TEXTS AND MONOGRAPHS IN COMPUTER SCIENCE

ALGEBRAIC APPROACHES TO PROGRAM SEMANTICS

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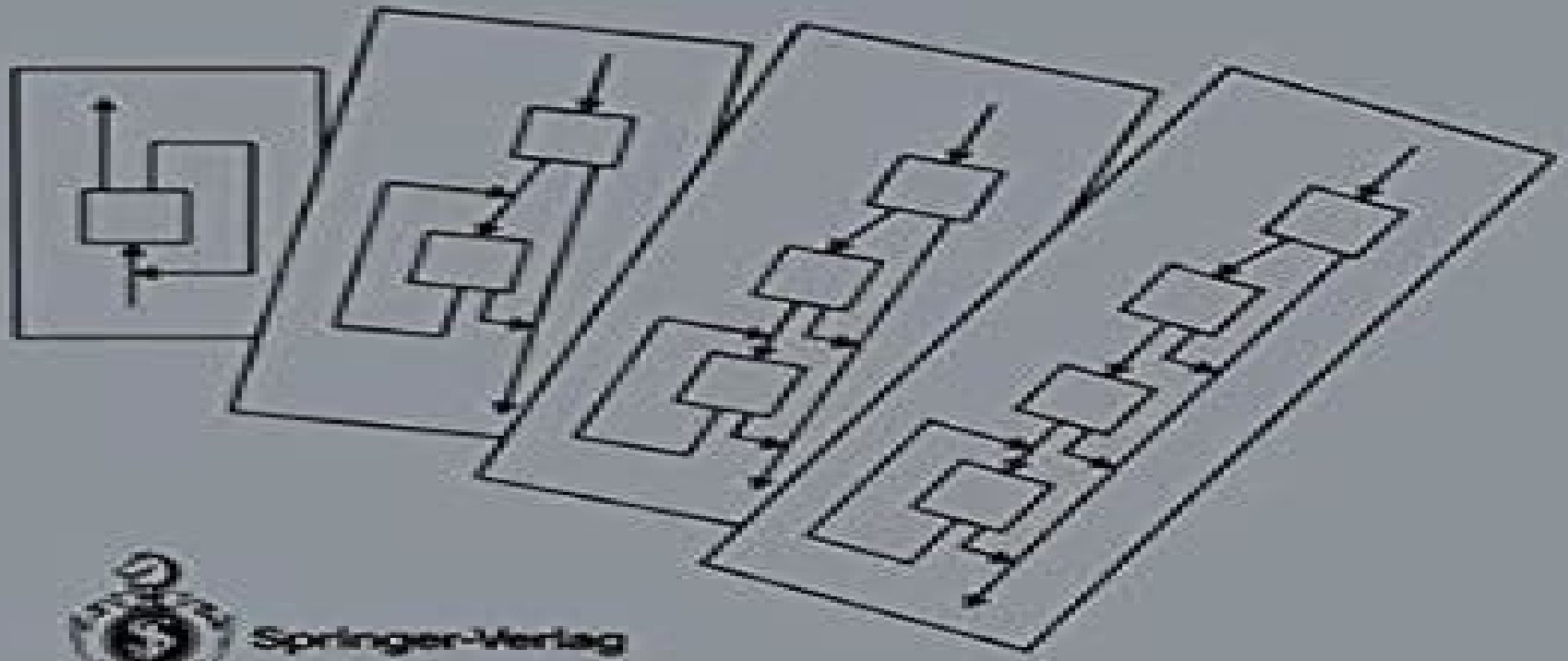

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Algebraic Approaches To Program Semantics

Ernest G. Manes

Algebraic Approaches To Program Semantics:

Algebraic Approaches to Program Semantics Ernest G. Manes,Michael A. Arbib,2012-12-06 In the 1930s mathematical logicians studied the notion of effective comput ability using such notions as recursive functions A calculus and Turing machines The 1940s saw the construction of the first electronic computers and the next 20 years saw the evolution of higher level programming languages in which programs could be written in a convenient fashion independent thanks to compilers and interpreters of the architecture of any specific machine The development of such languages led in turn to the general analysis of questions of syntax structuring strings of symbols which could count as legal programs and semantics determining the meaning of a program for example as the function it computes in transforming input data to output results An important approach to semantics pioneered by Floyd Hoare and Wirth is called assertion semantics given a specification of which assertions preconditions on input data should guarantee that the results satisfy desired assertions postconditions on output data one seeks a logical proof that the program satisfies its specification An alternative approach pioneered by Scott and Strachey is called denotational semantics it offers algebraic techniques for characterizing the denotation of i e the function computed by a program the properties of the program can then be checked by direct comparison of the denotation with the specification This book is an introduction to denotational semantics More specifically we introduce the reader to two approaches to denotational semantics the order semantics of Scott and Strachey and our own partially additive semantics

