Konstantinos N. Gyftakis (M'11-SM'20) received his Integrated Master 5-year Diploma (2010) and his Ph.D (2015) from the Dept. of Electrical and Computer Engineering, University of Patras, Greece.

He worked as a Post Doctoral Research Assistant in the School of Engineering Science, University of Oxford, UK (2014-2015), for the FUTURE Electric Vehicles project, while the goal of his research was the understanding of the insulation degradation mechanisms in traction electric motors. Afterwards, he worked as a Lecturer on Electrical Engineering, Coventry University, UK (2015-2019). Finally, he was employed as a Lecturer on Electrical Machines, School of Engineering, University of Edinburgh, UK (2019-2022). Since 2022, he has been an Associate Professor in the School of Electrical and Computer Engineering, Technical University of Crete, Greece. His main research interests lie in the fields of condition monitoring, fault diagnosis, prognosis, electromagnetic analysis and design of electrical machines.

Dr. Gyftakis was the recipient of the “Diagnostics Achievement Award” in 2025 at the IEEE Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives (IEEE SDEMPED). Moreover, he regularly appears in the Stanford list of 2% most influential researchers across all fields (2021-2025). His publications record includes more than 150 papers in International scientific journals and conferences and a chapter for the book: “Diagnosis and Fault Tolerance of Electrical Machines, Power Electronics and Drives”, IET, 2018. He serves as an Associate Editor for the IEEE Transactions on Energy Conversion and the IEEE Transactions on Industry Applications. Moreover, he is a Member of the IEEE SDEMPED International Steering Committee and serves his second term as its elected Secretary.

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Lecture Topics

1. Modern Aspects and Challenges on the Condition Monitoring and Fault Diagnosis of Electrical Machines

Electrical machines are the beating heart of the modern world. As generators they produce the much-needed electric power, while as motors convert it into mechanical work. Therefore, the number of electrical machines in a country may be synonymous with the prosperity level. During their operation, electrical machines are subjected to a variety of stresses that will eventually lead to degradation and ageing. Consequently, faults may appear in electrical machines, the severity of which is low at early stages. However, if early faults are not detected, they may lead to catastrophic breakdown with several negative consequences. This Lecture addresses the issue of condition monitoring, fault diagnosis and prognosis of electrical machines. The state of the art in this field is thoroughly discussed, and different methods are presented and compared, as well as the challenges faced by diagnosticians. Finally, the Lecture will cover most frequent rotor and stator faults in both induction and synchronous machines.

Duration: 1 hour

2. Health Assessment of Permanent Magnet Generators for Remote Renewables

Remote renewables mainly include the power harvesting of sea waves, tides and offshore wind. In such applications, the reliability constraints are extremely high, due to the increased cost of service and maintenance. This is the reason for the development of new technologies such as modular generators and power electronics, as well as magnetic gearboxes. New topologies facilitate the easy and fast assembly and disassembly of the components and at the same time increase the reliability level of the system that requires less complicated maintenance actions. This Lecture intends to inform about possible failures that may appear in permanent magnet generators for remote renewables. The case of the C-GEN topology is used as a paradigm and various faulty conditions are discussed, such as stator inter-turn, eccentricity and demagnetization faults. A critical assessment of the diagnostic capabilities of different generator waveforms is also presented.

Duration: 45 minutes

3. Frequency Response Analysis for Off-line Testing of Electrical Machines

Insulation degradation is the main cause for stator electrical faults in electrical machines. During their lifetime, electrical machines are subjected to a variety of stresses (thermal, electrical, ambient and mechanical) leading to progressive ageing. When the insulating materials lose their dielectric properties, short circuits are created leading to a catastrophic machine failure. Off-line tests are popular for insulation health state determination. Frequency response analysis is a relatively new methodology that may assist towards this goal. This Lecture aims to introduce the ageing mechanisms of insulation, introduce the impact of faulty insulation, present the frequency response analysis method in various machines and introduce the modelling of machine components, to apply the frequency response analysis.

Duration: 45 minutes