

Handbook Of Graph Grammars And Computing By Graph Transformation Vol 1

Getting the books **Handbook Of Graph Grammars And Computing By Graph Transformation Vol 1** now is not type of challenging means. You could not on your own going past book accrual or library or borrowing from your contacts to contact them. This is an unquestionably simple means to specifically acquire lead by on-line. This online publication Handbook Of Graph Grammars And Computing By Graph Transformation Vol 1 can be one of the options to accompany you later having additional time.

It will not waste your time. endure me, the e-book will totally manner you further matter to read. Just invest little time to edit this on-line pronouncement **Handbook Of Graph Grammars And Computing By Graph Transformation Vol 1** as without difficulty as evaluation them wherever you are now.

Graph Transformations in Computer Science

Hans J. Schneider 2014-01-15

Recent Trends in Algebraic Development

Techniques José Luiz Fiadeiro 2007-06-20 This book constitutes the thoroughly refereed postproceedings of the 18th International Workshop on Algebraic Development Techniques, WADT 2006, held in La Roche en Ardenne, Belgium, June 2006. The 10 revised full papers focus on the algebraic approach to the specification and development of systems and address topics such as formal methods for system development, specification languages and methods, and distributed and mobile systems.

Graph Transformation, Specifications, and Nets

Reiko Heckel 2018-02-06 This volume pays tribute to the scientific achievements of Hartmut Ehrig, who passed away in March 2016. The contributions represent a selection from a symposium, held in October 2016 at TU Berlin, commemorating Hartmut's life and work as well as other invited papers in the areas he was active in. These areas include Graph Transformation, Model Transformation, Concurrency Theory, in particular Petri Nets, Algebraic Specification, and Category Theory in Computer Science.

Context Free Hypergraph Grammars Renate Klempien-Hinrichs 2002-01

Theory and Application of Graph Transformations

Hartmut Ehrig 2014-01-15

Foundation of Software Science and Computation Structures Jerzy Tiuryn 2000-03-15

ETAPS2000wasthethirdinstanceoftheEuropeanJointConferencesonTheory and Practice of Software. ETAPS is an annual federated conference that was established in 1998 by combining a number of existing and new conferences. This year it comprised the conferences (FOSSACS, FASE, ESOP,CC, TACAS), the satellite workshops (CBS, CMCS, CoFI, GRATRA, INT), seven invited lectures, a panel discussion, and ten tutorials. The events that comprise ETAPS address various aspects of the system - development process, including specification, design, implementation, analysis, and improvement. The languages, methodologies, and tools which support these activities are all well within its scope. The blend of theory and practice are represented, with an inclination towards theory with a practical motivation on one hand and soundly-based practice on the other. Many of the issues involved in software design apply to systems in general, including hardware systems, and the emphasis on software is not intended to be exclusive. ETAPS is a loose confederation in which each event retains its own identity, with a separate program committee and independent proceedings. Its format is open-ended, allowing it to grow and evolve as time goes by. Contributed talks and system demonstrations are in synchronized parallel

sessions, with invited lectures in plenary sessions. Two of the invited lectures are reserved for "invited" talks on topics of interest to the whole range of ETAPS attendees.

Unconventional Programming Paradigms

Jean-Pierre Banatre 2005-07-15 Unconventional approaches to programming have long been developed, in various niches and out of curiosity, and they constitute a reservoir of alternative avenues to deal with unknown programming challenges. New paradigms of programming are currently experiencing a renewed period of interest and growth to cope with problems from specific application domains. This book constitutes the thoroughly refereed post-proceedings of the International Workshop on Unconventional Programming Paradigms, UPP 2004, held at Le Mont Saint Michel, France, in September 2004. The 26 revised full papers presented together with an invited paper on quantum computing were carefully reviewed for presentation in the book. The papers are organized in topical sections on chemical computing, amorphous computing, bio-inspired computing, autonomic computing, and generative programming.

