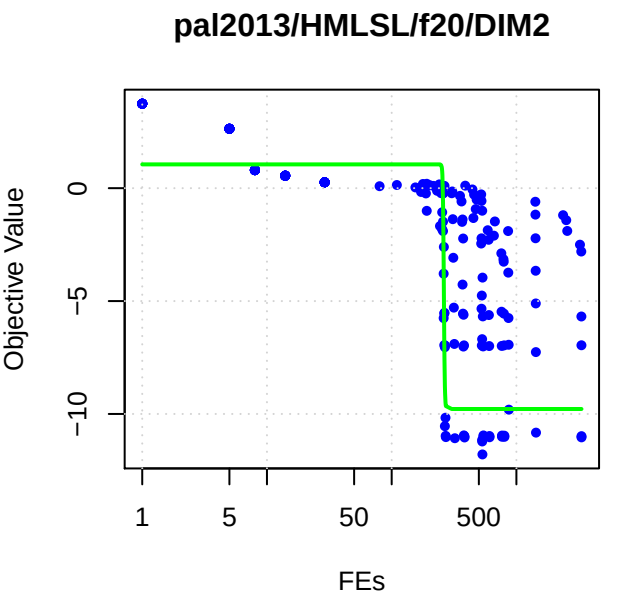
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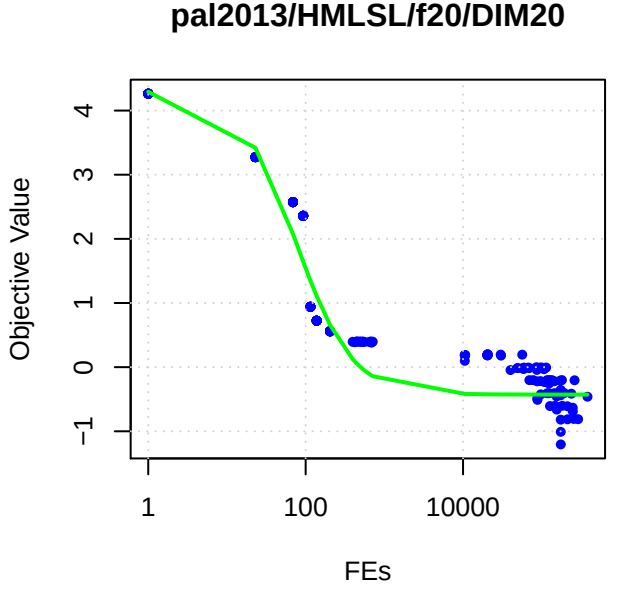
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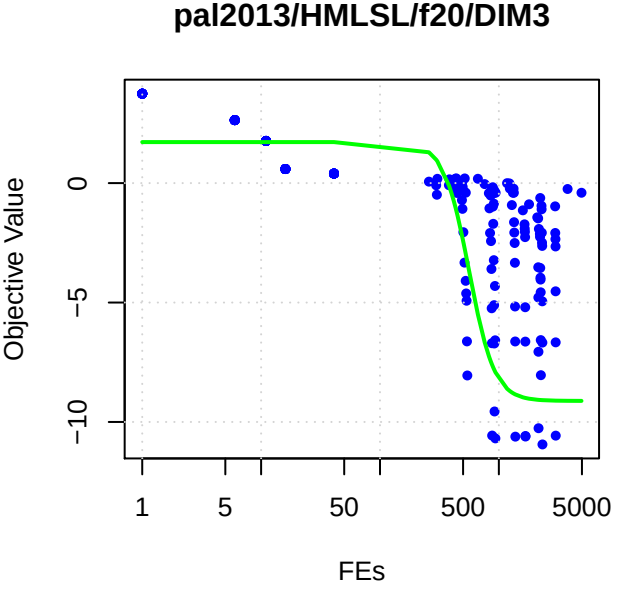
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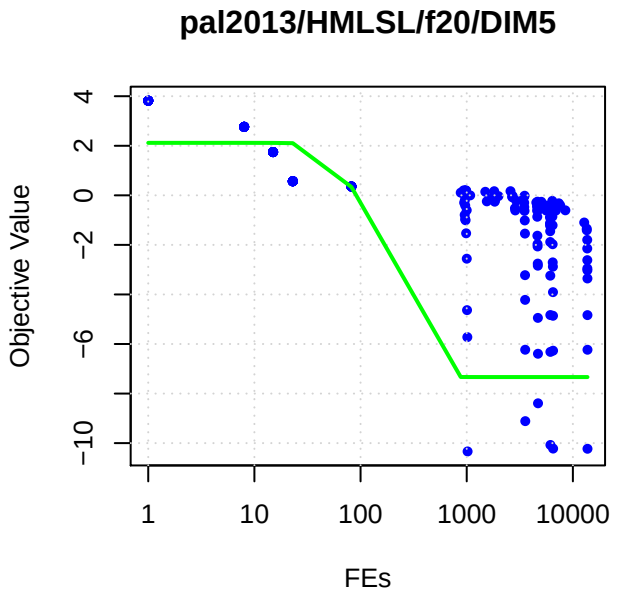
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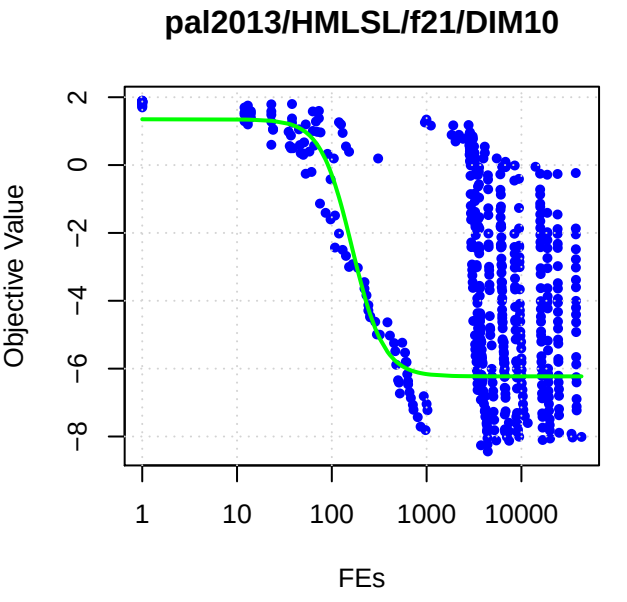
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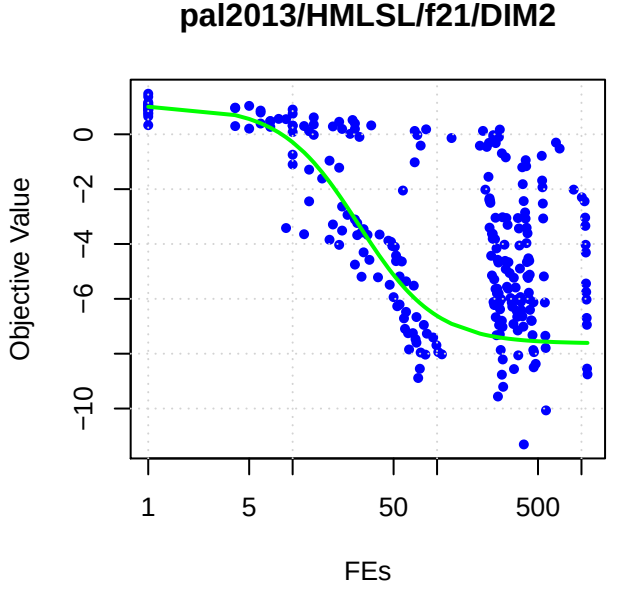
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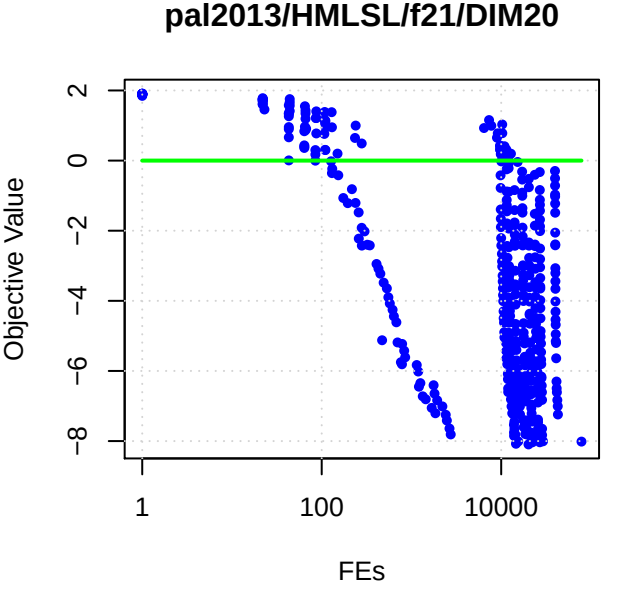
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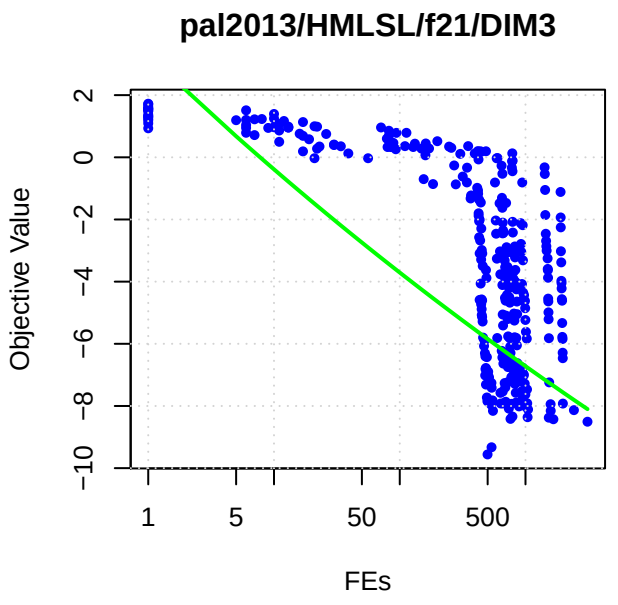
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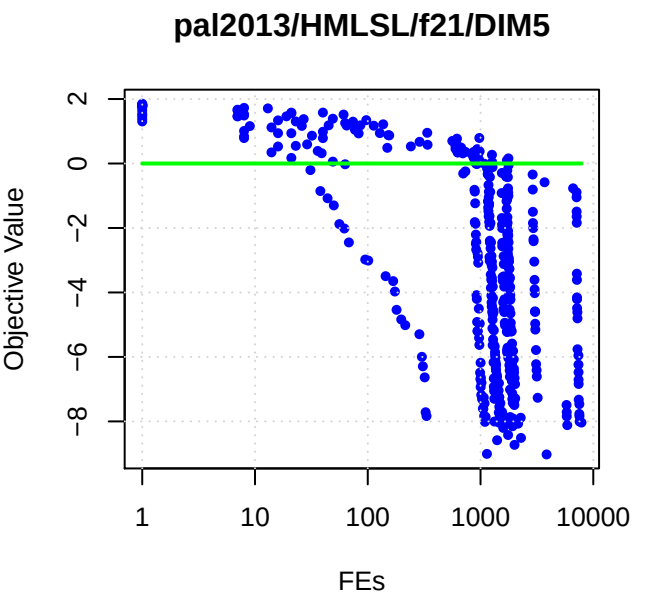
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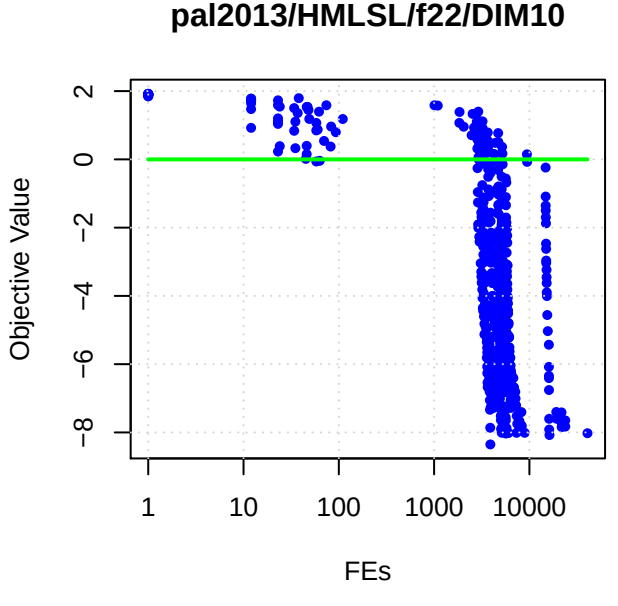
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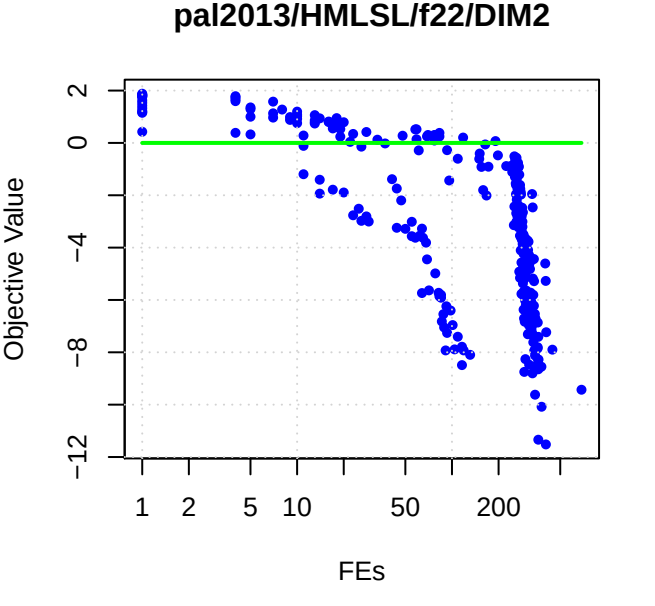
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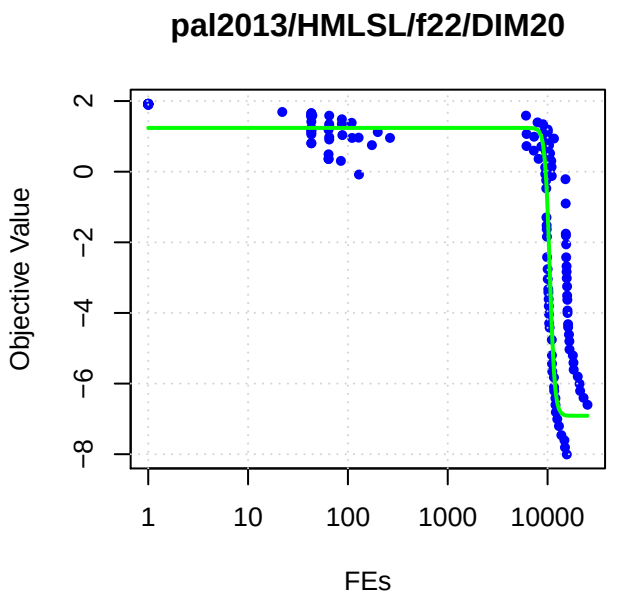
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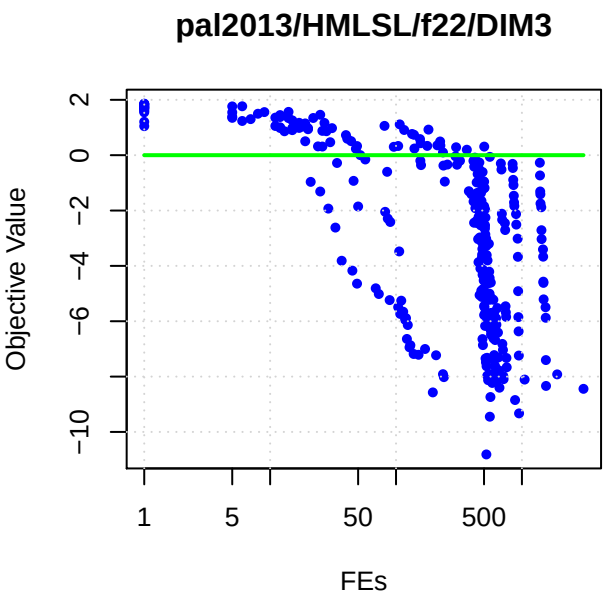
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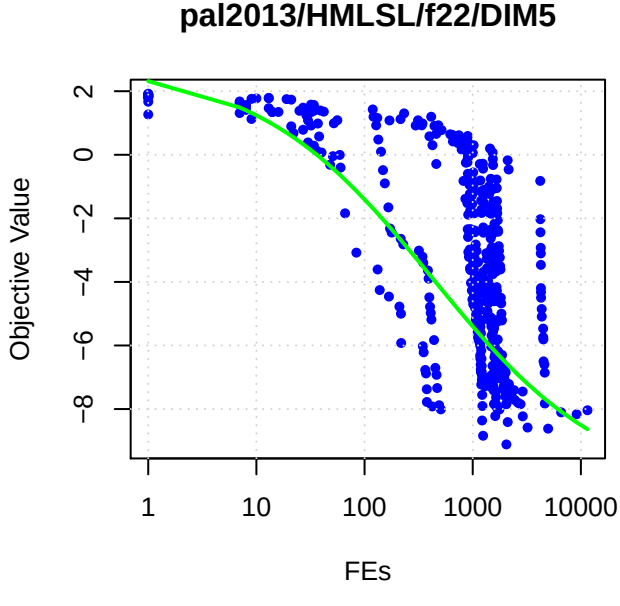
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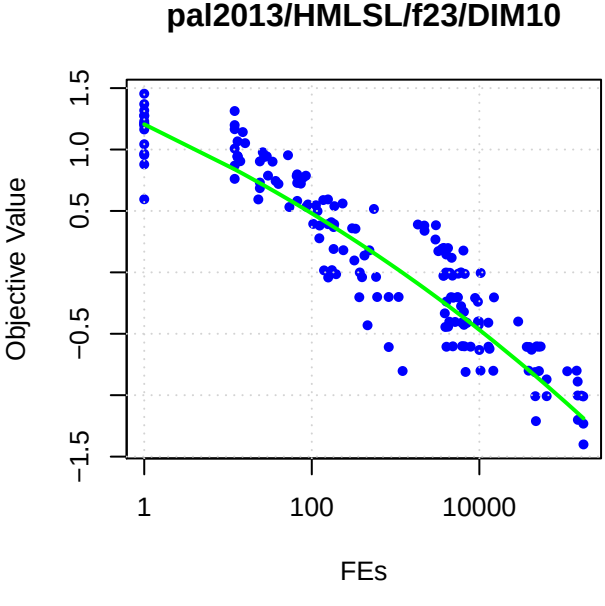
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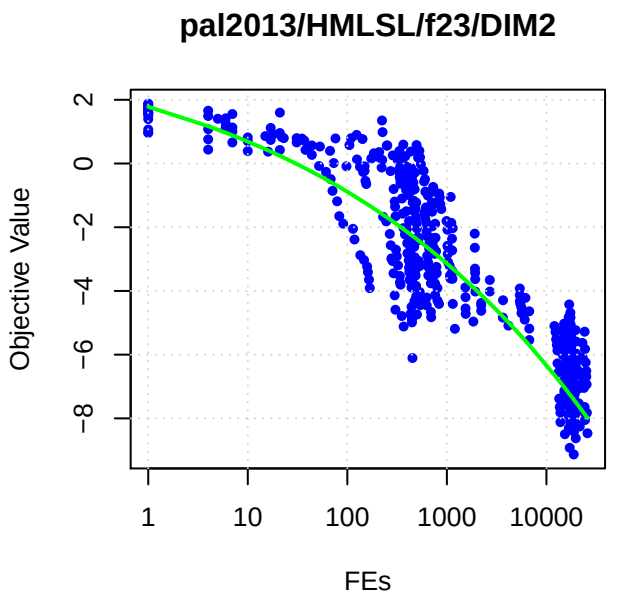
FEs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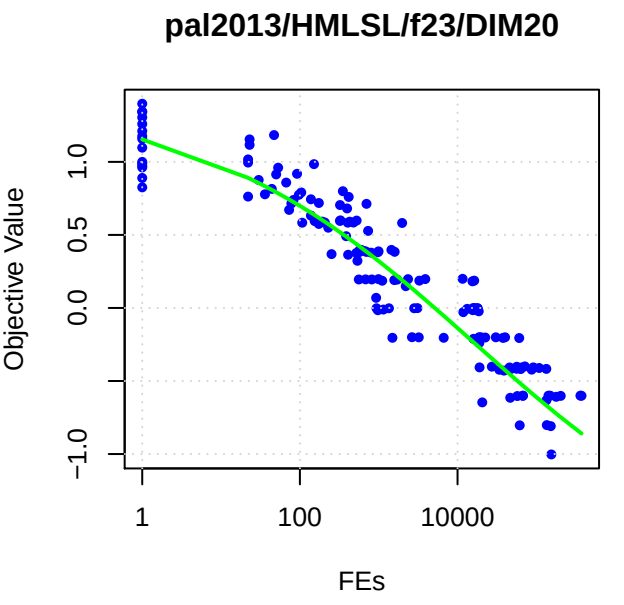
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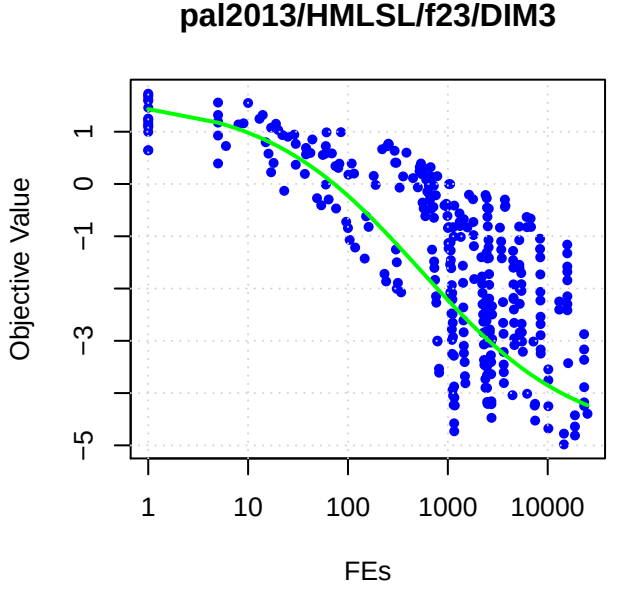
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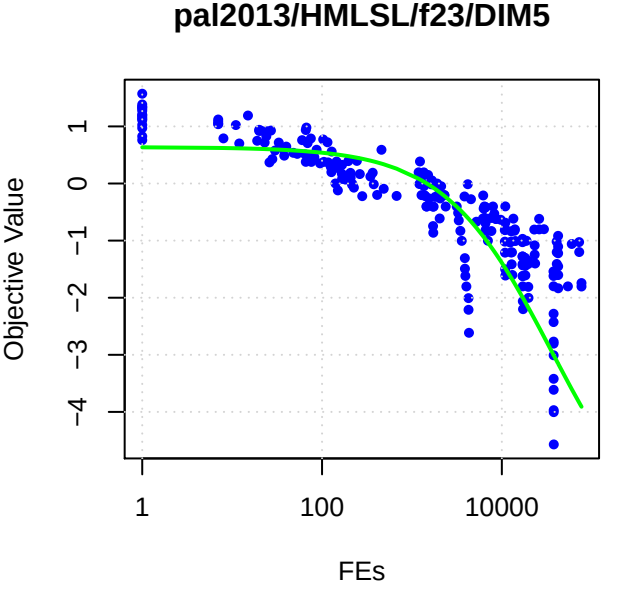
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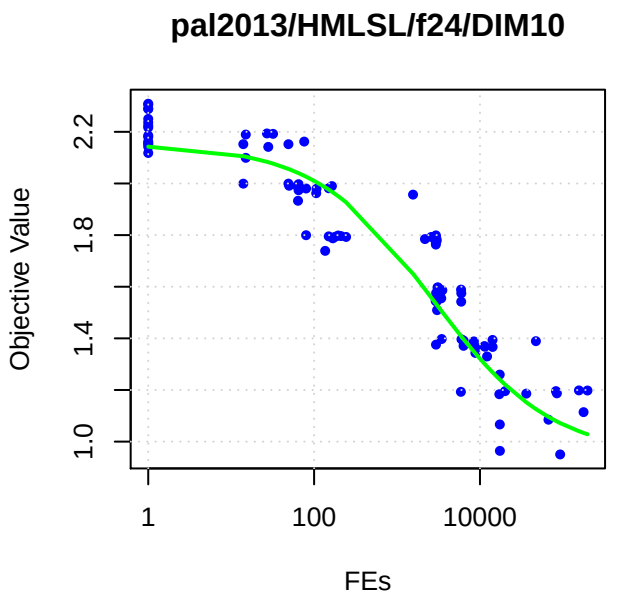
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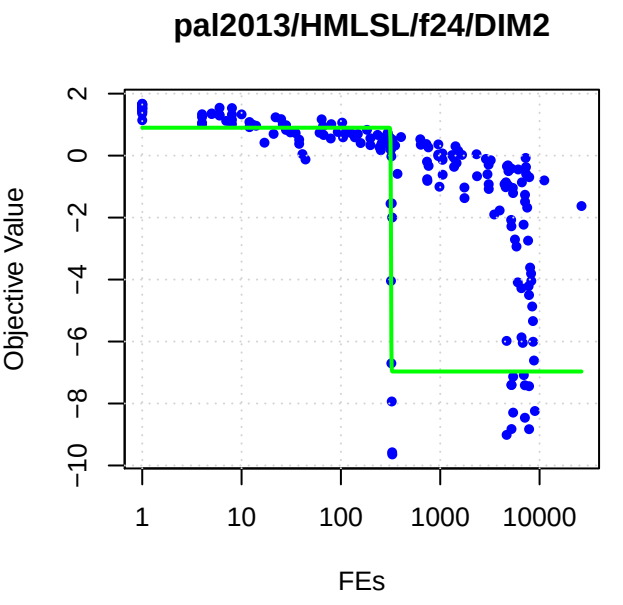
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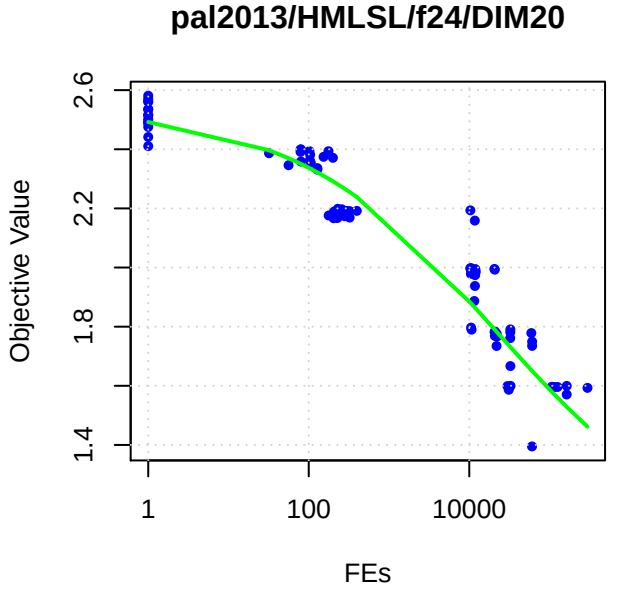
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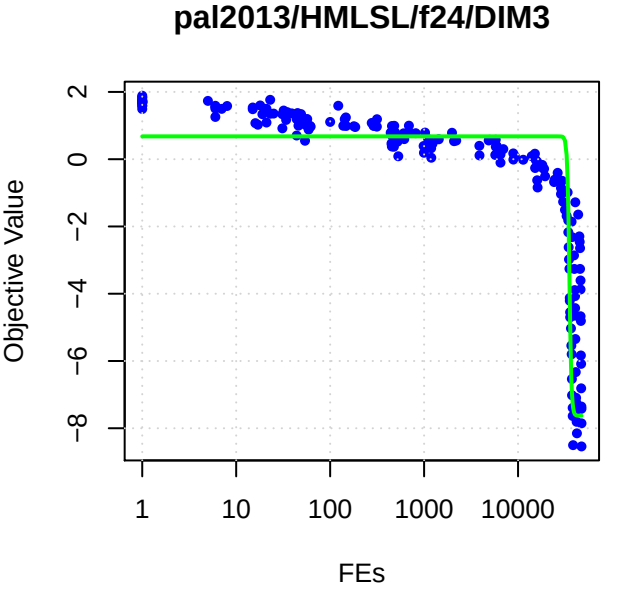
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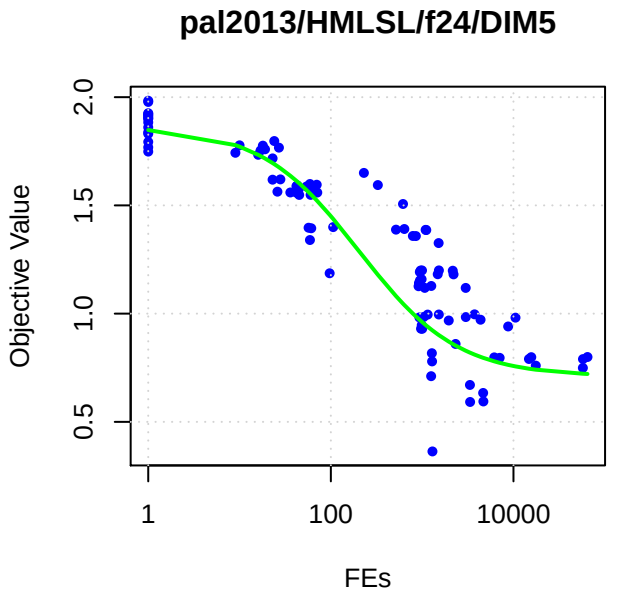
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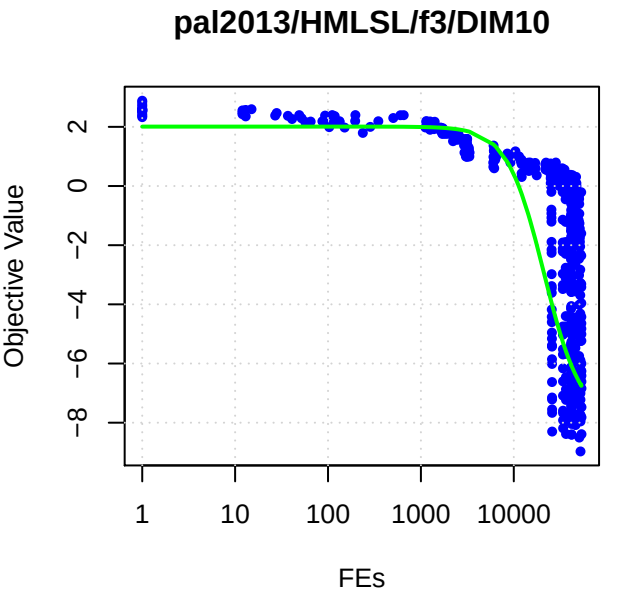
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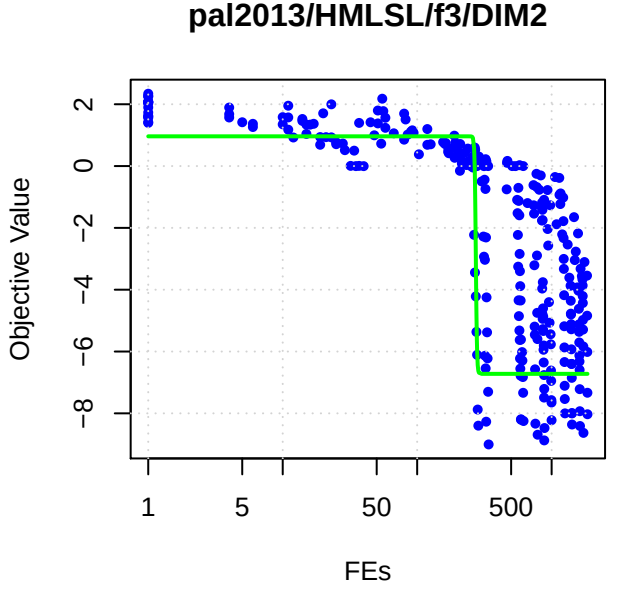
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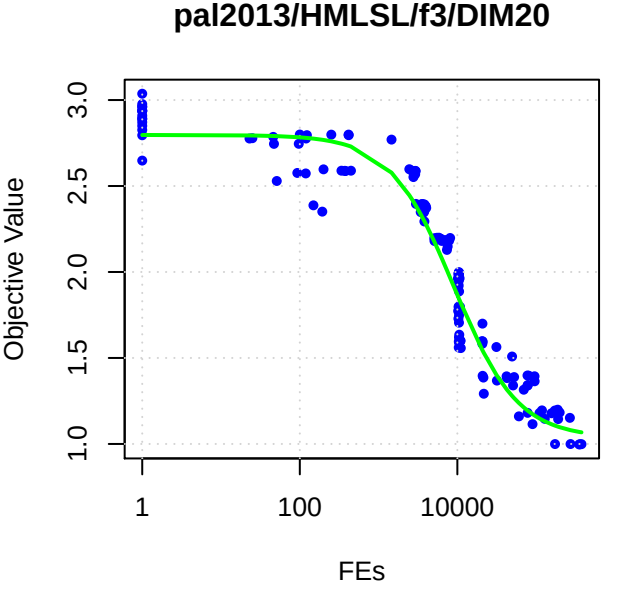
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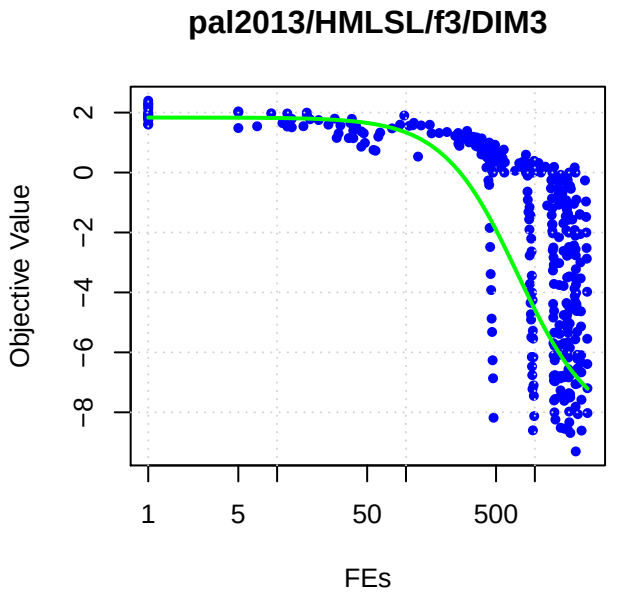
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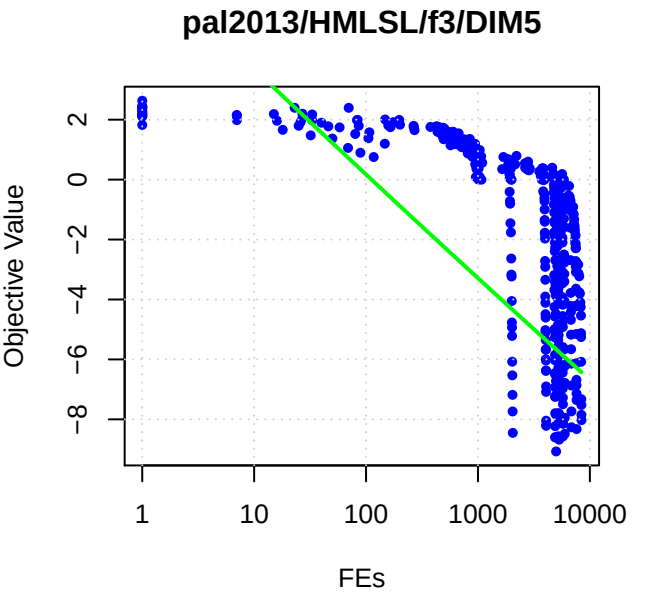
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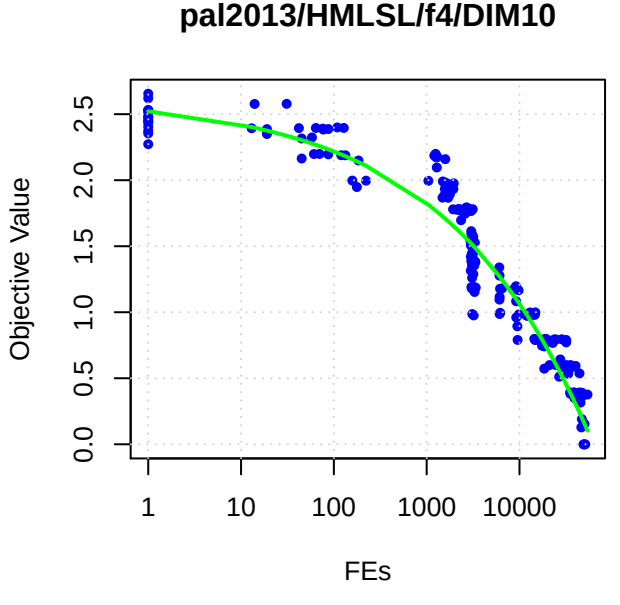
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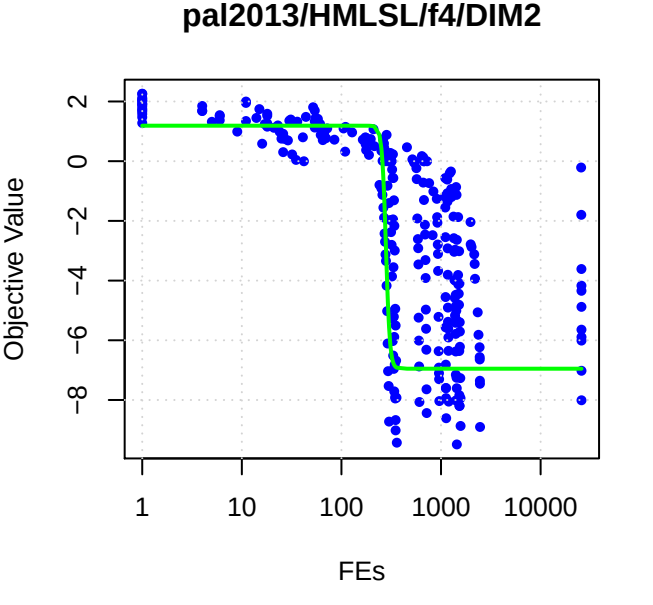
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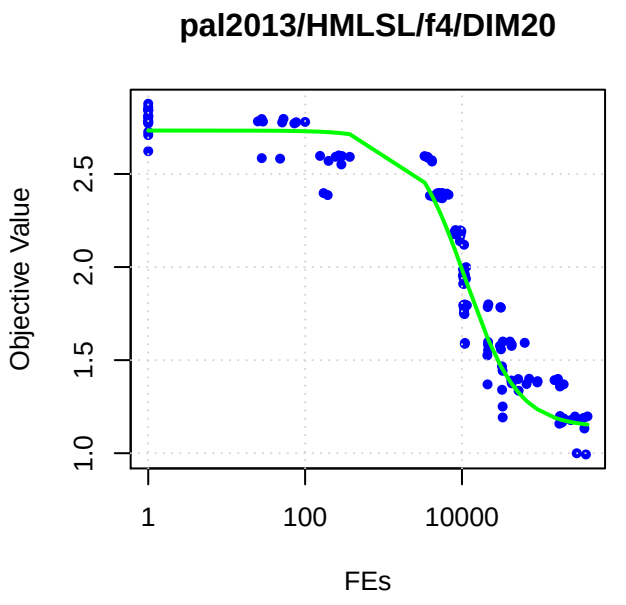
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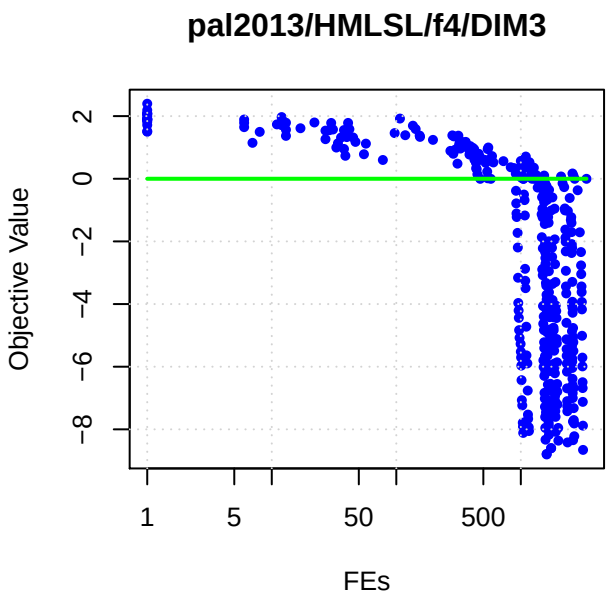
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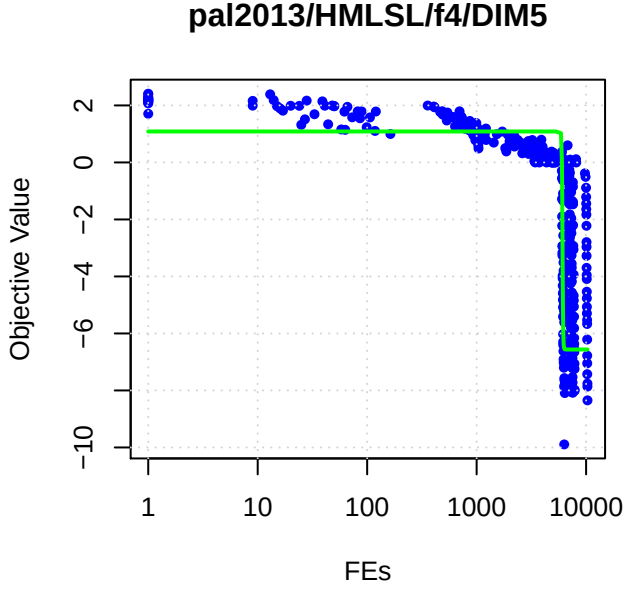
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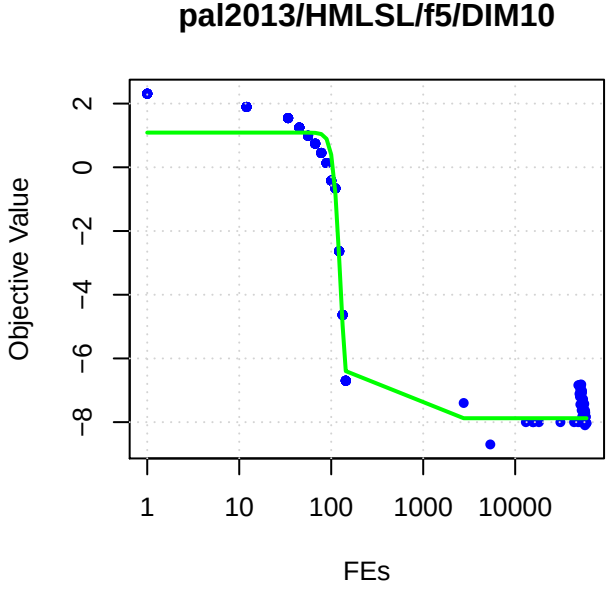
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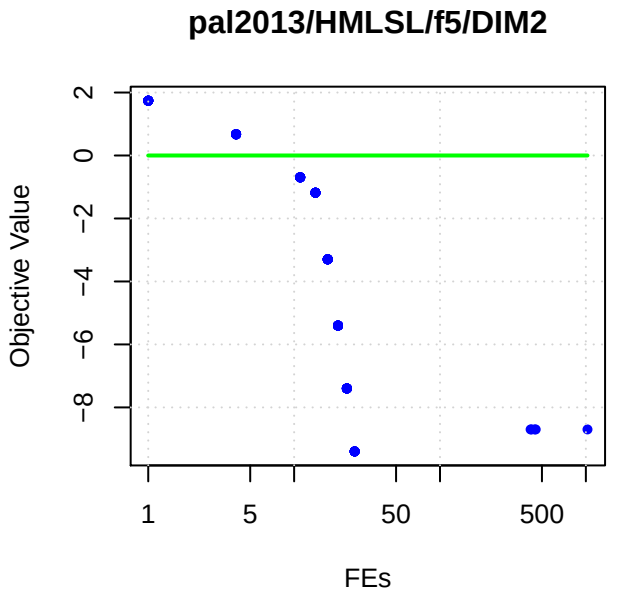
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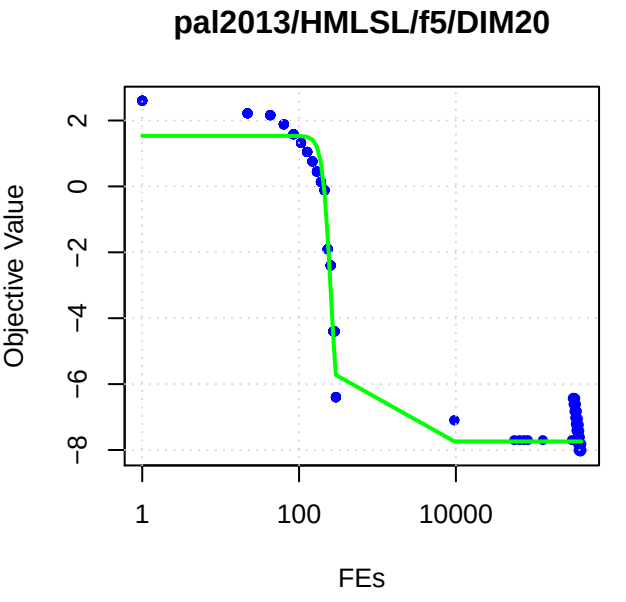
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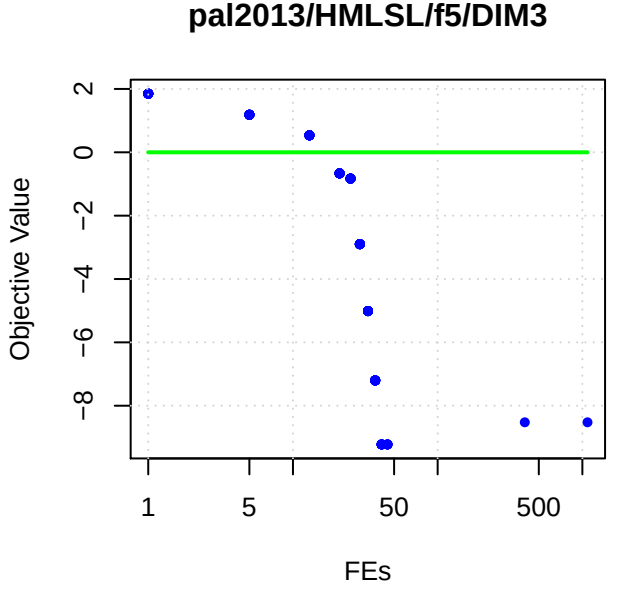
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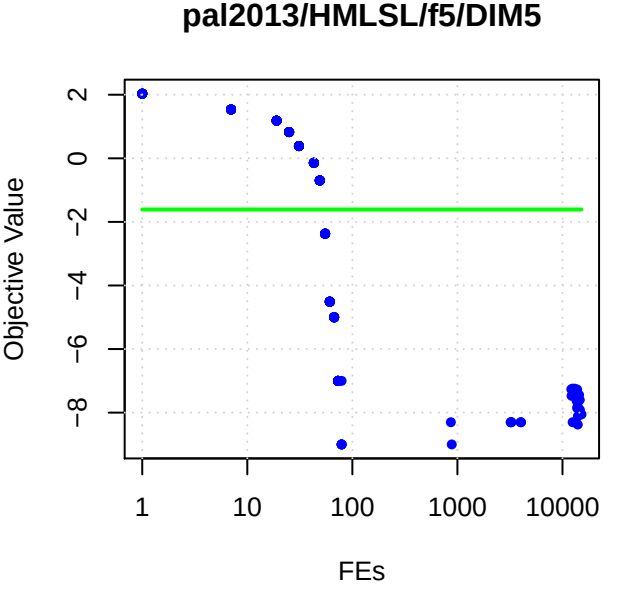
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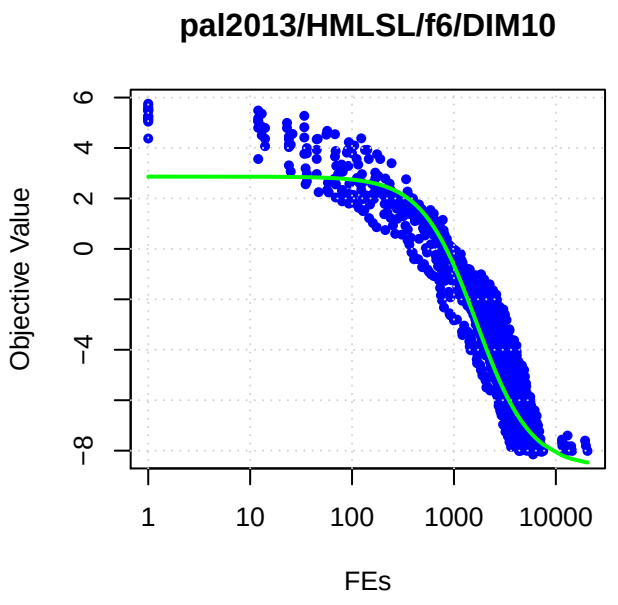
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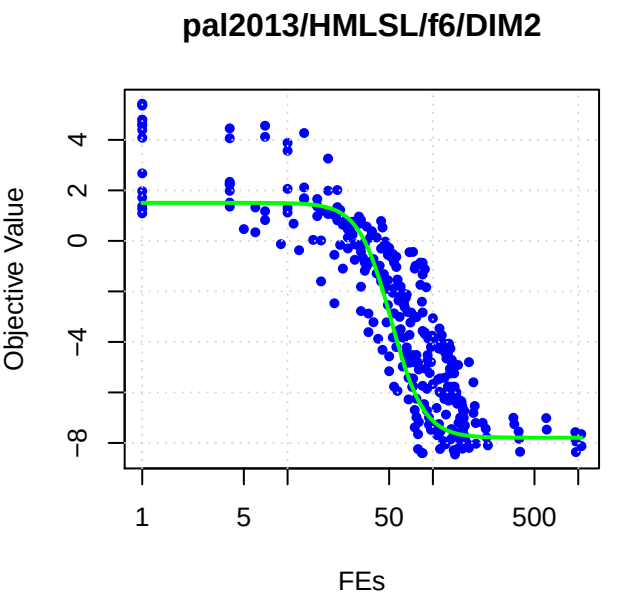
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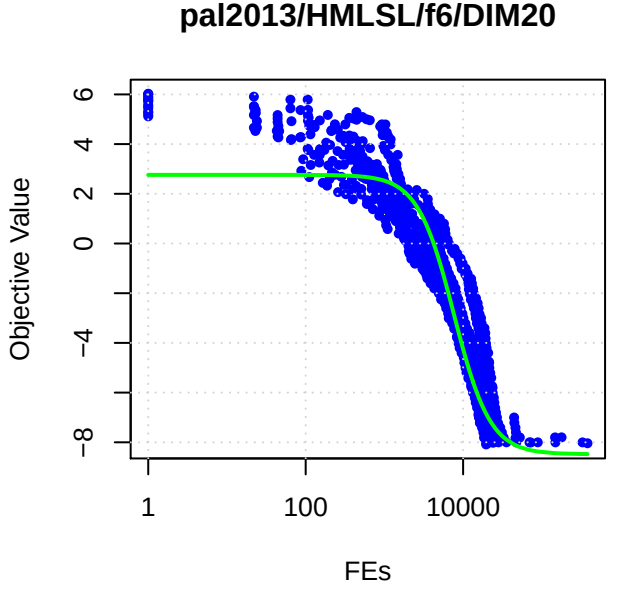
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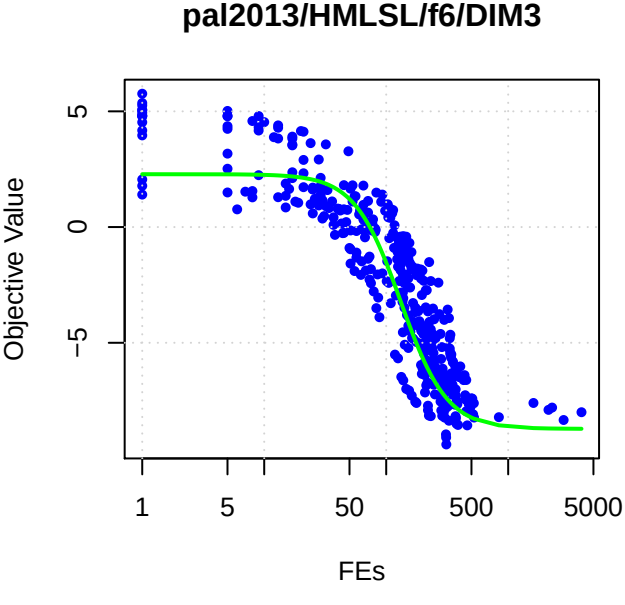
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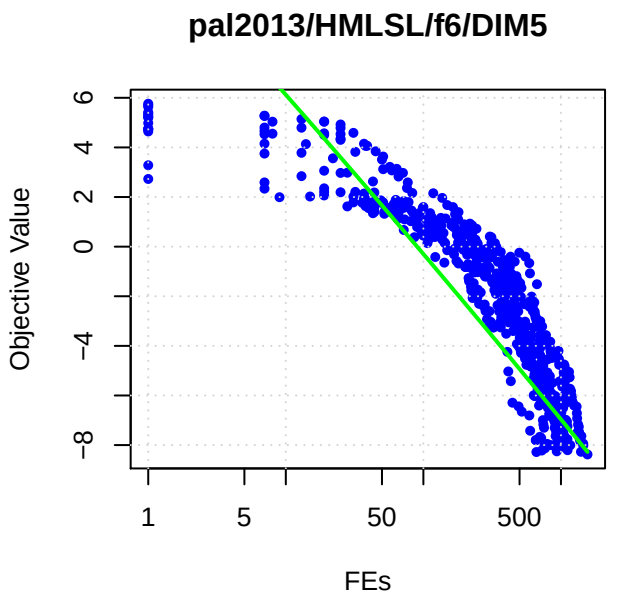
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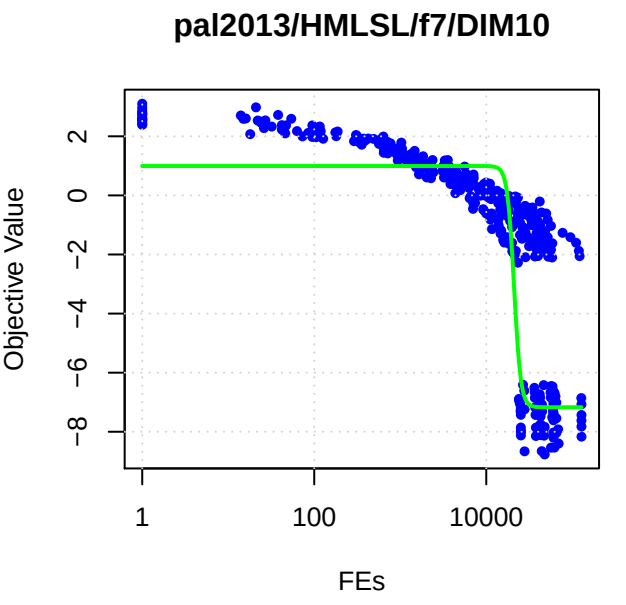
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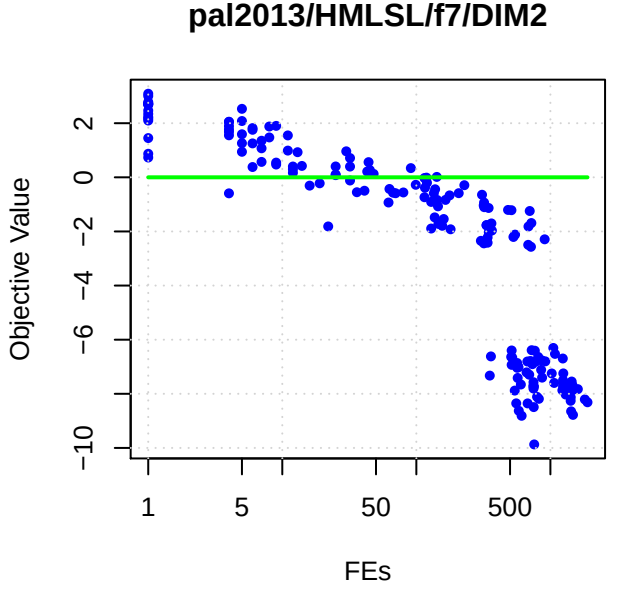
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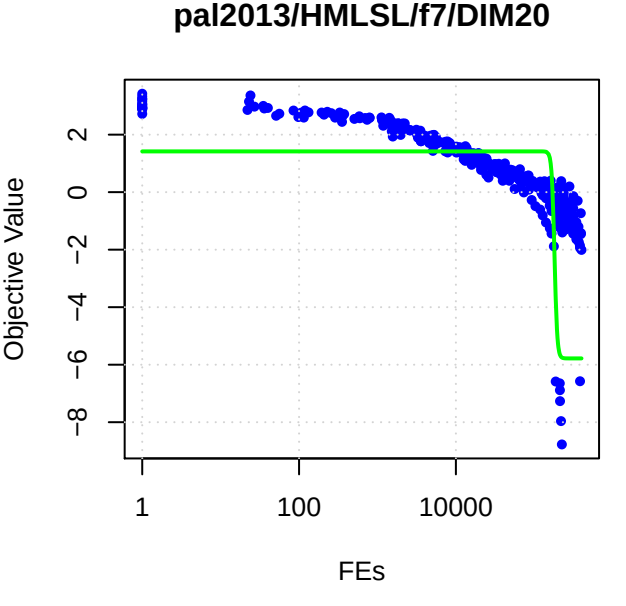
pal2013/HMLSL/f7/DIM20
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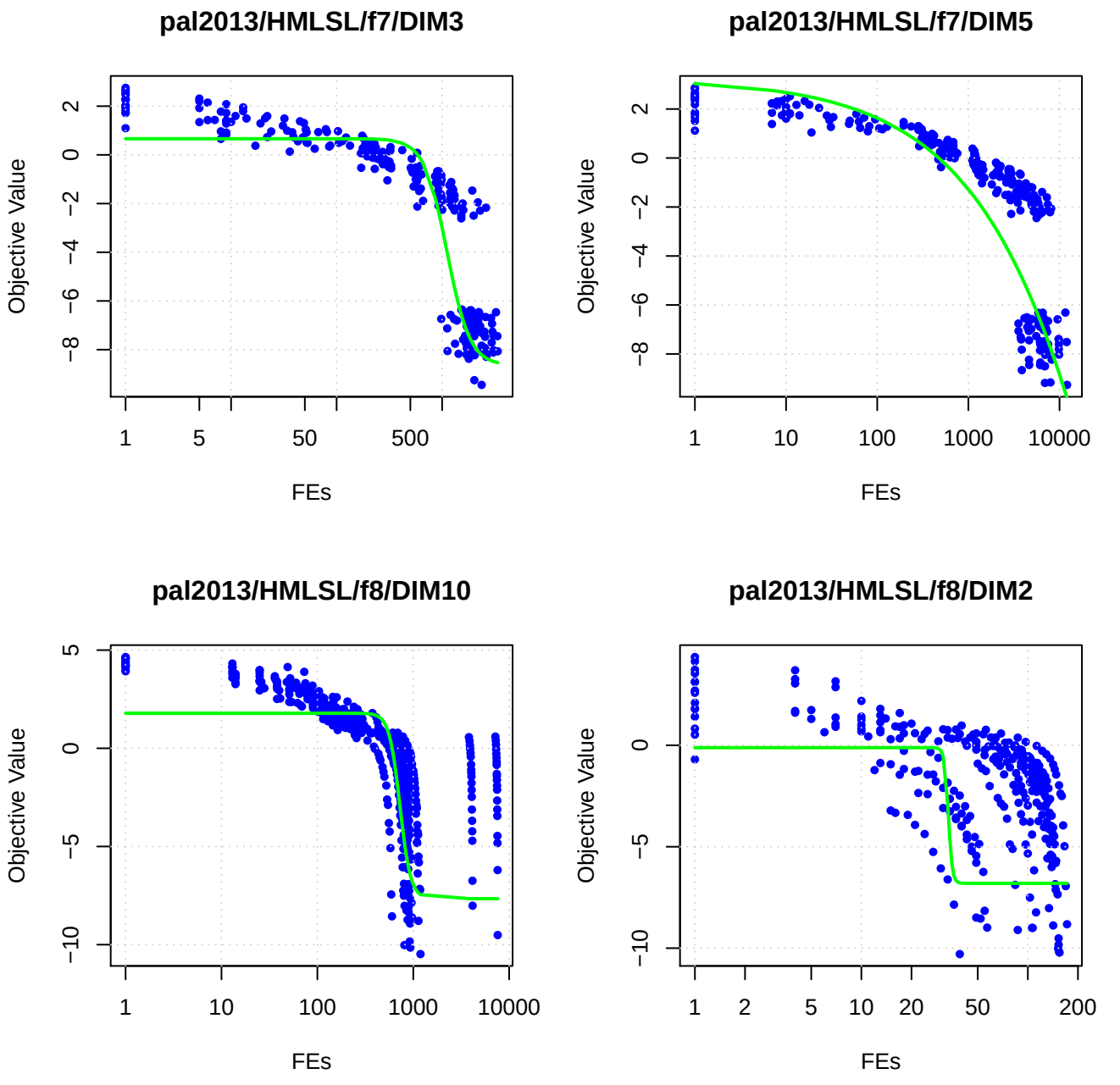
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FEs
pal2013/HMLSL/f7/DIM5
Objective Value
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0
−2
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10000
FEs
pal2013/HMLSL/f8/DIM10
Objective Value
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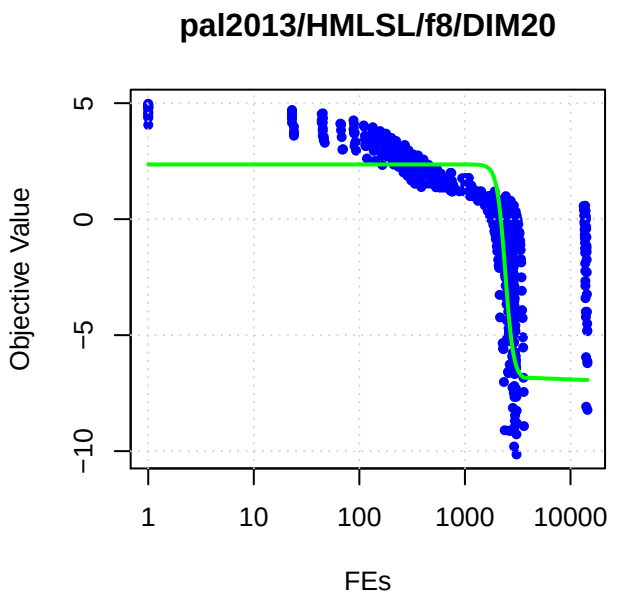
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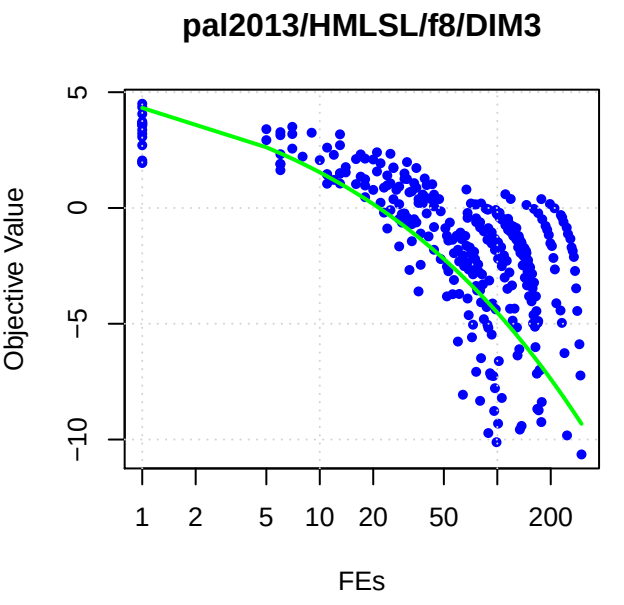
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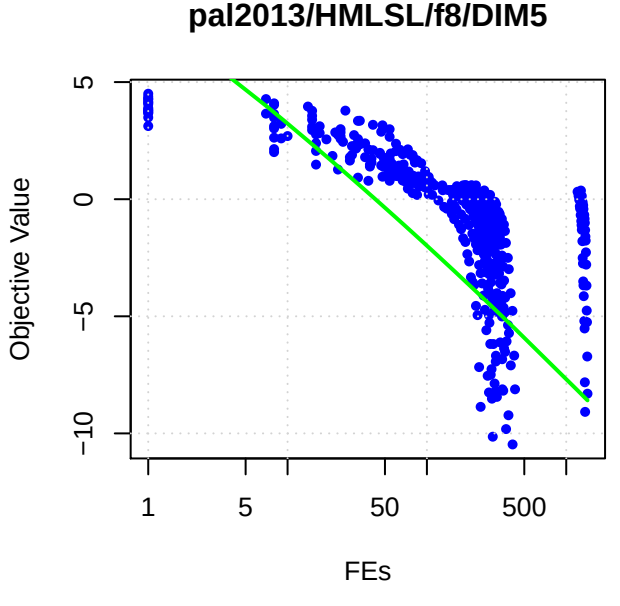
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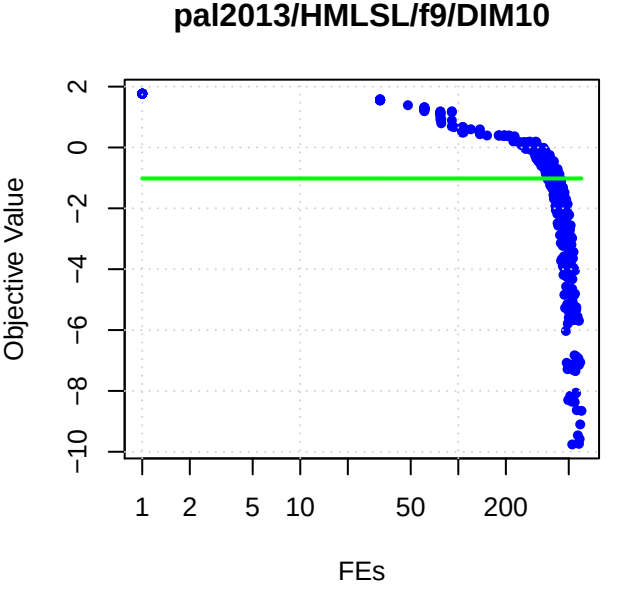
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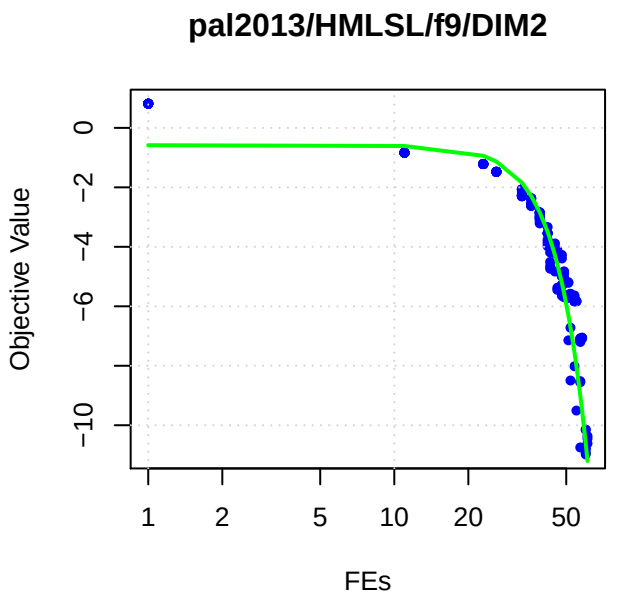
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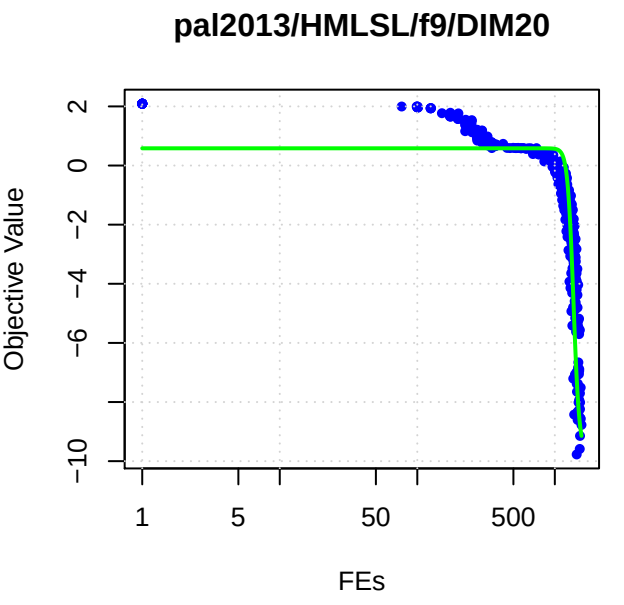
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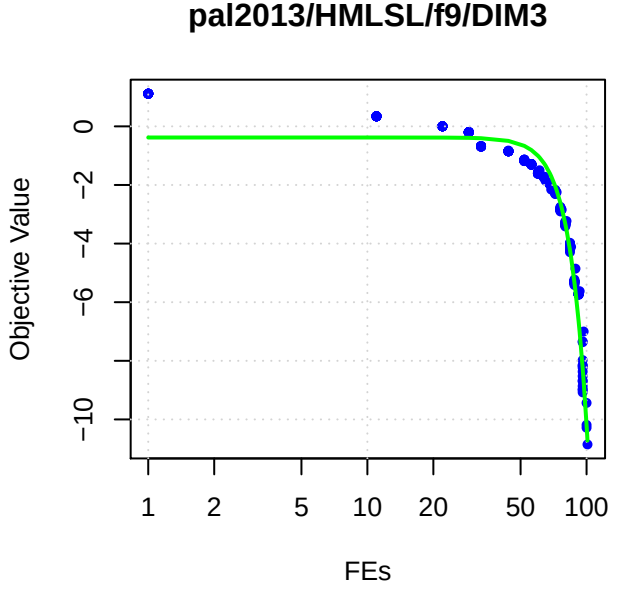
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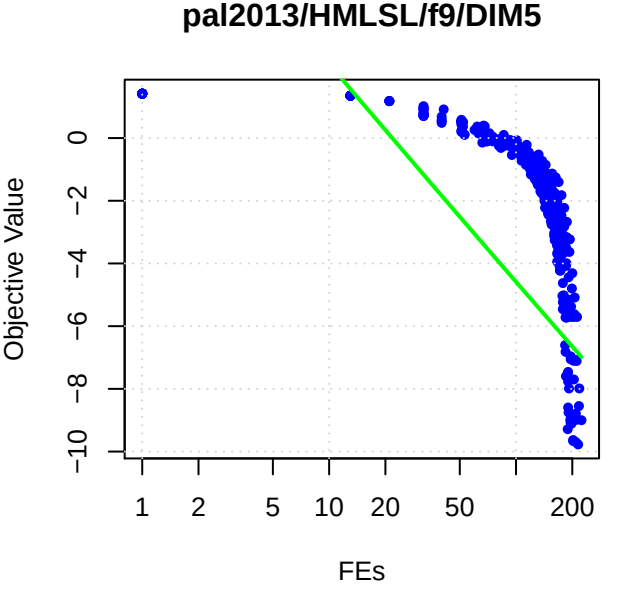
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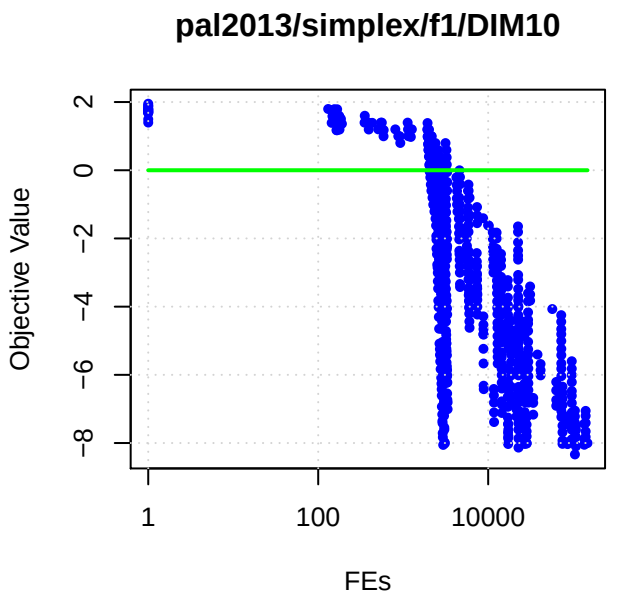
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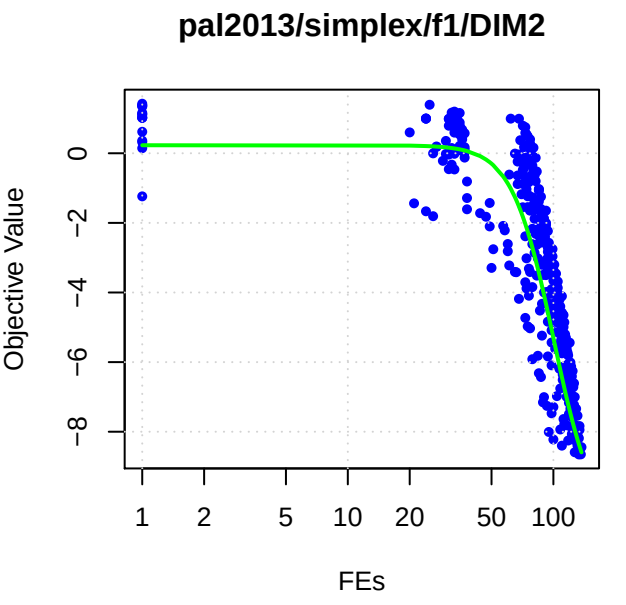
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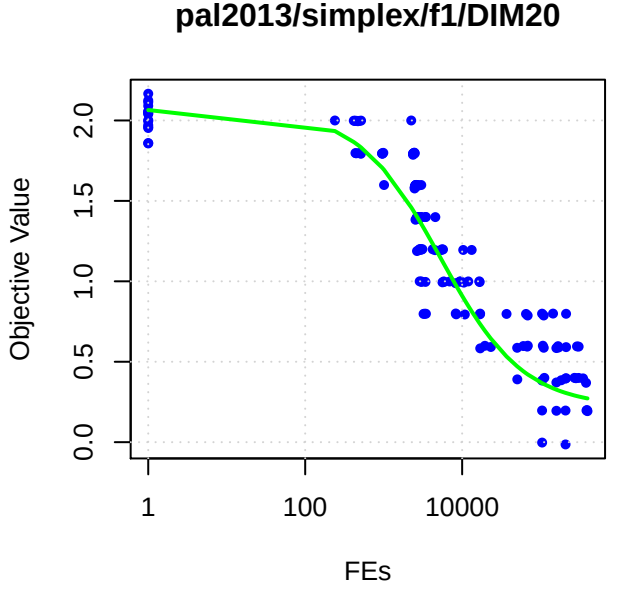
FEs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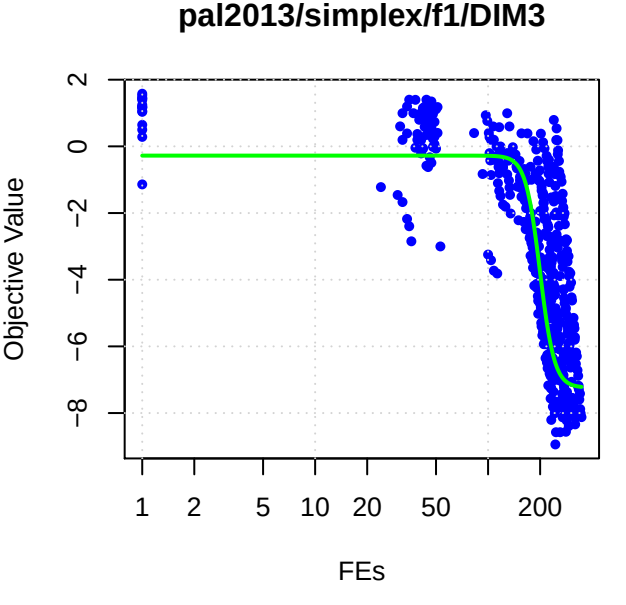
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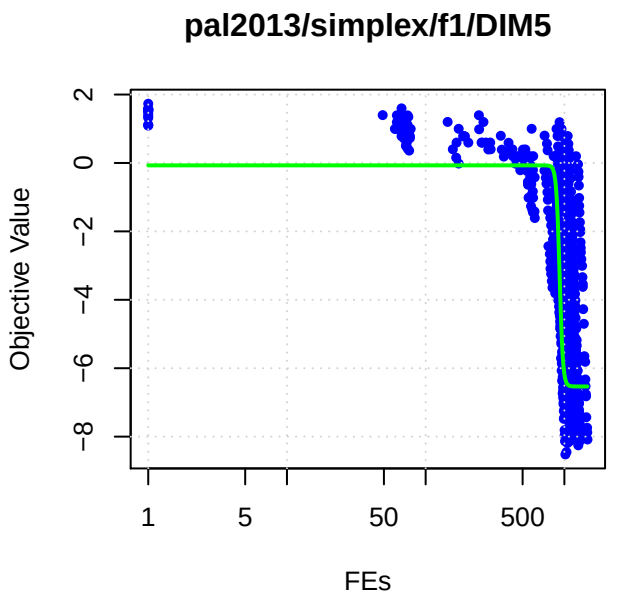
FEs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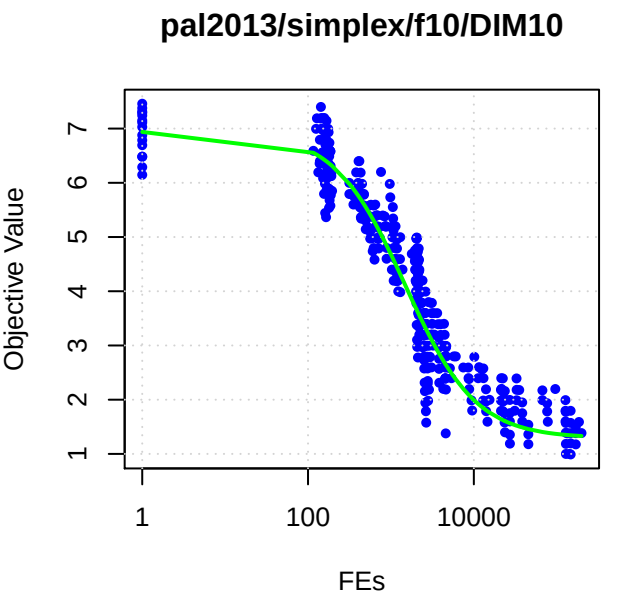
FEs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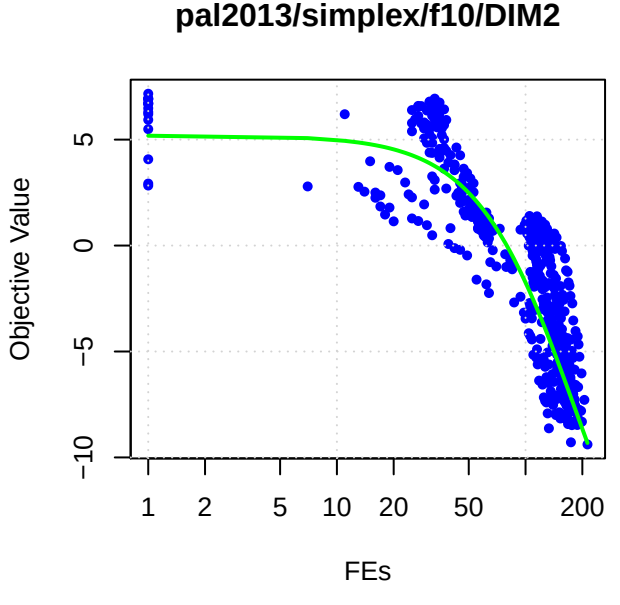
FEs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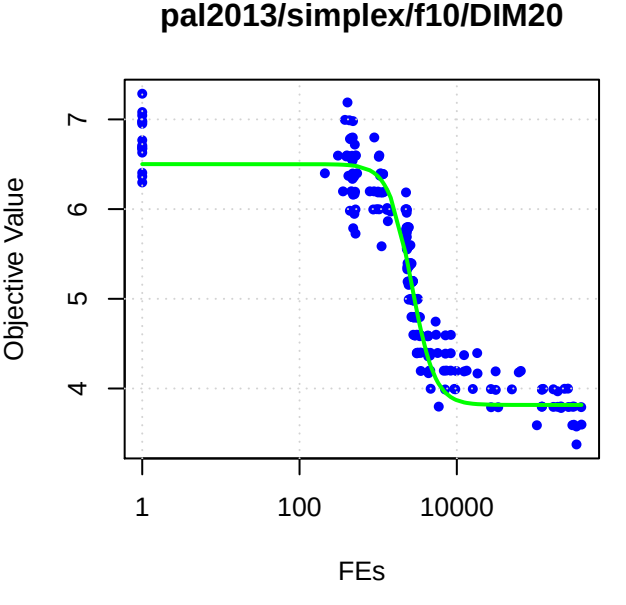
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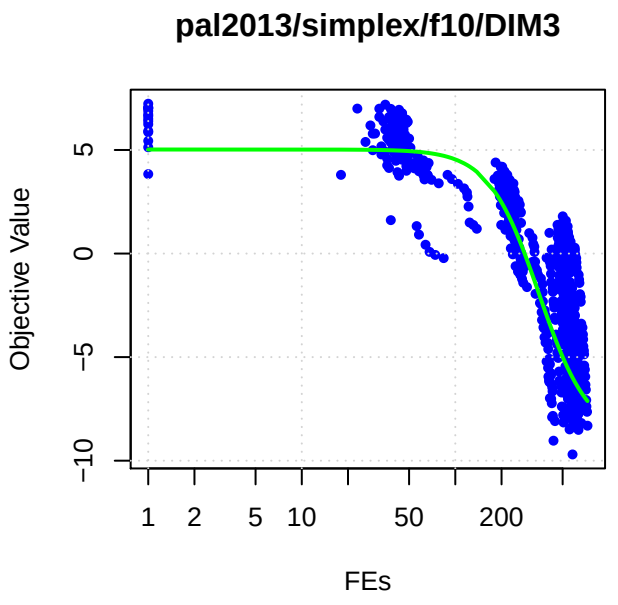
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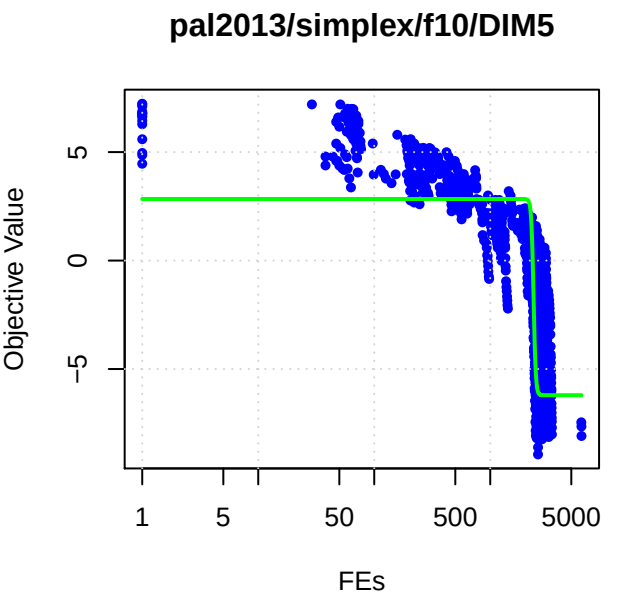
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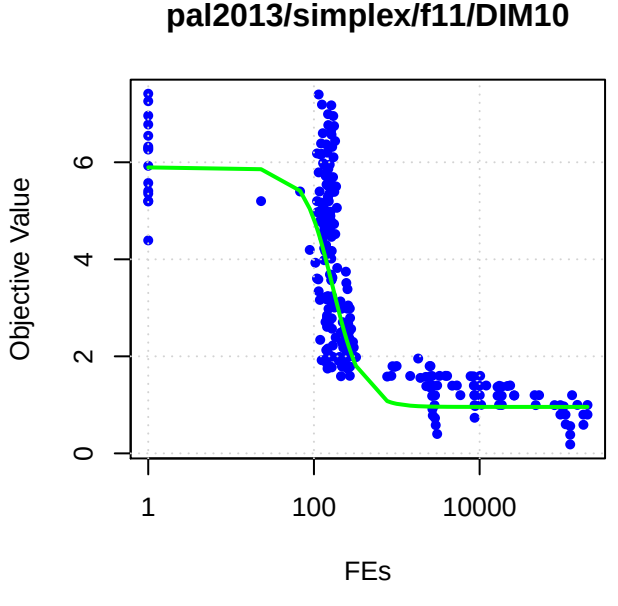
FEs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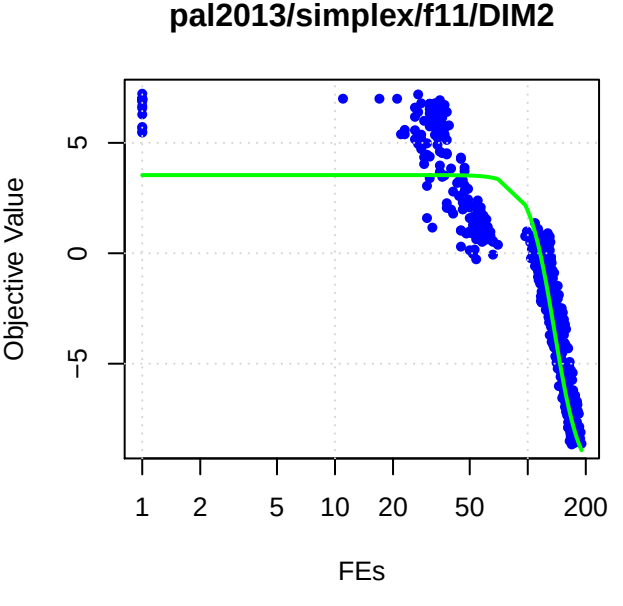
