Nader Safari-Shad, Ph.D.
Professor of Electrical Engineering
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Contact Information:

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Education:

- PhD 1992, EE, (Control systems with minor in power systems and mathematics)
  University of Wisconsin-Madison

- MS 1984, EE, (Control systems with minor in mathematics)
  Oregon State University

- BS 1982, EE, (Control and communication systems)
  Oregon State University

Employment History:

- 2001 - Present: Professor at the department of electrical engineering, **University of Wisconsin-Platteville**, WI, USA

- 2001 - Present: Power system protection consultant at **Alliant Energy Corporation**, Dubuque, IA, USA

- 1992 - 2001: Assistant professor at the department of electrical engineering, **K. N. Toosi University of Technology**, Tehran, Iran

US Patent:

- Nader Safari-Shad, *"Methods for Providing Generator Stator Winding Ground Fault Protection,"* US Patent 9,236,726 B2, Jan. 12, 2016.

Scientific & Professional Collaboration:

- 2014 - Present: Professional collaboration with IEEE Power and Energy Society, Power System Relaying Committees. Member of J12, J16 and J17 working subcommittees in charge of identifying *"Improved Generator Ground Fault Protection Schemes"* and updating IEEE Standards C37.101 and C37.102. Website: http://www.pes-psrc.org/index.html.

- 2015 - 2018: Research collaboration with Electrical and Computer Engineering Department at University of Texas A & M, College Station, TX.

- 2000 - 2007: Collaboration with Research Institute on Information and Control (INRIA), France.

Book Publication:

- Mohammad-Javad Khosrojerdi, and Nader Safari-Shad, *"Modern Control: Analysis and Design,"* Published by Sahand University of Technology, (in Farsi) Tabriz, Iran, 2011.

Journal and Conference Publications:

- Nader Safari-Shad, and Russ Franklin, *"Performance Verification of an Adaptive* 100% *Injection-Based Stator Ground Fault Protection Using a Large MVA Generator,"* 72nd Conference for Protective Relay Engineers, College Station, Texas, March 2019.

- Nader Safari-Shad, Russ Franklin, Amir Negahdari, and Hamid A. Toliyat, *"Adaptive* 100% *Injection-Based Generator Stator Ground Fault Protection with Real-Time Fault Location Capability,"* IEEE Transaction on Power Delivery, Vol. 33, No. 5, pp. 2364 - 2372, October 2018.

- Khaled Al Jaafari, Amir Negahdari, Hamid A. Toliyat, Nader Safari-Shad, and Russ Franklin, *"Reliability Analysis of an Adaptive Third-Harmonic Differential Voltage Stator Ground Fault Protection Scheme Using a Lab-Scale Generating Station,"* IEEE Energy Conversion Congress and Exposition (ECCE), pp. 3119 - 3124, Oct. 1-5, 2017.

- Khaled Al Jaafari, Amir Negahdari, Hamid A. Toliyat, Nader Safari-Shad, and Russ Franklin, *"Modeling and Experimental Verification of a* 100% *Stator Ground Fault Protection Based on Adaptive Third Harmonic Differential Voltage Scheme for Synchronous Generators,"* IEEE Transaction on Industry Applications, Vol. 53, No. 4, pp. 3379-3386, July/August 2017.

- Nader Safari-Shad, and Russ Franklin *"Adaptive* 100% *Stator Ground Fault Protection Based on Subharmonic Injection Method,"* XXIIth International Conference on Electrical Machines (ICEM'2016), pp. 2153-2159, Lausanne, Switzerland, September 4-7, 2016.

- Khaled Al Jaafari, Amir Negahdari, Hamid A. Toliyat, Nader Safari-Shad, and Russ Franklin *"Experimental Verification of a Novel Adaptive Stator Ground Fault Protection Scheme for Synchronous Generators,"* XXIIth International Conference on Electrical Machines (ICEM'2016), pp.2239-2245, Lausanne, Switzerland, September 4-7, 2016.

- Nader Safari-Shad, and Russ Franklin *"Adaptive* 100% *Stator Ground Fault Protection Based on Third-Harmonic Differential Voltage Scheme,"* IEEE Transaction on Power Delivery, Vol. 31, No. 4, pp. 1429-1436, August 2016.

