Stochastic models for quality of service of component connectors

Moon, Y.J.

Bibliography

[1] Almende website. `http://www.almende.com`.

[2] Farhad Arbab. Reo: a channel-based coordination model for component composition. *Mathematical Structures in Computer Science*, 14(3):329–366, 2004.

[3] Farhad Arbab. Abstract Behavior Types: a foundation model for components and their composition. *Science of Computer Programming*, 55(1-3):3–52, 2005.

[4] Farhad Arbab. *Composition of Interacting Computations*, chapter 12, pages 277–321. Springer-Verlag New York, Inc., Secaucus, NJ, USA, 2006.

[5] Farhad Arbab, Tom Chothia, Sun Meng, and Young-Joo Moon. Component Connectors with QoS Guarantees. In *COORDINATION*, volume 4467 of *Lecture Notes in Computer Science*, pages 286–304. Springer, 2007.

[6] Farhad Arbab, Tom Chothia, Rob van der Mei, Sun Meng, Young-Joo Moon, and Chrétien Verhoef. From Coordination to Stochastic Models of QoS. In *COORDINATION*, volume 5521 of *Lecture Notes in Computer Science*, pages 268–287. Springer, 2009.

[7] Farhad Arbab, Ivan Herman, and Pål Spilling. An overview of manifold and its implementation. *Concurrency - Practice and Experience*, 5(1):23–70, 1993.

[8] Farhad Arbab, Sun Meng, Young-Joo Moon, Marta Z. Kwiatkowska, and Hongyang Qu. Reo2MC: a tool chain for performance analysis of coordination models. In *ESEC/SIGSOFT FSE*, pages 287–288. ACM, 2009.

[9] Farhad Arbab and Jan J. M. M. Rutten. A Coinductive Calculus of Component Connectors. In *WADT*, pages 34–55, 2002.

[10] ASK Community systems website. `http://www.ask-cs.com`.

[11] Jos C. M. Baeten and W. Peter Weijland. *Process Algebra*. Cambridge University Press, 1990.

[12] Christel Baier, Marjan Sirjani, Farhad Arbab, and Jan J. M. M. Rutten. Modeling component connectors in Reo by constraint automata. *Science of Computer Programming*, 61(2):75–113, 2006.

[13] Christel Baier and Verena Wolf. Stochastic Reasoning About Channel-Based Component Connectors. In *COORDINATION*, volume 4038 of *Lecture Nonte in Computer Science*, pages 1–15. Springer, 2006.

[14] Marco Antonio Barbosa, Luís Soares Barbosa, and José Creissac Campos. Towards a Coordination Model for Interactive Systems. *Electronic Notes in Theoretical Computer Science*, 183:89–103, 2007.

[15] Ananda Basu, Marius Bozga, and Joseph Sifakis. Modeling Heterogeneous Real-time Components in BIP. In *SEFM*, pages 3–12. IEEE Computer Society, 2006.

[16] Marco Bernardo and Roberto Gorrieri. A Tutorial on EMPA: A Theory of Concurrent Processes with Nondeterminism, Priorities, Probabilities and Time. Technical Report UBLCS-96-17, 1996.

[17] Marco Bernardo and Roberto Gorrieri. Extended Markovian Process Algebra. In *CONCUR*, volume 1119 of *Lecture Notes in Computer Science*, pages 315–330. Springer, 1996.

[18] Stefano Bistarelli, Ugo Montanari, and Francesca Rossi. Semiring-based constraint satisfaction and optimization. *Journal of the ACM*, 44(2):201–236, 1997.

[19] Marcello Bonsangue, Dave Clarke, and Alexandra Silva. A model of context-dependent component connectors. *Science of Computer Programming*, In Press, Corrected Proof, 2011.

[20] Hichem Boudali, Pepijn Crouzen, Boudewijn R. Haverkort, Matthias Kuntz, and Mariëlle Stoelinga. Architectural dependability evaluation with Arcade. In *International Conference on Dependable Systems and Networks*, pages 512–521. IEEE Computer Society, 2008.

[21] Hichem Boudali, Pepijn Crouzen, and Mariëlle Stoelinga. A Compositional Semantics for Dynamic Fault Trees in Terms of Interactive Markov Chains. In *ATVA*, volume 4762 of *Lecture Notes in Computer Science*, pages 441–456. Springer, 2007.

[22] Hichem Boudali, Pepijn Crouzen, and Mariëlle Stoelinga. Dynamic Fault Tree Analysis Using Input/Output Interactive Markov Chains. In *International Conference on Dependable Systems and Networks*, pages 708–717. IEEE Computer Society, 2007.

