The COCO Data Archive and This Year's Results [aka the BBOB-2023 Summary]

The BBOBies
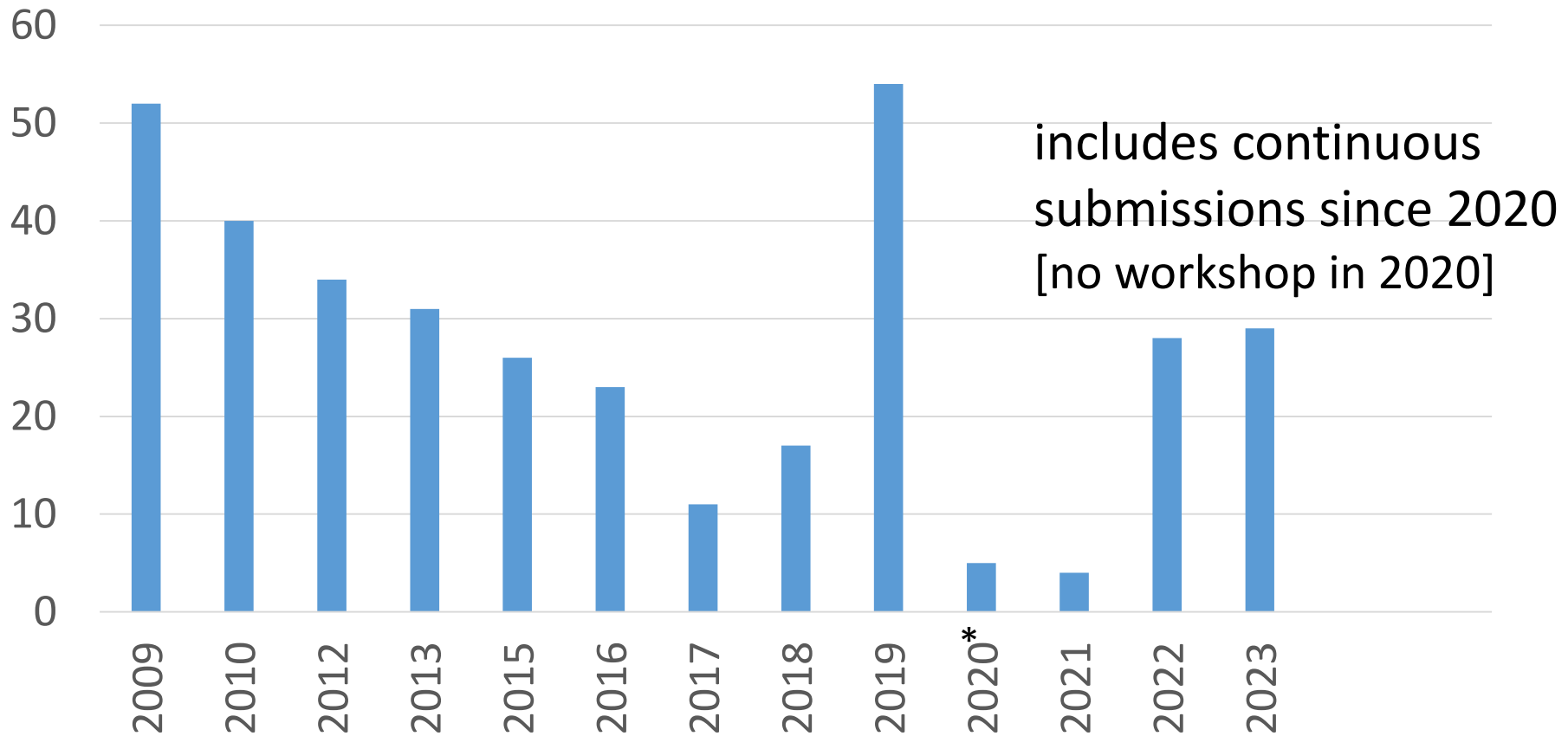
https://github.com/numbbo/coco

BBOB-2023 Stats

- +6 papers (total 159 since 2009)

- +28 data sets (now at 350+)

- +16 new authors (now at 140)

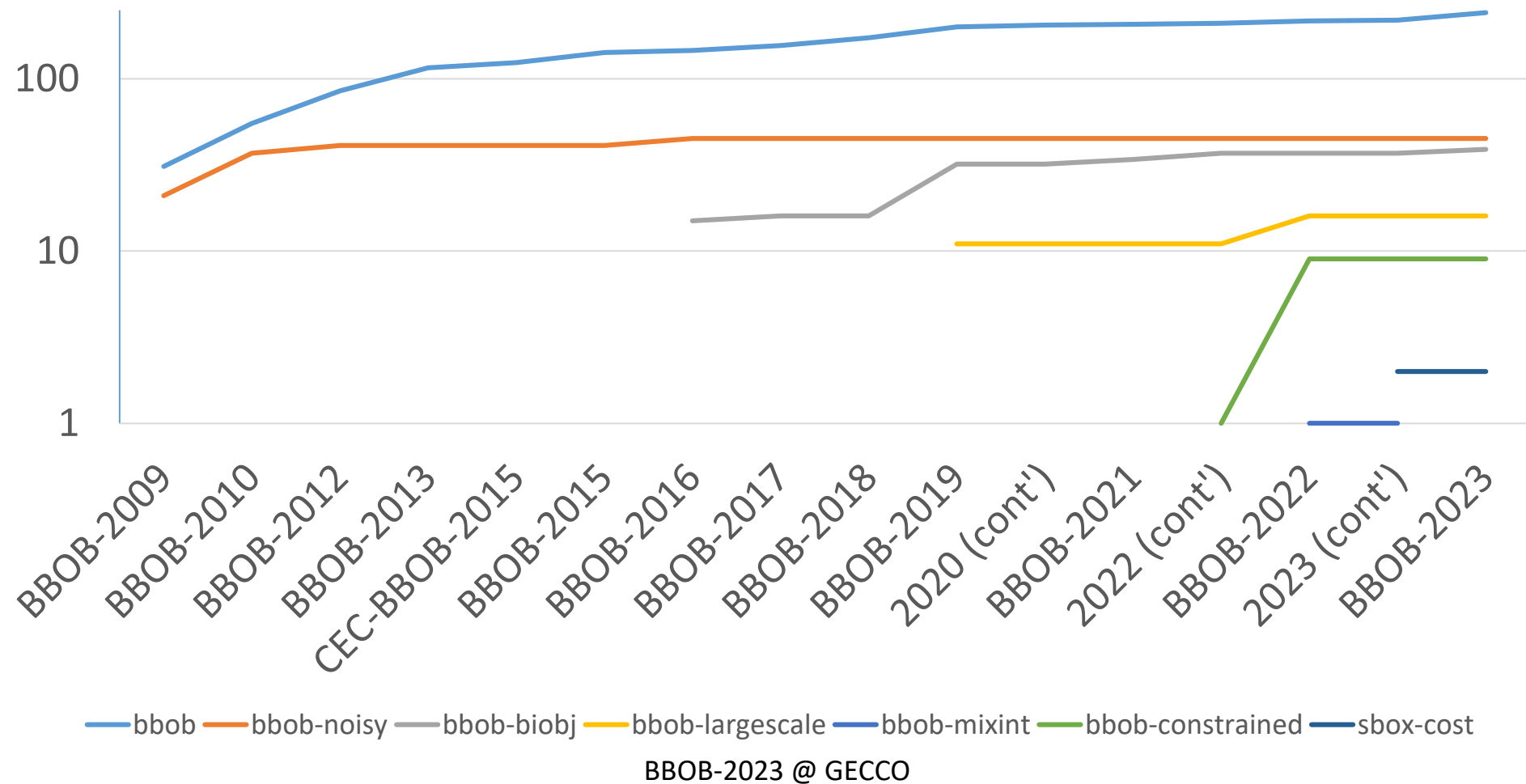- finally, first ever BBOB paper from the UK (contributing country #30)

