CALL FOR PAPERS

Special Session:

Advanced Signal Processing Techniques for Condition Monitoring of Electric Machines and Systems

Area: Computing

Organized and Co-chaired by:

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Dear Colleagues,

It is our pleasure to invite you to participate in ROPEC 2026 by submitting novel and original research papers on any topic related to this special session.

Condition monitoring plays a crucial role in ensuring the reliability, efficiency, and safety of electric machines and systems by detecting changes in their operating conditions through the analysis of physical variables such as currents, voltages, vibrations, temperatures, and acoustic emissions. Recent advances in signal processing, artificial intelligence, and computational methods have significantly enhanced the capabilities of condition monitoring systems, enabling earlier fault detection, improved diagnostic accuracy, and the development of intelligent predictive maintenance strategies.

This Special Session aims to bring together researchers, engineers, and practitioners working on advanced signal processing techniques applied to condition monitoring and fault diagnosis of electric machines and systems. The session will provide a forum for presenting innovative methodologies, theoretical developments, practical implementations, and emerging trends in this rapidly evolving field.

The topic is particularly timely due to the growing demand for reliable industrial systems, smart manufacturing, Industry 4.0 technologies, and intelligent maintenance solutions. The proposed session aligns well with the ROPEC 2026 technical program by promoting interdisciplinary research in computing, signal processing, machine learning, and electrical engineering, while fostering collaboration between academia and industry.

In general, condition monitoring consists of detecting changes in the operating conditions of the machines or systems and their components from different physical variables, such as: currents, voltages, vibrations, temperatures, and acoustic emissions, among others. In order to improve the capabilities of condition monitoring systems, the application and development of new methods based on modern and advanced signal processing techniques in this topic are paramount.

Topics of interest include, but are not limited to:

- Signal processing methods in the time domain and frequency domain.
- Time-frequency analysis and decomposition techniques.
- Adaptive signal processing and model-based approaches.
- Statistical methods for condition monitoring and fault diagnosis.
- Parametric and non-parametric signal analysis techniques.
- Machine learning and deep learning methods for fault detection and classification.
- Intelligent predictive maintenance systems.
- Feature extraction and pattern recognition techniques.
- Sensor-based monitoring systems.
- Software and hardware implementations for online and real-time monitoring.
- Signal processing applications for electric machines, power systems, and industrial equipment.
- Data-driven approaches for condition monitoring and prognostics.

All accepted and presented papers at the conference will be published in the proceedings of ROPEC and they will be indexed by IEEExplore.

General information regarding manuscript submission, important dates, conference fees, and local accommodation, can be found in the conference website: https://2026.ropec.org/

Sincerely yours,
Organizer committee