- H. T. Evensen, O. Jadaan, H. Abdel-Aal, J. Hamilton, W. Li, M. Momot, E. Ofulue, M. M. Patterson, N. Safari-Shad, *"The Minor in Microsystems and Nanotechnology at UW-Platteville,"* Proc. of the 2008 ASEE North Midwest Sectional Conference, Platteville, WI, October, 2008.

- Mohammad-Javad Khosrojerdi, Nader Safari-Shad, and Ramine Nikoukhah, *"Optimal Sensor Location for Robust Fault Detection,"* Proc. of the European Control Conference, Kos, Greece, July 2-5, 2007.

- Mohammad-Javad Khosrojerdi, Nader Safari-Shad, and Ramine Nikoukhah, *"Robust Fault Detection in a Mixed $\mathcal{H}_2/\mathcal{H}_\infty$ Setting: The Discrete-Time Case,"* Proc. of the 14th Mediterranean Conf. on Control and Automation, Ancona, Italy, June 28-30, 2006.

- Mohammad-Javad Khosrojerdi, Ramine Nikoukhah, and Nader Safari-Shad, *"Fault detection in a Mixed $\mathcal{H}_2/\mathcal{H}_\infty$ Setting,"* IEEE Transaction on Automatic Control, Vol. 50, No. 7, pp. 1063-1068, July 2005.

- Mohammad-Javad Khosrojerdi, Ramine Nikoukhah, and Nader Safari-Shad, *"A Mixed $\mathcal{H}_2/\mathcal{H}_\infty$ Approach to Simultaneous Fault Detection and Control,"* Automatica, vol. 40, pp.261-267, Feb. 2004. Available on line at *www.sciencedirect.com.*

- Mohammad-Javad Khosrojerdi, Ramine Nikoukhah, and Nader Safari-Shad, *"Fault Detection in a Mixed $\mathcal{H}_2/\mathcal{H}_\infty$ Setting,"* Proc. of the IEEE Conf. on Dec. and Contr. Conf. (CDC), Maui, Hawaii, USA, pp. 1461-1466 Dec. 2003.

- Mohammad-Javad Khosrojerdi, Ramine Nikoukhah, and Nader Safari-Shad, *"Controller Design with Fault Detection Capabilities,"* Submitted to IEEE Conf. on Contr. Applic., June 23 - 25, 2003, Istanbul, Turkey.

- Mohammad-Javad Khosrojerdi, Ramine Nikoukhah, and Nader Safari-Shad, *"Simultaneous Fault Detection and Control Problem,"* Proc. of 10th Mediterranean Conf. On Control and Automation, Lisbon, Portugal, June 2002.

- Mohammad-Javad Khosrojerdi, Ramine Nikoukhah, and Nader Safari-Shad, *"A Mixed $\mathcal{H}_2/\mathcal{H}_\infty$ Approach to Simultaneous Fault Detection and Control,"* INRIA report. Available online at *www.inria.fr/rrrt/rt-0263.html.*

- N. Safari-Shad, N. Abedi, and P. Niazi, *"An Interactive Environment for Design, Simulation and Real-Time Control of Nonlinear Systems,"* Proc. of the American Contr. Conf., Chicago, Il, June 2000.

- N. Safari-Shad, N. Abedi, and P. Niazi, *"An Environment for Real-Time Control of Nonlinear Systems,"* Proc. of the Iranian Conf. on Elect. Engr., Tehran, May 1999 (in Farsi).

- N. Safari-Shad, N. Abedi, and S. Dehsarvi, *"Nonlinear Optimal Control Design Experiments Using the Inverted Pendulum on a Cart Paradigm,"* Proc. of Euro. Contr. Conf., Karlsruhe, Germany, Sept. 1999.

- M. Abrishamchian, N. Safari-Shad, and H. Bevarani *"Nonlinear Robust Control of DC-DC Switching Regulators,"* Proc. of the 3rd Asia-Pacific Conf. on Contr. and Measur., China, Aug. 1998.

- H. Bevarani, N. Safari-Shad, and M. Abrishamchian, *"Linear Robust Control of DC-DC Power Converters,"* Proc. of the Iranian Conf. on Elect. Engr., Tehran, May 1998 (in Farsi).