[23] Hichem Boudali, Pepijn Crouzen, and Marielle Stoelinga. A Rigorous, Compositional, and Extensible Framework for Dynamic Fault Tree Analysis. *IEEE Transactions on Dependable and Secure Computing*, 7(2):128–143, 2010.

[24] Marco Bozzano, Alessandro Cimatti, Joost-Pieter Katoen, Viet Yen Nguyen, Thomas Noll, and Marco Roveri. The COMPASS Approach: Correctness, Modelling and Performability of Aerospace Systems. In *SAFECOMP*, volume 5775 of *Lecture Notes in Computer Science*, pages 173–186. Springer, 2009.

[25] Marco Bozzano, Alessandro Cimatti, Marco Roveri, Joost-Pieter Katoen, Viet Yen Nguyen, and Thomas Noll. Codesign of dependable systems: a component-based modeling language. In *MEMOCODE'09: Proceedings of the 7th IEEE/ACM international conference on Formal Methods and Models for Codesign*, pages 121–130, Piscataway, NJ, USA, 2009. IEEE Press.

[26] Mario Bravetti and Marco Bernardo. Compositional Asymmetric Cooperations for Process Algebras with Probabilities, Priorities, and Time. *Electronic Notes in Theoretical Computer Science*, 39(3), 2000.

[27] Peter Buchholz. Hierarchical Markovian Models: Symmetries and Reduction. *Performance Evaluation*, 22(1):93–110, 1995.

[28] Behnaz Changizi, Natallia Kokash, and Farhad Arbab. A Unified Toolset for Business Process Model Formalization. In *7th International Workshop on Formal Engineering approaches to Software Components and Architectures (FESCA 2010)*, pages 147–156, 2010.

[29] Tom Chothia and Jetty Kleijn. Q-Automata: Modelling the Resource Usage of Concurrent Components. *Electronic Notes in Theoretical Computer Science*, 175(2):153–167, 2007.

[30] Dave Clarke, David Costa, and Farhad Arbab. Connector colouring I: Synchronisation and context dependency. *Science of Computer Programming*, 66(3):205–225, 2007.

[31] David Costa. *Formal Models for Context Dependent Connectors for Distributed Software Components and Services*. PhD thesis, Vrij Universiteit Amsterdam, 2010.

[32] David Costa, Milad Niqui, and Jan J. M. M. Rutten. Intentional Automata: A Context-Dependent Model For Component Connectors (Extended Abstract). In *FSEN*, 2011.

[33] Credo project. `http://projects.cwi.nl/credo/`.

[34] Frank S. de Boer, Immo Grabe, Mohammad Mahdi Jaghoori, Andries Stam, and Wang Yi. Modeling and Analysis of Thread-Pools in an Industrial Communication Platform. In *Proc. 11th International Conference on Formal Engineering Methods (ICFEM'09)*, volume 5885 of *Lecture Notes in Computer Science*, pages 367–386. Springer, 2009.

[35] Extensible Coordination Tools. `http://reo.project.cwi.nl/`.

[36] Johan Eker, Jörn W. Janneck, Edward A. Lee, Jie Liu, Xiaojun Liu, Jozsef Lud-
     vig, Stephen Neuendorffer, Sonia Sachs, and Yuhong Xiong. Taming heterogene-
     ity - the Ptolemy approach. *Proceedings of the IEEE*, 91(1):127–144, 2003.

[37] Paulo Fernandes, Brigitte Plateau, and William J. Stewart. Efficient Descriptor-
     Vector Multiplications in Stochastic Automata Networks. *Journal of the ACM*,
     45(3):381–414, 1998.

[38] Cédric Fournet and Georges Gonthier. The Join Calculus: A Language for Dis-
     tributed Mobile Programming. In *APPSEM*, volume 2395 of *Lecture Notes in
     Computer Science*, pages 268–332. Springer, 2000.

[39] Hubert Garavel and Holger Hermanns. On Combining Functional Verification
     and Performance Evaluation Using CADP. In *FME*, volume 2391 of *Lecture
     Notes in Computer Science*, pages 410–429. Springer, 2002.

[40] Hubert Garavel, Radu Mateescu, Frédéric Lang, and Wendelin Serwe. CADP
     2006: A Toolbox for the Construction and Analysis of Distributed Processes.
     In *CAV*, volume 4590 of *Lecture Notes in Computer Science*, pages 158–163.
     Springer, 2007.

[41] David Gelernter. Generative Communication in Linda. *ACM Transaction on
     Programming Languages and Systems*, 7(1):80–112, 1985.