Evolution of Data Archive
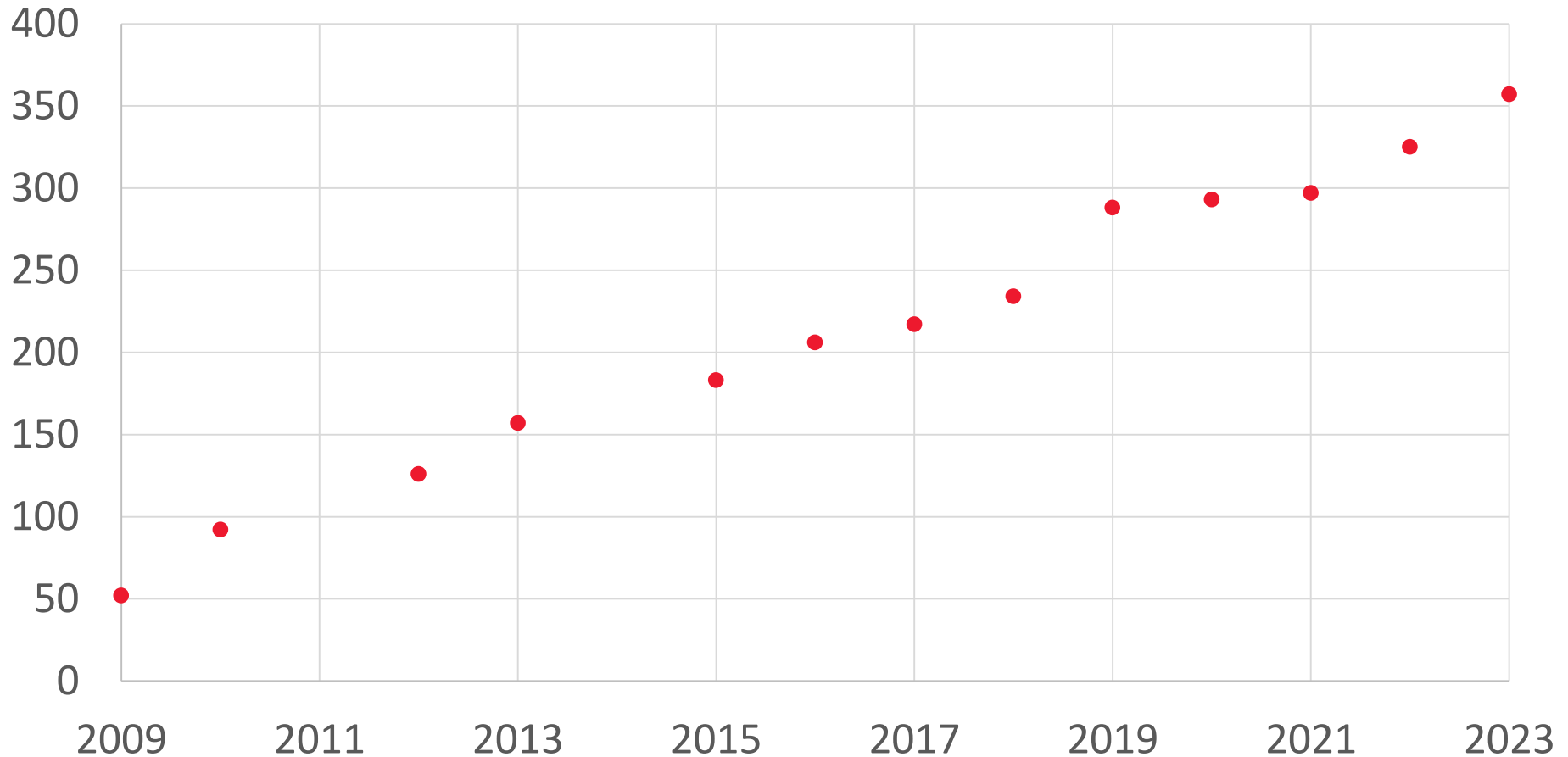
submitted data sets per year

includes continuous
submissions since 2020
[no workshop in 2020]

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Evolution of Data Archive

Submitted COCO Data Sets (cumulated)

Legend: bbob · bbob-noisy · bbob-biobj · bbob-largescale · bbob-mixint · bbob-constrained · sbox-cost

x-axis: BBOB-2009, BBOB-2010, BBOB-2012, BBOB-2013, CEC-BBOB-2015, BBOB-2015, BBOB-2016, BBOB-2017, BBOB-2018, BBOB-2019, 2020 (cont'), BBOB-2021, 2022 (cont'), BBOB-2022, 2023 (cont'), BBOB-2023

