

# Ernesto Kofman

## Curriculum Vitae

Juan B. Justo 1837  
(2000) Rosario – Argentina

☎ Work +54-341-4821771 int.104

☎ Home +54-341-5270829

FAX +54-341-4802654

✉ kofman@fceia.unr.edu.ar

<http://www.fceia.unr.edu.ar/~kofman>

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## Education

- 1999–2003 **Doctor en Ingeniería (Doctor of Engineering)**, *Universidad Nacional de Rosario*, Thesis: Discrete Event Simulation and Control of Continuous Systems, Supervisor: Sergio Junco.
- 1992–1999 **Ingeniero Electrónico (Electronic Engineer)**, *Universidad Nacional de Rosario*.

## Employment

Universidad Nacional de Rosario

- 2001– **Adjunct Professor**, *Departamento de Electrónica, FCEIA, UNR.*
- CONICET (National Research Council of Argentina)
- 2007– **Adjunct Researcher**, *CIFASIS, CONICET–UNR.*
- Eidgenössische Technische Hochschule (ETH Zurich)
- 2007 **Visiting Researcher**, *Institute of Computational Science, ETH Zürich – Switzerland, January–February 2007.*

## R&D Grants

- 2009– **PIP–2009/2011 00183**, *Development of Software and Integration Methods for Real Time Simulation, Control and Filtering*, CONICET, Role: Director. \$36.000
- 2007–2009 **PICT–2005 31653**, *Real Time Simulation and Control of Power Electronics Systems*, ANPCYT, Role: Director. \$25.000
- 2006– **PID–ING140**, *Simulation and Control of Complex Dynamic Systems*, UNR, Role: Director.

## Books

F.E. Cellier and E. Kofman. *Continuous System Simulation*. Springer, New York, 2006.

## Book Chapters

G. Wainer and P. Mosterman. *Discrete Event Simulation and Modeling: Theory and Applications*, chapter Kofman, E., Cellier, F. and Migoni, G.: Continuous System Simulation and Control, pages 75–107. CRC Press. Taylor and Francis Group, Boca Raton, FL., 2011.

## Journal Papers

- E. Kofman, J. De Doná, and M. Seron. Probabilistic set invariance and ultimate boundedness. *Automatica*, 2012. in Press.
- C. Perfumo, E. Kofman, J. Braslavsky, and J.K. Ward. Load Management: Model-Based Control of Aggregate Power for Populations of Thermostatically Controlled Loads. *Energy Conversion and Management*, 55:36–48, 2012.
- G. Grinblat, H. Ahumada, and E. Kofman. Quantized State Simulation of Spiking Neural Networks. *Simulation: Transactions of the Society for Modeling and Simulation International*, 88(3):299–313, 2012.
- G. Migoni, E. Kofman, and F. Cellier. Quantization-Based New Integration Methods for Stiff ODEs. *Simulation: Transactions of the Society for Modeling and Simulation International*, 88(4):387–407, 2012.
- R. Castro, E. Kofman, and F. Cellier. Quantization Based Integration Methods for Delay Differential Equations. *Simulation Modelling Practice and Theory*, 19(1):314–336, 2011.
- F. Bergero and E. Kofman. PowerDEVS. A Tool for Hybrid System Modeling and Real Time Simulation. *Simulation: Transactions of the Society for Modeling and Simulation International*, 87(1–2):113–132, 2011.
- R. Castro, E. Kofman, and G. Wainer. A Formal Framework for Stochastic DEVS Modeling and Simulation. *Simulation: Transactions of the Society for Modeling and Simulation International*, 86(10):587–611, 2010.
- G. Migoni and E. Kofman. Linearly Implicit Discrete Event Methods for Stiff ODEs. *Latin American Applied Research*, 39(3):245–254, 2009.
- E. Kofman. Relative Error Control in Quantization Based Integration. *Latin American Applied Research*, 39(3):231–238, 2009.
- E. Kofman, M. Seron, and H. Haimovich. Control Design with Guaranteed Ultimate Bound for Perturbed Systems. *Automatica*, 44(7):1815–1821, 2008.
- S. Dormido, J. Sánchez, and E. Kofman. Muestreo, control y comunicación basados en eventos. *Revista Iberoamericana de Automática e Informática Industrial (RIAI)*, 5(1):5–26, 2008.
- G. Migoni, E. Kofman, and F. Cellier. Integración por Cuantificación de Sistemas Stiff. *Revista Iberoamericana de Automática e Informática Industrial*, 4(3):97–106, 2007.
- H. Haimovich, E. Kofman, and M. Seron. Systematic ultimate bound computation for sampled-data systems with quantization. *Automatica*, 43(6):1117–1123, 2007.
- E. Kofman, H. Haimovich, and M. Seron. A systematic method to obtain ultimate bounds for perturbed systems. *International Journal of Control*, 80(2):167–178, 2007.
- E. Kofman. A Third Order Discrete Event Simulation Method for Continuous System Simulation. *Latin American Applied Research*, 36(2):101–108, 2006.
- E. Kofman. Non-conservative ultimate bound estimation in LTI perturbed systems. *Automatica*, 41(10):1835–1838, October 2005.
- E. Kofman. Discrete Event Control of Time Varying Plants. *Latin American Applied Research*, 35(2):135–141, 2005.
- E. Kofman. Discrete Event Simulation of Hybrid Systems. *SIAM Journal on Scientific Computing*, 25(5):1771–1797, 2004.
- E. Kofman. Quantization-Based Simulation of Differential Algebraic Equation Systems. *Simulation: Transactions of the Society for Modeling and Simulation International*, 79(7):363–376, 2003.
- E. Kofman. Quantized-State Control. A Method for Discrete Event Control of Continuous Systems. *Latin American Applied Research*, 33(4):399–406, 2003.