- N. Safari-Shad, N. Abedi, and S. Dehsavi, *"A Least Action Nonlinear Regulator Design: The Inverted Pendulum On a Cart Example,"* Proc. of the Iranian Conf. on Elect. Engr., Tehran, May 1998.

- M. Teshnehlab, N. Safari-Shad and H. Beverani, *"Control of DC-DC Switching Regulators Using Artificial Neural Networks,"* Proc. of the Iranian Conf. on Elect. Engr., Tehran, May 1997 (in Farsi).

- N. Safari-Shad and M. Takabe, *"Refined Robust Stability Analysis of a Spark Ignition Engine Model,"* IEEE Trans. on Contr. Syst. Tech., March 1997.

- N. Safari-Shad and M. J. Khosrojerdy, *"Robust Nonlinear Control of an Automotive Spark Ignition Engine,"* Proc. of the 2nd Asian Contr. Conf., Seoul, Korea, July 1997.

- N. Safari-Shad and M. Takabe, *"The Role of Modelling in Reducing the Order of Computational Complexity Associated With Robust Stability Problems: A Case Study,"* Proc. of the Iranian Conf. on Elect. Engr., Tehran, May 1996.

- N. Safari-Shad, M. Abrishamchian, and M. Takabe, *"Robust Stabilization of Longitudinal Short Period Mode of An F4-E Aircraft,"* Proc. of the Iranian Conf. on Elect. Engr., Tehran, May 1995.

- N. Safari-Shad and J. D. Cobb, *"On a Deterministic Least Squares Estimation Theory for LTI Systems,"* Proc. of the Iranian Conf. on Elect. Engr., Tehran, May 1995.

- N. Safari-Shad, *"Deterministic L^2/H^2 Optimization of Linear Dynamical Systems,"* Proc. of the Iranian Conf. on Elect. Engr., Tehran, May 1993.

- N. Safari-Shad and J. D. Cobb, *"On the Separation Principle for Systems with Partially Noise-Free Measurements,"* Proc. of the Conf. on Dec. and Contr., Tucson, Az, Dec. 1992.

- N. Safari-Shad and J. D. Cobb, *"A Lyapunov-Based Proof of the Quadratic Separation Principle for Systems with Noise-Free Measurements,"* Proc. of the American Contr. Conf., Chicago, Il, June 1992.

Industrial Activities:

- Design and implementation of Schweitzer Engineering Lab (SEL) micro-processor relays for 69 KV, 138 KV and 161 KV transmission line protection.

- Design and implementation of SEL and Beckwith micro-processor relays for large industrial synchronous generator protection.

- Design and implementation of SEL micro-processor relays for distribution substation protection.

- Design and implementation of SEL micro-processor relays for capacitor bank protection.

- Developing standards for distribution substation protection.

- Developing standards for 100+ KV transmission line protection with pilot relaying.

- Implementation of SCADA and HMI systems for distribution substation monitoring and control.

Continuing Education Course Deliveries:

- Nader Safari-Shad, "Stator Ground Synchronous Generator Protection with Real-Time Fault Location," One-day short course offered to practicing EE engineers on UWP campus and remotely via live video streaming on Thursday May 24, 2018.

- Nader Safari-Shad, "100% Stator Ground Synchronous Generator Protection using Adaptive Subharmonic Injection Scheme," One-day short course offered to practicing EE engineers on UWP campus and remotely via live video streaming on Thursday May 25, 2017.

- Nader Safari-Shad, "*Generator Protection Fundamentals,*" Two-day short course offered to practicing EE engineers on UWP campus and remotely via live video streaming on Thursday May 19, 2016.

- Nader Safari-Shad, "100% *Stator Ground Fault Protection Methods in Large Synchronous Generators,*" One-day short course offered to practicing EE engineers on UWP campus and remotely via live video streaming on Thursday may 19, 2015.

Research Interest:

- Fault detection and isolation in dynamical systems

- Robust control analysis and synthesis of dynamical systems

- Nonlinear and optimal control of stochastic and deterministic dynamical systems

Computer skills:

- Dynamical control system simulators: MATLAB/SIMULINK

- Power system short-circuit simulators: Cape

- Latex typesetting and most Microsoft applications

References
Available upon request.