Hyperedge Replacement: Grammars and Languages

Annegret Habel 1992-12-08 The area of graph grammars is theoretically attractive and well motivated by various applications. More than 20 years ago, the concept of graph grammars was introduced by A. Rosenfeld as a formulation of some problems in pattern recognition and image processing, as well as by H.J. Schneider as a method for data type specification. Within graph-grammar theory one may distinguish the set-theoretical approach, the algebraic approach, and the logical approach. These approaches differ in the method in which graph replacement is described. Specific approaches, node replacement and hyperedge replacement, concern the basic units of a hypergraph, nodes and hyperedges. This monograph is mainly concerned with the hyperedge-replacement approach. Hyperedge-replacement grammars are introduced as a device for generating hypergraph languages including graph languages and string languages. The concept combines a context-free rewriting with a comparatively large generative power. The volume includes a foreword by H. Ehrig.

Applications of Graph Transformations with Industrial Relevance

Manfred Nagl 2003-07-31 This book constitutes the thoroughly refereed post-proceedings of the International Workshop on Graph Transformation with Industrial Relevance, AGTIVE'99, held in Kerkrade, The Netherlands, in June 1999. The 28 revised full papers presented went through an iterated process of reviewing and revision. Also included are three invited papers, 10 tool demonstrations, a summary of a panel discussion, and lists of graph transformation systems and books on graph transformations. The papers are organized in sections on modularization concepts, distributed systems modeling, software architecture: evolution and reengineering, visual graph transformation languages, visual language modeling and tool development, knowledge modeling, image recognition and constraint solving, process modeling and view integration, and visualization and animation tools.

Foundations of Software Science and Computation Structures (Spain)

FOSSACS 2004 (2004 : Barcelona 2004-03-19 This book constitutes the refereed proceedings of the 7th International Conference on Foundations of Software Science and Computation Structures, FOSSACS 2004, held in Barcelona, Spain in March/April 2004. The 34 revised full papers presented together with the abstracts of 2 invited talks were carefully reviewed and selected from over 130 submissions. Among the topics addressed are lambda calculus, cryptographic protocol analysis, graphs and grammar systems, decision theory, bisimulation, rewriting, normalization, specification, verification, process calculi, mobile code, automata, program semantics, dynamic logics, timed languages, security analysis, information-theoretical aspects.

Theory and Application of Graph

Transformations Hartmut Ehrig 2004-02-02 The area of graph transformation originated in the late 1960s under the name "graph grammars" – the main motivation came from practical considerations concerning pattern recognition and compiler construction. Since then, the list of areas which have interacted with the development of graph transformation has grown impressively. The areas include: software specification and development, VLSI layout schemes, database design, modeling of

concurrent systems, massively parallel computer architectures, logic programming, computer animation, developmental biology, music composition, distributed systems, specification languages, software and web engineering, and visual languages. As a matter of fact, graph transformation is now accepted as a fundamental computation paradigm where computation includes specification, programming, and implementation. Over the last three decades the area of graph transformation has developed at a steady pace into a theoretically attractive research field, important for applications. This volume consists of papers selected from contributions to the Sixth International Workshop on Theory and Applications of Graph Transformation that took place in Paderborn, Germany, November 16-20, 1998. The papers underwent an additional refereeing process which yielded 33 papers presented here (out of 55 papers presented at the workshop). This collection of papers provides a very broad snapshot of the state of the art of the whole field today. They are grouped into nine sections representing most active research areas. The workshop was the sixth in a series of international workshops which take place every four years. Previous workshops were called "Graph Grammars and Their Application to Computer Science". The new name of the Sixth Workshop reflects more accurately the current situation, where both theory and application play an equally central role.