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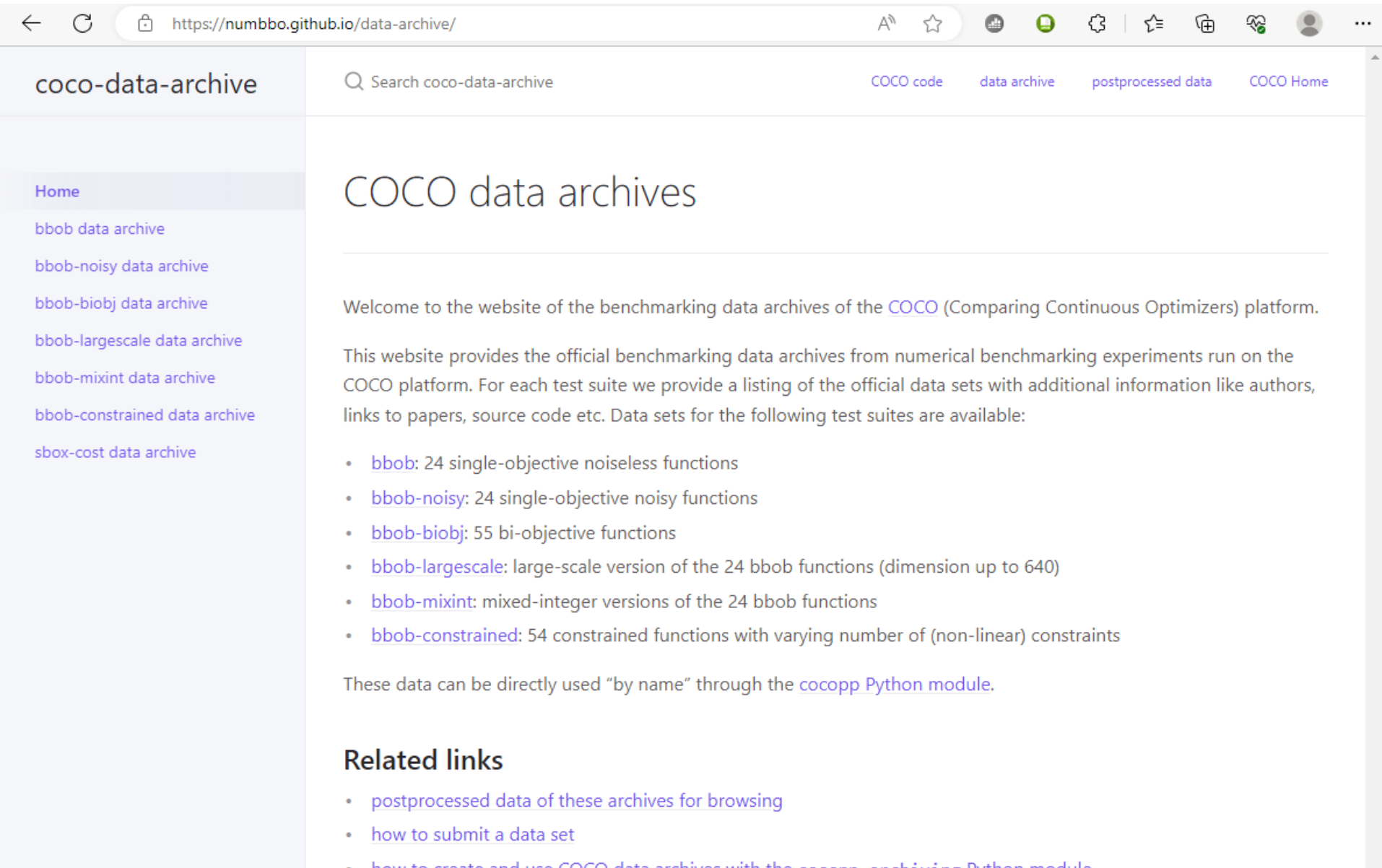
Evolution of Data Archive

Total Number of Datasets in Archive

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data archive: numbbo.github.io/data-archive/

coco-data-archive

Search coco-data-archive

COCO code   data archive   postprocessed data   COCO Home

Home

bbob data archive

bbob-noisy data archive

bbob-biobj data archive

bbob-largescale data archive

bbob-mixint data archive

bbob-constrained data archive

sbox-cost data archive

COCO data archives

Welcome to the website of the benchmarking data archives of the COCO (Comparing Continuous Optimizers) platform.

This website provides the official benchmarking data archives from numerical benchmarking experiments run on the COCO platform. For each test suite we provide a listing of the official data sets with additional information like authors, links to papers, source code etc. Data sets for the following test suites are available:

- bbob: 24 single-objective noiseless functions
- bbob-noisy: 24 single-objective noisy functions
- bbob-biobj: 55 bi-objective functions
- bbob-largescale: large-scale version of the 24 bbob functions (dimension up to 640)
- bbob-mixint: mixed-integer versions of the 24 bbob functions
- bbob-constrained: 54 constrained functions with varying number of (non-linear) constraints

These data can be directly used "by name" through the cocopp Python module.

Related links

- postprocessed data of these archives for browsing
- how to submit a data set
- how to create and use COCO data archives with the cocopp archiving Python module

data archive: numbbo.github.io/data-archive/

https://numbbo.github.io/data-archive/bbob/

coco-data-archive

Search coco-data-archive

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bbob data archive

bbob-noisy data archive

bbob-biobj data archive

bbob-largescale data archive

bbob-mixint data archive

bbob-constrained data archive

sbox-cost data archive

Algorithm data sets for the bbob test suite

In the first table below, you will find all official algorithm data sets on the bbob test suite, together with their year of publication, the authors, and related PDFs for each data set. Links to the source code to run the corresponding experiments/algorithms are provided whenever available.

A second table mentions data sets that have been collected on the bbob suite, but which are not complete in the sense that they miss at least one of the requested dimensions 2, 3, 5, 10, 20.

To sort the tables, simply click on the table header of the corresponding column.

Number	Algorithm Name	Year	Author(s)	link to data	related PDFs, source code, a
000	ALPS	2009	Hornby	data	pdf
001	AMALGAM	2009	Bosman et al.	data	pdf noiseless - pdf noisy
002	BAYEDA	2009	Gallagher	data	pdf noiseless - pdf noisy
003	BFGS	2009	Ros	data	pdf noiseless - pdf noisy
004	BIPOP-CMA-ES	2009	Hansen	data	pdf noiseless - pfd noisy
005	Cauchy-EDA	2009	Pošík	data	pdf

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ppdata archive: numbbo.github.io/ppdata-archive/

ppdata archive

COCO postprocessed data archive

COCO (COmparing Continuous Optimizers) is a platform for systematic and sound comparisons of real-parameter global optimizers. Here, we provide postprocessed data from all 300+ officially supported algorithm data sets for the various available test suites. Due to the large amount of algorithms (and the limited space in the figures), we group algorithm data sets by year of publication.

bbob	bbob-noisy	bbob-biobj	bbob-largescale	bbob-mixint	bbob-constrained
24 functions single-objective continous domain 200+ algorithm data sets	30 functions noisy evaluations single-objective 45 algorithm data sets	55 functions bi-objective noiseless 30+ algorithm data sets	24 bbob functions single-objective dimensions 20 to 640 11 algorithm data sets	24 functions 80% discrete variables single-objective 4 algorithm data sets	54 functions from 9 "raw" bbob functions with 1 to $(9 + \lfloor 9n/2 \rfloor)$ non-linear constraints 1 baseline algorithm data set
2009 2010 2012					

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```
pip install cocopp
python -m cocopp CMA-ES! BFGS! 2009/NEWUOA
```

or

