

CNFgen

A generator of crafted CNF formulas

Marc Vinyals

KTH Royal Institute of Technology
Stockholm, Sweden

Joint work with Massimo Lauria, Jan Elffers, and Jakob Nordström

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Benchmarks

How to test a SAT solver? Benchmarks!

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Industrial

Pros

- ▶ Close to reality
- ▶ Cover interesting applications

Cons

- ▶ Few instances
- ▶ Results hard to compare

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Crafted

Pros

- ▶ Can scale (no cactus plots)
- ▶ Can choose to be extremal with respect to a measure

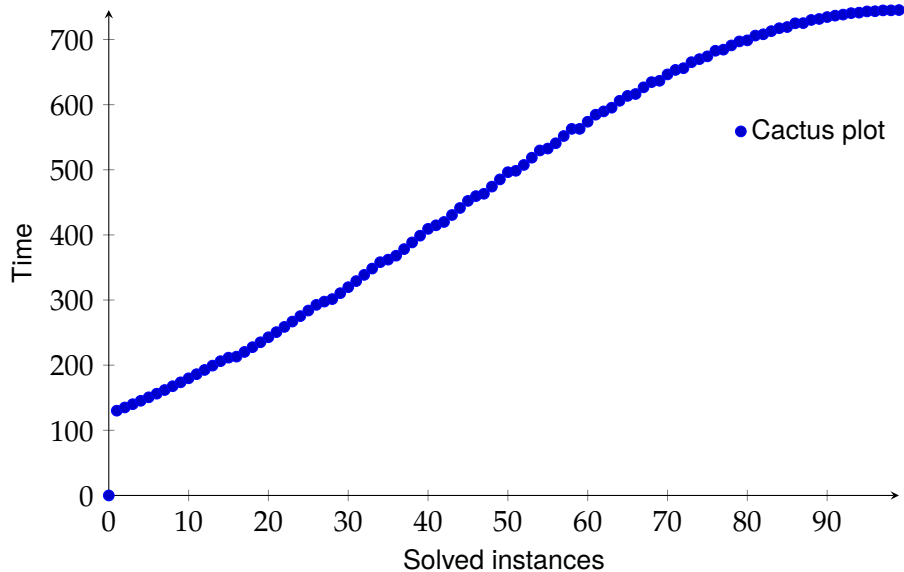
Cons

- ▶ Crafted

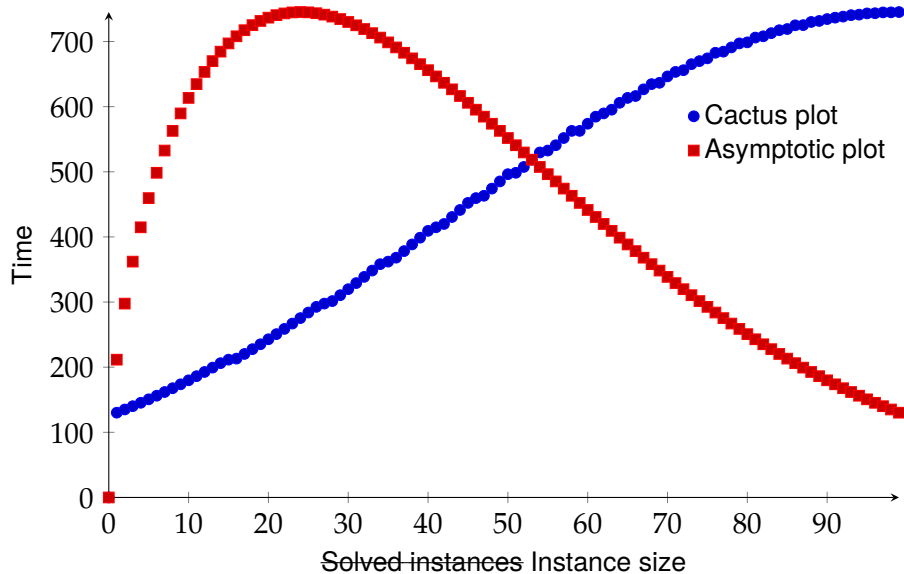
Beyond Cactus Plots

- ▶ Cactus plots great to compare mixed formulas
- ▶ But lose a lot of information