FEs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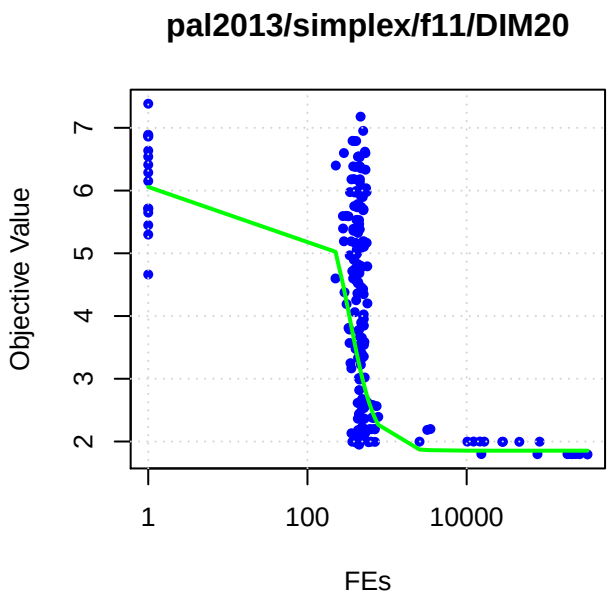
FEs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FEs
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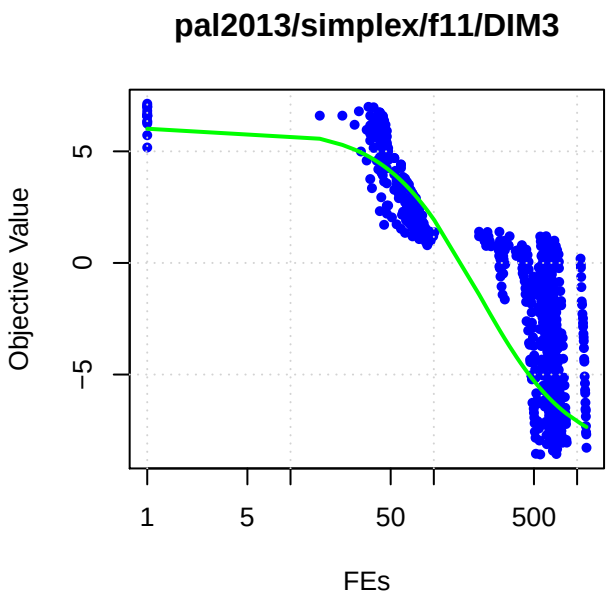
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FEs
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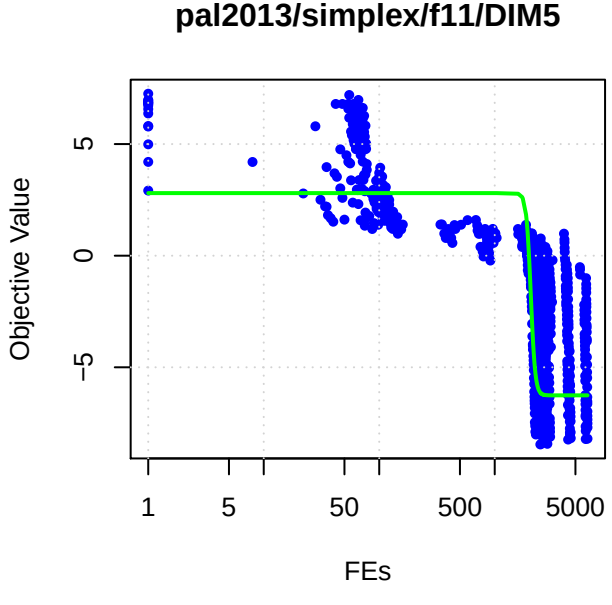
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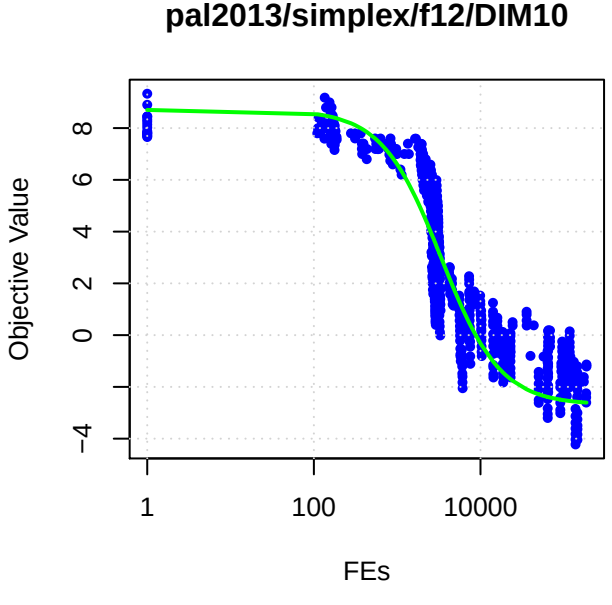
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FEs
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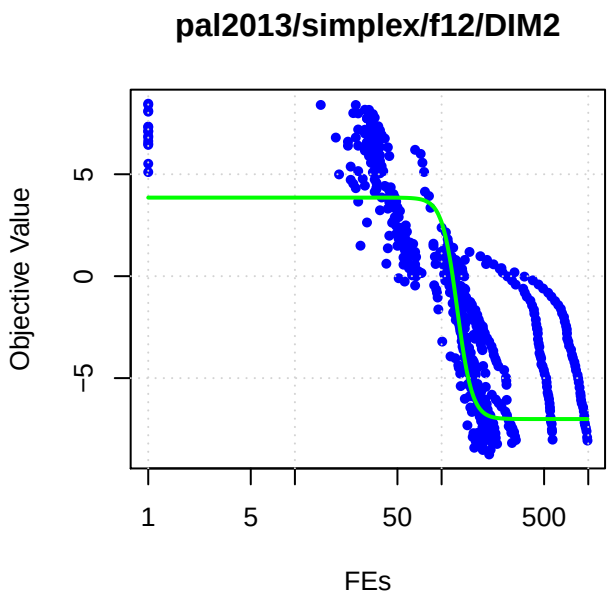
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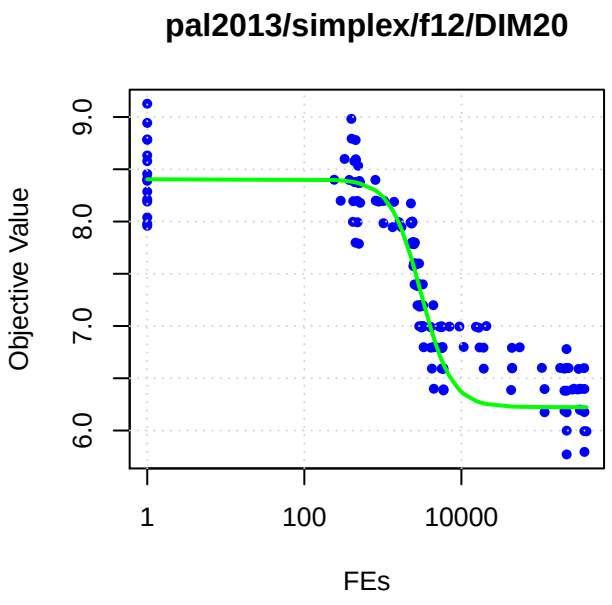
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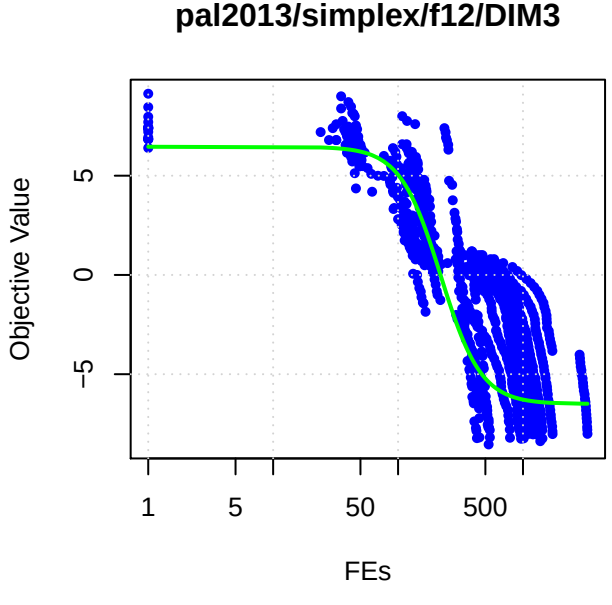
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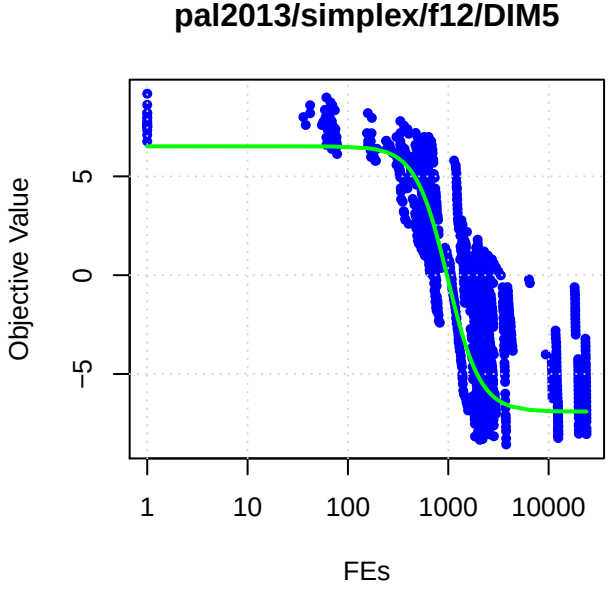
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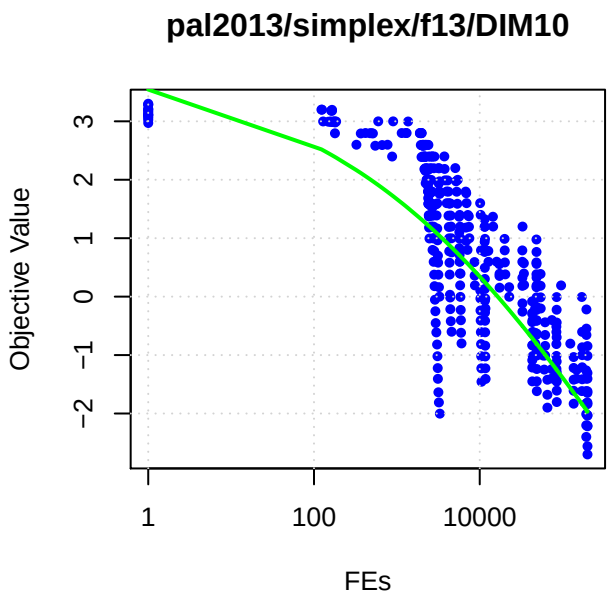
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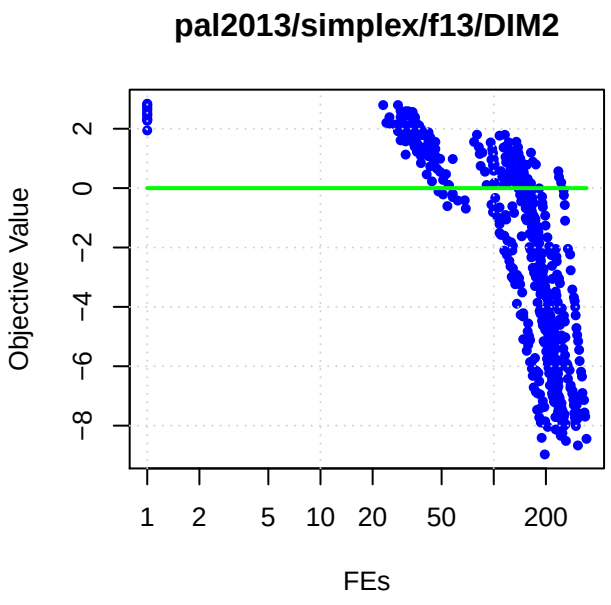
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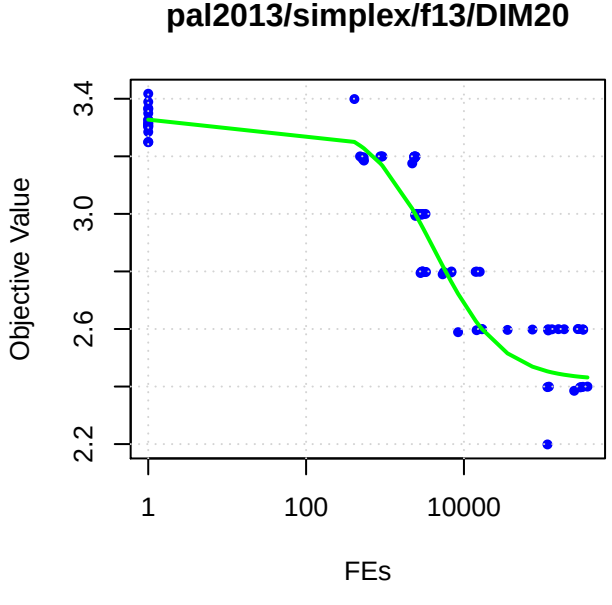
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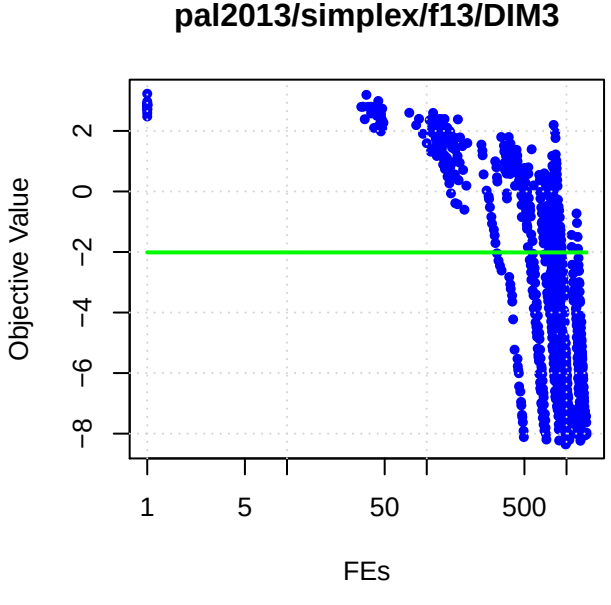
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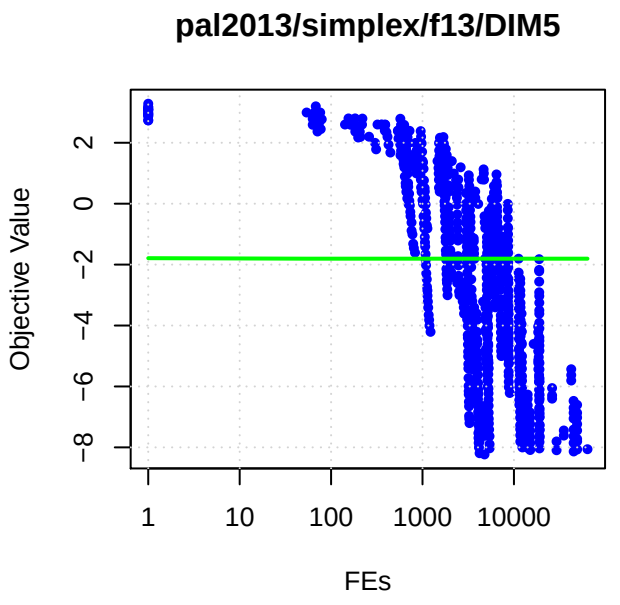
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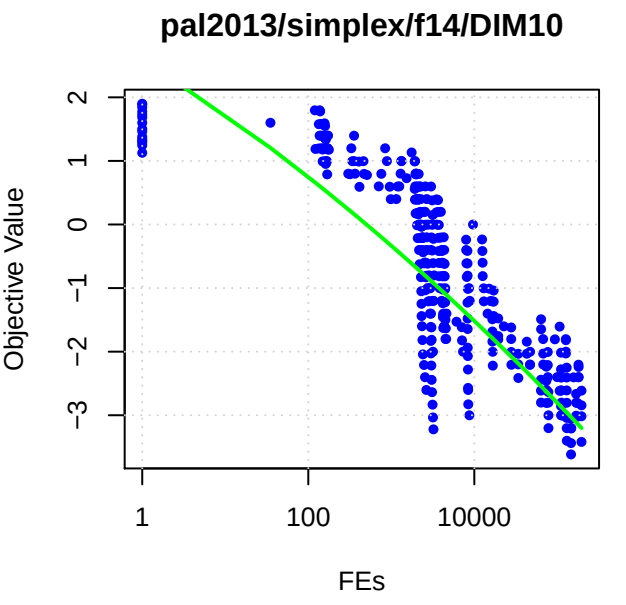
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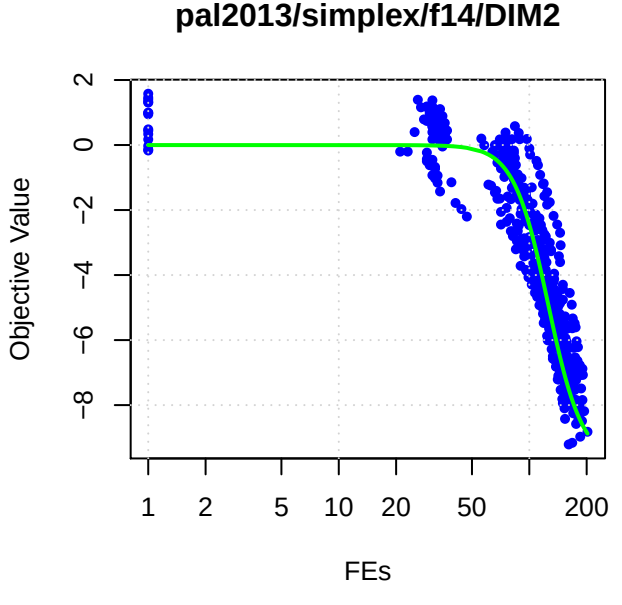
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Objective Value
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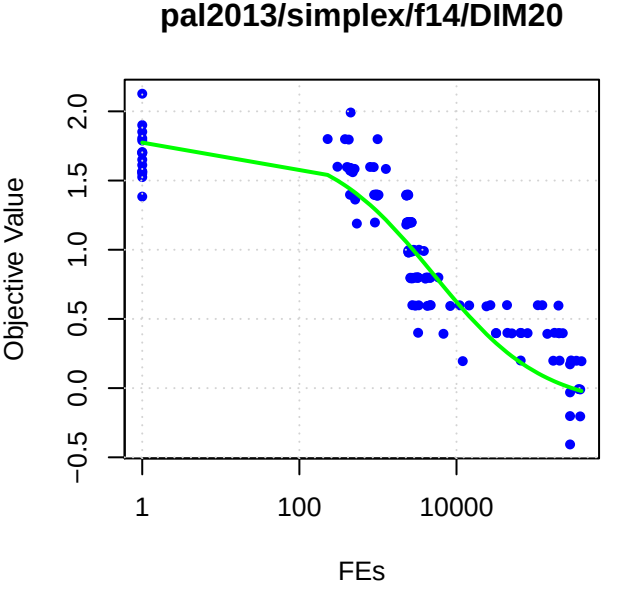
FEs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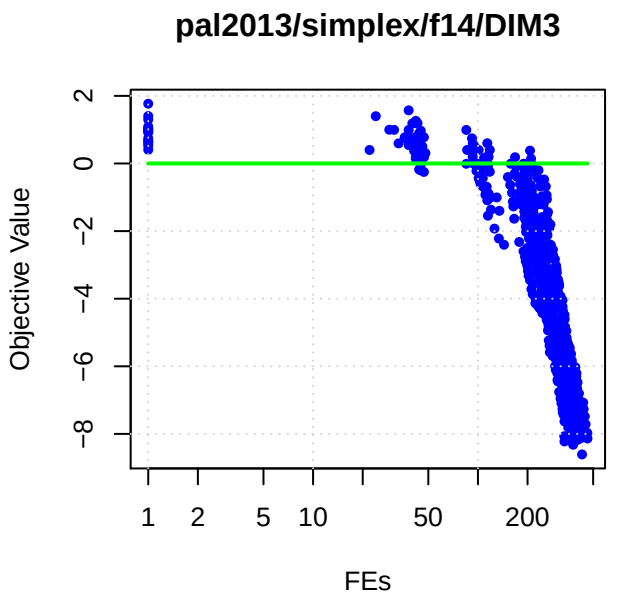
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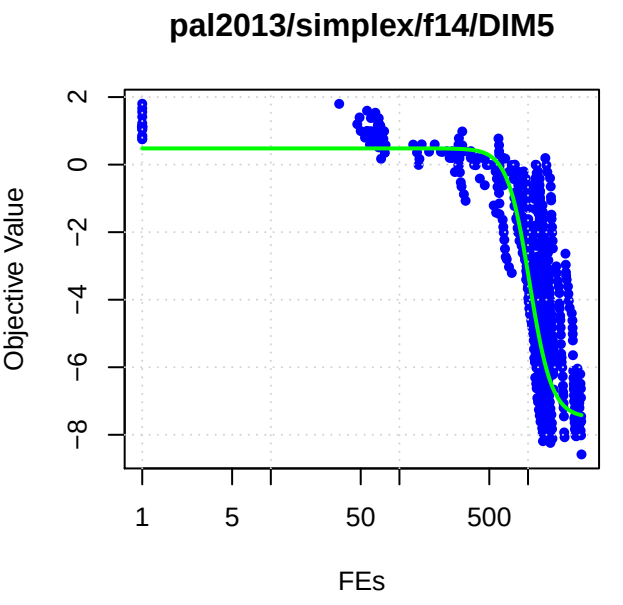
FEs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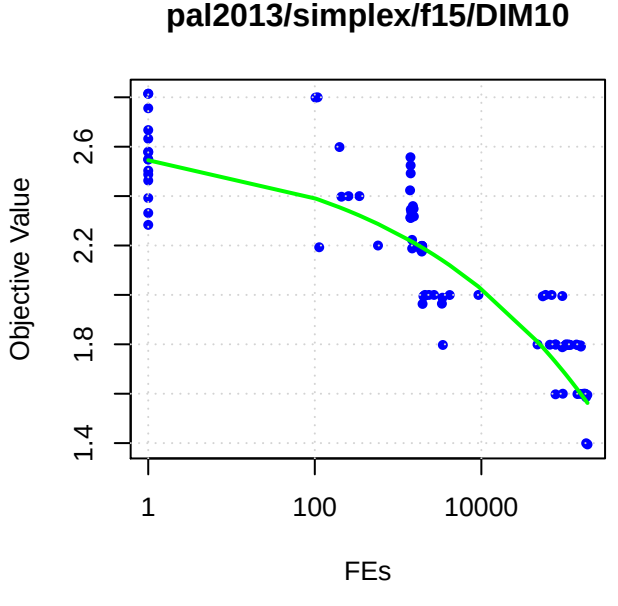
FEs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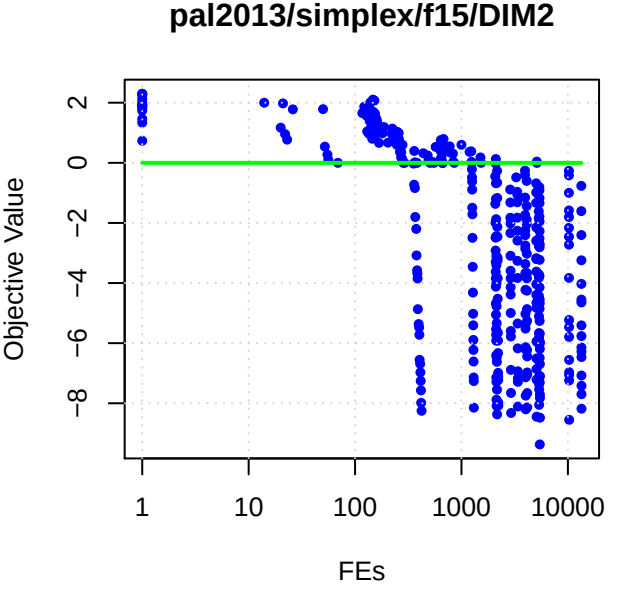
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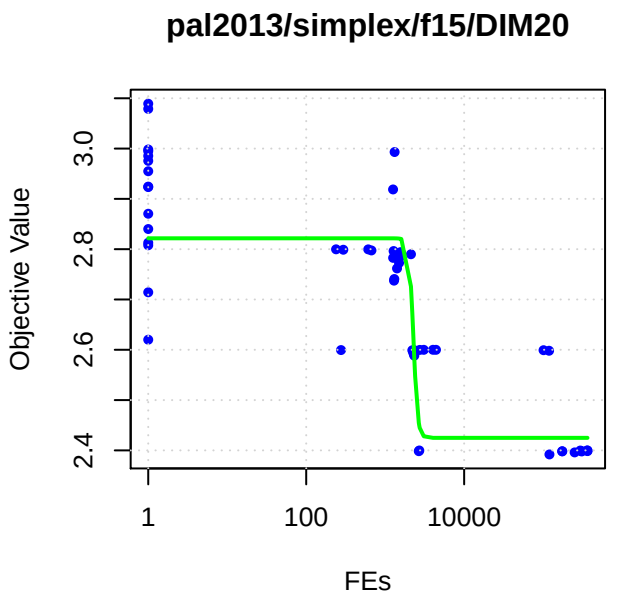
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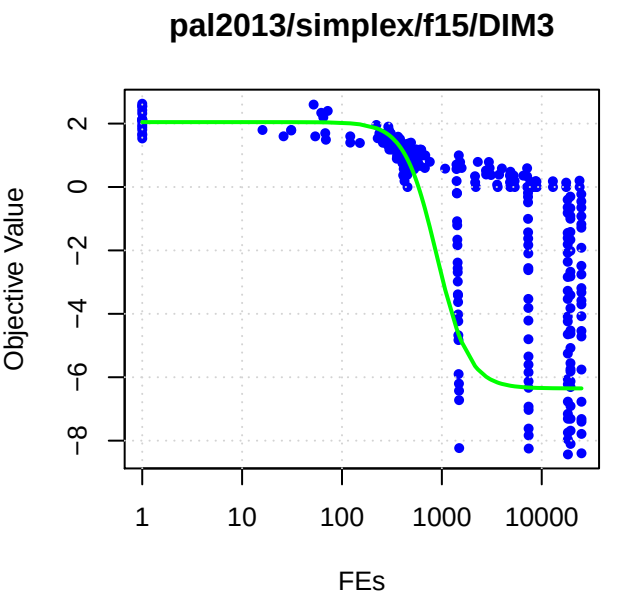
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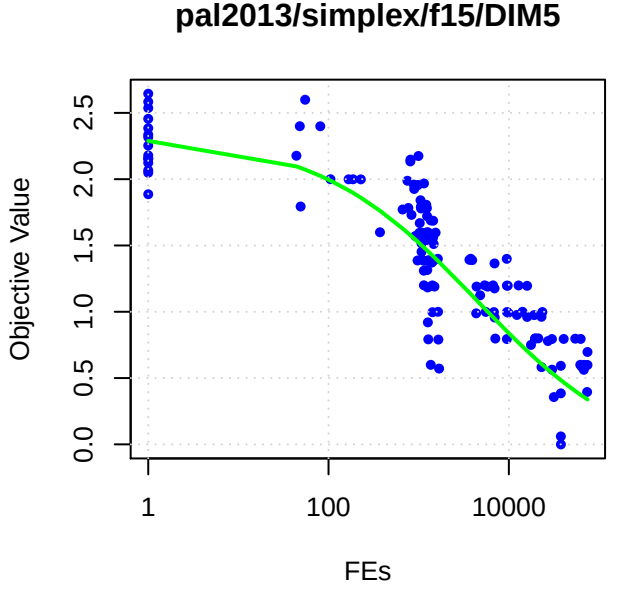
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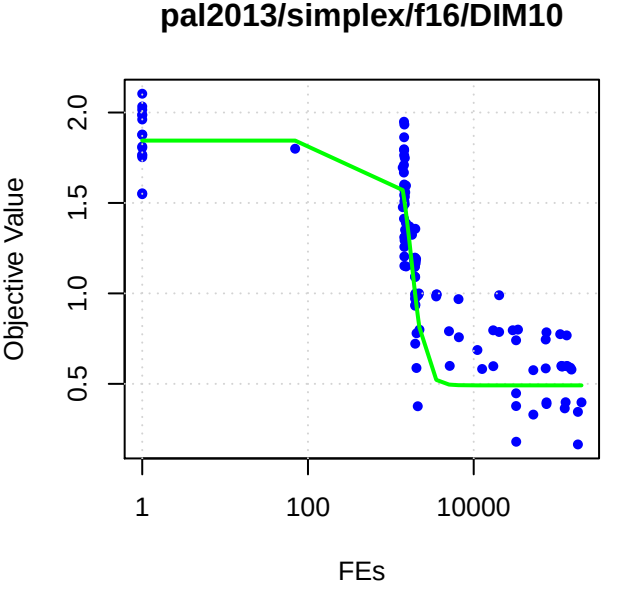
FEs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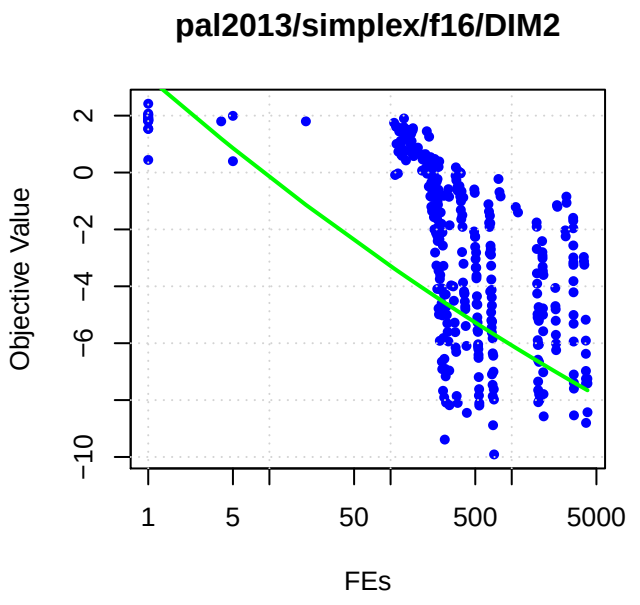
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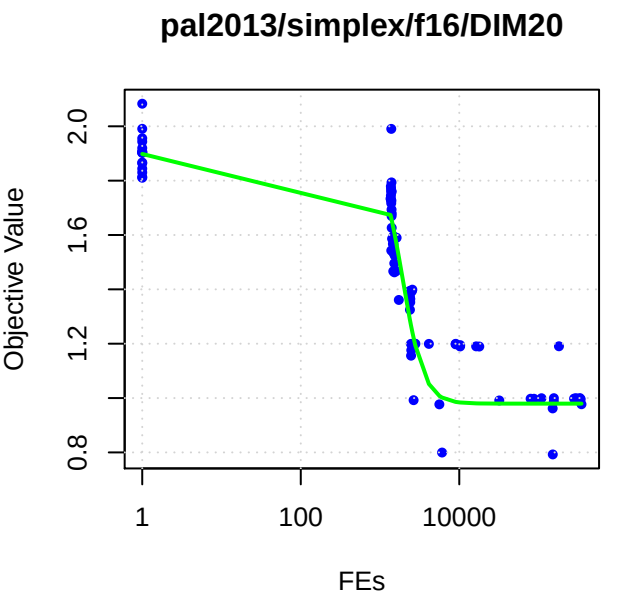
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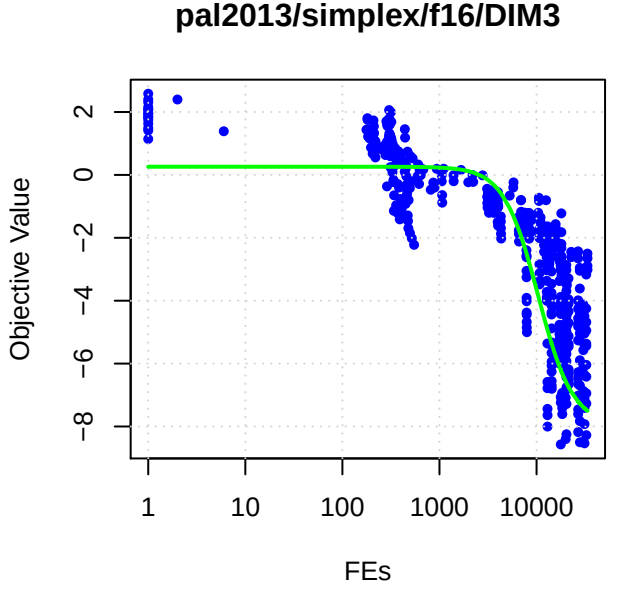
FEs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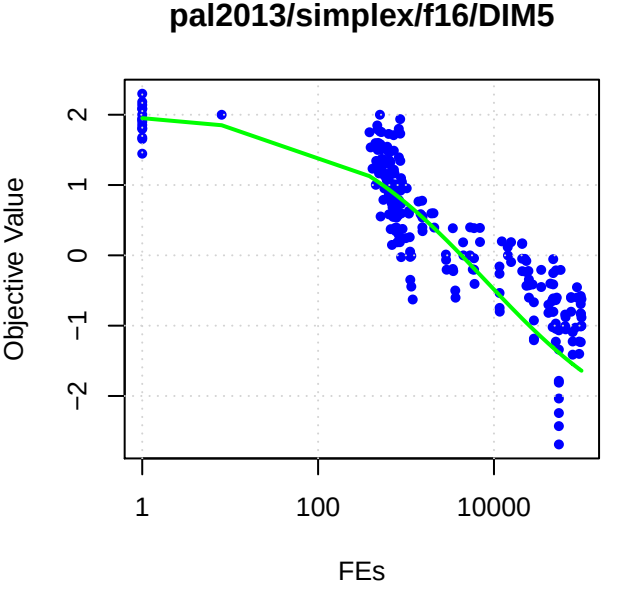
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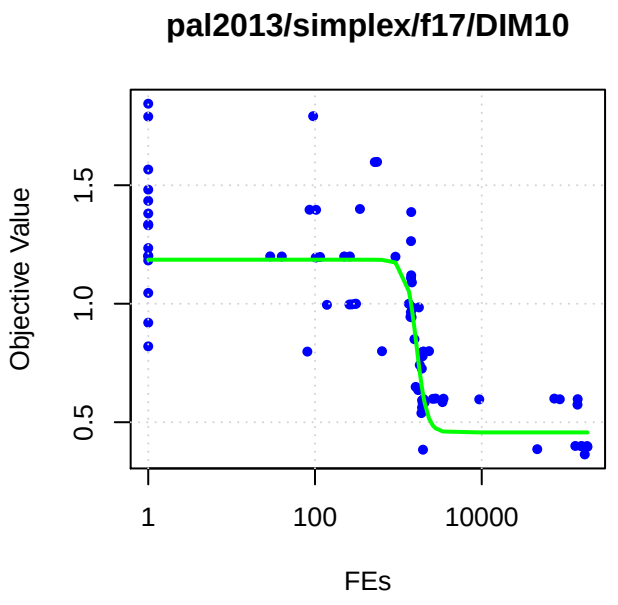
FEs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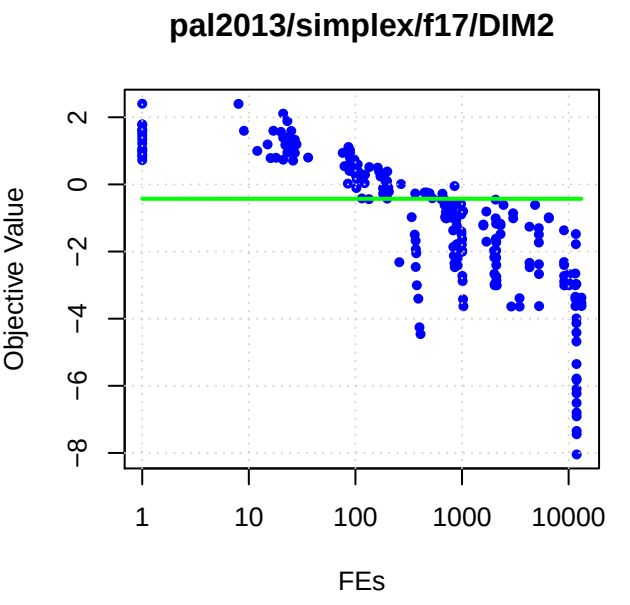
FEs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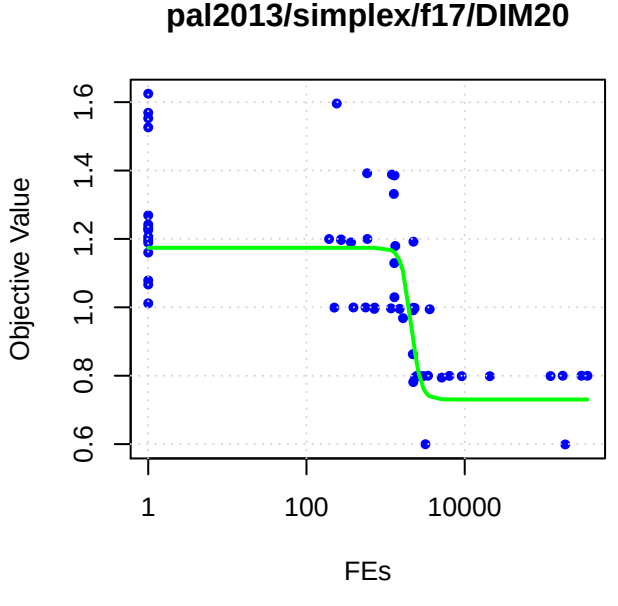
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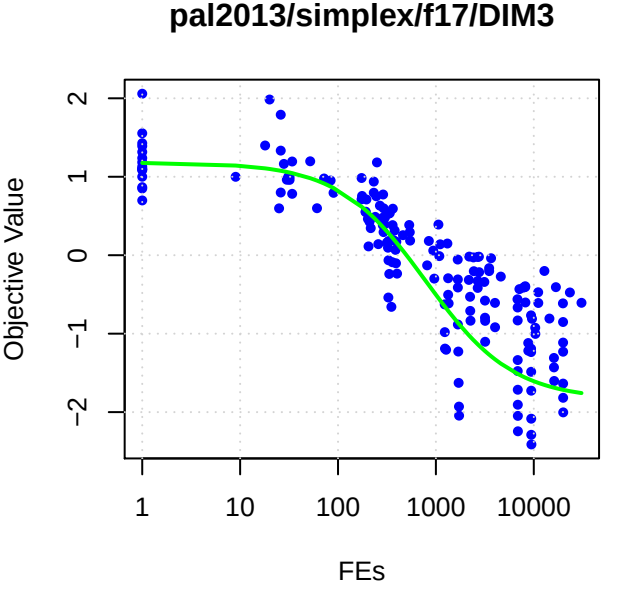
FEs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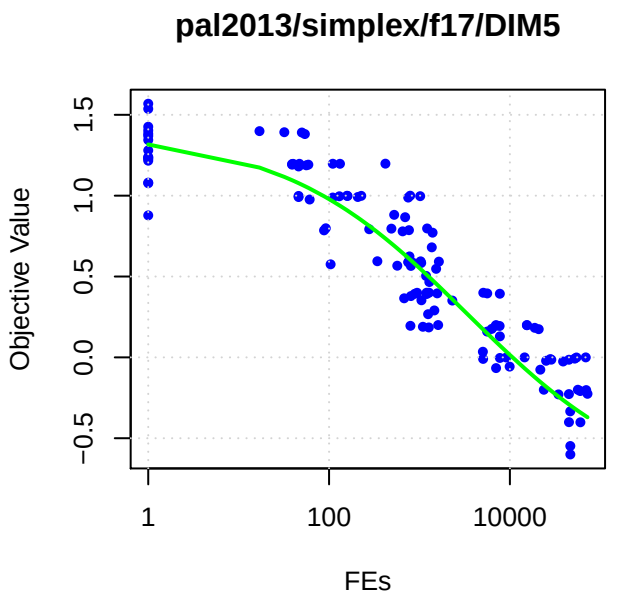
FEs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FEs
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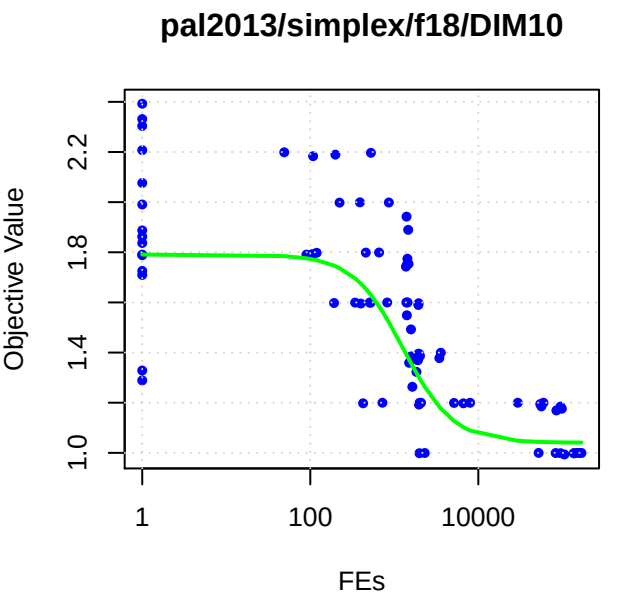
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Objective Value
FEs
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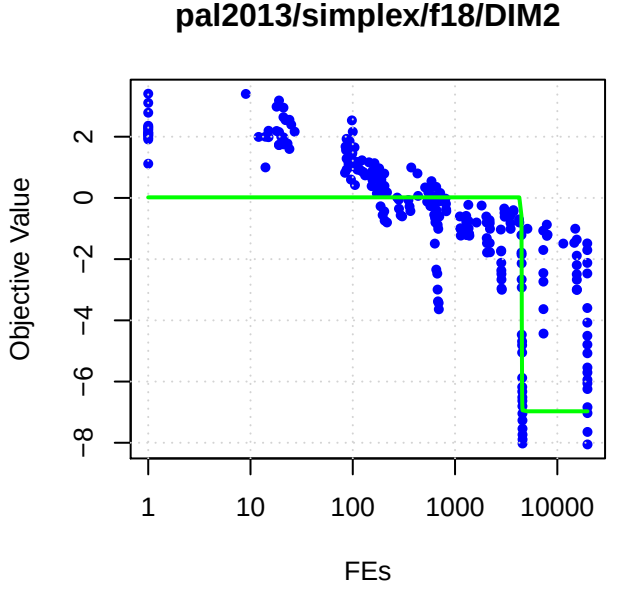
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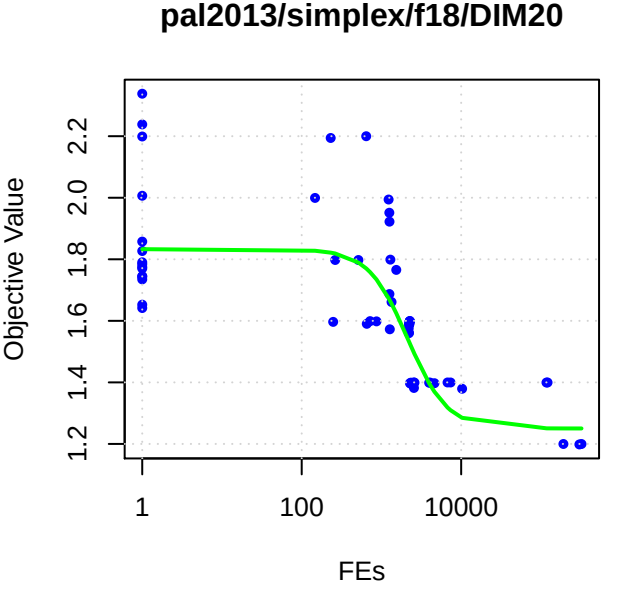
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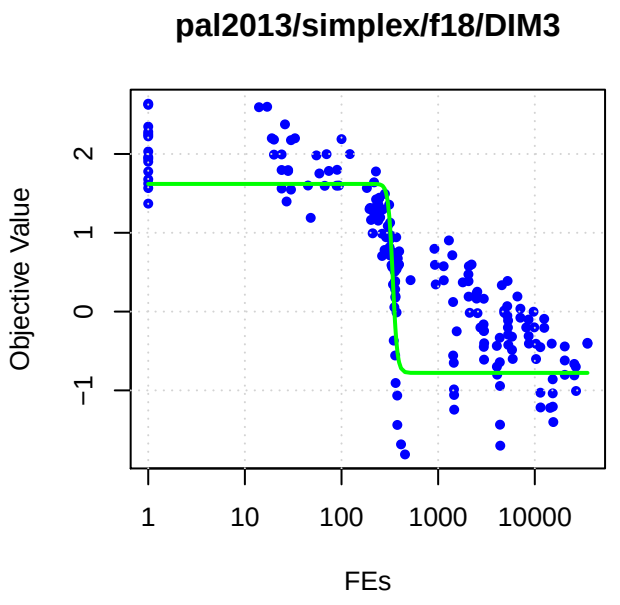
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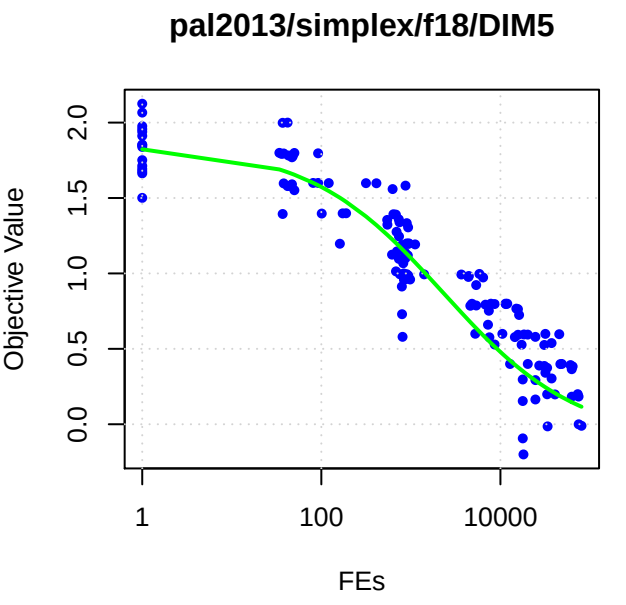
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FEs
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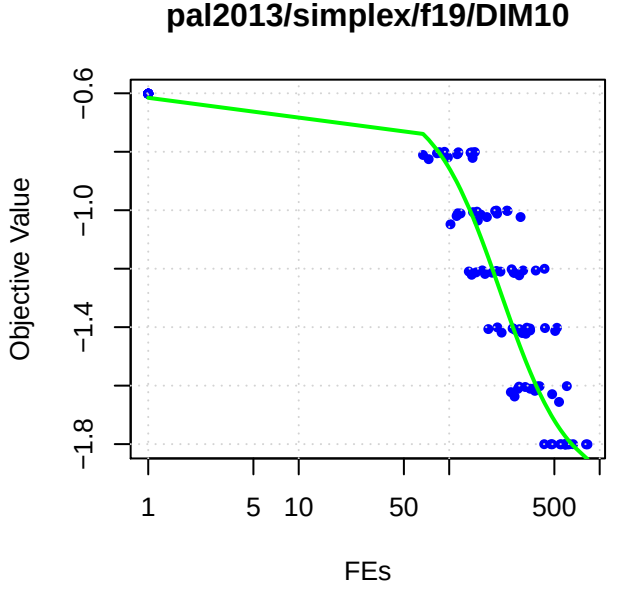
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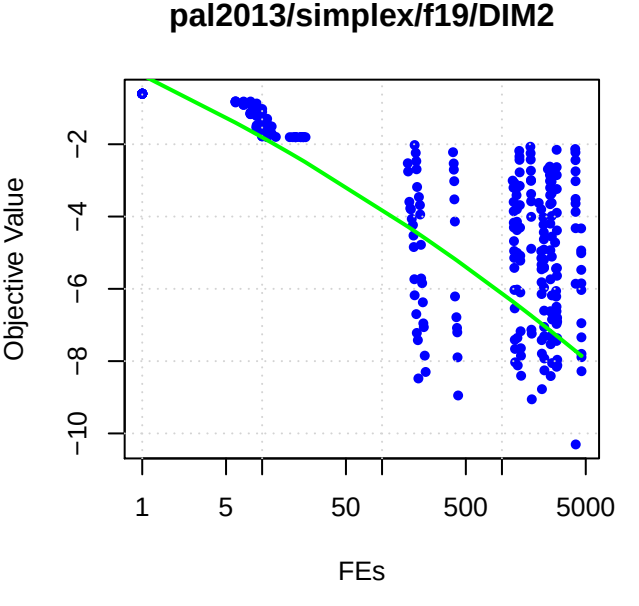
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Objective Value
FEs
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50
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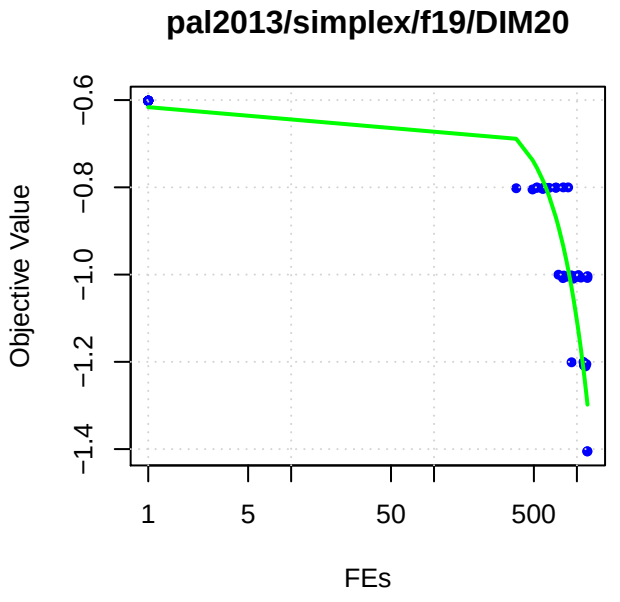
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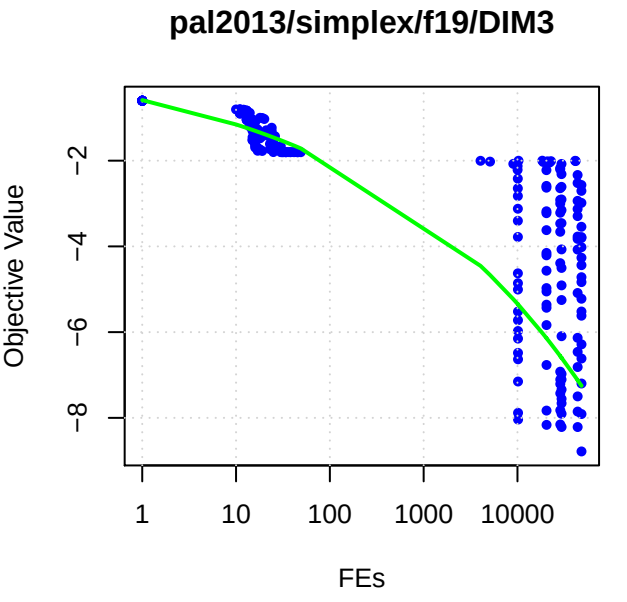
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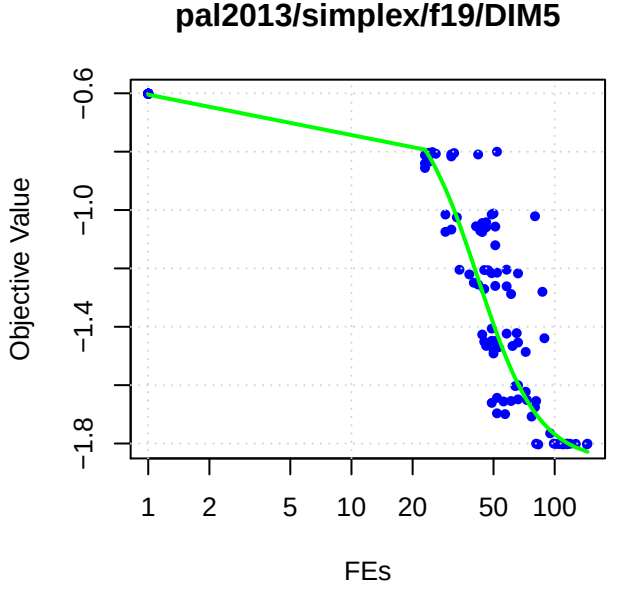
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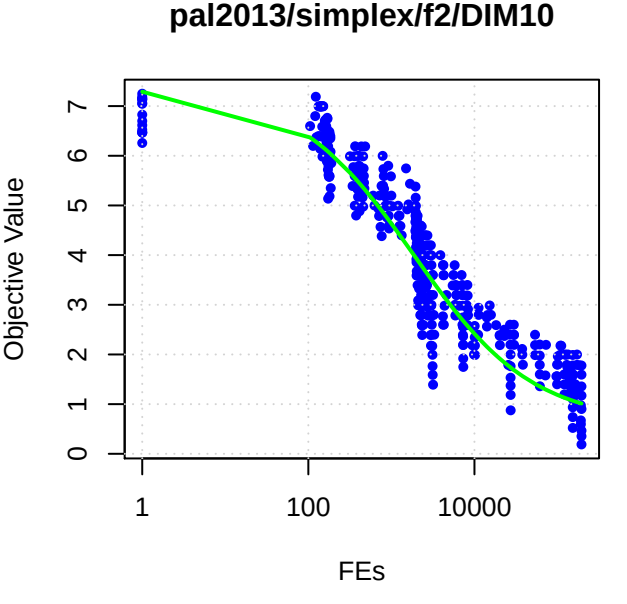
FEs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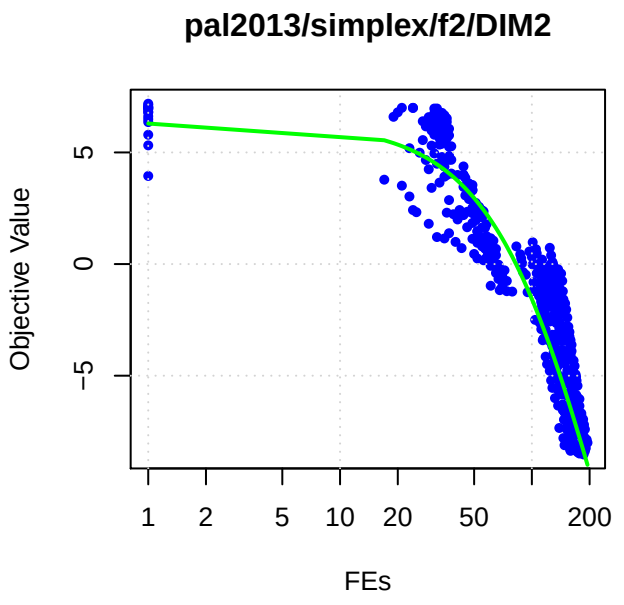
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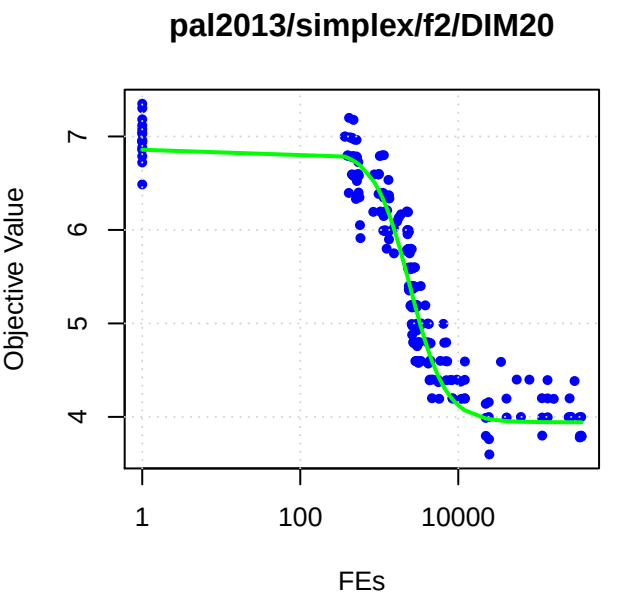
FEs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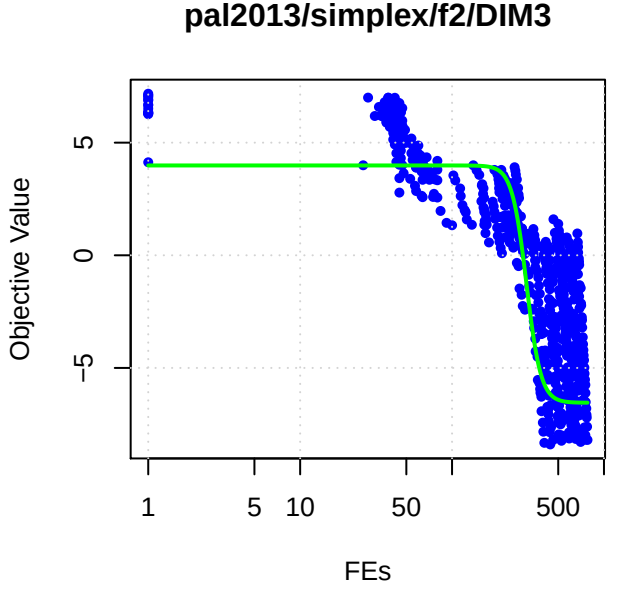
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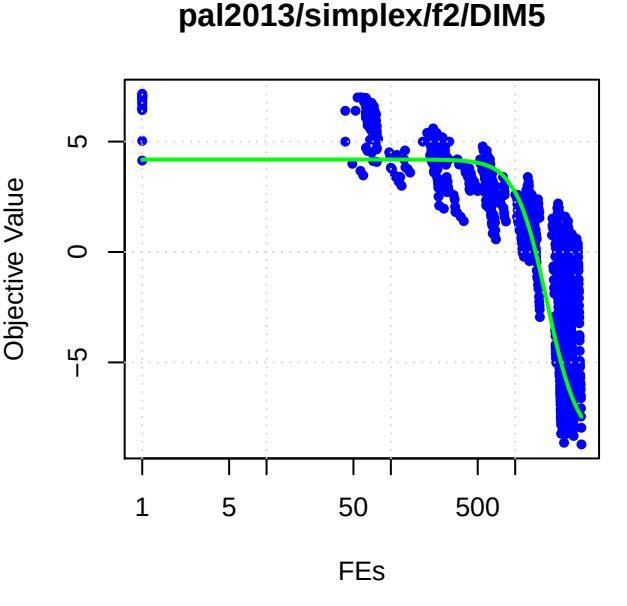
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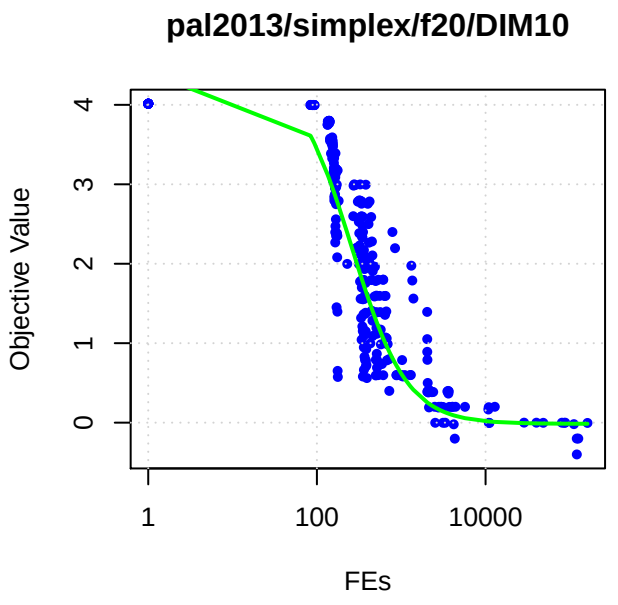
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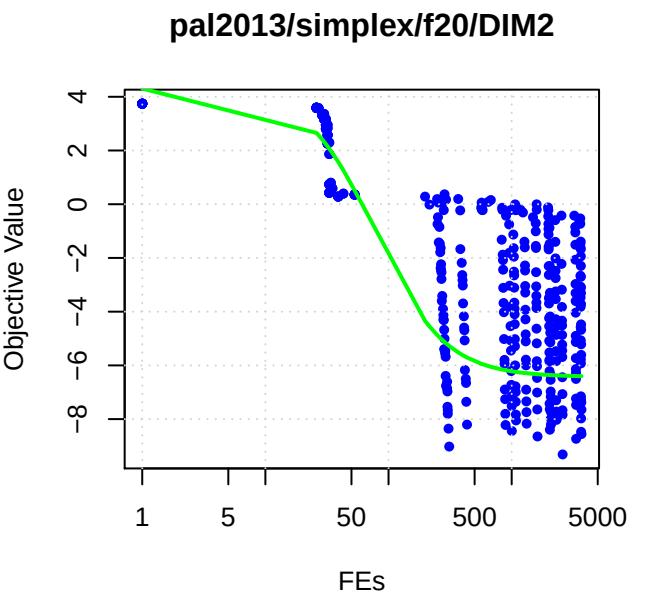
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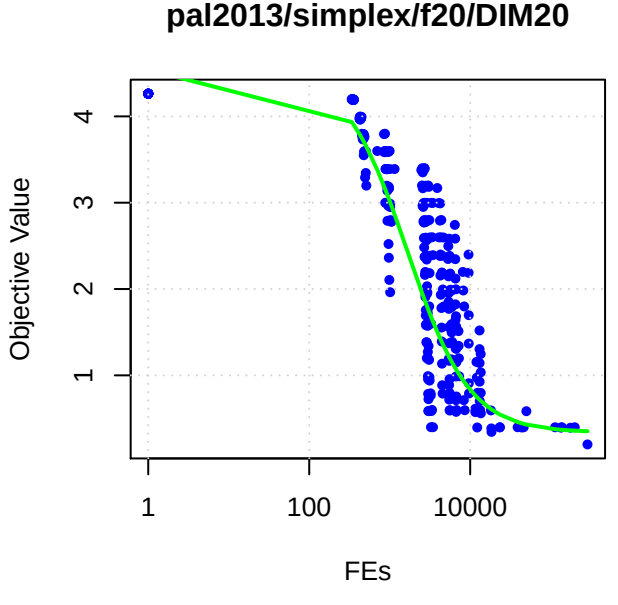
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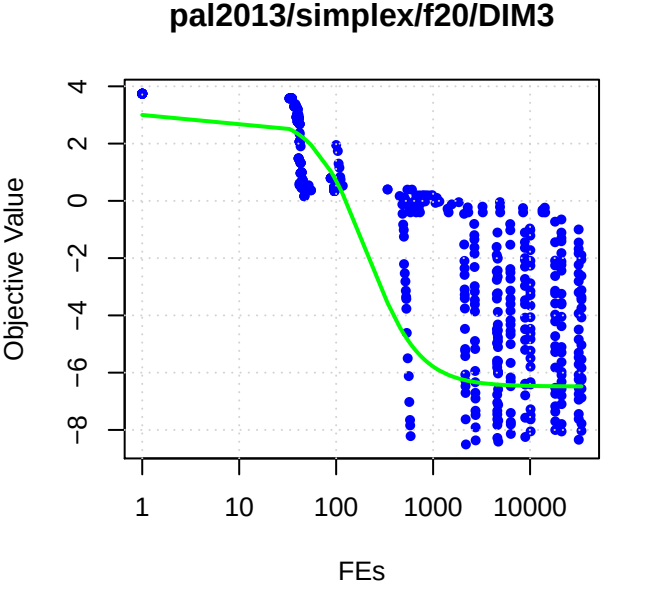
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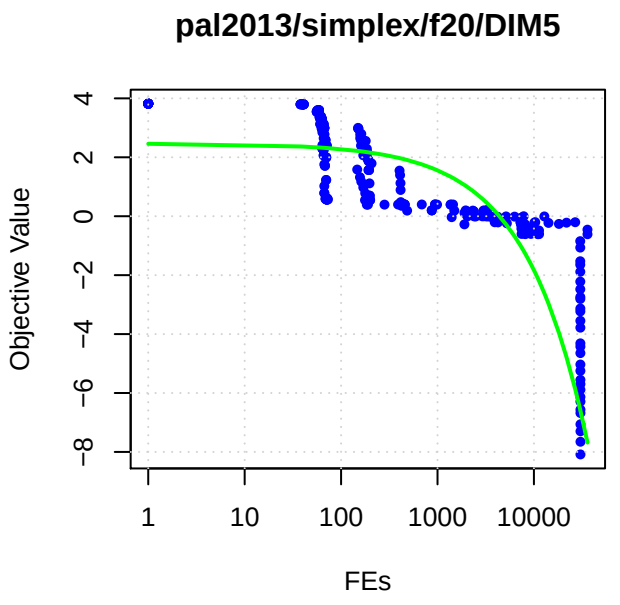
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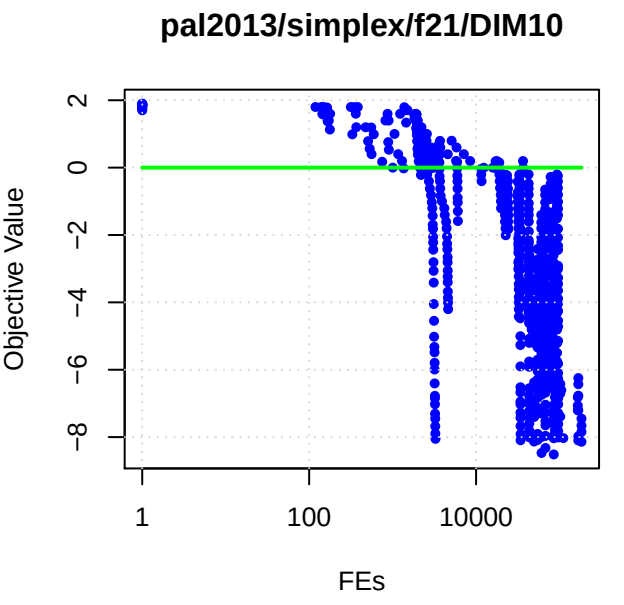
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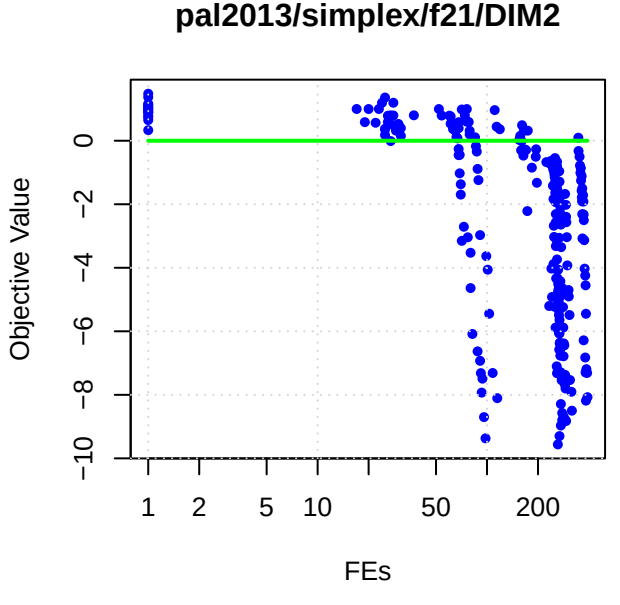
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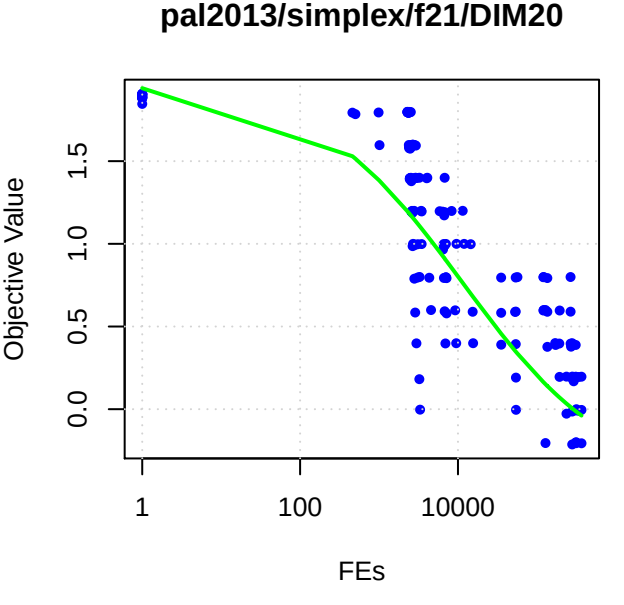
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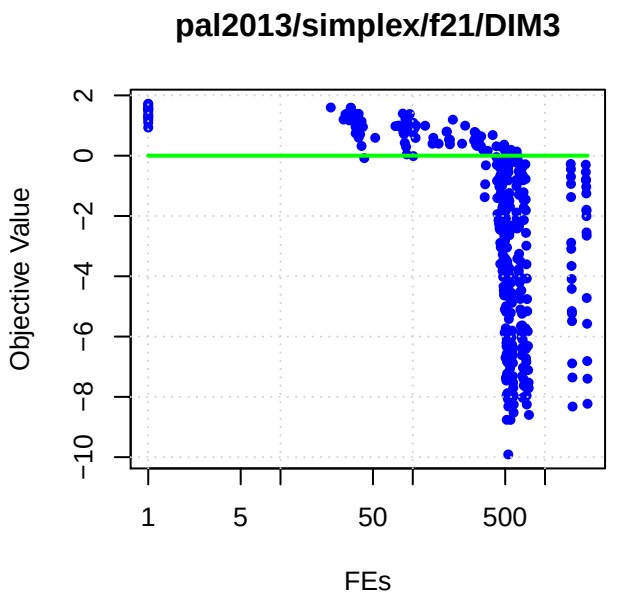
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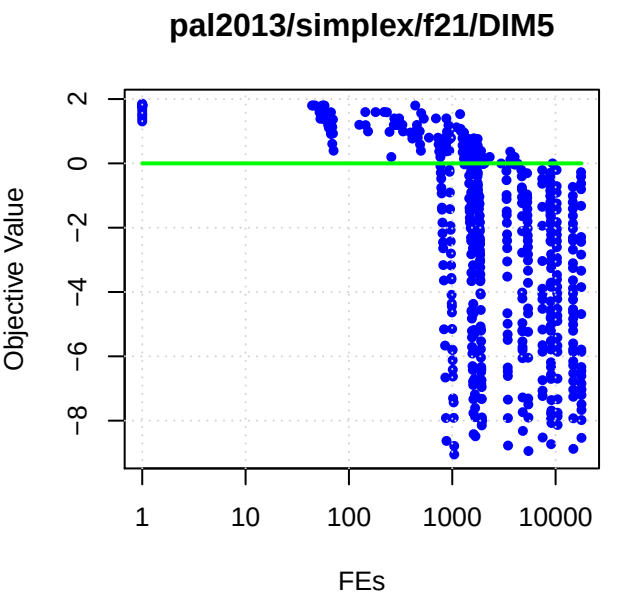
FEs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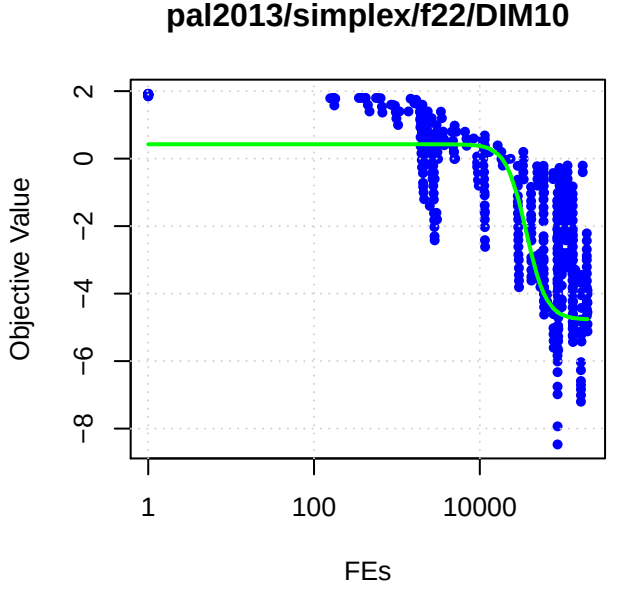
FEs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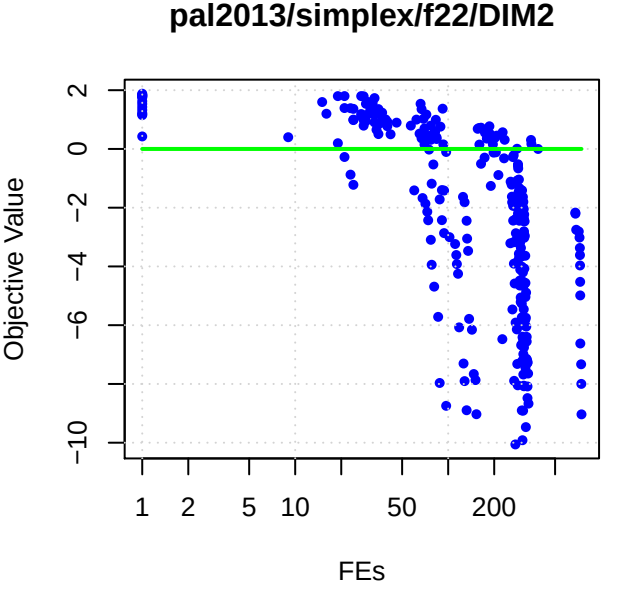
FEs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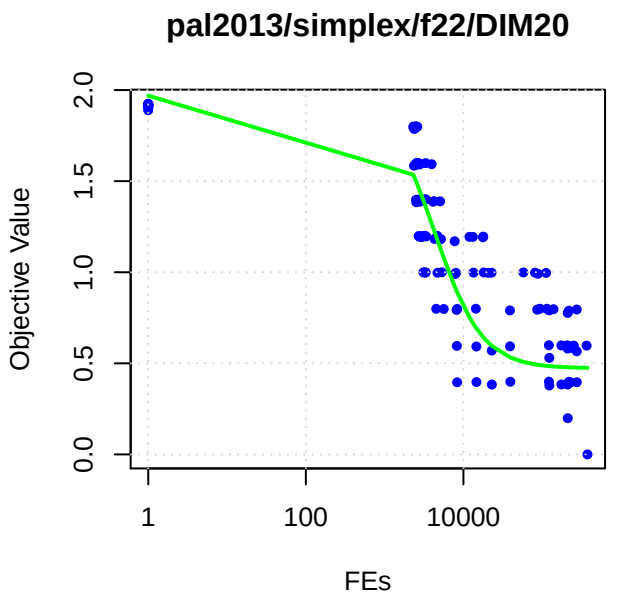
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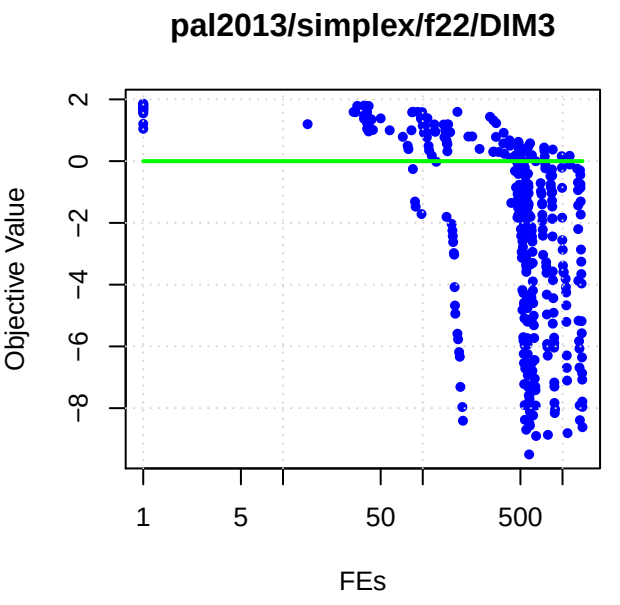
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Objective Value
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−2
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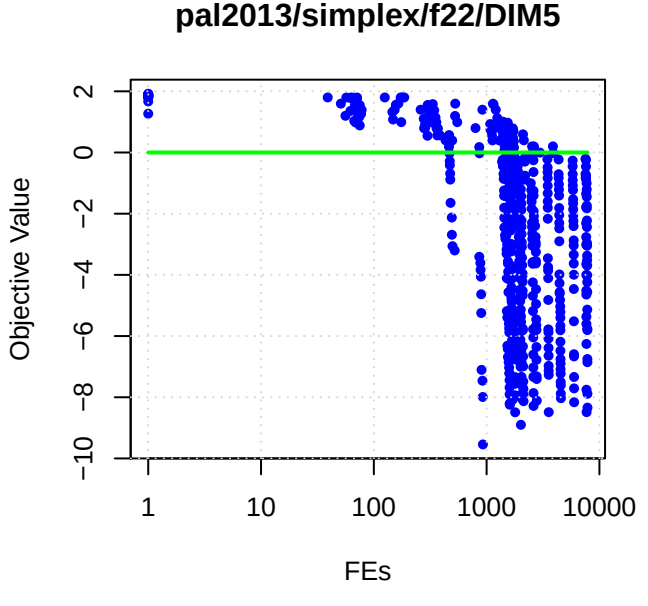
500
FEs