```
python -m cocopp bbob-biobj/*
```
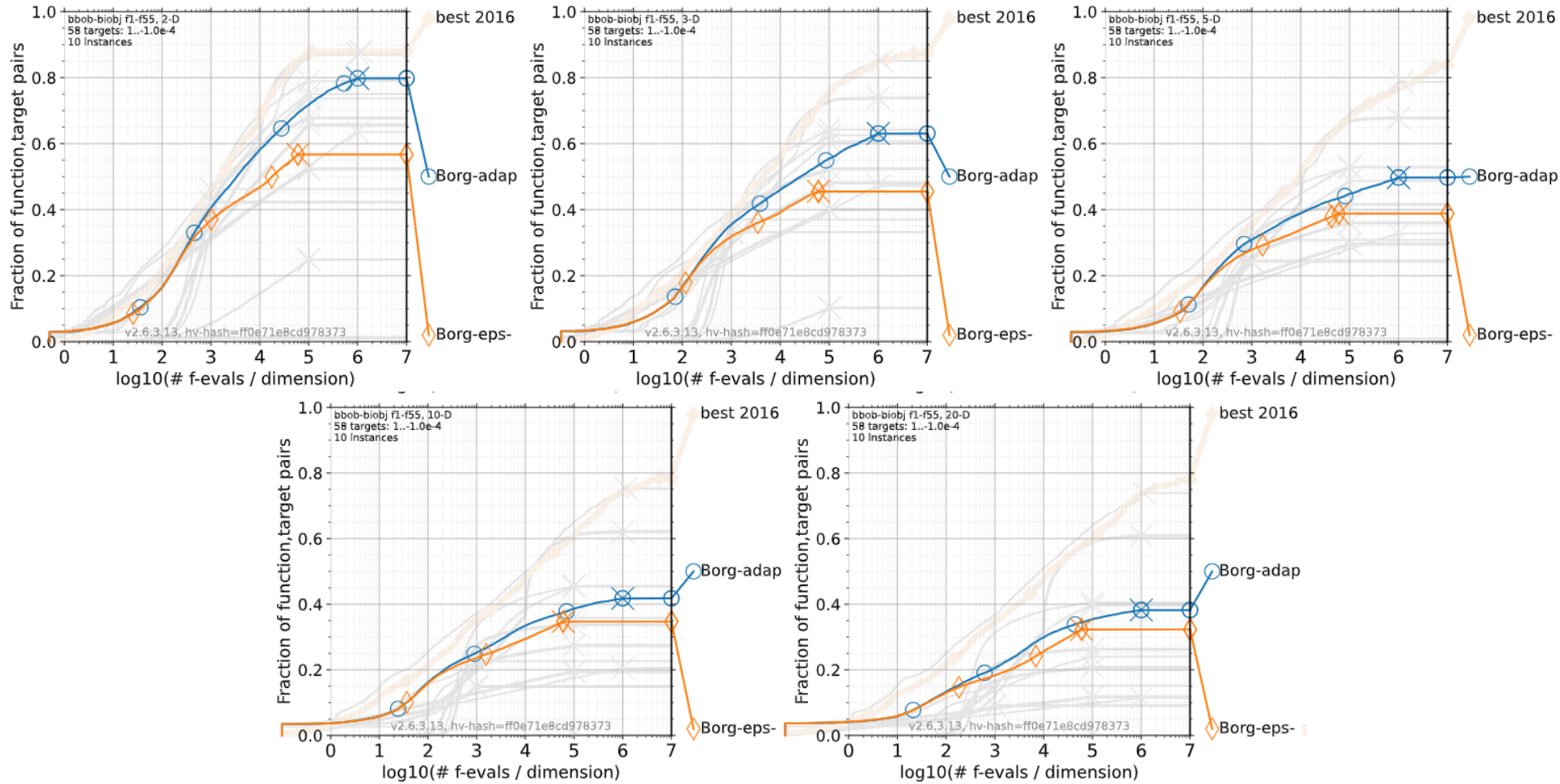
or

…

Take-Home Messages (?)

3 new data sets for `bbob-mixint`
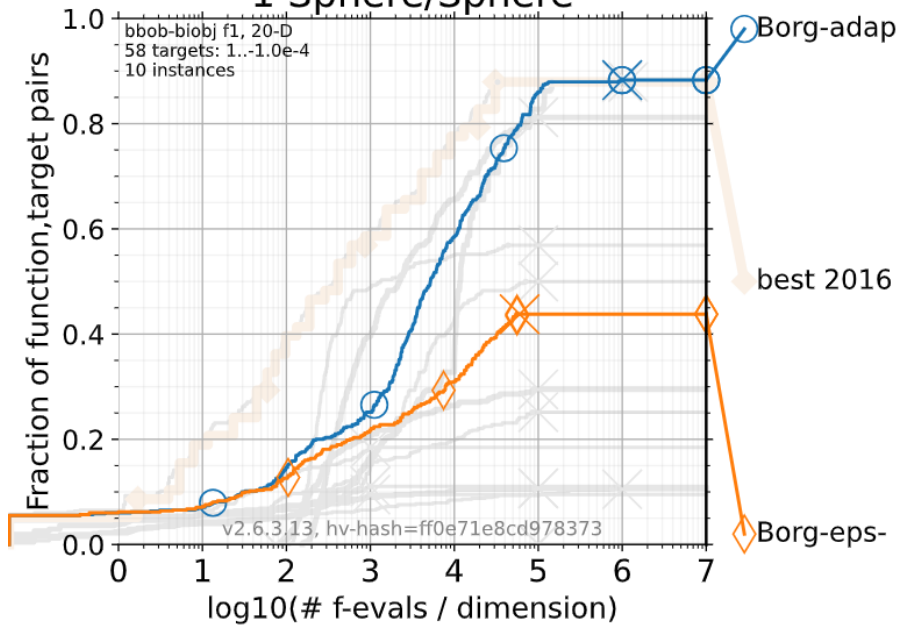
for technical reasons not yet online (I apologize)

please see the talk by Tristan for details and for the link to the data
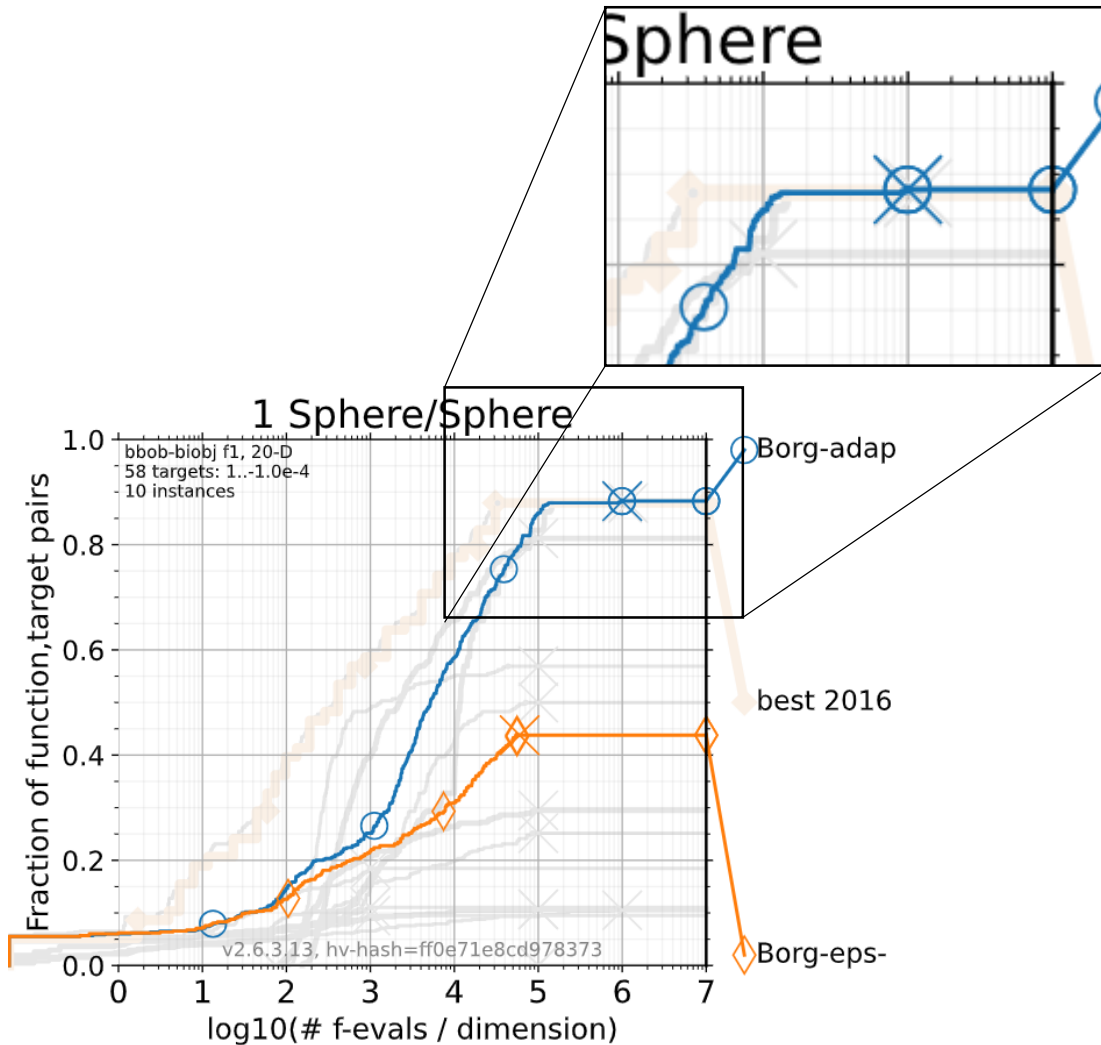
2 new data sets for `bbob-biobj`

