

# Solving qualified constraint satisfaction problems with value selection rules

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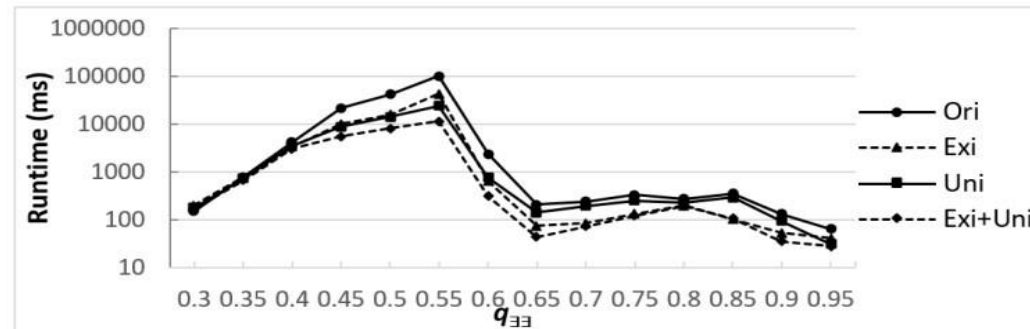
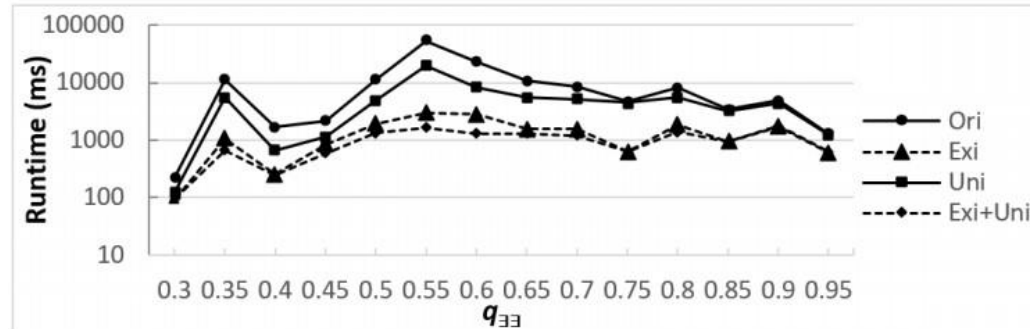
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# Problems & Ideas

- Quantified Constraint Satisfaction Problems (QCSP)
  - Solving QCSPs is usually a hard task
  - PSPACE-complete
  - The best exact solver is based on backtracking
- Two new value heuristic rules with history information
  - When assigning a universally quantified variable:
    - assign the latest failure value
    - fail-first principle
  - When assigning an existentially quantified variables:
    - record the latest success assignments
    - such assignments are tried preferentially when exploiting other branches
    - promise principle

# Main Contributions

- Comparison on average runtimes of four algorithms,



Ori: original solver, Exi: our rule for existentially quantified variables, Uni: our rule for universally quantified variables, Exi+Uni: both rules.

- **Exi+Uni is 2-10 times faster than the original solver**