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Gastvortrag

Failure Prognosis of Electrical Drives

Professor Elias G. Strangas (Michigan State University, USA)

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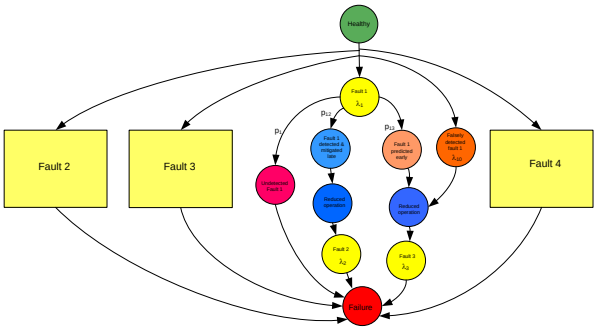
As more electric drive systems are replacing mechanical and hydraulic actuators and off-the-grid operated electrical machines, their reliability is becoming more of concern. Besides improving the Mean-Time-Between-Failures of components, the health of the drive system is monitored and managed.

Although fault diagnosis has been a research topic for many years, the related work has been addressing individual faults rather than all the possible ones. Reliability is increasingly tied to prognosis and the estimation of the remaining useful life.



Paths to failure of a system with fault diagnosis and prognosis; yellow circles identify current lack of knowledge.

The research issues that remain to be addressed include the determination of the probability of failure from the history of the electrical drive performance, the operating conditions, and the available indicators. Based on these, the life estimate can possibly be calculated and the confidence of this calculation established. From those estimates appropriate action can be determined – continuing operation, maintenance, fault mitigation.

This talk will address the specifics of the most prominent faults: bearings, power electronics, windings, sensors and magnets, the present condition of the research in their failure prognosis, as well as some results from the work at Michigan State University Electrical Machines and Power Electronics groups.

Professor **Elias G. Strangas** received the Dipl. Eng. degree in Electrical Engineering from the National Technical University of Greece, in Athens, Greece and the Ph.D. degree from the University of Pittsburgh, Pittsburgh, PA, in 1980. He was the head of research and development with Schneider Electric in Greece from 1981 to 1983 and the Amoco Assistant Professor at University of Missouri, Rolla, from 1983 to 1986. Since 1986, he has been with the Department of Electrical and Computer Engineering, Michigan State University, where he directs the Electrical Machines and Drives Laboratory. The projects in the laboratory and his students have been funded over the years by the US and Michigan governments, and by a wide array of industry, primarily automotive.