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2 new data sets for `bbob-biobj`

2 new data sets for `bbob-biobj`

fastest non-portfolio algorithm on double sphere to reach hardest target in 20-D
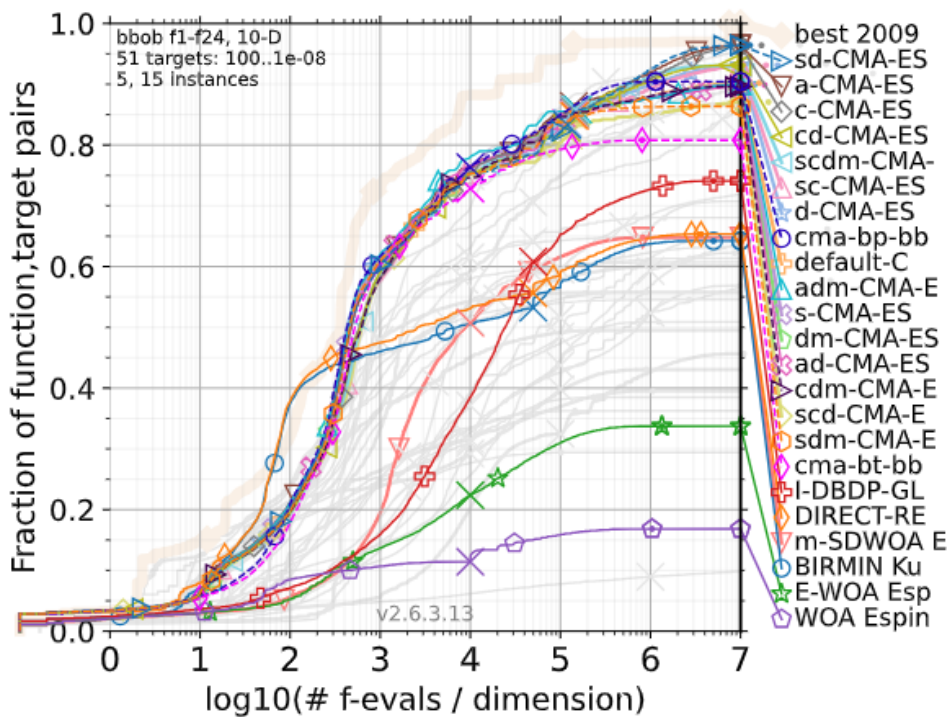
2 new data sets for `bbob-biobj`
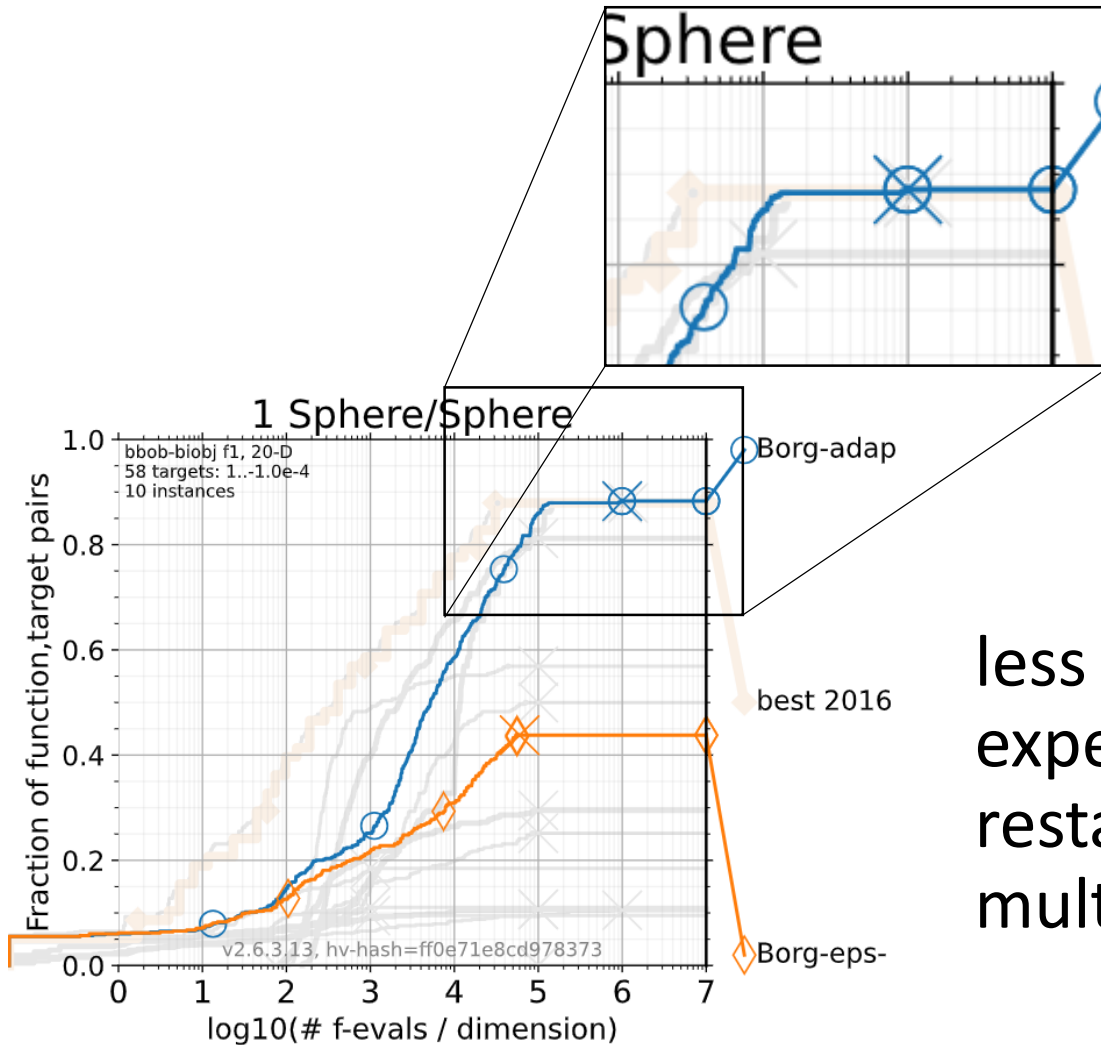
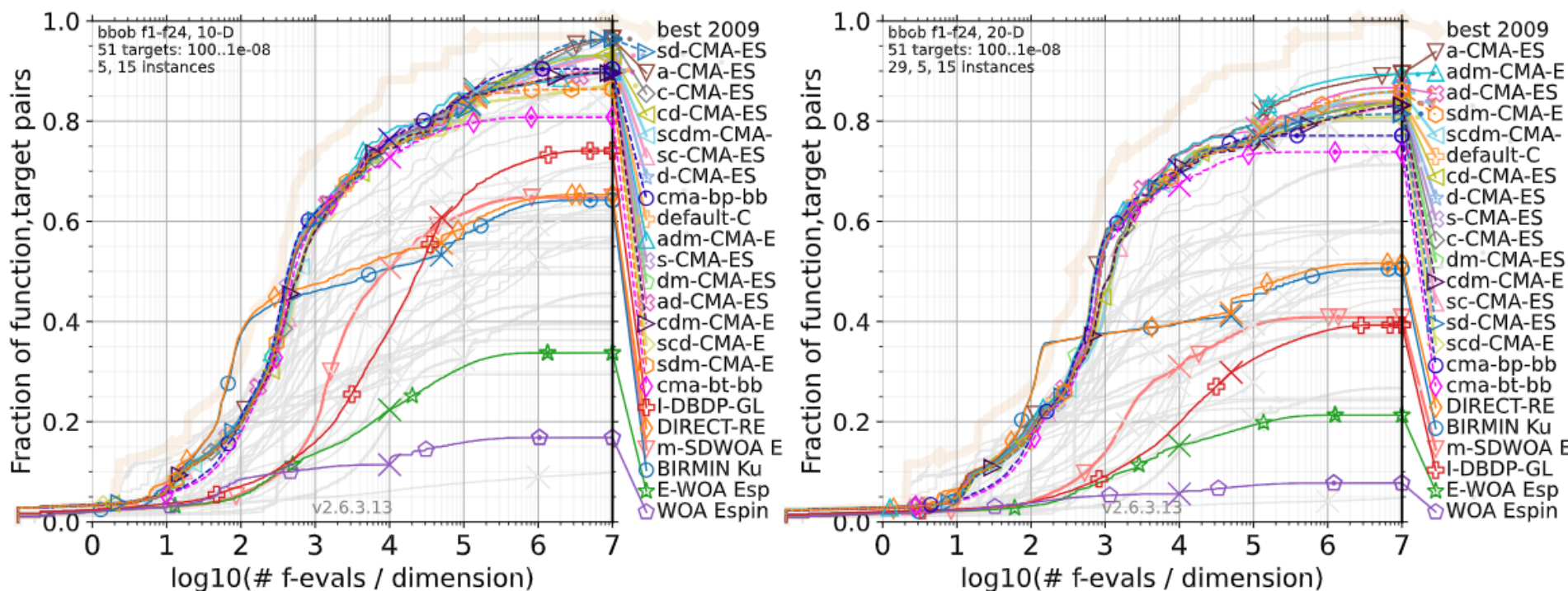fastest non-portfolio algorithm on double sphere to reach hardest target in 20-D

