

Federico Milano

University of Castilla-La Mancha
Electrical Engineering Department
Campus Universitario, s/n, 13071
Ciudad Real, Spain
Tel. (+34) 926 295219 (ext. 3843)
Fax. (+34) 926 295361
Federico.Milano@uclm.es
<http://www.uclm.es/area/gsee/Web/Federico>

CURRENT POSITION **Associate Professor (tenured)** at the University of Castilla-La Mancha, Ciudad Real, Spain, (since November 2007).

EDUCATION ♦ **University of Genova**, Genova, Italy.
Ph.D. in Electrical Engineering, June 2003.
Homologated to the Spanish Ph.D. degree, October 2005.
Thesis title: *Pricing System Security in Electricity Market Models with Inclusion of Voltage Stability Constraints*.
♦ **University of Genova**, Genova, Italy.
Laurea [M.Sc.] in Electrical Engineering, March 1999.
Homologated to the Spanish Industrial Engineering degree, February 2007.
Thesis title: *La Stabilità di Tensione dei Sistemi Elettrici: Metodologie di Valutazione e Correlazioni tra Procedure Statiche e Dinamiche*.

LANGUAGES English, Italian, Spanish, Latin, Ancient Greek.

RESEARCH INTERESTS Voltage stability, electricity markets, bifurcation theory, computer-based power systems modeling, FACTS devices, distributed generation.

WORK EXPERIENCE ♦ **Associate Professor (untenured)**, University of Castilla-La Mancha, Spain, (February 2007 – November 2007).
♦ **Invited Researcher**, ETH Zürich, Switzerland, (November 2006).
♦ **Visiting Professor**, University of Castilla-La Mancha, Spain, (September 2003 – February 2007).
♦ **Teaching Assistant**, University of Genova, Italy, (March 2003 – June 2003)
Course: Power System Analysis.
♦ **Visiting Scholar**, University of Waterloo, Canada, (September 2001 – December 2002)
Research topic: Pricing System Security in Electricity Markets.
♦ **Teaching Assistant**, University of Genova, Italy, (September 2000 – December 2000)
Course: Electric Machine Modeling and Control.
♦ **Teaching Assistant**, University of Genova, Italy, (March 2001 – June 2001)
Course: Power System Analysis.

RESEARCH PROJECTS ♦ **JCCLM - PCI08-0102-1841**, “Integration of renewable electric energy sources in a power system: Technical and economic impact”, 2007-2009.
♦ “Análisis de la red de energía eléctrica de Castilla - La Mancha y estudio del impacto en la misma de la integración de centrales eólicas y/o solares”, Junta de Comunidades de Castilla-La Mancha, 2006-2007.

- ◇ “Network Equivalents”, ABB AB Corporate Research, Västerås, Sweden, August 2006-August 2007.
- ◇ CICYT - DPI 2006-08001, “Estrategias de producción, suministro y comercialización en mercados eléctricos mediante programación estocástica (EMEPE)”, 2006-2009.
- ◇ JCCLM - PBI-05-053, “Análisis de riesgo y seguridad en el suministro de energía eléctrica”, 2005-2007.
- ◇ CICYT - DPI 2003-01362, “Respuesta óptima al mercado eléctrico por parte de productores, comercializadores y consumidores”, 2003-2006.
- ◇ “Sviluppo di modelli FACTS per l’analisi di sicurezza ed indicatori di stabilità per il controllo del sistema elettrico”, Internal Report, CESI-University of Genova, Italy, October 2001.
- ◇ “Sviluppo di modelli per l’analisi di sicurezza e di flessibilità delle reti di trasmissione. Linea di attività A: Valutazione delle potenzialità applicative delle misure di fasori per il controllo in tempo reale del sistema elettrico”, Internal Report, CESI-University of Genova, Italy, October 2000.
- ◇ “Il sistema elettrico in regime di libero mercato: potenzialità di dispositivi FACTS nella gestione del sistema di trasmissione e metodologie di sintesi di equivalenti dinamici per studi di sicurezza”, Internal Report, ENEL-University of Genova, Italy, February 2000.

SOFTWARE DEVELOPMENT MATLAB-based routines for power system analysis (PSAT). The main features of PSAT are as follows: power flow, continuation power flow, optimal power flow, small signal stability analysis, time domain simulation, phasor measurement unit (PMU) placement, complete graphical user interface, CAD for network design (Simulink library), user defined models, and conversion of data files from several formats.
Available at <http://www.uclm.es/area/gsee/Web/Federico/psat.htm>.