E. Kofman. A Second Order Approximation for DEVS Simulation of Continuous Systems. *Simulation: Transactions of the Society for Modeling and Simulation International*, 78(2):76–89, 2002.

E. Kofman and S. Junco. Quantized State Systems. A DEVS Approach for Continuous System Simulation. *Transactions of SCS*, 18(3):123–132, 2001.

## Conference Papers

J.M. Alvarez Leiva, J. Tarrío, and E. Kofman. Implementación de Equipos de Control no Lineal con Muestreo Asincrónico. In *Proc. of RPIC 2011*, Paraná, Argentina, 2011.

C. Perfumo, E. Kofman, J. Braslavsky, and J.K. Ward. Model-Based Control on Populations of Air Conditioners: Shaping Aggregated Power for Demand Side Management. In *Proc. of 2011 Australian Control Conference*, Melbourne, Australia, 2011.

E. Kofman, J. De Doná, and M. Seron. Probabilistic Ultimate Bounds and Invariant Sets for LTI Systems with Gaussian Disturbances. In *Proc. of 2011 Australian Control Conference*, Melbourne, Australia, 2011.

X. Floros, F. Bergero, F. Cellier, and E. Kofman. Automated Simulation of Modelica Models with QSS Methods - The Discontinuous Case. In *Proc. 8th International Modelica Conference*, Dresden, Germany, 2011.

X. Floros, F. Cellier, and E. Kofman. Discretizing Time or States? A Comparative Study between DASSL and QSS. In *Proc. 3rd International Workshop on Equation-based Object-oriented Modeling Languages and Tools*, pages 107–115, Oslo, Norway, 2010.

A. Gasparri, P. Codoni, J. Danelón, and E. Kofman. Diseño, Implementación y Utilización de un Conversor A/D – D/A Asincrónico. In *Proceedings of AADECA 2010*, Buenos Aires, Argentina, 2010.

T. Pire, F. Bergero, and E. Kofman. Modelado y Simulación de Redes de Petri con el Formalismo DEVS. In *Proceedings of AADECA 2010*, Buenos Aires, Argentina, 2010.

G. Boroni, E. Kofman, P. Lotito, and A. Clausse. Extensión del Método One–Leg Multistep con Estabilidad Marginal. In *Mecánica Computacional. Proceedings of ENIEF 2009*, volume XXVIII, pages 2351–2364, Tandil, Argentina, 2009.

R. Castro, E. Kofman, and G. Wainer. Control Híbrido de Redes Embebidas Basado en DEVS. In *Proceedings of RPIC 2009*, Rosario, Argentina, 2009.

F. Bergero and E. Kofman. Integración del Simulador PowerDEVS con el entorno Scilab. In *Proceedings of RPIC 2009*, Rosario, Argentina, 2009.

C. Basabilbaso, J. Zúccolo, F. Bergero, and E. Kofman. Simulación en Tiempo Real de Sistemas de Control de Movimiento. In *Proceedings of RPIC 2009*, Rosario, Argentina, 2009.

R. Castro, E. Kofman, and G. Wainer. A DEVS–based end–to–end Methodology for Hybrid Control of Embedded Networking Systems. In *Proceedings of ADHS'09: 3rd IFAC Conference on Analysis and Design of Hybrid Systems*, Zaragoza, Spain, 2009.

