

# Refinement Calculus

A Systematic Introduction



Ralph-Johan Back  
Joakim von Wright



Springer

# On The Refinement Calculus

**G Psacharopoulos**



## On The Refinement Calculus:

**On the Refinement Calculus** Carroll Morgan, Trevor Vickers, 1994 On the Refinement Calculus gives one view of the development of the refinement calculus and its attempt to bring together among other things Z specifications and Dijkstra's programming language It is an excellent source of reference material for all those seeking the background and mathematical underpinnings of the refinement calculus *On the Refinement Calculus* Carroll Morgan, Ken Robinson, Paul Gardiner, 1988

*Refinement Calculus* Ralph-Johan Back, Joakim Wright, 1998-04-13 Much current research in computer science is concerned with two questions is a program correct And how can we improve a correct program preserving correctness This latter question is known as the refinement of programs and the purpose of this book is to consider these questions in a formal setting In fact correctness turns out to be a special case of refinement and so the focus is on refinement Although a reasonable background knowledge is assumed from mathematics and CS the book is a self contained introduction suitable for graduate students and researchers coming to this subject for the first time There are numerous exercises provided of varying degrees of challenge Program Development in the Refinement Calculus Philip Clayton, 2000 *Specification and*

*Programming* Kevin Hely, University College, Dublin. Dept. of Computer Science, 1998 **Procedures in the Refinement Calculus** Lindsay J. Groves, Victoria University of Wellington. Department of Computer Science, 1996 **Data Refinement in the Refinement Calculus** Ralph-Johan Back, 1988 *Products in the Refinement Calculus* Ralph-Johan Back, Joakim von Wright, 1999 **Interpreting Nondeterminism in the Refinement Calculus** Ralph-Johan Back, Joakim von Wright, 1996

**Theorem Proving in Higher Order Logics** Victor A. Carreno, César A. Muñoz, Sofiène Tahar, 2002 *Higher-level Algorithmic Structures in the Refinement Calculus* Stephen King (D.Phil.), 1998 **Logic Based Program Synthesis and Transformation** M. Leuschel, 2003-08-03 The thoroughly refereed post proceedings of the 12th International Workshop on Logic Based Program Synthesis and Transformation LOPSTR 2002 held in Madrid Spain in September 2002 The 15 revised full papers presented together with 7 abstracts were carefully selected during two rounds of reviewing and revision from 40 submissions The papers are organized in topical sections on debugging and types tabling and constraints abstract interpretation program refinement verification partial evaluation and rewriting and object oriented development

**Functional and Logic Programming** Oleg Kiselyov, Andy King, 2016-02-22 This book constitutes the proceedings of the 13th International Symposium on Functional and Logic Programming FLOPS 2016 held in Kochi Japan in March 2016 The 14 papers presented in this volume were carefully reviewed and selected from 36 submissions They cover the following topics functional and logic programming program transformation and re writing and extracting programs from proofs of their correctness Application and Theory of Petri Nets 2002 Javier Esparza, Charles Lakos, 2003-08-02 Typed Lambda Calculi and Applications Simona Ronchi Della Rocca, 2007-07-11 This book constitutes the refereed proceedings of the 8th International Conference on Typed Lambda Calculi and Applications TLCA 2007 held in Paris France in June 2007 in

conjunction with RTA 2007 the 18th International Conference on Rewriting Techniques and Applications as part of RDP 2007 the 4th International Conference on Rewriting Deduction and Programming The 25 revised full papers presented together with 2 invited talks were carefully reviewed and selected from 52 submissions The papers present original research results that are broadly relevant to the theory and applications of typed calculi and address a wide variety of topics such as proof theory semantics implementation types and programming

#### **Foundations of Component-Based Systems** Gary T.

Leavens, Murali Sitaraman, 2000-03-28 This collection of articles by well known experts was originally published in 2000 and is intended for researchers in computer science practitioners of formal methods and computer programmers working in safety critical applications or in the technology of component based systems The work brings together several elements of this area that were fast becoming the focus of much research and practice in computing The introduction by Clemens Szyperski gives a snapshot of research in the field About half the articles deal with theoretical frameworks models and systems of notation the rest of the book concentrates on case studies by researchers who have built prototype systems and present findings on architectures verification The emphasis is on advances in the technological infrastructure of component based systems how to design and specify reusable components and how to reason about verify and validate systems from components Thus the book shows how theory might move into practice

#### **Formal Methods and Software Engineering**

Jin Song Dong, Jim Woodcock, 2003-10-27 This book constitutes the refereed proceedings of the 5th International Conference on Formal Engineering Methods ICFEM 2003 held in Singapore in November 2003 The 34 revised full papers presented together with 3 invited contributions were carefully reviewed and selected from 91 submissions The papers are organized in topical sections on testing and validation state diagrams PVS HOL refinement hybrid systems Z Object Z Petri nets timed automata system modelling and checking and semantics and synthesis

#### **Program Design Calculi** Manfred

Broy, 2013-12-01 The development of information processing systems requires models calculi and theories for the analysis of computations It is well understood by now that more complex software systems cannot and should not be constructed in one step A careful systematic and disciplined structuring of the development process is most adequate It should start from basic requirement specifications in which aU the relevant details of the problem to be solved are formalized The envisaged solution should be developed step by step by adding more and more details and giving evidence in the best case by formal proof to show the correctness of the developed steps The development ends if a description of a solution is obtained that has aU the required properties The Summer School in Marktoberdorf 1992 showed significant approaches in this area to refinement calculi to models of computation and as a special issue to the treatment of reactive timed systems Like in the many summer schools before the success of the 1992 Summer School was not only due to the excellent lectures but even more due to the brilliant students taking part in the discussions at the summer school the exchange of different views and the recognition of the similarity of a number of different view points These were some of the most important contributions of the summer school

fu the following the proceedings of the summer school are collected They show the maturity of the field in an impressive way

**Mathematics of Program Construction** Bernhard Möller,1995-07-10 This volume constitutes the proceedings of the Third International Conference on the Mathematics of Program Construction held at Kloster Irsee Germany in July 1995 Besides five invited lectures by distinguished researchers there are presented 19 full revised papers selected from a total of 58 submissions The general theme is the use of crisp clear mathematics in the discovery and design of algorithms and in the development of corresponding software and hardware among the topics addressed are program transformation program analysis program verification as well as convincing case studies     Theorem Proving in Higher Order Logics Jim

Grundy,Malcolm Newey,1998-09-09 This book constitutes the refereed proceedings of the 11th International Conference on Theorem Proving in Higher Order Logics TPHOLs 98 held in Canberra Australia in September October 1998 The 26 revised full papers presented were carefully reviewed and selected from a total of 52 submissions Also included are two invited papers The papers address all current aspects of theorem proving in higher order logics and formal verification and program analysis Besides the HOL system the theorem provers Coq Isabelle LAMBDA LEGO NuPrl and PVS are discussed

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