pal2013/simplex/f22/DIM5
Objective Value
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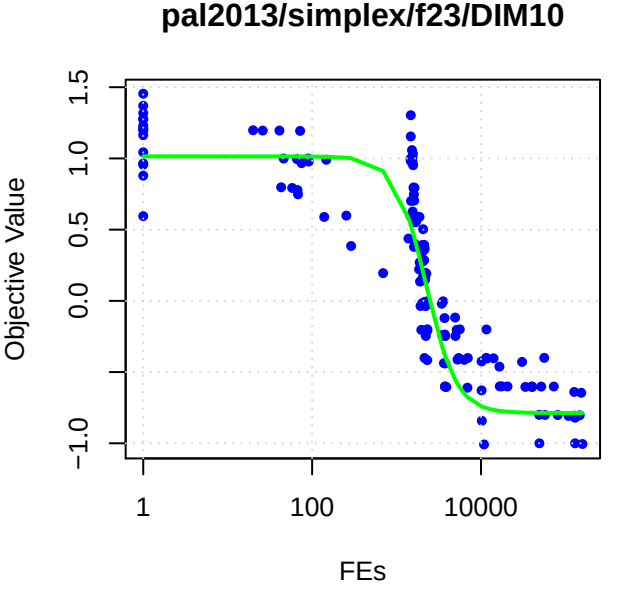
1000
10000
FEs