less performant than expected (despite internal restarts) on many multimodal functions

room for future research

23 new data sets for bbob
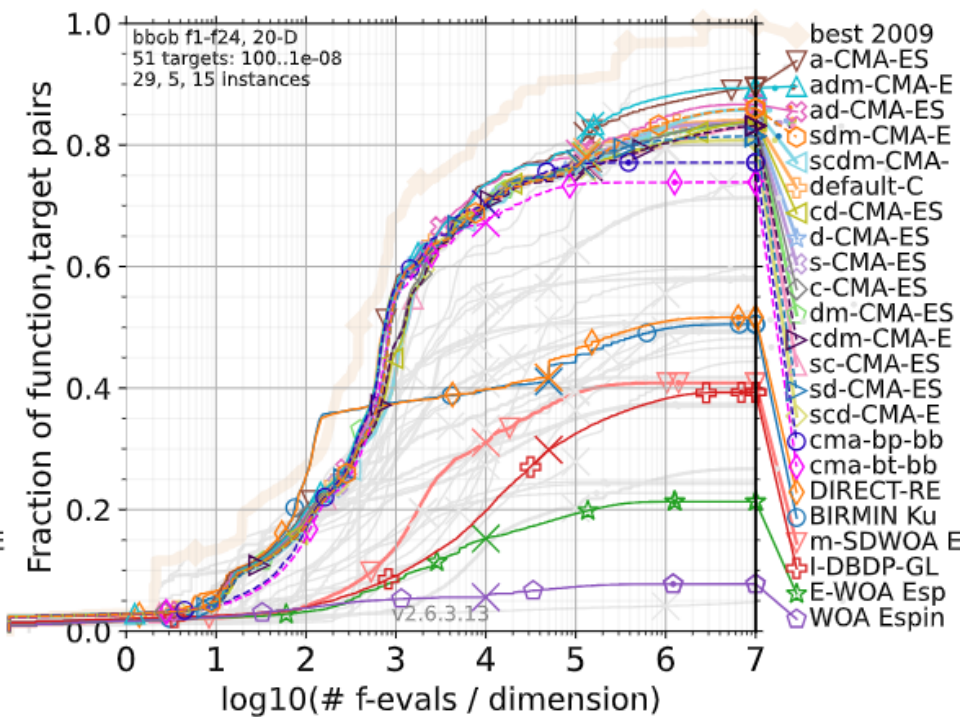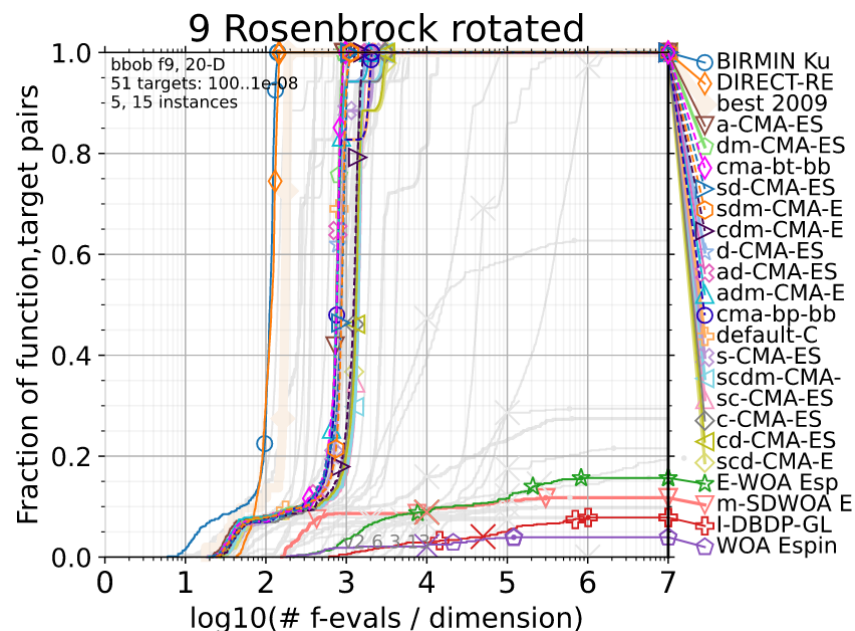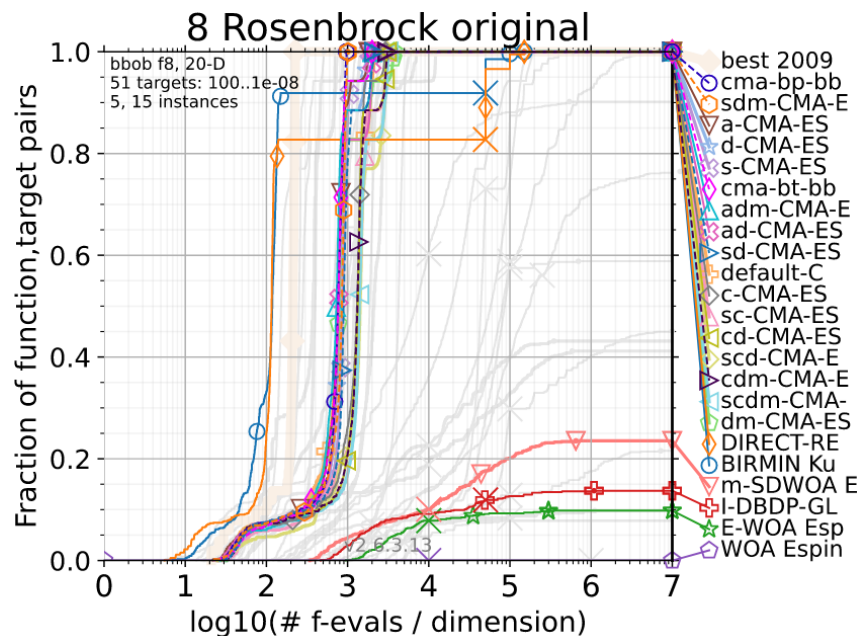
23 new data sets for bbob
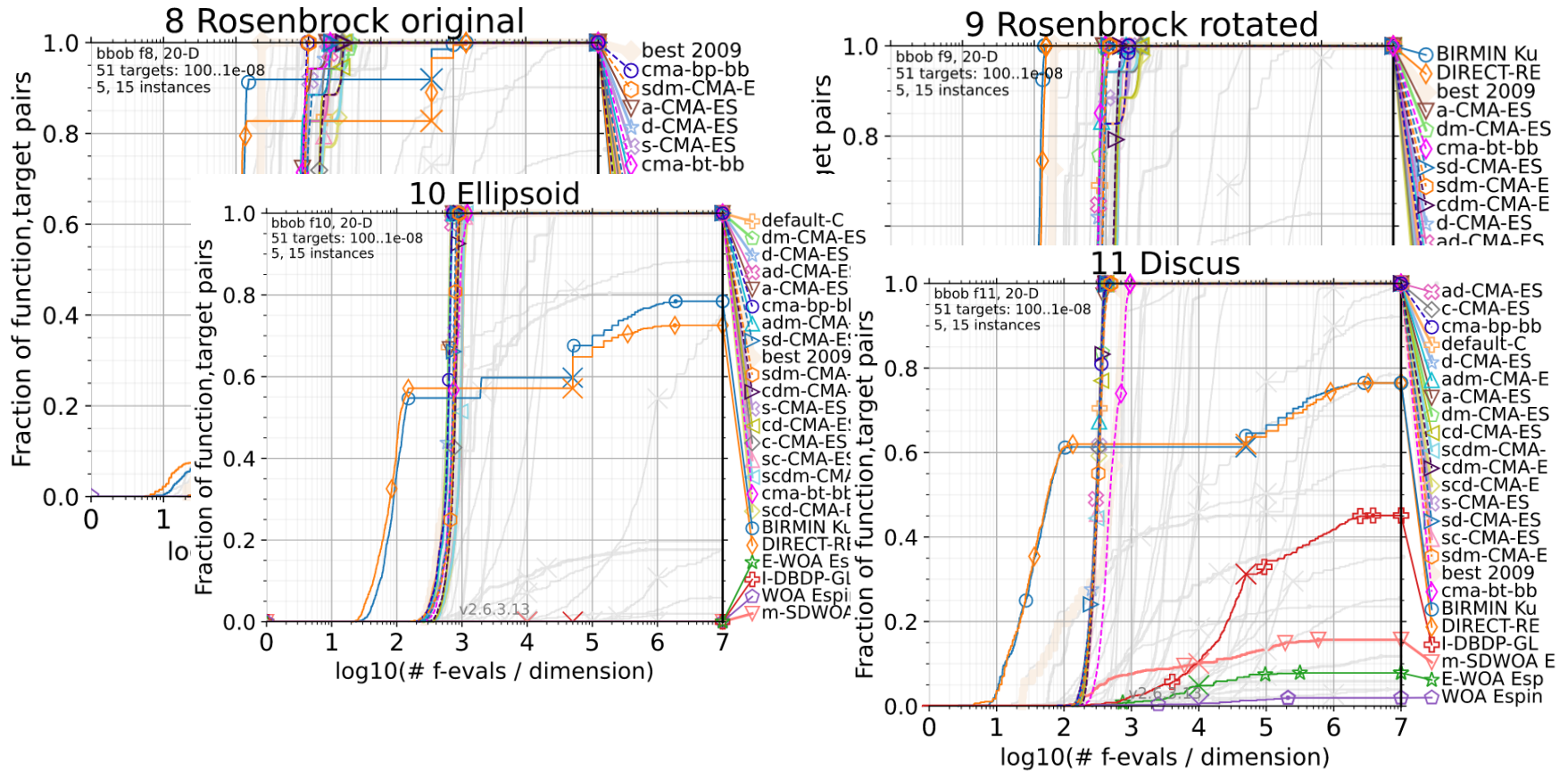

