

# Design and Validation of Computer Protocols

Part IX:  
Theorem Proving using Rank Functions

based mainly on [4,2]

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## Abstract

This report aims at giving a *short* overview on rank function analysis of authentication protocols concentrating on the results of Schneider in [4] and Heather in [2]. Therefore it shows a standard form of protocol implementation in CSP, shows how authentication properties can be captured as trace specifications, gives basic definitions necessary to reason about the unbounded set of messages, reformulates the central rank function theorem and restates its proof. Additionally it gives hints on applying this approach to verify secrecy protocols as well, a *short* overview on tool support available and some hints on interesting properties of rank functions.

This report will use notations introduced in earlier reports [11-16] throughout and only reintroduce notations where they are considered vital.

# Design And Validation Of Computer Protocols

**James Odell, Paolo Giorgini, Jörg, P.  
Müller**



## **Design And Validation Of Computer Protocols:**

Design and Validation of Computer Protocols Gerard J. Holzmann, 1991 More than just a guide to protocol standards codes and formats this text offers a systematic approach for designing complete and consistent protocol systems with the power to govern the interactions of concurrent processes in distributed systems Specifically intended as a guide to protocol design and analysis the text familiarizes readers with all the issues of protocol design including general and specific techniques for process coordination

Design and Validation of Computer Protocols Gerard J. Holzmann, 1991 This volume discusses the fundamental problems of designing logically consistent methods of communication between multiple computer processes Standard protocol design problems such as error control and flow control are covered in detail but also structured design methods and the construction of formal validation models The book contains complete listings and explanations of new protocol validation and design tool called SPIN Author is in charge of protocol design at Bell Labs Professionals who bought Tanenbaum's COMPUTER NETWORKS 2 E and Comer's TCP IP will buy this This is the first book to cover automated protocol design and validation tools extensively

**Agent-Oriented Software Engineering V** James Odell, Paolo Giorgini, Jörg, P. Müller, 2005-01-24 The explosive growth of application areas such as electronic commerce enterprise resource planning and mobile computing has profoundly and irreversibly changed our views on software systems Nowadays software is to be based on open architectures that continuously change and evolve to accommodate new components and meet new requirements Software must also operate on different platforms without recompilation and with minimal assumptions about its operating environment and its users Furthermore software must be robust and autonomous capable of serving a naive user with a minimum of overhead and interference Agent concepts hold great promise for responding to the new realities of software systems They offer higher level abstractions and mechanisms which address issues such as knowledge representation and reasoning communication coordination cooperation among heterogeneous and autonomous parties perception commitments goals beliefs and intentions all of which need conceptual modelling On the one hand the concrete implementation of these concepts can lead to advanced functionalities e.g. in inference based query answering transaction control adaptive workflows brokering and integration of disparate information sources and automated communication processes On the other hand their rich representational capabilities allow more faithful and flexible treatments of complex organizational processes leading to more effective requirements analysis and architectural detailed design

Communications Architectures and Protocols, 1991

Protocol Specification, Testing, and Verification, XII R. J. Linn, M. Ü Uyar, 1992 For more than a decade researchers and engineers have been addressing the problem of the application of formal description techniques to protocol specification implementation testing and verification This book identifies the many successes that have been achieved within the industrial framework and the difficulties encountered in applying theoretical methods to practical situations Issues discussed include testing and certification verification validation environments and automated

tools formal specifications protocol conversion implementation specification languages and models Consideration is also given to the concerns surrounding education available to students and the need to upgrade and develop this through sponsorship of a study of an appropriate curriculum at both undergraduate and graduate levels It is hoped this publication will stimulate such support and inspire further research in this important arena

**SDL '99** R. Dssouli, G.V. Bochmann, Y. Lahav, 1999-06-10 This book represents the proceedings of the 9th SDL Forum which was held in Montreal Quebec Canada during the week of June 21 25 1999 The 9th SDL Forum presents papers on the past and future development of the MSC and SDL languages The volume presents information on experience with the use of these languages in industrial development projects on tools and techniques for using these languages in the software and hardware development process and other aspects of these languages

Protocol Specification, Testing and Verification XV Piotr Dembinski, Marek Sredniawa, 1996 This volume presents the latest research worldwide on communications protocols emphasizing specification and compliance testing It presents the complete proceedings of the fifteenth meeting on Protocol Specification Testing and Verification arranged by the International Federation for Information Processing

**Second International Conference on Computer Communications and Networks (IC3N), San Diego, California, USA, June 28-30, 1993** Tatsuya Suda, E. K. Park, 1993

**Proceedings**, 1995 **Tools and Algorithms for the Construction and Analysis of Systems**, 1998

**Proceedings of the ... European Simulation Multiconference**, 1999 **International Test Conference, 1993**, 1993

*Formal Description Techniques VII* D. Hogrefe, S. Leue, 1995-02-28 This book presents the latest research in formal techniques for distributed systems including material on theory applications tools and industrial usage of formal techniques

**WiSec'08**, 2008 *1998 9th Mediterranean Electrotechnical Conference* Mediterranean Electrotechnical Conference, Institute of Electrical and Electronics Engineers, 1998 The Mediterranean Electrotechnical Conference provides a forum for the presentation and discussion of the latest advances in research and applications relating to power systems computer science photonics telecommunications and more

Testing of Communicating Systems Myungchul Kim, Sungwon Kang, Keesoo Hong, 1997-08-31 The aim of this book is to bring together the research of academics and practitioners in the field of communication systems testing It covers four major topic areas types of testing including conformance testing inoperability testing performance and QoS testing phases of testing including test case generation means of testing test execution and test results analysis classes of systems tested and the theory and practice of testing including test related algorithms practical testing methodology and practical testing experience

**Testing of Communicating Systems**, 1997

*Information Modelling and Knowledge Bases XII* Hannu Jaakkola, Hannu Kangassalo, Eiji Kawaguchi, 2001

**Formal Description Techniques IX** R. Gotzhein, J. Brederke, 1996-09-30 This book is the combined proceedings of the latest IFIP Formal Description Techniques FDTs and Protocol Specification Testing and Verification PSTV series It addresses FDTs applicable to communication protocols and distributed systems with special emphasis on standardised FDTs It features state

of the art in theory application tools and industrialisation of formal description     25th ISATA Silver Jubilee International Symposium on Automotive Technology and Automation, Florence, Italy, 1st-5th June 1992 ,1992

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