pal2013/simplex/f23/DIM10
Objective Value
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1.0
0.5
0.0
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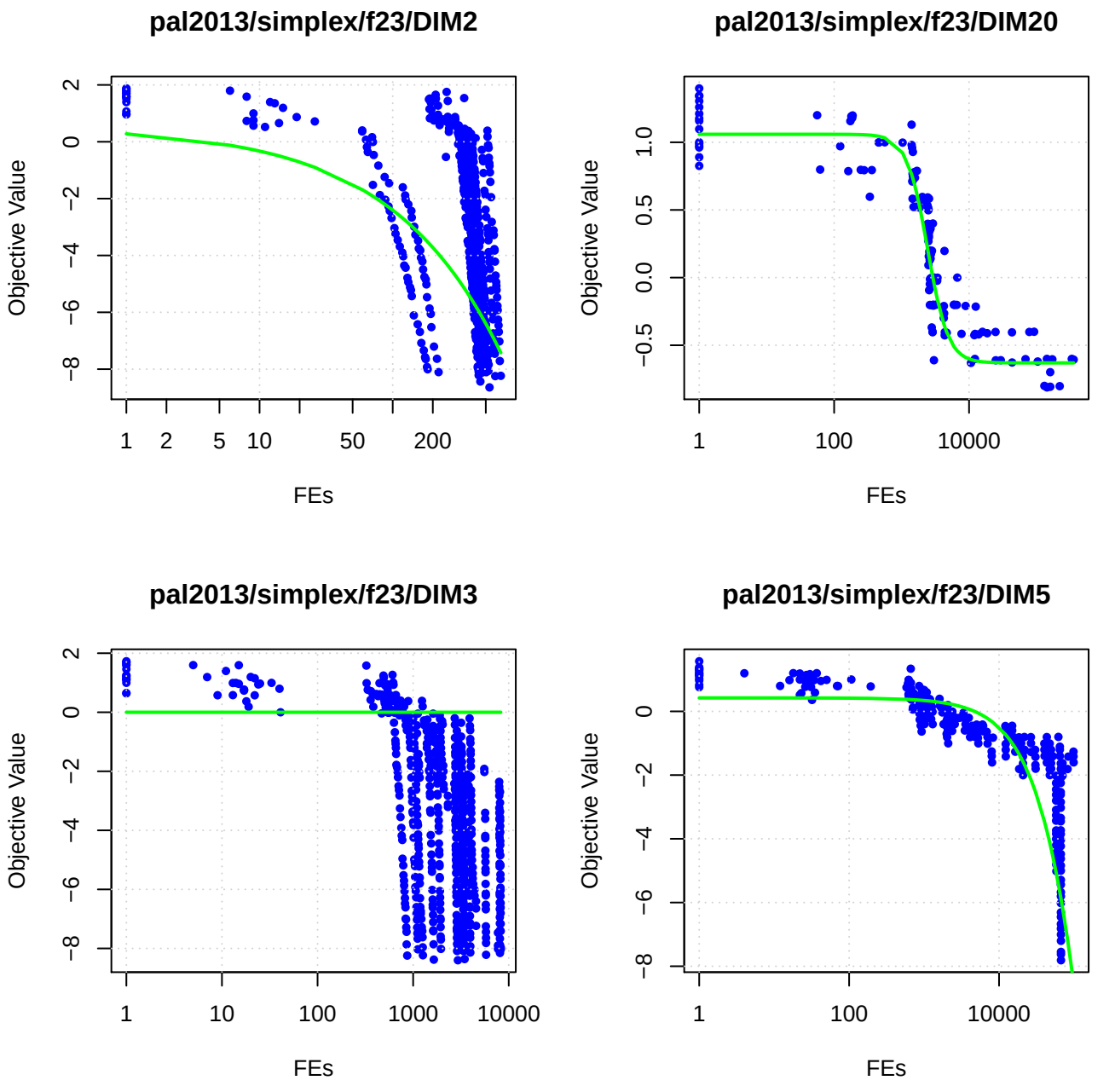
1
100
10000
FEs