[42] Peter G. Harrison and Jane Hillston. Exploiting Quasi-reversible Structures in
     Markovian Process Algebra Models. *The Computer Journal*, 38(7):510–520, 1995.

[43] Holger Hermanns. *Interactive Markov Chains: The Quest for Quantified Quality*,
     volume 2428 of *Lecture Nonte in Computer Science*. Springer, 2002.

[44] Holger Hermanns and Joost-Pieter Katoen. The How and Why of Interactive
     Markov Chains. In *Formal Methods for Components and Objects (FMCO)*, vol-
     ume 6286 of *Lecture Notes in Computer Science*, pages 311—-337. Springer-
     Verlag, 2010.

[45] Ulrich Herzog. Formal Description, Time and Performance Analysis. A Frame-
     work. In *Entwurf und Betrieb verteilter Systeme*, pages 172–190, London, UK,
     1990. Springer-Verlag.

[46] Jane Hillston. PEPA: Performance Enhanced Process Algebra. Technical Report
     CSR-24-93, University of Edinburgh, 1993.

[47] Jane Hillston. *A Compositional Approach to Performance Modelling*. PhD thesis,
     University of Edinburgh, April 1994.

[48] Andrew Hinton, Marta Z. Kwiatkowska, Gethin Norman, and David Parker.
     PRISM: A Tool for Automatic Verification of Probabilistic Systems. In *TACAS*,
     volume 3920 of *Lecture Notes in Computer Science*, pages 441–444. Springer,
     2006.

[49] C. A. R. Hoare. Communicating sequential processes. *Communication of the ACM*, 21(8):666–677, 1978.

[50] Håkan L. S. Younes and Reid G. Simmons. Solving Generalized Semi-Markov Decision Processes using Continuous Phase-Type Distributions. In *Proceedings of the 19th National Conference on Artificial Intelligence*, pages 742–748. California AAAI Press, 2004.

[51] Oscar Kanters. QoS analysis by simulation in Reo. Master's thesis, Vrije Universiteit, Amsterdam, The Netherlands, 2010.

[52] Joost-Pieter Katoen and Pedro R. D'Argenio. General Distributions in Process Algebra. In *European Educational Forum: School on Formal Methods and Performance Analysis*, volume 2090 of *Lecture Notes in Computer Science*, pages 375–430. Springer, 2000.

[53] Christian Koehler, Alexander Lazovik, and Farhad Arbab. Connector Rewriting with High-Level Replacement Systems. *Electr. Notes Theor. Comput. Sci.*, 194(4):77–92, 2008.

[54] Natallia Kokash, Behnaz Changizi, and Farhad Arbab. A Semantic Model for Service Composition with Coordination Time Delays. In *ICFEM*, volume 6447 of *Lecture Notes in Computer Science*, pages 106–121. Springer, 2010.

[55] Christian Krause. *Reconfigurable Component Connectors*. Phd thesis, Universiteit Leiden, To appear in 2011.

[56] Christian Krause, Ziyan Maraikar, Alexander Lazovik, and Farhad Arbab. Modeling Dynamic Reconfigurations in Reo using High-Level Replacement Systems. *Science of Computer Programming*, 76(1):23–36, 2011. Selected papers from the 6th International Workshop on the Foundations of Coordination Languages and Software Architectures - FOCLASA'07.

[57] Marta Z. Kwiatkowska, Gethin Norman, and David Parker. PRISM: Probabilistic Symbolic Model Checker. In *Computer Performance Evaluation/TOOLS*, pages 200–204, 2002.

[58] Bilung Lee and Edward A. Lee. Hierarchical Concurrent Finite State Machines in Ptolemy. In *ACSD*, pages 34–40. IEEE Computer Society, 1998.

[59] Xiaojun Liu, Yuhong Xiong, and Edward A. Lee. The Ptolemy II Framework for Visual Languages. In *HCC*. IEEE Computer Society, 2001.

[60] Marco Ajmone Marsan, Gianfranco Balbo, Gianni Conte, Susanna Donatelli, and Giuliana Franceschinis. Modelling with Generalized Stochastic Petri Nets. *SIGMETRICS Performance Evaluation Review*, 26(2):2, 1998.

[61] Sun Meng and Farhad Arbab. QoS-Driven Service Selection and Composition Using Quantitative Constraint Automata. *Fundamenta Informaticae*, 95(1):103–128, 2009.

[62] Vassilis Mertsiotakis. *Approximate Analysis Methods for Stochastic Process Algebras.* PhD thesis, University of Erlangen, 1998.

[63] Robin Milner. *Communication and concurrency.* Prentice-Hall, Inc., Upper Saddle River, NJ, USA, 1989.