M. Bortolotto, E. Kofman, and G. Migoni. Métodos de integración por cuantificación en sistemas hamiltonianos. In *Proceedings of AADECA 2008*, Buenos Aires, Argentina, 2008.

F. Bergero, E. Kofman, C. Basabilbaso, and J. Zúccolo. Desarrollo de un simulador de sistemas híbridos en tiempo real. In *Proceedings of AADECA 2008*, Buenos Aires, Argentina, 2008.

E. Kofman, F. Fontenla, and H. Haimovich. Cómputo por componentes del error introducido por señales pwm en sistemas lti. In *Proceedings of AADECA 2008*, Buenos Aires, Argentina, 2008.

F. Cellier, E. Kofman, G. Migoni, and M. Bortolotto. Quantized state system simulation. In *Proceedings of SummerSim 08 (2008 Summer Simulation Multiconference)*, Edinburg, Scotland, 2008.

- R. Castro, E. Kofman, and G. Wainer. A formal framework for stochastic dev's modeling and simulation. In *Proceedings of HPCS 2008 (High Performance Computing and Simulation Symposium)*, pages 421–428, Ottawa, Canada, 2008.
- E. Kofman, F. Fontenla, H. Haimovich, and M. Seron. Control design with guaranteed ultimate bound for feedback linearizable systems. In *Proceedings of IFAC World Congress 2008*, Seoul, Korea, 2008.
- G. Migoni and E. Kofman. Linearly Implicit Discrete Event Methods for Stiff ODEs. Part I: Theory. In *Proceedings of RPIC 2007*, Rio Gallegos, Argentina, 2007.
- G. Migoni and E. Kofman. Linearly Implicit Discrete Event Methods for Stiff ODEs. Part II: Implementation. In *Proceedings of RPIC 2007*, Rio Gallegos, Argentina, 2007.
- E. Kofman. Relative Error Control in Quantization Based Integration. In *Proceedings of RPIC 2007*, Rio Gallegos, Argentina, 2007.
- M. Bortolotto, F. Fontenla, E. Kofman, and M. Romero. Librería de Simulación por Eventos Discretos de Fuentes Conmutadas. In *Proceedings of RPIC 2007*, Rio Gallegos, Argentina, 2007.
- E. Kofman, M.M. Seron, and H. Haimovich. Robust control design with guaranteed state ultimate bound. In *3rd International Conference on Integrated Modeling and Analysis in Applied Control and Automation IMAACA*, Buenos Aires, Argentina, 2007.
- E. Kofman and J. Braslavsky. Level Crossing Sampling in Feedback Stabilization under Data-Rate Constraints. In *Proceedings of CDC'06, IEEE Conference on Decision and Control*, pages 4423–4428, San Diego, 2006.
- E. Kofman and R.D. Castro. STDEVs, A Novel Formalism for Modeling and Simulation of Stochastic Discrete Event Systems. In *Proceedings of AADECA 2006*, Buenos Aires, Argentina, 2006.
- G. Migoni, E. Kofman, and F.E. Cellier. Integración por Cuantificación de Sistemas Stiff. Parte II: Aplicaciones. In *Proceedings of AADECA 2006*, Buenos Aires, Argentina, 2006.
- E. Kofman, G. Migoni, and F.E. Cellier. Integración por Cuantificación de Sistemas Stiff. Parte I: Teoría. In *Proceedings of AADECA 2006*, Buenos Aires, Argentina, 2006.
- J. Braslavsky, E. Kofman, and F. Felicioni. Effects of Time Quantization and Noise in Level Crossing Sampling Stabilization. In *Anales de AADECA 2006*, Buenos Aires, Argentina, 2006.
- E. Kofman and B. Zeigler. DEVs Simulation of Marginally Stable Systems. In *Proceedings of IMACS'05*, Paris, France, 2005.
- E. Kofman and S. Junco. DEVs as Part of and Integrating Tool in a Course on System Dynamics. In *Proceedings of ICSiE'05 (International Conference on Simulation in Education)*, New Orleans, 2005.
- E. Kofman. A Third Order Discrete Event Simulation Method for Continuous System Simulation. Part I: Theory. In *Anales de RPIC 2005*, Rio Cuarto, Argentina., 2005.
- E. Kofman. A Third Order Discrete Event Simulation Method for Continuous System Simulation. Part II: Applications. In *Anales de RPIC 2005*, Rio Cuarto, Argentina., 2005.
- E. Kofman. Non Lyapunov Ultimate Bound Estimation. In *Anales de RPIC 2005*, Rio Cuarto, Argentina., 2005.
- E. Kofman and M. Romero. Discrete Event Simulation of Sliding Mode Control Systems. In *Proceedings of AADECA 2004*, 2004.
- E. Kofman. Discrete Event Control of Time Varying Plants. In *Proceedings of RPIC'03*, volume 2, pages 636–641, San Nicolas, Argentina, 2003.
- E. Kofman. Quantization Based Simulation of Hybrid Systems. In *Proceedings of RPIC'03*, volume 1, pages 286–291, San Nicolas, Argentina, 2003.