pal2013/simplex/f23/DIM2
Objective Value
FEs
2
0
−2
−4
−6
−8
1
2
5
10
50
200
pal2013/simplex/f23/DIM20
Objective Value
FEs
1.0
0.5
0.0
−0.5
1
100
10000
pal2013/simplex/f23/DIM3
Objective Value
FEs
2
0
−2
−4
−6
−8
1
10
100
1000
10000
pal2013/simplex/f23/DIM5
Objective Value
FEs
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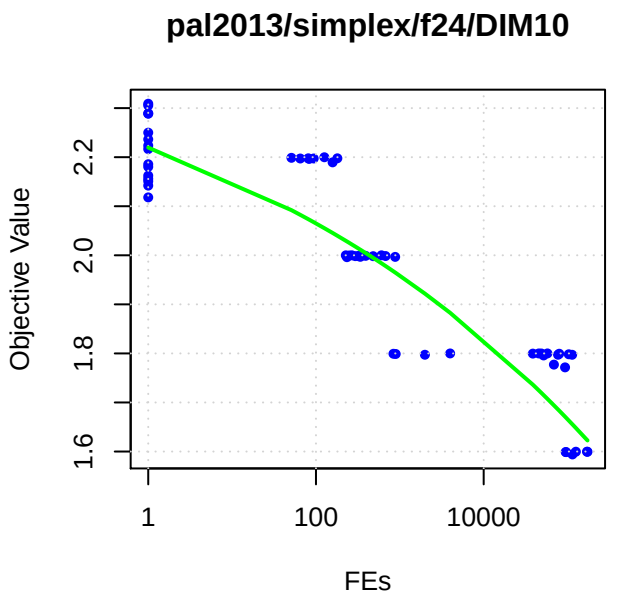
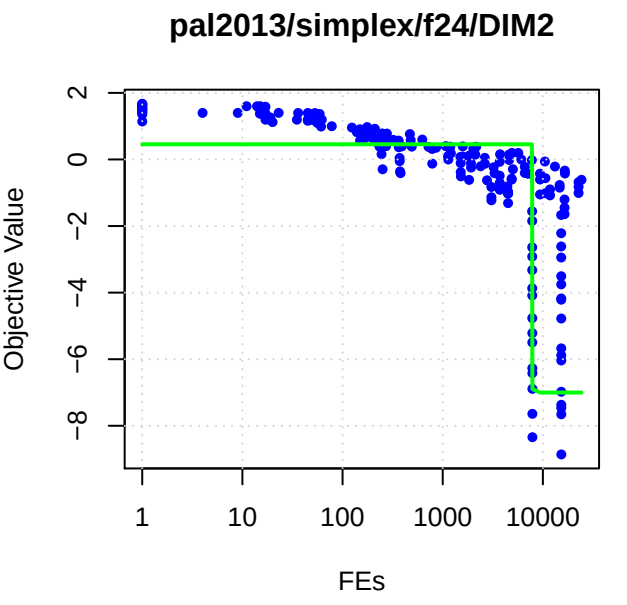
−2
−4
−6
−8
1
100
10000


