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Ph.D. Program in Electronics, Computer Science and Electrical Engineering

SEMINAR

Signal processing and condition monitoring of electrical machines

Prof. Daniel Morinigo-Sotelo, Dr. Tomás A. García-Calva and Prof. Vanesa Fernandez-Cavero

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Monday 25th March 11:00-13:00 – Tuesday 26th March 11:00-13:00
Aula Seminari BLU, Faculty of Engineering, University of Pavia

Abstract: Condition monitoring of electrical machines is becoming increasingly important to avoid unexpected shutdowns of industrial plants, but also to reduce energy losses and economic costs of repairing any faults. For this purpose, new and efficient signal processing techniques have been proposed in recent years. Based on these considerations, the two seminars will develop according to the following program:

1. Electrical machines: components and their failure modes; fault detection techniques; fault diagnosis.
2. Signal acquisition systems.
3. Spectral analysis of stationary signals: fundamentals (sampling theorem, Fourier Transform); filtering and resampling.
4. Spectral analysis of non-stationary signals: Heisenberg uncertainty principle; Short-Time Fourier Transform; non-parametric techniques (MUSIC); time-frequency atoms.
5. Analysis of real and synthetic signals: how to produce synthetic signals for testing; analysis of examples with synthetic and real signals.

Bio: **Daniel Morinigo-Sotelo** (M'04) received B.S. and Ph.D. degrees in electrical engineering from University of Valladolid (UVa), Spain, in 1999 and 2006, respectively. He was a research collaborator on Electromagnetic Processing of Materials with the Light Alloys Division of CIDAUT Foundation since 2000 until 2015. He is currently with the research group on Analysis and Diagnostics of Electrical Grids and Installations (ADIRE), that belongs to the ITAP Institute (UVa), and with the HSPdigital Research Group, Mexico. His current research interests include fault detection and diagnostics of induction machines, power quality, and smart grids. **Tomás A. Garcia-Calva** received M.E. and Ph.D. degrees in electrical engineering from University of Guanajuato, Mexico, in 2016 and 2021, respectively. He was an intern with the Universitat Politecnica de Valencia (UPV), Spain, in 2016, and with UVa in 2019. He is currently a researcher assistant in UVa. His research interests include digital signal processing, spectral analysis, time-frequency distributions, and condition monitoring of electrical machines. **Vanesa Fernandez-Cavero** received the B.S. degree in Industrial Organization Engineering and Electrical Engineering from ICAI, Comillas Pontifical University (UPCO), Madrid, Spain, in 2005. She received the Ph.D. degrees in electrical engineering from UVa in 2018. She was a Researcher with the UVa and she is currently a Professor with the University of Burgos. Her current research interests are monitoring of induction machines, detection and diagnosis of faults in inverter-fed IM in transient regimes.

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