- E. Pagliero, M. Lapadula, and E. Kofman. PowerDEVS. Una Herramienta Integrada de Simulación por Eventos Discretos. In *Proceedings of RPIC'03*, volume 1, pages 316–321, San Nicolas, Argentina, 2003.
- F. Felicioni and E. Kofman. Simulación por Eventos Discretos de Sistemas de Electrónica de Potencia. In *Proceedings of RPIC'03*, volume 1, pages 134–139, San Nicolas, Argentina, 2003.
- E. Kofman. Non Conservative Ultimate Bound Estimation in LTI Perturbed Systems. In *Proceedings of AADECA 2002*, Buenos Aires, Argentina, September 2002.
- E. Kofman. Quantized-State Control of Linear Systems. In *Proceedings of AADECA 2002*, Buenos Aires, Argentina, September 2002.
- E. Kofman, J.S. Lee, and B. Zeigler. DEVS Representation of Differential Equation Systems. Review of Recent Advances. In *Proceedings of ESS'01*, Marseille, France, 2001.
- E. Kofman. Quantized-State Control. A Method for Discrete Event Control of Continuous Systems. Part I. In *Proceedings of RPIC'01*, pages 103–108, 2001.
- E. Kofman. Quantized-State Control. A Method for Discrete Event Control of Continuous Systems. Part II. In *Proceedings of RPIC'01*, pages 109–114, 2001.
- E. Kofman. Algunas Propiedades de la Simulación de ODE's por Cuantificación de Estados. In *Proceedings of RPIC'01*, pages 532–537, 2001.
- E. Kofman and S. Junco. Quantized Bond Graphs: An Approach for Discrete Event Simulation of Physical Systems. In *Proceedings of ICBGM'01*, pages 369–374, Phoenix, 2001.
- E. Kofman, N. Giambiasi, and S. Junco. FDEVS: A General DEVS-based Formalism for Fault Modeling and Simulation. In *Proceedings of the 2000 European Simulation Symposium*, pages 77–82, Hamburg, Germany, 2000.
- E. Kofman. Simulación de sistemas dinámicos por cuantificación de estados. In *Proceedings of AADECA 2000*, pages 425–430, 2000.
- E. Kofman. Quantized Bond Graph. Una aproximación para la simulación de sistemas físicos por eventos discretos. In *Proceedings of AADECA 2000*, pages 419–424, Buenos Aires, 2000.
- E. Kofman and S. Junco. Un ambiente computacional para la modelización de sistemas dinámicos no lineales con Bond Graphs. In *Proceedings of RPIC'99*, volume 3, 16–10, 1999.

## Software Development

- PowerDEVS Hybrid system simulation software based on the DEVS formalism. Developed by E. Kofman, M. Lapadula, E. Pagliero, R. Namías y F. Bergero.
- PowerDynaMo Bond Graph-based modeling and simulation of physical systems. Developed by E. Kofman.

## Current PhD Students

- 2008– **Federico Bergero**, *CONICET*, Real Time and Parallel Discrete Event Simulation, Universidad Nacional de Rosario.  
Role: Director
- 2012– **Joaquín Fernández**, *CONICET*, Discrete Event Simulation of Large Scale Hybrid Systems, Universidad Nacional de Rosario.  
Role: Director

## Former PhD Students

- 2006–2010 **Rodrigo Castro**, *Fundación YPF*, Generalized Stochastic Discrete Event Systems. Usage in Analysis, Design, Modeling and Simulation of Admission Control System in Data Networks., Universidad Nacional de Rosario.  
Role: Director
- 2005–2010 **Gustavo Migoni**, *CONICET*, Quantization Based Integration of Stiff Systems, Universidad Nacional de Rosario.  
Role: Director

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### Prizes and Awards

- 2010 Young Researcher in Engineering 1st. Award.– Asociación Rosarina de Fomento de la Investigación Científica (ARFIC).
- 2008 TOYP 2008 – The Outstanding Young Person in Science and Technology of Santa Fe. Junior Chamber International.
- 1992 Silver Medal - International Olympiad in Informatics IOI 92, Bonn, Germany.