pal2013/simplex/f24/DIM10
Objective Value
1.6
1.8
2.0
2.2
1
100
10000
FEs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Objective Value
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−4
−2
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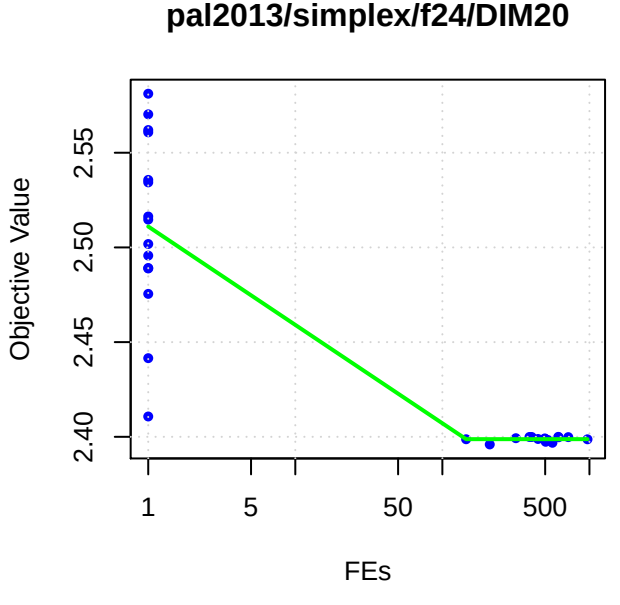
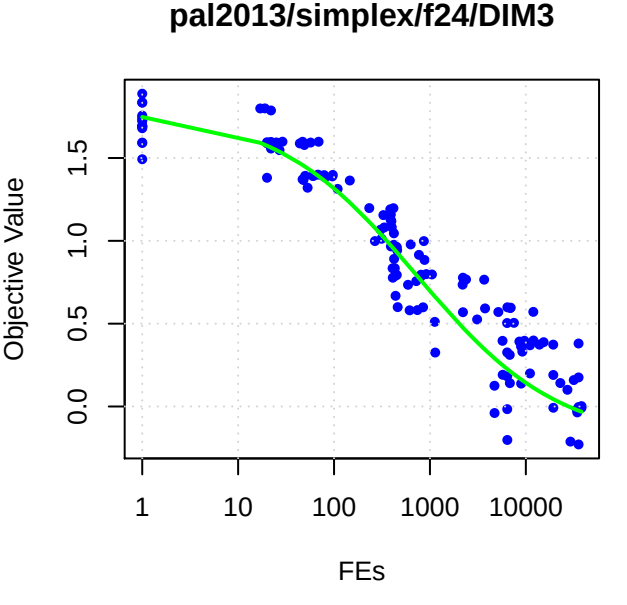
2
1
10
100
1000
10000
FEs


