ALBERT-LUDWIGS-
UNIVERSITÄT FREIBURG

FAKULTÄT FÜR ANGEWANDTE WISSENSCHAFTEN

Gastvortrag

Zeit: Donnerstag, 17. 4. 1997, 17.00 Uhr c.t.
Ort: Raum 02-017, Geb. 52, Am Flughafen 17

Binary Decision Diagrams and Reliability Analyses

Dr. Antoine Rauzy

LaBRI, Université Bordeaux-1

Abstract

This talk is about the use of Binary Decision Diagrams to handle Boolean reliability models. We first present various engineering techniques used to assess the risk in industrial systems (such as chemical plants, avionic systems, ...). We show how these models can be compiled into Boolean formulae, which can be in turn efficiently handled by means of Binary Decision Diagrams. Then, we focuss on the most simple model, namely fault trees. We present the main operations required to analyse fault trees (computation of prime implicants, probability assessment). We examine their theoretical complexities. We present BDD based algorithms to perform them. Based on practical considerations, we introduce a new notion of prime implicants: minimal p-cuts. We show that this notion is interesting both from a theoretical (complexity) from a practical (BDD implementation) point of views. We then consider approximated computations of BDDs encoding Boolean functions. We show the equivalence between functions induced by minimal p-cuts has very nice algebraic properties which make it possible to monitor the complexity of fault tree assessment. We provide empirical evidence (on real-life fault trees) of the interest of minimal p-cuts and approximated computations. Finally, we present some perspectives opened by this work.

Gastgeber: Prof. Dr. Bernd Becker

Alle Interessenten sind recht herzlich eingeladen.

Weitere Informationen im WWW unter http://www.informatik.uni-freiburg.de:/~hengster/kolloquium/