

DEPARTMENT OF MECHANICAL ENGINEERING

WILLIAM MAXWELL REED SEMINAR SERIES

“New Signal Processing Technologies for Gearbox Bearing Fault Detection”

Dr. Shazali Osman
Norwich University

Abstract: Machinery health condition monitoring can be undertaken by different type of information such as noise, temperature, lubricant and vibration. Vibration monitoring could be the most widely used approach to determine the condition of mechanical systems, due to its ease of measurement analysis. In data acquisition, transducers are used to collect vibration signal. Signal processing techniques are then used to extract representative features to assess the health condition of gearbox components. However, in practice, the theoretical frequencies and characteristic features of gearbox faults may be modulated by parasitical frequencies from numerous noisy vibration sources, as well as by the transmission impedance mechanics. To tackle these related problems, the objective of this research work is to propose new techniques to evaluate gearbox health conditions. Firstly, an enhanced filtering technique is proposed to improve signal-to-noise ratio and remove gear and shaft signals. Secondly, a leakage-free resonance sparse decomposition technique is developed for advanced vibration signal analysis and to recognize characteristic features for bearings in gearboxes. The effectiveness of the proposed techniques is verified by a series of experimental tests corresponding to different bearing and gearbox conditions.

Bio: Dr. Shazali Osman received his B. Tech. in Manufacturing Engineering (McMaster University, 2010), MSc. in Control Engineering (Lakehead University, 2013), and PhD in Mechanical Engineering (Lakehead University, 2018) with specialization in Mechatronics. Dr. Osman joined the faculty of Lakehead University in January 2016 as an Engineering Contract Lecturer until December 2019. Since January 2020 he has been a Visiting Assistant Professor in Mechanical Engineering at Norwich University. His research interests are in Signal Processing, Artificial Intelligence, Online Machinery Condition Monitoring, Time Series Forecasting, Smart Sensors, Intelligent Control, and Mechatronics.

Date: March 4, Thursday

Time: 3-4 pm (CST); 4-5pm (EST)

Place: <https://uky.zoom.us/j/83008957257?pwd=MmVWwW9MODBJaW1HZXpPaEkzSko2Zz09>

Attendance open to all interested persons



Paducah Engineering Seminar Series

Contact: Dr. Charles Lu at ycharles.lu@uky.edu