pal2013/simplex/f24/DIM20
Objective Value
2.40
2.45
2.50
2.55
1
5
50
500
FEs


pal2013/simplex/f24/DIM3
Objective Value
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0.5
1.0
1.5
1
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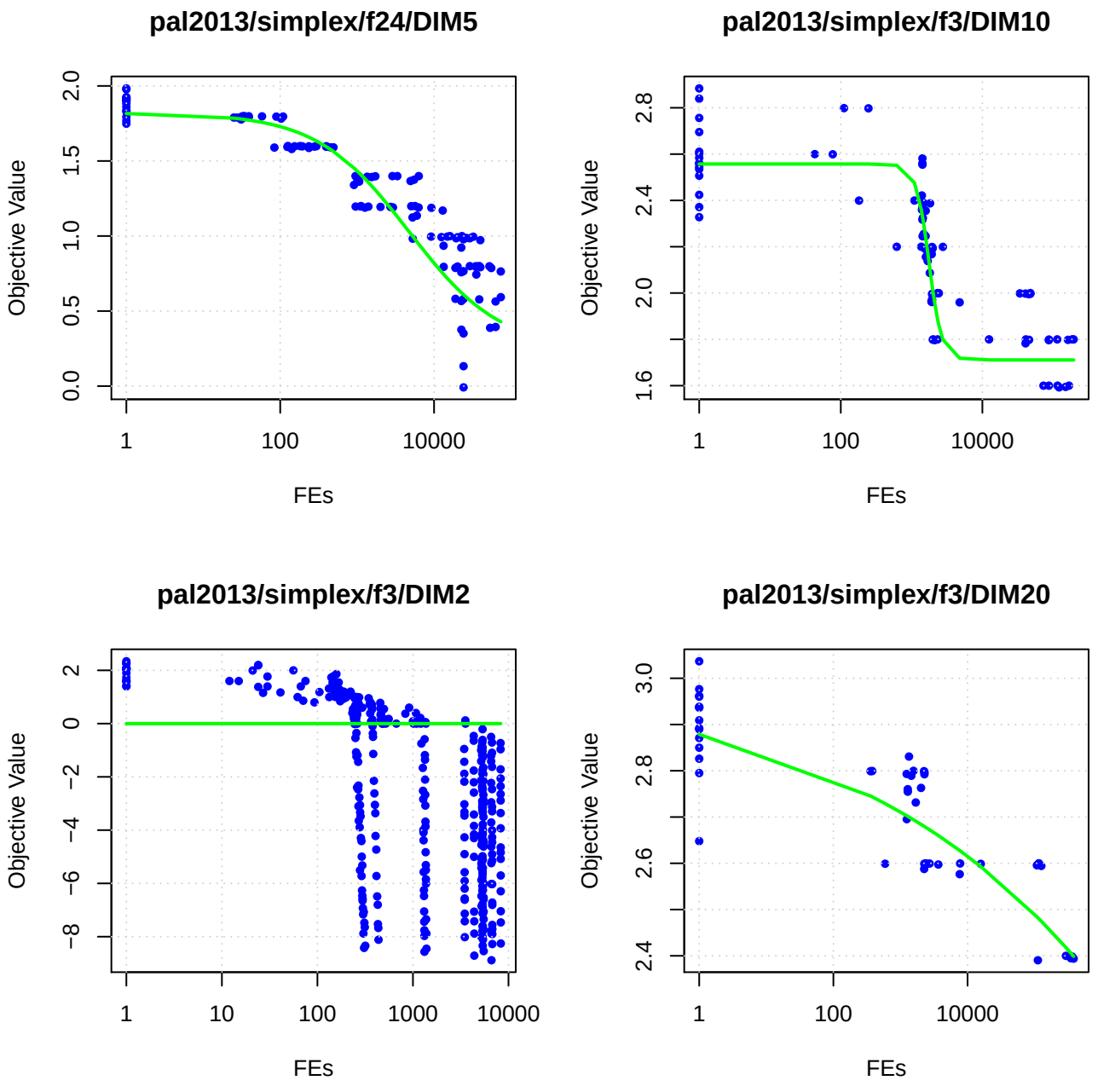
100
1000
10000
FEs


pal2013/simplex/f24/DIM5
Objective Value
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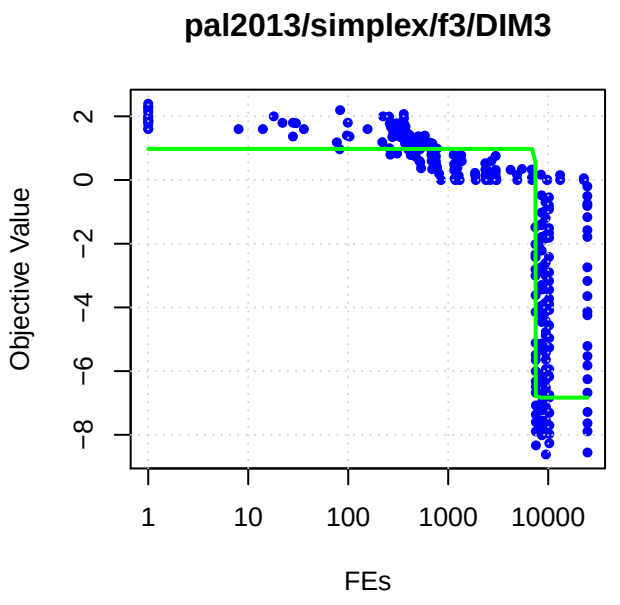
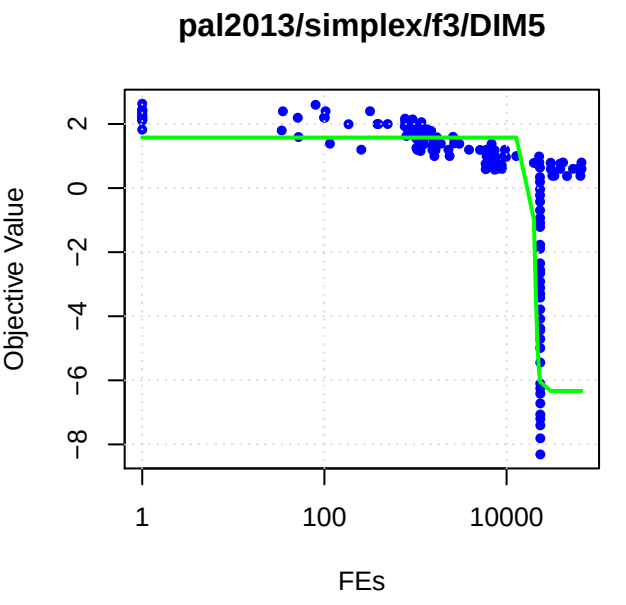
0.5
1.0
1.5
2.0
1
100
10000
FEs
pal2013/simplex/f3/DIM10
Objective Value
1.6
2.0
2.4
2.8
1
100
10000
FEs
pal2013/simplex/f3/DIM2
Objective Value
−8
−6
−4
−2
0
2
1
10
100
1000
10000
FEs
pal2013/simplex/f3/DIM20
Objective Value
2.4
2.6
2.8
3.0
1
100
10000
FEs


pal2013/simplex/f3/DIM3
Objective Value
2
0
−2
−4
−6
−8
1
10
100
1000
10000
FEs


pal2013/simplex/f3/DIM5
Objective Value
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−2
−4
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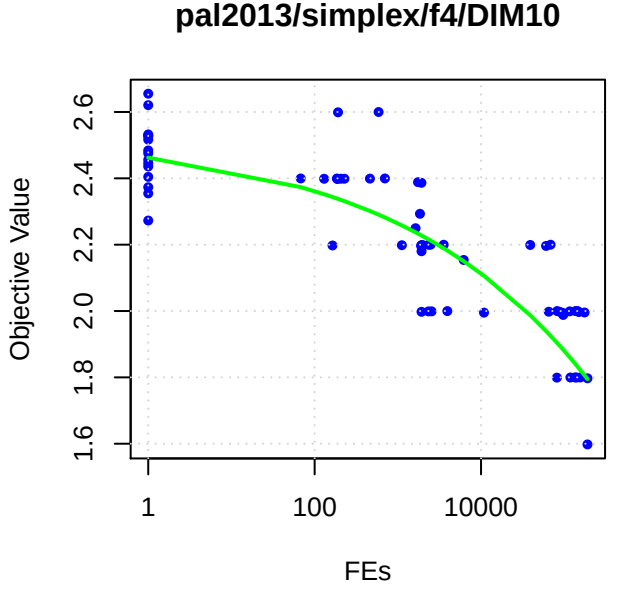
1
100
10000
FEs


pal2013/simplex/f4/DIM10
Objective Value
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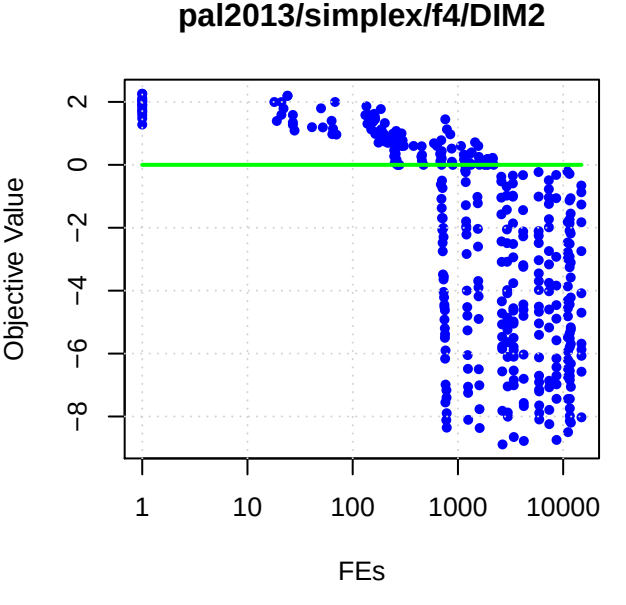
2.4
2.2
2.0
1.8
1.6
1
100
10000
FEs


pal2013/simplex/f4/DIM2
Objective Value
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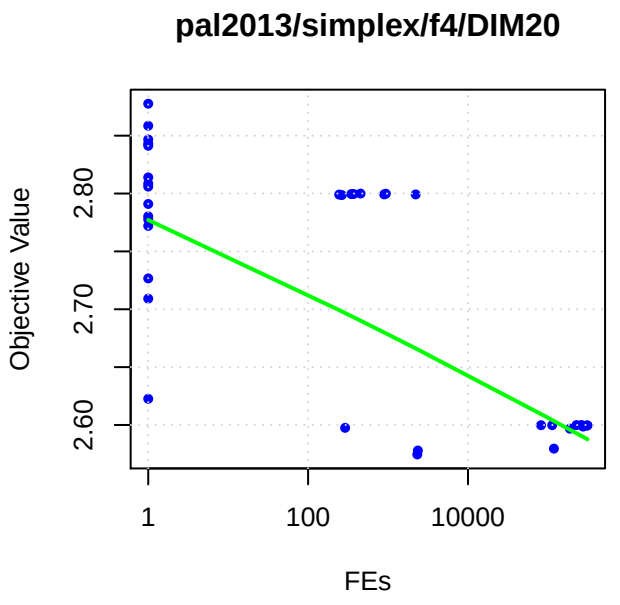
−2
−4
−6
−8
1
10
100
1000
10000
FEs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Objective Value
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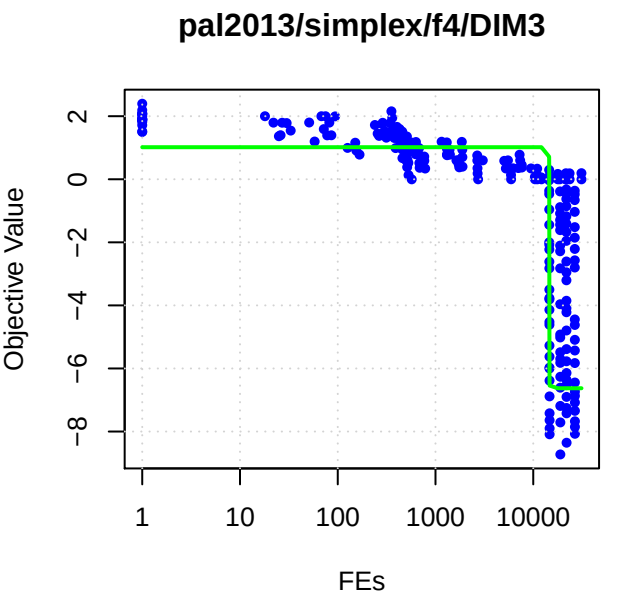
2.70
2.80
1
100
10000
FEs


pal2013/simplex/f4/DIM3
Objective Value
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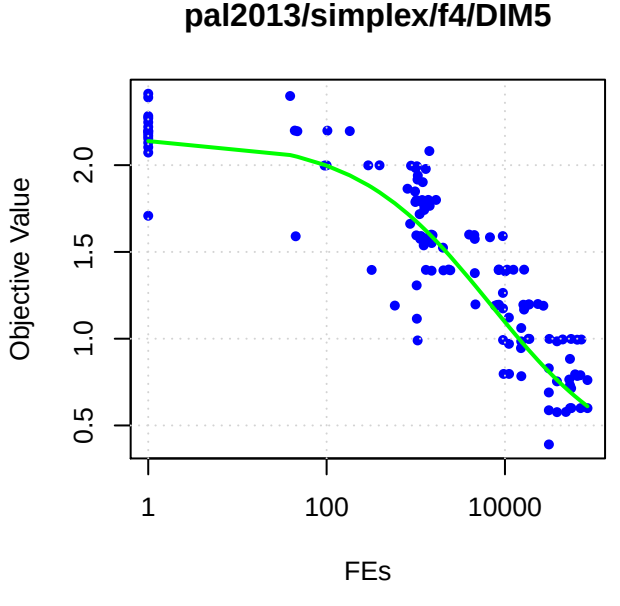
−2
−4
−6
−8
1
10
100
1000
10000
FEs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Objective Value
0.5
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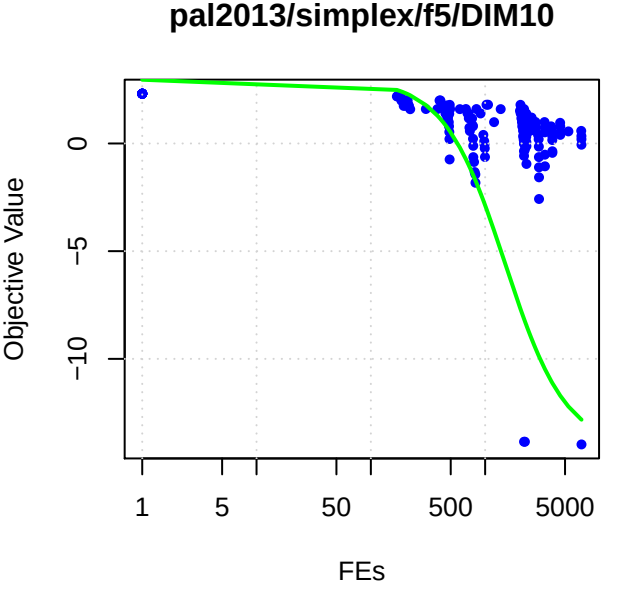
1.5
2.0
1
100
10000
FEs


pal2013/simplex/f5/DIM10
Objective Value
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−10
1
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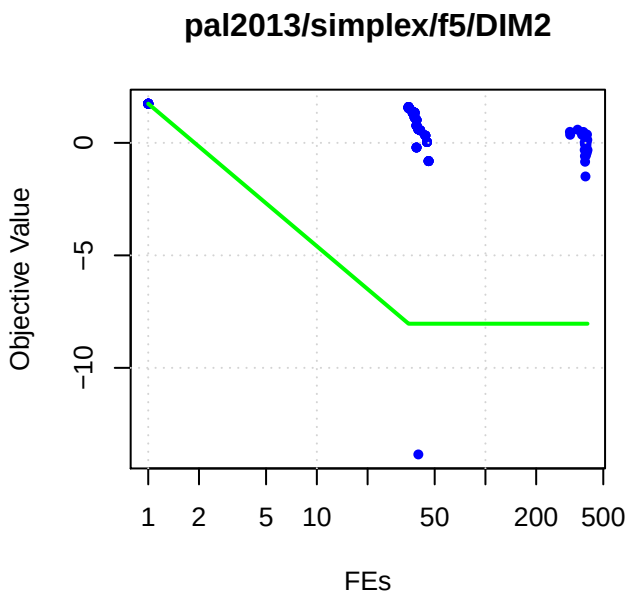
50
500
5000
FEs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Objective Value
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−10
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2
5
10
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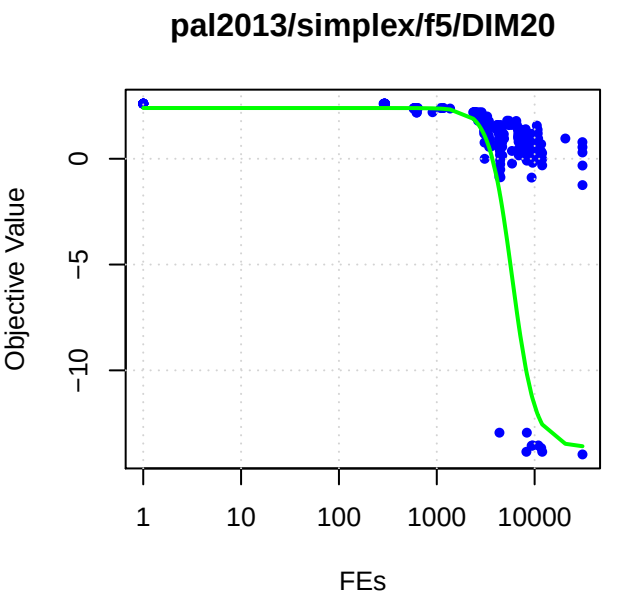
200
500
FEs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Objective Value
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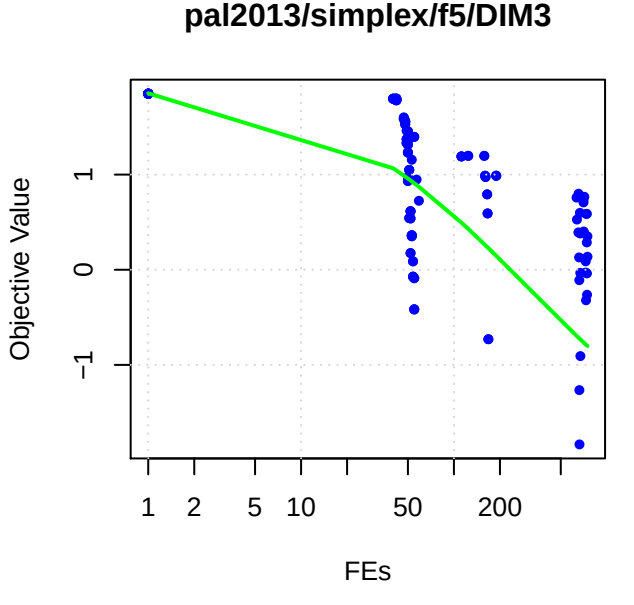
1000
10000
FEs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Objective Value
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2
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10
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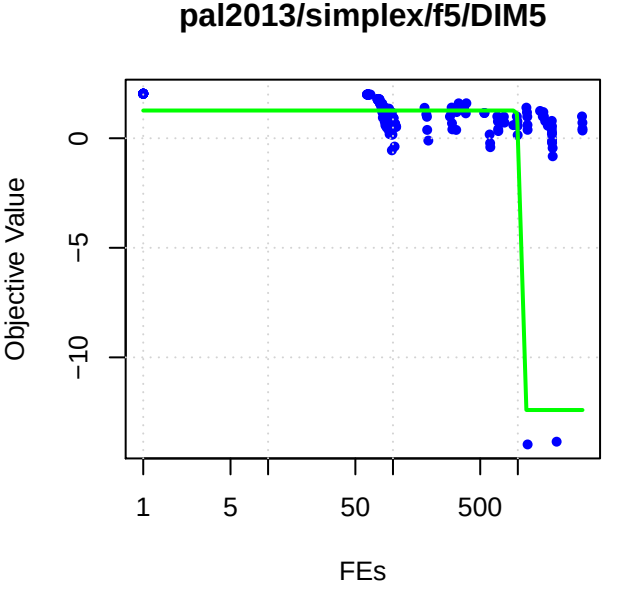
200
FEs