Graph Grammars and Their Application to Computer Science Janice Cuny 2014-01-15
[Handbook of Graph Grammars and Computing by Graph Transformation](#) Hartmut Ehrig 1999
 Graph grammars originated in the late 60s, motivated by considerations about pattern recognition and compiler construction. Since then, the list of areas which have interacted with the development of graph grammars has grown quite impressively. Besides the aforementioned areas, it includes software specification and development, VLSI layout schemes, database design, modeling of concurrent systems, massively parallel computer architectures, logic programming, computer animation, developmental biology, music composition, visual languages, and many others. The area of graph

grammars and graph transformations generalizes formal language theory based on strings and the theory of term rewriting based on trees. As a matter of fact, within the area of graph grammars, graph transformation is considered a fundamental computation paradigm where computation includes specification, programming, and implementation. Over the last three decades, graph grammars have developed at a steady pace into a theoretically attractive and important-for-applications research field. Volume 2 of the indispensable Handbook of Graph Grammars and Computing by Graph Transformations considers applications to functional languages, visual and object-oriented languages, software engineering, mechanical engineering, chemical process engineering, and images. It also presents implemented specification languages and tools, and structuring and modularization concepts for specification languages. The contributions have been written in a tutorial/survey style by the top experts in the corresponding areas. This volume is accompanied by a CD-Rom containing implementations of specification environments based on graph transformation systems, and tools whose implementation is based on the use of graph transformation systems.

Graph Transformation Andrea Corradini
 2003-06-30 ICGT 2002 was the first International Conference on Graph Transformation following a series of six international workshops on graph grammars with applications in computer science, held in Bad Honnef (1978), Osnabrück (1982), Warrenton (1986), Bremen (1990), Williamsburg (1994), and Paderborn (1998). ICGT 2002 was held in Barcelona (Spain), October 7-12, 2002 under the auspices of the European Association of Theoretical Computer Science (EATCS), the European Association of Software Science and Technology (EASST), and the IFIP Working Group 1.3, Foundations of Systems Specification. The scope of the conference concerned graphical structures of various kinds (like graphs, diagrams, visual sentences and others) that are useful to describe complex structures and systems in a direct and intuitive way. These structures are often augmented by formalisms which add to the static description a further dimension, allowing for the modeling of the evolution of systems via all kinds of

transformations of such graphical structures. The field of Graph Transformation is concerned with the theory, applications, and implementation issues of such formalisms. The theory is strongly related to areas such as graph theory and graph algorithms, formal language and parsing theory, the theory of concurrent and distributed systems, formal specification and verification, logic, and semantics.

Graph Grammars and Their Application to Computer Science Hartmut Ehrig 2014-01-15

Handbook of Graph Grammars and Computing by Graph Transformation H Ehrig

1999-10-20 Graph grammars originated in the late 60s, motivated by considerations about pattern recognition and compiler construction. Since then, the list of areas which have interacted with the development of graph grammars has grown quite impressively. Besides the aforementioned areas, it includes software specification and development, VLSI layout schemes, database design, modeling of concurrent systems, massively parallel computer architectures, logic programming, computer animation, developmental biology, music composition, visual languages, and many others. The area of graph grammars and graph transformations generalizes formal language theory based on strings and the theory of term rewriting based on trees. As a matter of fact, within the area of graph grammars, graph transformation is considered as a fundamental computation paradigm where computation includes specification, programming, and implementation. Over the last three decades, graph grammars have developed at a steady pace into a theoretically attractive and important-for-applications research field. Volume 2 of the indispensable Handbook of Graph Grammars and Computing by Graph Transformations considers applications to functional languages, visual and object-oriented languages, software engineering, mechanical engineering, chemical process engineering, and images. It also presents implemented specification languages and tools, and structuring and modularization concepts for specification languages. The contributions have been written in a tutorial/survey style by the top experts in the corresponding areas. This volume is accompanied by a CD-Rom containing

implementations of specification environments based on graph transformation systems, and tools whose implementation is based on the use of graph transformation systems. Contents: Term Rewriting and Functional Languages Visual and Object-Oriented Languages Applications to Software Engineering Applications to Engineering Disciplines Applications to Pictures Implemented Specification Languages and Tools Structuring and Modularization Concepts Readership: Students and researchers interested in modern developments in computer science, and in particular in the use of modern formal methods in applied computer science. Keywords:

