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Alloy [Jac02a] is a widely adopted relational modeling language. It
ing syntax and the support provided by the Alloy Analyzer [Jac02b] t
model analysis accessible to a public of non-specialists. A model and
are translated to a propositional formula, which is fed to a SAT-solver
for counterexamples. The translation strongly depends on user-provide
for data domains called scopes – the larger the scopes, the more conf
user is about the correctness of the model. Due to the intrinsic comp
the SAT-solving step, it is often the case that analyses do not scale we
to remain feasible as scopes grow.

ParAlloy exploits the possibility of splitting the SAT formula, thus
for parallel SAT-solving of Alloy models. Three of its important chara
are:

1. Its core component is a parallel solver for arbitrary propositiona
las –not necessarily in CNF– based on problem decomposition, an
a novel use of BEDs [AH02] for subproblem representation and
lation, Minisat [ES03] for subproblem analysis, and MPI [SOHl
inter-process communication.
2. Its Alloy-specific enhancements further improve (parallel) analyza
using knowledge obtained from the models to assist splitting decis
3. For valid properties (the UNSAT case), the speedups allowed the
of Alloy properties (such as some assertions in [Zav06]) that ex
current capabilities of the Alloy Analyzer. For invalid properties,
generation or iterative model refinement (the SAT case), parallel a
search space paths often leads to much higher speedups, since its ex
is unnecessary.

References

[AH02] Andersen, H.R., Hulgaard, H.: Boolean expression diagrams. In
and computation 179(2), 194–212 (2002)

[ES03] Eén, N., Sörensson, N.: An extensible sat solver. In: Giunchiglia
chella, A. (eds.) SAT 2003. LNCS, vol. 2919, pp. 502–518. Spri
delberg (2004)

M. Frappier et al. (Eds.): ABZ 2010, LNCS 5977, pp. 396–397, 2010.

ysis with Alloy. Computer Science and Artificial Intelligence La
MIT, Cambridge (2002)
[SOHL+98] Snir, M., Otto, S., Huss-Lederman, S., Walker, D., Dongarra,
The complete reference. MIT Press, Cambridge (1998)
[Zav06] Zave, P.: Compositional binding in network domains. In: Misra
kow, T., Sekerinski, E. (eds.) FM 2006. LNCS, vol. 4085, pp.
Springer, Heidelberg (2006)