pal2013/simplex/f5/DIM5
Objective Value
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−10
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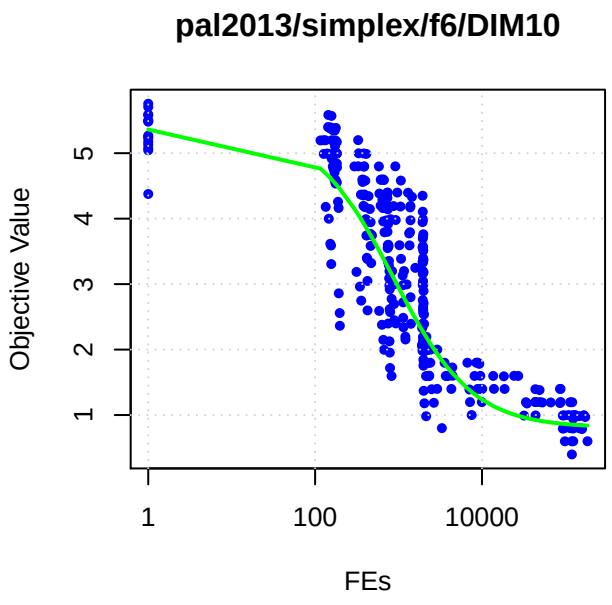
5
50
500
FEs


pal2013/simplex/f6/DIM10
Objective Value
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3
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5
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100
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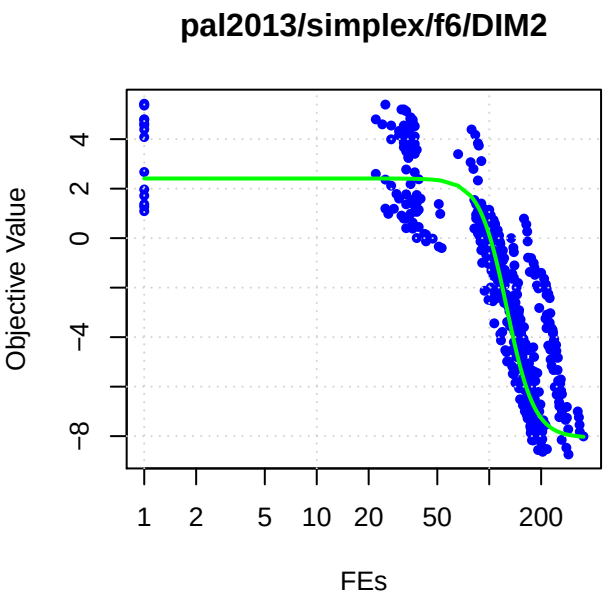
FEs


pal2013/simplex/f6/DIM2
Objective Value
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2
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1
2
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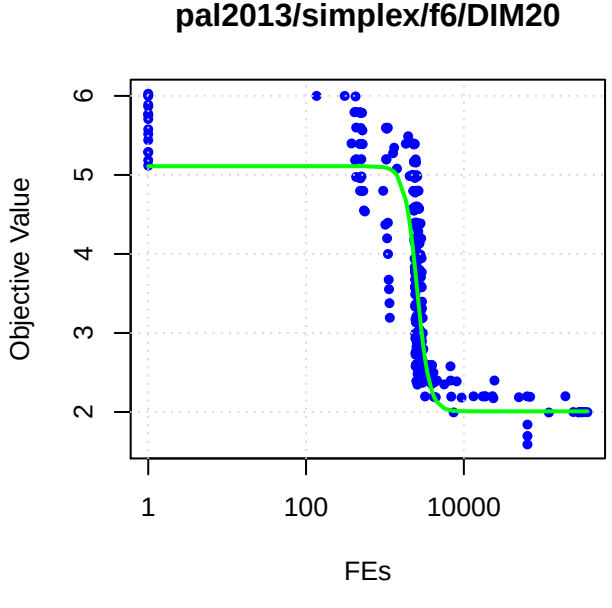
10
20
50
200
FEs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Objective Value
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4
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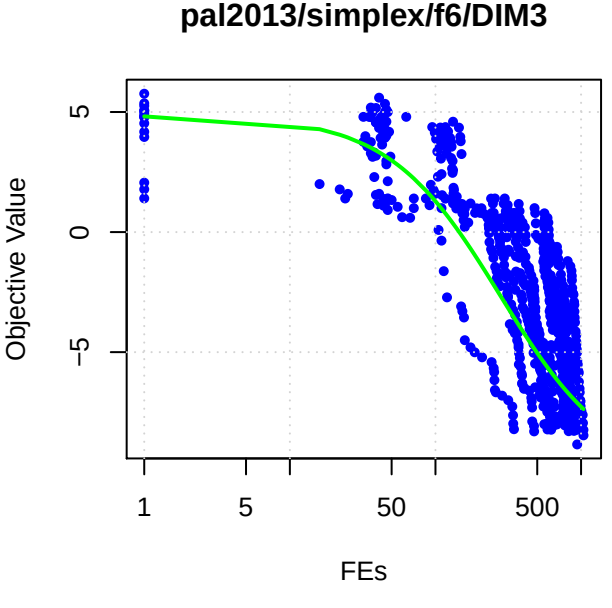
10000
FEs


pal2013/simplex/f6/DIM3
Objective Value
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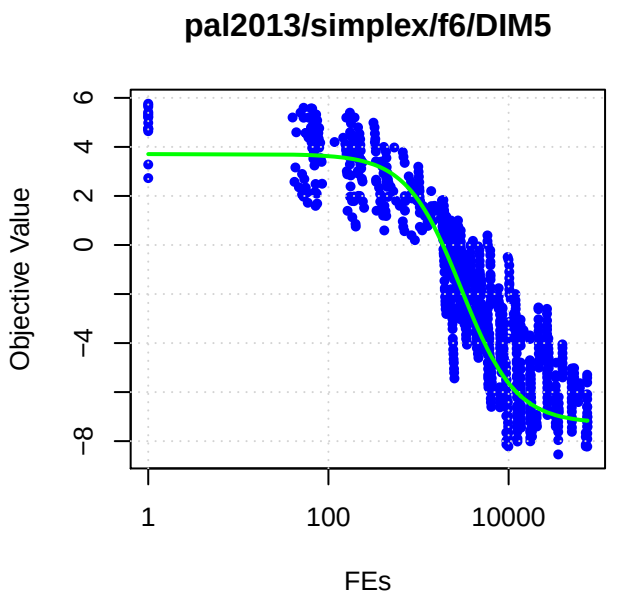
FEs


pal2013/simplex/f6/DIM5
Objective Value
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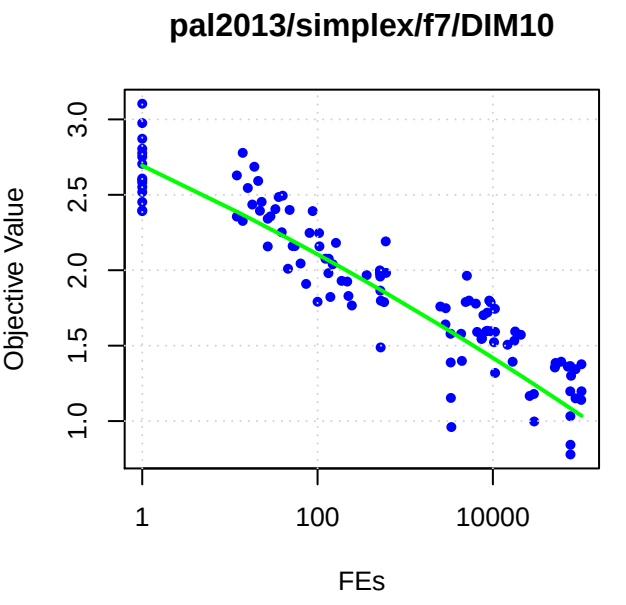
FEs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Objective Value
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2.0
1.5
1.0
1
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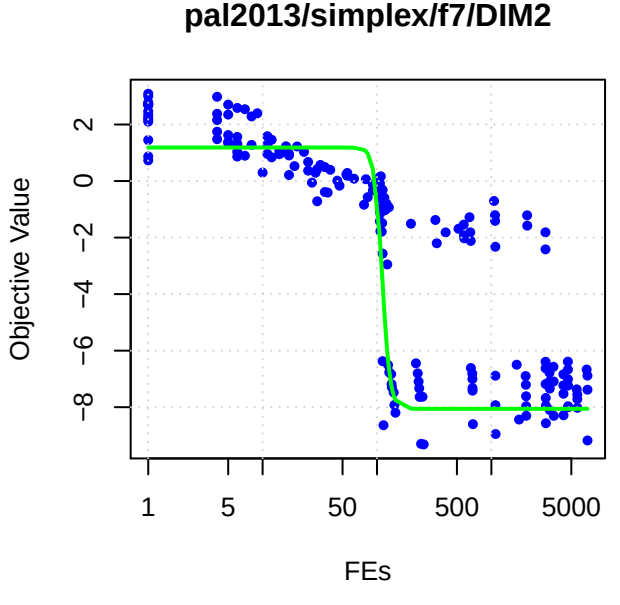
10000
FEs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Objective Value
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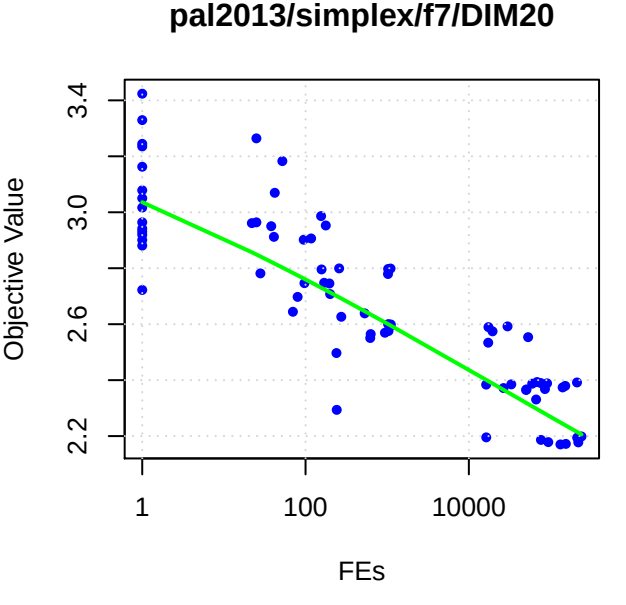
5
50
500
5000
FEs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Objective Value
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2.6
2.2
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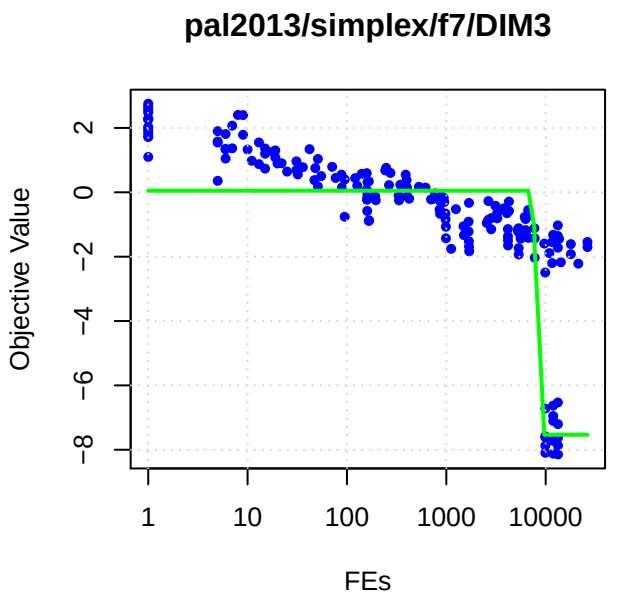
100
10000
FEs


pal2013/simplex/f7/DIM3
Objective Value
FEs
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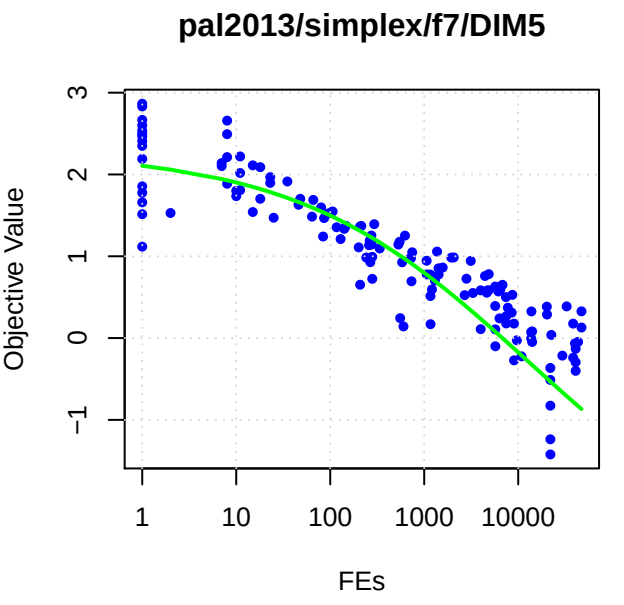
1000
10000


pal2013/simplex/f7/DIM5
Objective Value
FEs
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2
1
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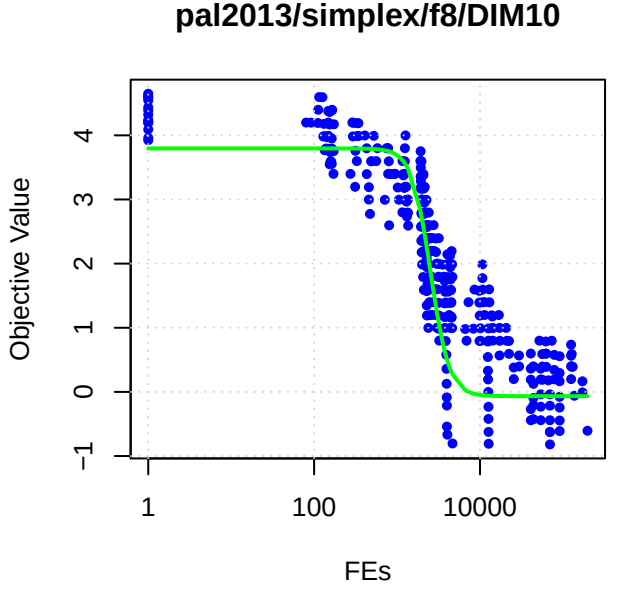
1000
10000


pal2013/simplex/f8/DIM10
Objective Value
FEs
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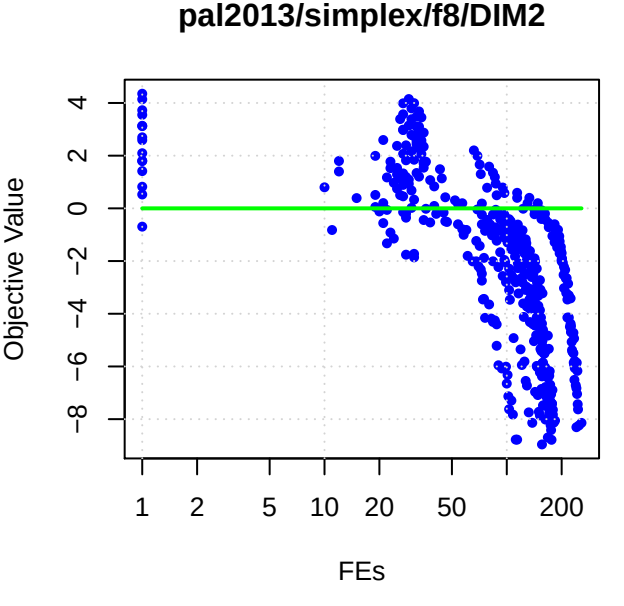
pal2013/simplex/f8/DIM2
Objective Value
FEs
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−2
−4
−6
−8
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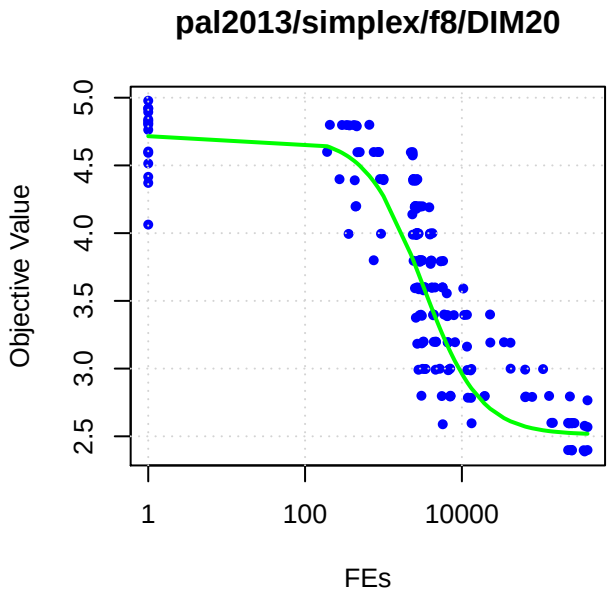
2
5
10
20
50
200


pal2013/simplex/f8/DIM20
Objective Value
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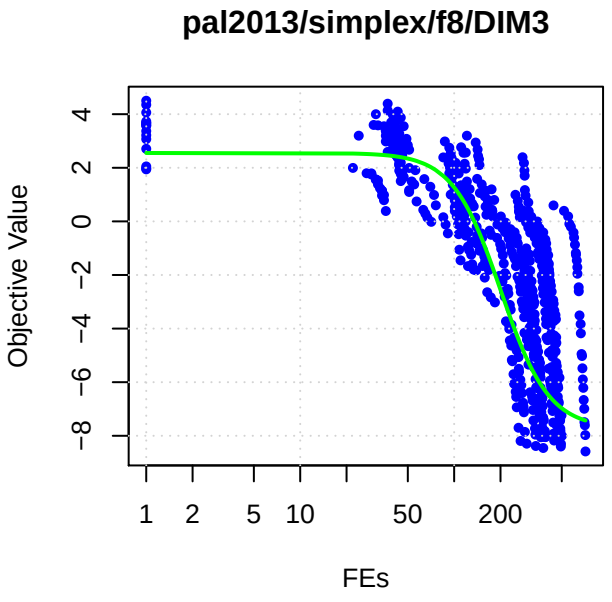
4.5
4.0
3.5
3.0
2.5
1
100
10000
FEs


pal2013/simplex/f8/DIM3
Objective Value
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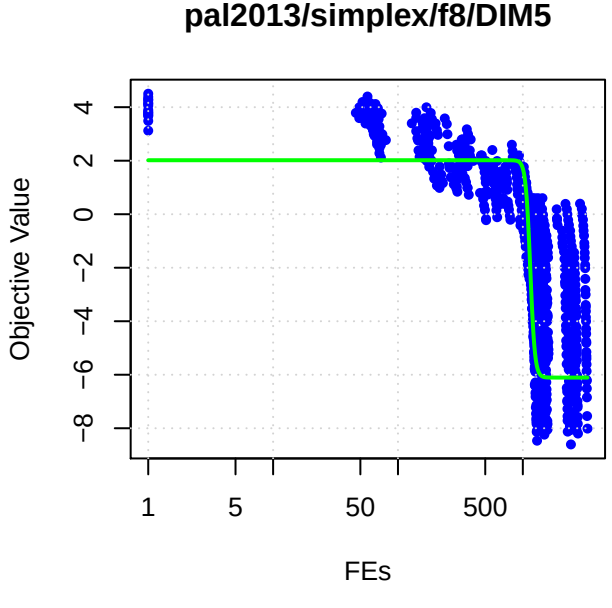
2
5
10
50
200
FEs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Objective Value
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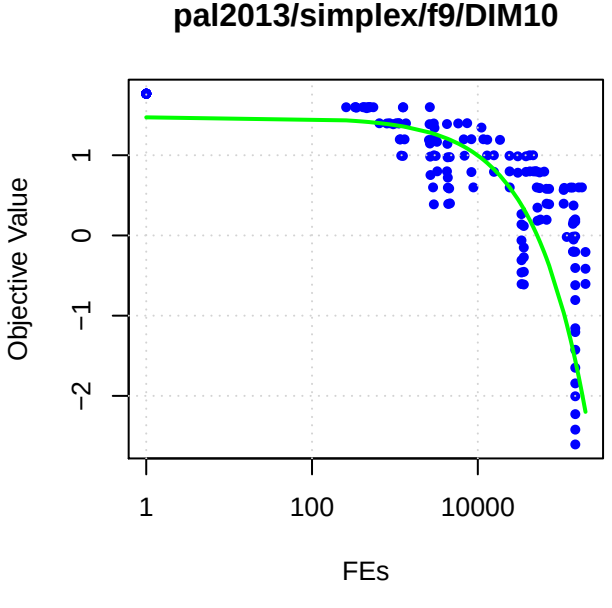
FEs


pal2013/simplex/f9/DIM10
Objective Value
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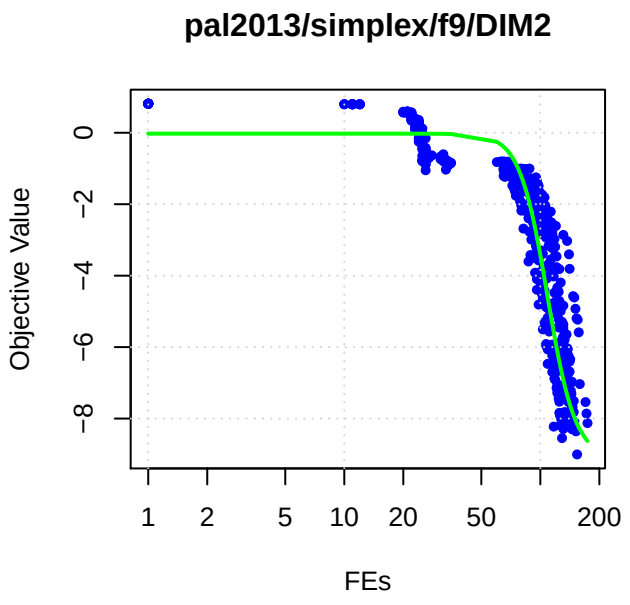
1
100
10000
FEs


pal2013/simplex/f9/DIM2
Objective Value
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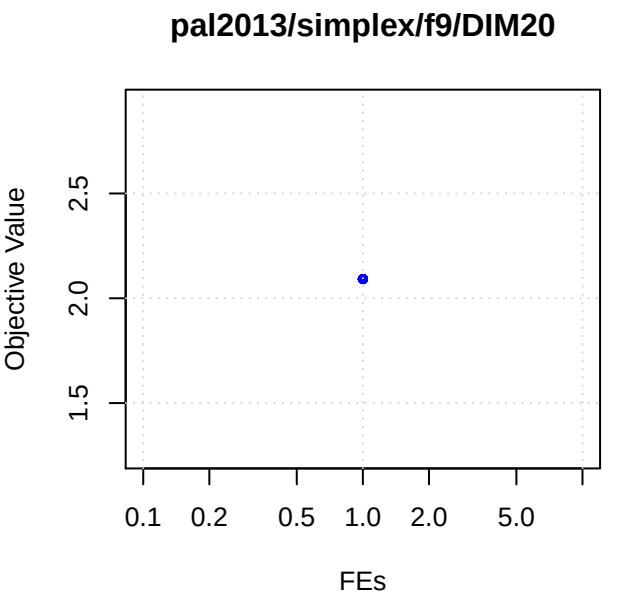
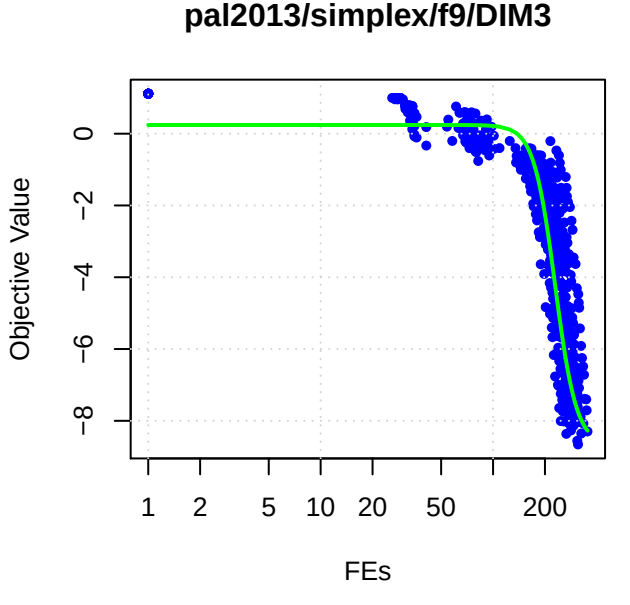
−6
−8
1
2
5
10
20
50
200
FEs


pal2013/simplex/f9/DIM20
Objective Value
2.5
2.0
1.5
0.1
0.2
0.5
1.0
2.0
5.0
FEs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Objective Value
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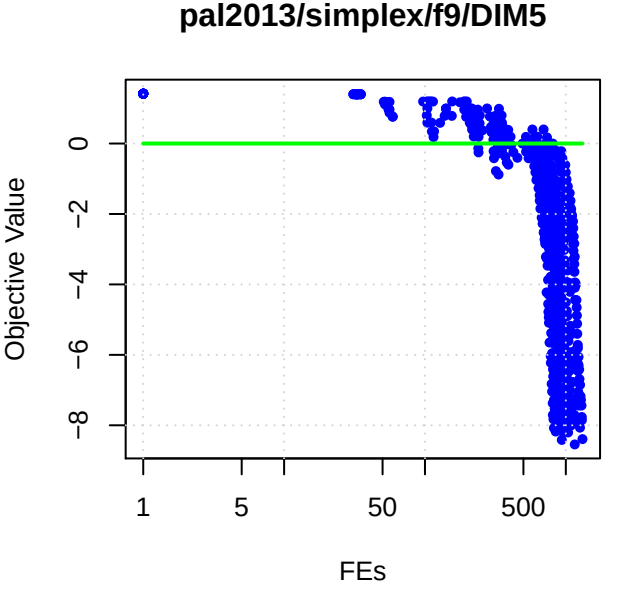
−4
−6
−8
1
2
5
10
20
50
200
FEs


pal2013/simplex/f9/DIM5
Objective Value
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−4
−6
−8
1
5
50
500
FEs