Formal Methods in Software and Systems

Modeling Hans-Jörg Kreowski 2005-02-09 By presenting state-of-the-art research results on various aspects of formal and visual modeling of software and systems, this book commemorates the 60th birthday of Hartmut Ehrig. The 24 invited reviewed papers are written by students and collaborators of Hartmut Ehrig who are established researchers in their fields. Reflecting the scientific interest and work of Hartmut Ehrig, the papers fall into three main parts on graph transformation, algebraic specification and logic, and formal and visual modeling.

Mathematical Foundations of Computer

Science 1997 Igor Privara 1997-08-13 This book constitutes the refereed post-conference proceedings of the Second International Andrei Ershov Memorial Conference on System Informatics, held in Akademgorodok, Novosibirsk, Russia, in June 1996. The 27 revised full papers presented together with 9 invited contributions were thoroughly refereed for inclusion in this volume. The book is divided in topical sections on programming methodology, artificial intelligence, natural language processing, machine learning, dataflow and concurrency models, parallel programming, supercompilation, partial evaluation, object-oriented programming, semantics and abstract interpretation, programming and graphical interfaces, and logic programming.

Applications, Languages and Tools Hartmut Ehrig 1999

CONCUR 2004 -- Concurrency Theory Philippa Gardner 2004-08-19 assisted us in the evaluation of the submitted papers.

Inductive Logic Programming Tamas Horváth

2003-10-24 This book constitutes the refereed proceedings of the 13th International Conference on Inductive Logic Programming, ILP 2003, held in Szeged, Hungary in September/October 2003. The 23 revised full papers presented were carefully reviewed and selected from 53 submissions. Among the topics addressed are multirelational data mining, complexity issues, theory revision, clustering, mathematical discovery, relational reinforcement learning, multirelational learning, inductive inference, description logics, grammar systems, and inductive learning.

Foundations Grzegorz Rozenberg 1997-01 Graph grammars originated in the late 60s, motivated by considerations about pattern recognition and compiler construction. Since then the list of areas which have interacted with the development of graph grammars has grown quite impressively. Besides the aforementioned areas it includes software specification and development, VLSI layout schemes, database design, modeling of concurrent systems, massively parallel computer architectures, logic programming, computer animation, developmental biology, music composition, visual languages, and many others. The area of graph grammars and graph transformations generalizes formal language theory based on strings and the theory of term rewriting based on trees. As a matter of fact within the area of graph grammars, graph transformation is considered a fundamental programming paradigm where computation includes specification, programming, and implementation. Over the last 25-odd years graph grammars have developed at a steady pace into a theoretically attractive and well-motivated research field. In particular, they are now based on very solid foundations, which are presented in this volume. Volume 1 of the indispensable Handbook of Graph Grammars and Computing by Graph Transformations includes a state-of-the-art presentation of the foundations of all the basic approaches to rule-based graph specification and transformation: algebraic approach, logic approach, node-based rewriting, (hyper)edge-based rewriting, programmed graph rewriting, and 2-structures. The book has been written in a tutorial/survey style to enhance its usefulness.

Transformation of Knowledge, Information

and Data Patrick van Bommel 2005-01-01 This book considers transformations within the context of computing science and information science, as they are essential in changing organizations. It not only considers transformations of structured models, rather, the transformation of instances (i.e. the actual contents of those structures) is addressed as well.