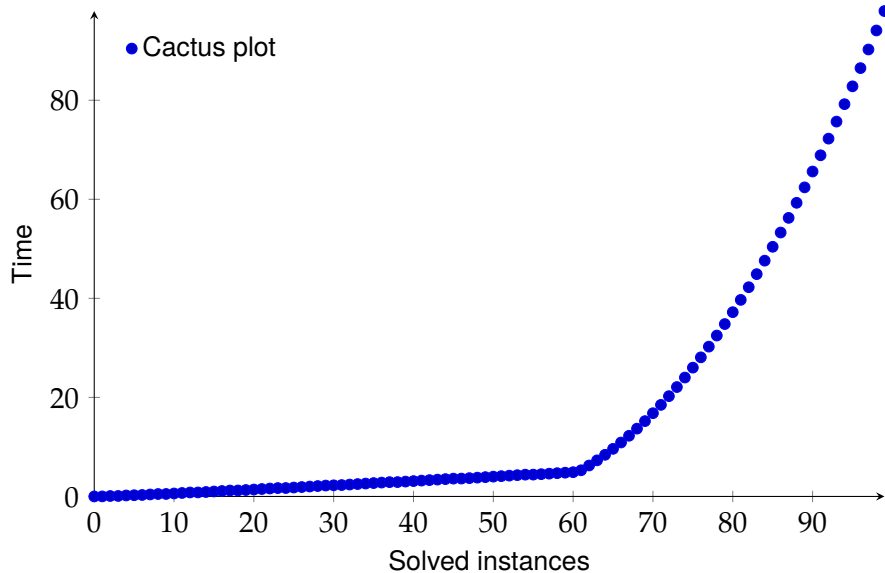
Beyond Cactus Plots



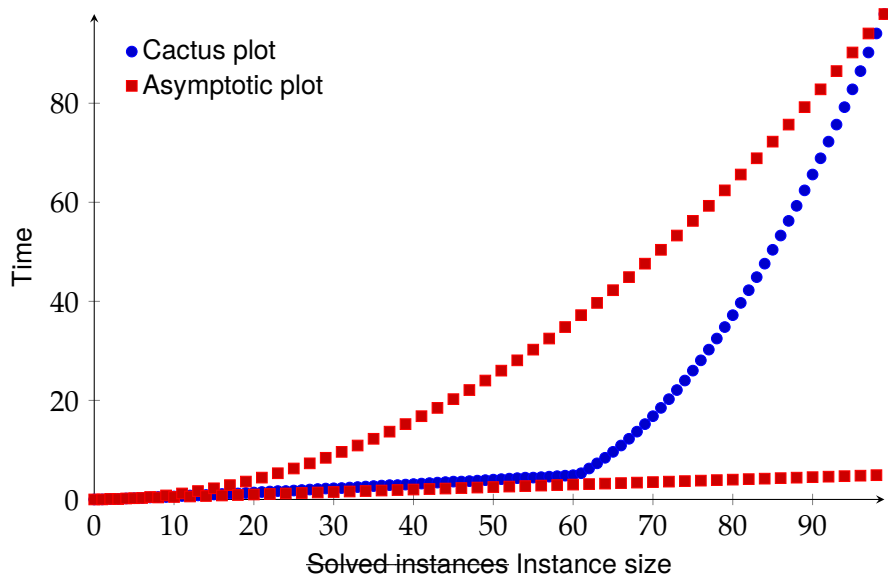
Beyond Cactus Plots



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Beyond Cactus Plots

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- ▶ But lose a lot of information

- ▶ Need asymptotic plots to understand behaviour

Easy Benchmarks

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Easy Benchmarks

What are good benchmarks?

- ▶ Easy for solvers: no fun
- ▶ Provably hard \Rightarrow hard for solvers: no fun
- ▶ Easy for method of reasoning, hard for solvers: interesting!
 - ▶ e.g. easy for resolution, hard for CDCL

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Generator of tricky CNF formulas.

Features

- ▶ Many formula families
- ▶ Easy to extend
- ▶ Python library with common constructs

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Use Cases

- ▶ SAT competition 2016: easy formulas, hard in practice
- ▶ [ENSS, PoS'16]: evaluation of CDCL heuristics on tricky formulas

Take Home

Suggestions

- ▶ Use crafted benchmarks for scalability
 - ▶ Beyond cactus plots
 - ▶ Easy instances
- ▶ Send feedback, requests, patches

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Website `http://massimolauria.github.io/cnfgen/`

GitHub `https://github.com/MassimoLauria/cnfgen/`

Install `$ easy_install networkx cnfgen`

or `$ pip install cnfgen`

Thanks!