Algebraic approaches to program semantics Ernest Gene Manes,1986 **Algebraic Methods in Semantics** M. Nivat,John C. Reynolds,1985 This book which contains contributions from leading researchers in France USA and Great Britain gives detailed accounts of a variety of methods for describing the semantics of programming languages i e for attaching to programs mathematical objects that encompass their meaning Consideration is given to both denotational semantics where the meaning of a program is regarded as a function from inputs to outputs and operational semantics where the meaning includes the sequence of states or terms generated internally during the computation The major problems considered include equivalence relations between operational and denotational semantics rules for obtaining optimal computations especially for nondeterministic programs equivalence of programs meaning preserving transformations of programs and program proving by assertions Such problems are discussed for a variety of programming languages and formalisms and a wealth of mathematical tools is described *Algebraic Approach to Program Semantics* Ernest G. Manes,1986 An Algebraic Approach to Compiler Design Augusto Sampaio,1997 This book investigates the design of compilers for procedural languages based on the algebraic laws which these languages satisfy The particular strategy adopted is to reduce an arbitrary source program to a general normal form capable of representing an arbitrary target machine This is achieved by a series of normal form reduction theorems which are proved algebraically from the more basic laws The normal form and the related reduction theorems can then be instantiated to design compilers for distinct target

machines This constitutes the main novelty of the author s approach to compilation together with the fact that the entire process is formalised within a single and uniform semantic framework of a procedural language and its algberaic laws Furthermore by mechanising the approach using the OBJ3 term rewriting system it is shown that a prototype compiler is developed as a byproduct of its own proof of correctness **Relational and Algebraic Methods in Computer Science** Jules Desharnais,Walter Guttmann,Stef Joosten,2018-10-22 This book constitutes the proceedings of the 17th International Conference on Relational and Algebraic Methods in Computer Science RAMiCS 2018 held in Groningen The Netherlands in October November 2018 The 21 full papers and 1 invited paper presented together with 2 invited abstracts and 1 abstract of a tutorial were carefully selected from 31 submissions The papers are organized in the following topics Theoretical foundations reasoning about computations and programs and applications and tools *An Algebraic Approach To Compiler Design* Augusto Sampaio,1997-04-19 This book investigates the design of compilers for procedural languages based on the algebraic laws which these languages satisfy The particular strategy adopted is to reduce an arbitrary source program to a general normal form capable of representing an arbitrary target machine This is achieved by a series of normal form reduction theorems which are proved algebraically from the more basic laws The normal form and the related reduction theorems can then be instantiated to design compilers for distinct target machines This constitutes the main novelty of the author s approach to compilation together with the fact that the entire process is formalised within a single and uniform semantic framework of a procedural language and its algberaic laws Furthermore by mechanising the approach using the OBJ3 term rewriting system it is shown that a prototype compiler is developed as a byproduct of its own proof of correctness

Relational and Algebraic Methods in Computer Science Harrie de Swart,2011-05-20 This book constitutes the proceedings of the 12 International Conference on Relational and Algebraic Methods in Computer Science RAMICS 2011 held in Rotterdam The Netherlands in May June 2011 This conference merges the RelMICS Relational Methods in Computer Science and AKA Applications of Kleene Algebra conferences which have been a main forum for researchers who use the calculus of relations and similar algebraic formalisms as methodological and conceptual tools Relational and algebraic methods and software tools turn out to be useful for solving problems in social choice and game theory For that reason this conference included a special track on Computational Social Choice and Social Software The 18 papers included were carefully reviewed and selected from 27 submissions In addition the volume contains 2 invited tutorials and 5 invited talks

Relational and Algebraic Methods in Computer Science Peter Höfner,Peter Jipsen,Wolfram Kahl,Martin Eric Müller,2014-04-08 This book constitutes the proceedings of the 14th International Conference on Relational and Algebraic Methods in Computer Science RAMiCS 2014 held in Marienstatt Germany in April May 2014 The 25 revised full papers presented were carefully selected from 37 submissions The papers are structured in specific fields on concurrent Kleene algebras and related formalisms reasoning about computations and programs heterogeneous and categorical approaches

applications of relational and algebraic methods and developments related to modal logics and lattices Relational and Algebraic Methods in Computer Science Uli Fahrenberg,Peter Jipsen,Michael Winter,2020-04-01 This book constitutes the proceedings of the 18th International Conference on Relational and Algebraic Methods in Computer Science RAMiCS 2020 which was due to be held in Palaiseau France in April 2020 The conference was cancelled due to the COVID 19 pandemic The 20 full papers presented together with 3 invited abstracts were carefully selected from 29 submissions Topics covered range from mathematical foundations to applications as conceptual and methodological tools in computer science and beyond

ACM Transactions on Programming Languages and Systems Association for Computing Machinery,2001

Algebra of Programming Richard Bird,Oege de Moor,1997 Describing an algebraic approach to programming based on a categorical calculus of relations this book is suitable for the derivation of individual programs and for the study of programming principles in general **Proceedings of the ... International ACM SIGPLAN Conference on Principles and Practice of Declarative Programming** ,2007 An Algebraic Definition of Knuthian Semantics Laurian M. Chirica,David F. Martin,1977 **Principles and Practice of Declarative Programming** ,2000 A Semantic Algebra Approach to Denotational Semantics of Programming Languages Antony Hosking,1986 **Proceedings of the Third Workshop-Meeting on "Categorical and Algebraic Methods in Computer Science and System Theory"** Gisbert Dittrich,1980 **Programming Concepts, Methods and Calculi** E.-R. Olderog,1994 **Working Papers** ,1990

SIAM Journal on Control and Optimization Society for Industrial and Applied Mathematics,1999 Contains research articles on the mathematics and applications of control theory and on those parts of optimization theory concerned with the dynamics of deterministic or stochastic systems in continuous or discrete time or otherwise dealing with differential equations dynamics infinite dimensional spaces or fundamental issues in variational analysis and geometry

Reviewing **Algebraic Approaches To Program Semantics**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is truly astonishing. Within the pages of "**Algebraic Approaches To Program Semantics**," an enthralling opus penned by a highly acclaimed wordsmith, readers embark on an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve into the book is central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

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