DIRECT&BIRMIN very good for budget around 100n...500n

no big differences among CMA-ES variants
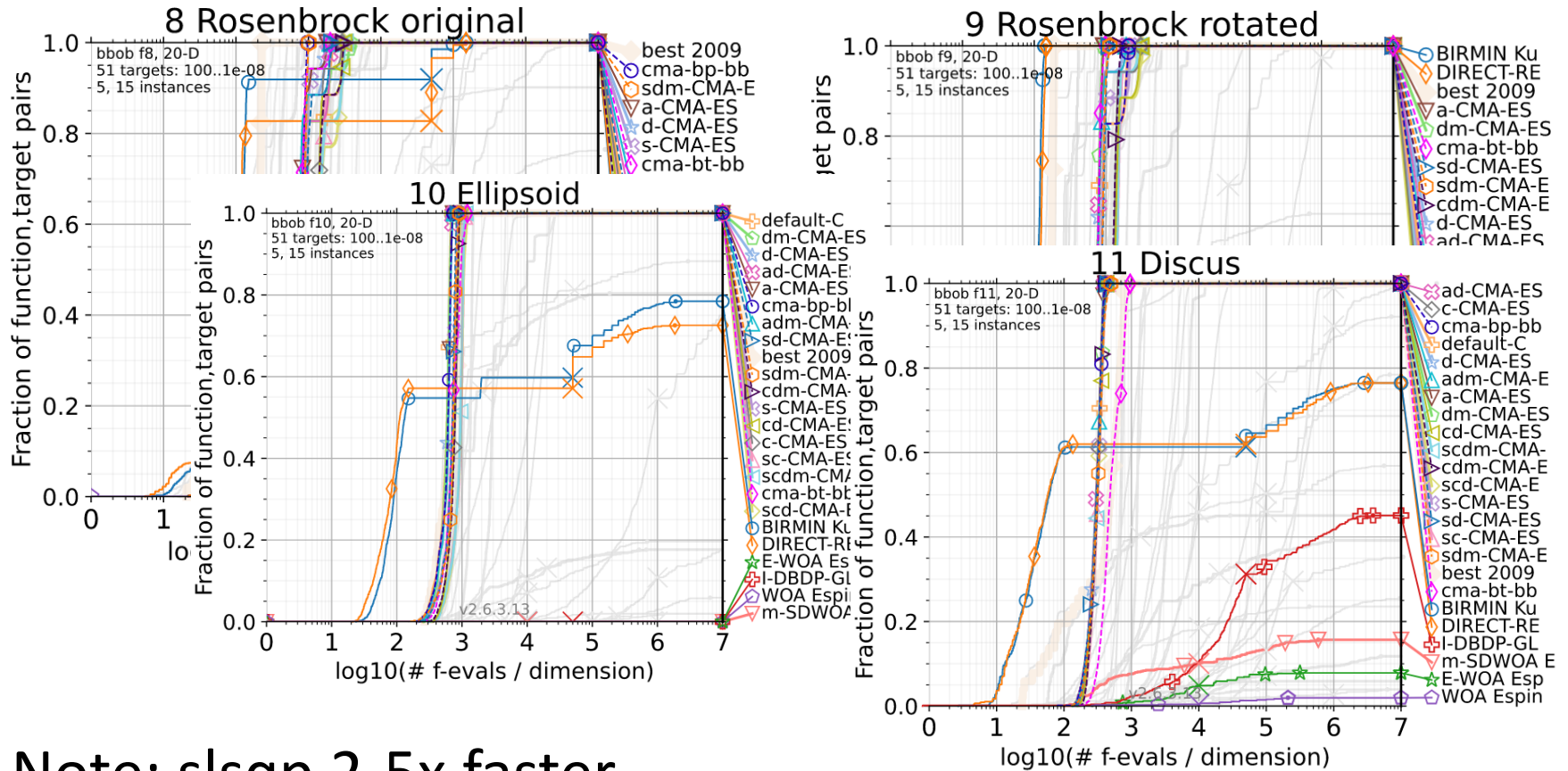
whale optimization scales badly with dimension

23 new data sets for bbob

8 Rosenbrock original

9 Rosenbrock rotated

23 new data sets for bbob

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23 new data sets for bbob

Note: slsqp 2-5x faster

BBOB-2023 Conclusion

- happy about number and quality of papers and contributions

- 28 new data sets for 3 test suites

- seems difficult to find exceptional performance

  still very important to collect more data

Open Discussion: Let us know…

- What can be improved/extended/…?

- Which direction should we go with COCO?

- What should we continue?

- Any other thoughts/comments/remarks/…