

Darwin - Overview

- (sound and complete) first-order theorem prover
- based on the Model Evolution Calculus
 - lifting of DPLL to first-order logic
 - instance based generation of model as conjunction of (non-ground) literals
 - unification, unit propagation, non-chronological backtracking, lemma learning
- decision procedure for function-free clause sets
- TPTP conform (uses E-Prover as clausifier)

Darwin - Improvements

- only EPR problems in EPR division
- preprocessing
 - ground clause splitting
 - unit subsumption / unit resolution
- memory limit
 - data structures (candidates, unifiers) cache only max. number of elements, rest recomputed on demand.
 - remove redundant candidates more eagerly

FM-Darwin

- finite model finder in the spirit of paradox
- transformation to function-free first-order clauses instead of propositional clauses
- Darwin instead of a SAT solver as the decision procedure
- slower but no memory explosion
- succinct representation for huge models (in TPTP format): $\forall x_0, \dots, x_n : f(x_0, \dots, x_n) = 1$
- first-order lemmas have effect of symmetry reduction