Handbook of Graph Grammars and Computing by Graph Transformation Grzegorz Rozenberg 1997-01-01 Graph grammars originated in the late 60s, motivated by considerations about pattern recognition and compiler construction. Since then the list of areas which have interacted with the development of graph grammars has grown quite impressively. Besides the aforementioned areas it includes software specification and development, VLSI layout schemes, database design, modeling of concurrent systems, massively parallel computer architectures, logic programming, computer animation, developmental biology, music composition, visual languages, and many others. The area of graph grammars and graph transformations generalizes formal language theory based on strings and the theory of term rewriting based on trees. As a matter of fact within the area of graph grammars, graph transformation is considered a fundamental programming paradigm where computation includes specification, programming, and implementation.

Graph and Model Transformation Hartmut Ehrig 2015-12-21 This book is a comprehensive explanation of graph and model transformation. It contains a detailed introduction, including basic results and applications of the algebraic theory of graph transformations, and references to the historical context. Then in the main part the book contains detailed chapters on M-adhesive categories, M-adhesive transformation systems, and multi-amalgamated transformations, and model transformation based on triple graph grammars. In the final part of the book the authors examine application of the techniques in various domains, including chapters on case studies and tool support. The book will be of interest to researchers and practitioners in the areas of theoretical computer science, software engineering, concurrent and distributed systems,

and visual modelling.

Handbook of Graph Grammars and Computing by Graph Transformation: Applications, languages and tools Grzegorz Rozenberg 1997

Graph Transformations Italy) IcgT 200 (2004 Rome 2004-09-17 This book constitutes the refereed proceedings of the Second International Conference on Graph Transformation, ICGT 2004, held in Rome, Italy, in September/October 2004. The 26 revised full papers presented together with three invited contributions and summaries of 2 tutorials and 5 workshops were carefully reviewed and selected from 58 submissions. The papers are organized in topical sections on integration technology, chemistry and biology, graph transformation concepts, DPO theory for high-level structures, analysis and testing, graph theory and algorithms, application conditions and logic, transformation of special structures, and object-orientation.

Current Trends in Theoretical Computer Science Gheorghe P?un 2001 The scientific developments at the end of the past millennium were dominated by the huge increase and diversity of disciplines with the common label "computer science". The theoretical foundations of such disciplines have become known as theoretical computer science. This book highlights some key issues of theoretical computer science as they seem to us now, at the beginning of the new millennium. The text is based on columns and tutorials published in the Bulletin of the European Association for Theoretical Computer Science in the period 1995 -- 2000. The columnists themselves selected the material they wanted for the book, and the editors had a chance to update their work. Indeed, much of the material presented here appears in a form quite different from the original. Since the presentation of most of the articles is reader-friendly and does not presuppose much knowledge of the area, the book constitutes suitable supplementary reading material for various courses in computer science.

Term Graph Rewriting M. R. Sleep 1993-06-08 Charting the progress of the theory, implementations and applications of rewriting models of computation, this volume represents a key resource for researchers. Much of modern computer science - particularly 'new generation languages' - relies heavily on rewriting systems, and Term Graph Rewriting offers an insight into

the very foundations. A major feature of the book is the presentation of theoretical advances, such as: a new theory of transfinite term rewriting, a single pushout categorical model of graph rewriting, and an abstract interpretation for term graph rewriting. In order to fully appreciate the practical but novel benefits offered by term and graph rewriting techniques, readers are here presented with the most comprehensive study conducted to date. A crucial theme throughout is the relationship between term and graph rewriting which provides a useful context for considering implementations - ranging from high performance sequential to parallel distributed memory, and applications - specifically to logic and functional programming.

Handbook of Graph Grammars and Computing by Graph Transformation H Ehrig

1999-08-30 Graph grammars originated in the late 60s, motivated by considerations about pattern recognition and compiler construction. Since then, the list of areas which have interacted with the development of graph grammars has grown quite impressively. Besides the aforementioned areas, it includes software specification and development, VLSI layout schemes, database design, modeling of concurrent systems, massively parallel computer architectures, logic programming, computer animation, developmental biology, music composition, visual languages, and many others. The area of graph grammars and graph transformations generalizes formal language theory based on strings and the theory of term rewriting based on trees. As a matter of fact, within the area of graph grammars, graph transformation is considered as a fundamental computation paradigm where computation includes specification, programming, and implementation. Over the last three decades, graph grammars have developed at a steady pace into a theoretically attractive and important-for-applications research field. Volume 3 of the indispensable Handbook of Graph Grammars and Computing by Graph Transformations presents the research on concurrency, parallelism, and distribution — important paradigms of modern computer science. The topics considered include semantics for concurrent systems, modeling of concurrency, mobile and coordinated systems, algebraic