[64] Jayadev Misra and William R. Cook. Computation Orchestration: A basis for wide-area computing. *Software and System Modeling*, 6(1):83–110, 2007.

[65] Michael Karl Molloy. *On the integration of delay and throughput measures in distributed processing models.* PhD thesis, 1981.

[66] Young-Joo Moon, Farhad Arbab, Alexandra Silva, Andries Stam, and Chrétien Verhoef. Stochastic Reo: a Case Study. Accepted for publication in TTSS 2011.

[67] Young-Joo Moon, Alexandra Silva, Christian Krause, and Farhad Arbab. A Compositional Model to Reason about end-to-end QoS in Stochastic Reo Connectors. To apper in *Science of Computer Programming*, 2011.

[68] Young-Joo Moon, Alexandra Silva, Christian Krause, and Farhad Arbab. A Compositional Semantics for Stochastic Reo Connectors. In *FOCLASA*, volume 30 of *EPTCS*, pages 93–107, 2010.

[69] Christopher Z. Mooney and Robert D. Duval. *Bootstrapping: a nonparametric approach to statistical inference.* Sage Publications, 1993.

[70] Marcel F. Neuts. *Matrix-geometric Solutions in Stochastic Models: An Algorithmic Approach.* The Johns Hopkins University Press, 1981.

[71] Oscar Nierstrasz. Piccola - A Small Compositional Language (Invited Talk). In *FMOODS*, volume 139 of *IFIP Conference Proceedings*. Kluwer, 1999.

[72] C. A. O'Cinneide. Characterization of phase-type distributions. *Stochastic Models*, 6(1):1–57, 1990.

[73] George A. Papadopoulos and Farhad Arbab. Coordination models and languages. In *M. Zelkowitz (Ed.), The Engineering of Large Systems*, volume 46 of *Advances in Computers*, pages 329–400. Academic Press, 1998.

[74] James Lyle Peterson. *Petri Net Theory and the Modeling of Systems.* Prentice Hall, 1981.

[75] Brigitte Plateau and Karim Atif. Stochastic Automata Network of Modeling Parallel Systems. *IEEE Transactions on Software Engineering*, 17:1093–1108, 1991.

[76] Prism website. `http://www.prismmodelchecker.org/`.

[77] José Proença. *Synchronous Coordination of Distributed Components*. PhD thesis, Universiteit Leiden, To appear in 2011.

[78] José Proença and Dave Clarke. Coordination Models Orc and Reo Compared. *Electronic Notes in Theoretical Computer Science*, 194(4):57–76, 2008.

[79] Wolfgang Reisig. *Petri nets: an introduction*. Springer-Verlag New York, Inc., New York, NY, USA, 1985.

[80] Juan Guillen Scholten. *Mobile channels for exogenous coordination of distributed systems: semantics, implementation and composition*. Phd thesis, Leiden University, 2007.

[81] Mary Shaw and David Garland. *Software Architecture: Perspectives on an Emerging Discipline*. Prentice Hall, Upper Saddle River, NJ, 1996.

[82] Markus Siegle. On Efficient Markovian Modelling. In *In Proc. QMIPS Workshop on Stochastic Petri Nets*, pages 213–225, 1992.

[83] Andries Stam. The ASK System and the Challenge of Distributed Knowledge Discovery. In *ISoLA*, volume 17 of *Communications in Computer and Information Science*, pages 663–668. Springer, 2008.

[84] Andries Stam, Sascha Klüppelholz, Tobias Blechmann, and Joachim Klein. ReASK Final Models. Technical Report To be appeared, Almende, The Netherlands and Technical University of Dresden, Germany, 2009.

[85] William J. Stewart. *Introduction to the Numerical Solution of Markov Chains*. Princeton University Press, 1994.

[86] William J. Stewart, Karim Atif, and Brigette Plateau. The numerical solution of stochastic automata networks. *European Journal of Operational Research*, (3):503–525, 1995.

[87] F. J. W. Symons. Introduction to Numerical Petri Nets, a General Graphical Model of Concurrent Processing Systems. *Australian Telecommunications Research*, 14(1):28–32, 1980.

[88] Clemens Szyperski. *Component Software: Beyond Object-Oriented Programming*. Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA, 2nd edition, 2002.

[89] Chrétien Verhoef, Christian Krause, Oscar Kanters, and Rob van der Mei. Simulation-based Performance Analysis of Channel-based Coordination Models. In *COORDINATION 2011*, volume 6721 of *Lecture Notes in Computer Science*, pages 187–201. Springer-Verlag, 2011.