PROFESSIONAL MEMBERSHIPS *IEEE Member*, since 2003.
◇ *Italian Professional Engineer*, since 1999.

Publications

- BOOKS ◇ A. J. Conejo, J. M. Arroyo, **F. Milano**, et al., *Instalaciones Eléctricas* (in Spanish), McGraw Hill, Madrid, May 2007.
- JOURNAL PAPERS ◇ H. M. Ayres, I. Kopcak, M. S. Castro, **F. Milano**, V. F. da Costa, *A Didactic Procedure for Designing Power Oscillation Dampers of FACTS Devices*, Simulation Modelling Practice and Theory, in press.
- ◇ A. M. A. Haidar, A. Mohamed, **F. Milano**, *A Computational Intelligence-based Suite for Vulnerability Assessment of Electrical Power Systems*, Simulation Modelling Practice and Theory, Vol. 18, No. 5, pp. 533-546, May 2010.
- ◇ L. Vanfretti, **F. Milano**, *The Experience of PSAT as a Free and Open Source Software for Power System Education and Research*, International Journal of Electrical Engineering Education, in press.
- ◇ R. Zárate-Miñano, T. Van Cutsem, **F. Milano**, A. J. Conejo, *Securing Transient Stability using Time-Domain Simulations within an Optimal Power Flow*, IEEE Transactions on Power Systems, Vol. 25, No. 1, pp. 243-253, February 2010.
- ◇ **F. Milano**, *Three-Dimensional Visualization and Animation for Power Systems Analysis*, Electric Power System Research, Vol. 79, No. 12, pp. 1638-1647, December 2009.
- ◇ **F. Milano**, K. Srivastava, *Dynamic REI Equivalents for Short Circuit and Transient Stability Analysis*, Electric Power System Research, Vol. 79, No. 6, pp. 878-887, June 2009.

- ◇ **F. Milano**, *Continuous Newton's Method for Power Flow Analysis*, IEEE Transactions on Power Systems, Vol. 24, No. 1, pp. 50-57, February 2009.
- ◇ R. J. Avalos, C. A. Cañizares, **F. Milano**, A. J. Conejo, *Equivalency of Continuation and Optimization Methods to Determine Saddle-node and Limit-induced Bifurcations in Power Systems*, IEEE Transactions on Circuits and Systems-I: Fundamental Theory and Applications, Vol. 56, No. 1, pp. 210-223, January 2009.
- ◇ R. Zárate Miñano, A. Conejo, **F. Milano**, *OPF-Based Security Redispatching Including FACTS Devices*, IET Generation, Transmission & Distribution, Vol. 2, No. 6, pp. 821-833, June 2008.
- ◇ W. Gu, **F. Milano**, P. Jiang, J. Zheng, *Improving Large-disturbance Stability through Optimal Bifurcation Control and Time Domain Simulations*, Electric Power System Research, Vol. 78, No. 3, pp. 337-345, March 2008.
- ◇ **F. Milano**, L. Vanfretti, J. C. Morataya, *An Open Source Virtual Laboratory: The PSAT case and Experience*, IEEE Trans. on Education, Vol. 51, No. 1, pp. 17-23, February 2008.
- ◇ R. Mínguez, **F. Milano**, R. Zárate Miñano, A. Conejo, *Optimal Network Placement of SVC Devices*, IEEE Trans. on Power Systems, Vol. 22, No. 4, pp. 1851-1860, November 2007.
- ◇ **F. Milano**, A. J. Conejo, J. L. García Dornelas, *Reactive Power Adequacy in Distribution Networks with Embedded Distributed Energy Resources*, ASCE Journal of Energy Engineering, Vol. 133, pp. 132-143, September 2007.
- ◇ **F. Milano**, A. J. Conejo, R. Zárate Miñano, *General Sensitivity Formulas for Maximum Loading Conditions in Power Systems*, IET Generation, Transmission & Distribution, Vol. 1, No. 3, pp. 516-526, May 2007.
- ◇ W. Gu, **F. Milano**, P. Jang, G. Tang, *Hopf Bifurcations Induced by SVC Controllers: A Didactic Example*, Electric Power Systems Research, Vol. 77, No. 3-4, pp. 234-240, March 2007.
- ◇ A. J. Conejo, J. M. Arroyo, **F. Milano**, J. A. Mora, *Electric Machine Undergraduate Lab. A traditional Approach with a New Technical Base*, International Journal of Electrical Engineering Education, Vol. 44, No. 1, pp. 12-22, January 2007.
- ◇ A. J. Conejo, **F. Milano**, R. García-Bertrand, *Congestion Management Avoiding Off-line Non-thermal Transmission Capacity Limits*, IEEE Trans. on Power Systems, Vol. 21, No. 1, pp. 357-364, February 2006.
- ◇ **F. Milano**, C. A. Cañizares, A. J. Conejo, *Sensitivity-based Security-constrained OPF Market Clearing Model*, IEEE Trans. on Power Systems, Vol. 20, No. 4, pp. 2051-2060, November 2005.
- ◇ A. J. Conejo, E. Castillo, R. Mínguez, **F. Milano**, *Locational Marginal Price Sensitivities*, IEEE Trans. on Power Systems, Vol. 20, No. 4, pp. 2026-2033, November 2005.
- ◇ **F. Milano** *An Open Source Power System Analysis Toolbox*, IEEE Trans. on Power Systems, Vol. 20, No. 3, pp. 1199-1206, August 2005.
- ◇ **F. Milano**, C. A. Cañizares, M. Invernizzi, *Voltage Stability Constrained OPF Market Models Considering N-1 Contingency Criteria*, Electric Power Systems Research, Vol. 74, No. 1, pp. 27-36, March 2005.
- ◇ C. A. Cañizares, H. Chen, **F. Milano**, A. Singh, *Transmission Congestion Management and Pricing in Simple Auction Electricity Markets*, International Journal of Emerging Electric Power Systems, Vol. 1, No. 1, pp. 1-28, 2004.
- ◇ C. A. Cañizares, N. Mithulanthan, **F. Milano**, J. Reeve, *Linear Performance Indices to Predict Oscillatory Instability Problems in Power Systems*, IEEE Trans. on Power Systems, Vol. 19, No. 2, pp. 1104-1114, May 2004.