specifications, Petri nets, visual design of distributed systems, and distributed algorithms. The contributions have been written in a tutorial/survey style by the top experts. Contents: Graph Relabelling Systems and Distributed Algorithms (I Litovsky et al.) Actor Grammars and Local Actions (D Janssens) Concurrent Semantics of Algebraic Graph Transformations (P Baldan et al.) Modeling Concurrent, Mobile and Coordinated Systems via Graph Transformations (U Montanari et al.) Distributed Graph Transformation with Application to Visual Design of Distributed Systems (I Fischer et al.) High-Level Replacement Systems Applied to Algebraic Specifications and Petri Nets (H Ehrig et al.) Describing Systems of Processes by Means of High-Level Replacement (H J Schneider) Readership: Students and researchers interested in modern developments in computer science and in particular in three modern paradigms of computer science — concurrency, parallelism, and distribution. Keywords:

Handbook of Graph Grammars and Computing by Graph Transformation: Concurrency, parallelism, and distribution Grzegorz Rozenberg 1997

Formal and Natural Computing Wilfried Brauer 2003-08-01 This book presents state of the art research in theoretical computer science and related fields. In particular, the following areas are discussed: automata theory, formal languages and combinatorics of words, graph transformations, Petri nets, concurrency, as well as natural and molecular computing. The articles are written by leading researchers in these areas. The writers were originally invited to contribute to this book but then the normal refereeing procedure was applied as well. All of the articles deal with some issue that has been under vigorous study during recent years. Still, the topics range from very classical ones to issues raised only two or three years ago. Both survey articles and papers attacking specific research problems are included. The book highlights some key issues of theoretical computer science, as they seem to us now at the beginning of the new millennium. Being a comprehensive overview of some of the most active current research in theoretical computer science, it should be of definite interest for all researchers in the areas covered. The topics range from basic decidability

and the notion of information to graph grammars and graph transformations, and from trees and traces to aqueous algorithms, DNA encoding and self-assembly. Special effort has been given to lucid presentation. Therefore, the book should be of interest also for advanced students.

Graph Transformations Hartmut Ehrig 2010-09-27 This book constitutes the proceedings of the 5th International Conference on Graph Transformations, ICGT 2010, held in Twente, The Netherlands, in September/October 2010. The 22 papers presented were carefully reviewed and selected from 48 submissions. These papers mirror the wide-ranged ongoing research activities in the theory and application of graph transformation. They are concerned with different kinds of graph transformation approaches, their algebraic foundations, composition and analysis, the relation to logic, as well as various applications, mainly to model transformation and distributed systems.

Unifying Petri Nets Hartmut Ehrig 2014-03-12

Since their introduction nearly 40 years ago, research on Petri nets has diverged in many different directions. Various classes of Petri net, motivated either by theory or applications, with its own specific features and methods of analysis, have been proposed and studied in depth. These successful developments have led to a very heterogeneous landscape of diverse models, and this, in turn, has stimulated research on concepts and approaches that contribute to unifying and structuring the diverse landscape. This state-of-the-art survey presents the most relevant approaches to unifying Petri nets in a systematic and coherent way. The 14 chapters written by leading researchers are organized in topical sections on application-oriented approaches, unifying frameworks, and theoretical approaches.

