

RECENT DEVELOPMENTS IN THE BARON PROJECT

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THE BARON PROJECT



- Branch-and-reduce algorithm and **BARON** software
- First publicly available software to offer **deterministic** guarantee of global optimality for mixed-integer nonlinear optimization problems
- Two-pronged approach to technology transfer
 - **Commercial**
 - Under the modeling languages GAMS, AIMMS, BARON, AMPL, MATLAB, YALMIP, Pyomo, JuMP
 - **Free**
 - Under the NEOS server for optimization
 - Over 500,000 problems solved on NEOS



Ryoo and S (1995, 1996), Tawarmalani and S (2002, 2004), Bao et al. (2009, 2015), Zorn and S (2013, 2014), Khajavirad and S (2012, 2013, 2018), Puranik and S (2017), Kılınç and S (2018), Zhou et al. (2018), Nohra et al. (2018, 2021, 2022)

HISTORIC BENCHMARK

Mittelmann MINLP test set

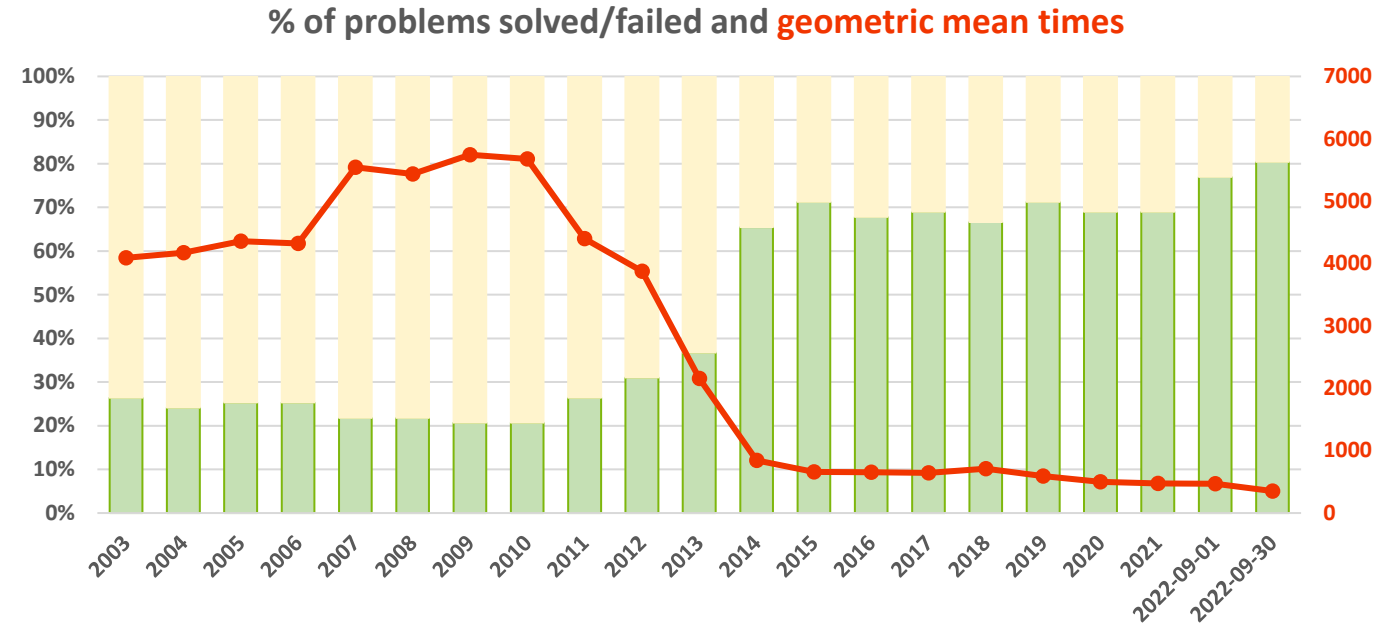
- 87 problems
- Statistics (min, max, avg)
 - Variables: 6, 107222, 2334
 - Binaries: 0, 3000, 111
 - Integers: 0, 100, 12
 - Constraints: 0, 108217, 2626

Runs under GAMS

- CPLEX, CBC
- MINOS, CONOPT, IPOPT, SNOPT, FilterSQP

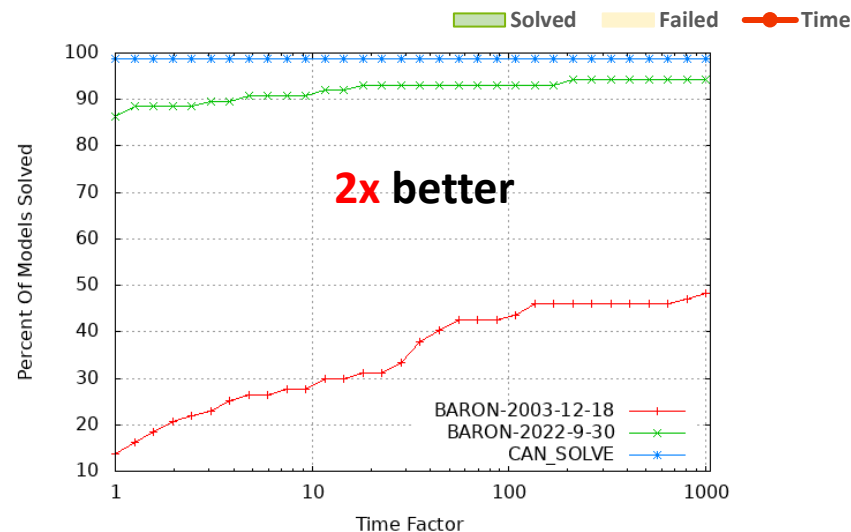
64-bit Xeon X5650 2.66GHz

- 3600 sec



3x more problems

10x faster



Lines of BARON code