- ◇ **F. Milano**, C. A. Cañizares, M. Invernizzi, *Multi-Objective Optimization for Pricing System Security in Electricity Markets*, IEEE Trans. on Power Systems, Vol. 18, No. 2, pp. 596-604, May 2003.
- CONFERENCE PAPERS ◇ **F. Milano**, L. Vanfretti, *State of the Art and Future of OSS for Power Systems*, IEEE PES General Meeting, Calgary, Canada, 26-30 July 2009.
- ◇ **F. Milano**, M. Zhou, G. Hou, *Open Model For Exchanging Power System Data*, IEEE PES General Meeting, Calgary, Canada, 26-30 July 2009.
- ◇ M. Stifter, **F. Milano**, *An Example of Integrating Open Source Modelling Frameworks: The Integration of GIS in PSAT*, IEEE PES General Meeting, Calgary, Canada, 26-30 July 2009.
- ◇ **F. Milano**, , *Assessing Adequate Voltage Stability Analysis Tools for Networks with High Wind Power Penetration*, DRPT 2008, Nanjing, China, 6-9 April 2008.
- ◇ T. Demiray, **F. Milano**, G. Andersson, *Dynamic Phasor Modeling of the Doubly-fed Induction Generator under Unbalanced Conditions*, PowerTech, Lausanne, Switzerland, 1-5 July 2007.
- ◇ L. Vanfretti, **F. Milano**, *Application of the PSAT, an Open Source Software, for Educational and Research Purposes*, PES General Meeting, Tampa, USA, 24-28 June 2007.
- ◇ **F. Milano**, *A Graphical and Open Source Matlab-GAMS Interface for Electricity Market Models*, 9CHLIE, Marbella, Spain, 30 June - 2 July 2005.
- ◇ G. B. Denegri, M. Invernizzi, and **F. Milano**, *A Security Oriented Approach to PMU positioning for Advanced Monitoring of Transmission Grid*, International Conference on Power System Technology *PowerCon 2002*, Kunming, China, October 2002.
- ◇ G. B. Denegri, M. Invernizzi, and **F. Milano**, *Synthesis of an equivalent dynamic model for load areas with LTC transformers*, IEEE Transmission & Distribution Conference, Atlanta, USA, October 2001.
- ◇ B. Delfino, G. B. Denegri, M. Invernizzi, and **F. Milano**, *Dynamic Index Assessment for Voltage Stability in Electric Power Systems*, International Conference on Power System Technology *PowerCon 2000*, Perth, Australia, December 2000.