Graph Transformations Hartmut Ehrig 2014-01-15

Handbook of Graph Grammars and Computing by Graph Transformation Hartmut Ehrig 1999 Graph grammars originated in the late 60s, motivated by considerations about pattern recognition and compiler construction. Since then, the list of areas which have interacted with the development of graph grammars has grown quite impressively. Besides the aforementioned areas, it includes software specification and development, VLSI layout schemes, database

design, modeling of concurrent systems, massively parallel computer architectures, logic programming, computer animation, developmental biology, music composition, visual languages, and many others. The area of graph grammars and graph transformations generalizes formal language theory based on strings and the theory of term rewriting based on trees. As a matter of fact, within the area of graph grammars, graph transformation is considered a fundamental computation paradigm where computation includes specification, programming, and implementation. Over the last three decades, graph grammars have developed at a steady pace into a theoretically attractive and important-for-applications research field. Volume 3 of the 'indispensable Handbook of Graph Grammars and Computing by Graph Transformations presents the research on concurrency, parallelism, and distribution -- important paradigms of modern science. The topics considered include semantics for concurrent systems, modeling of concurrency, mobile and coordinated systems, algebraic specifications, Petri nets, visual design of distributed systems, and distributed algorithms. The contributions have been written in a tutorial/survey style by the top experts.

Concurrency, Parallelism and Distribution

Hartmut Ehrig 1999

Lectures on Concurrency and Petri Nets

Jörg Desel 2004-06-14 This tutorial volume originates from the 4th Advanced Course on Petri Nets, ACPN 2003, held in Eichstätt, Germany in September 2003. In addition to lectures given at ACPN 2003, additional chapters have been commissioned to give a well-balanced presentation of the state of the art in the area. This book will be useful as both a reference for those working in the area as well as a study book for the reader who is interested in an up-to-date overview of research and development in concurrent and distributed systems; of course, readers specifically interested in theoretical or applicational aspects of Petri nets will appreciate the book as well.

Handbook of Graph Grammars and Computing by Graph Transformation

Grzegorz Rozenberg 1999

Handbook of Graph Grammars and Computing by Graph Transformation

Grzegorz Rozenberg 1997-02-27 Graph grammars originated in the late 60s, motivated by considerations about pattern recognition and compiler construction. Since then the list of areas which have interacted with the development of graph grammars has grown quite impressively. Besides the aforementioned areas it includes software specification and development, VLSI layout schemes, database design, modeling of concurrent systems, massively parallel computer architectures, logic programming, computer animation, developmental biology, music composition, visual languages, and many others. The area of graph grammars and graph transformations generalizes formal language theory based on strings and the theory of term rewriting based on trees. As a matter of fact within the area of graph grammars, graph transformation is considered a fundamental programming paradigm where computation includes specification, programming, and implementation. Over the last 25-odd years graph grammars have developed at a steady pace into a theoretically attractive and well-motivated research field. In particular, they are now based on very solid foundations, which are presented in this volume. Volume 1 of the indispensable Handbook of Graph Grammars and Computing by Graph Transformations includes a state-of-the-art presentation of the foundations of all the basic approaches to rule-based graph specification and transformation: algebraic approach, logic approach, node-based rewriting, (hyper)edge-based rewriting, programmed graph rewriting, and 2-structures. The book has been written in a tutorial/survey style to enhance its usefulness. Contents: Node Replacement Graph Grammars (J Engelfriet & G Rozenberg) Hyperedge Replacement Graph Grammars (F Drewes et al.) The Expression of Graph Properties and Graph Transformations in Monadic Second-Order Logic (B Courcelle) Algebraic Approaches to Graph Transformation — Part I: Basic Concepts and Double Pushout Approach (A Corradini et al.) Algebraic Approaches to Graph Transformation — Part II: Single Pushout Approach and Comparison with Double Pushout Approach (H Ehrig et al.) 2-Structures — A Framework for Decomposition and Transformation of Graphs (A Ehrenfeucht et

al.)Programmed Graph Replacement Systems (A

Schürr) Readership: Computer scientists and mathematicians. keywords: