

# Alt-Ergo

An automatic theorem prover dedicated to program verification

<http://alt-ergo.lri.fr>

**Authors.** The Alt-Ergo theorem prover is developed in the ProVal team at INRIA Saclay – Ile-de-France. The main developers are

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## System description.

Alt-Ergo is a little engine of proof dedicated to program verification. Alt-Ergo's native input syntax is the Why's syntax, a first-order logic with polymorphic sorts. But Alt-Ergo also supports the SMT-lib format. Alt-Ergo is used as a back-end in the Why/Caduceus/Krakatoa [2] and the Frama-C [3] platforms. It is currently used to prove correctness of C and Java programs. Its latest stable release is 0.9.

**Predefined theories.** Alt-Ergo supports some built-in theories:

- equality over uninterpreted function symbols
- linear arithmetics (over the reals and the integers)
- bit-vectors
- associativity and commutativity symbols

**Architecture.** Alt-Ergo's architecture is highly modular and it consists only of 7500 lines of Ocaml code. Its core component is CC(X) [1], a combination scheme for the theory of uninterpreted symbols and a built-in theory X. Alt-Ergo also contains a home made SAT-solver and an instantiation mechanism by which it fully supports quantifiers.

## References

- [1] Sylvain Conchon, Evelyne Contejean, Johannes Kanig and Stéphane Lescuyer. CC(X): Semantic Combination of Congruence Closure with Solvable Theories. *Electronic Notes in Theoretical Computer Science*, 198(2):51-69, May 2008.

- [2] Jean-Christophe Filliâtre and Claude Marché. The Why/Krakatoa/Caduceus platform for deductive program verification. In Werner Damm and Holger Hermanns, editors, *19th International Conference on Computer Aided Verification*, volume 4590 of *Lecture Notes in Computer Science*, pages 173–177, Berlin, Germany, July 2007. Springer.
- [3] Yannick Moy and Claude Marché. *Jessie Plugin Tutorial, Beryllium version*. INRIA, 2009. <http://www.frama-c.cea.fr/jessie.html>.