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Webinar Talk on

"Turbocharger Optimization Via Evolutionary Algorithm"

THURSDAY
01 JULY 2021
10:00AM - 12:00PM

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Speaker :
Dr. Uswah Khairuddin

Synopsis

The automotive industry is turning to turbochargers for engine downsizing in order to adapt to more stringent CO2 emissions regulations every year. For smaller-size engines, turbochargers are able to provide similar boost power as their larger counterparts by allowing more compressed air into the engine. However, turbocharger turbines will experience a different level of unsteadiness depending on different engine speed and load combinations. Part of the unsteady effect is due to pulsating flow from valve opening and closing, pulsating flow due to cylinder interactions and a high frequency-turbomachinery unsteadiness due to blade passing at the volute tongue. Therefore, it is important to increase turbocharger turbine efficiency at design conditions as well as in the wider range of engine operating conditions. One of the ways to optimize turbocharger design is by running a 3D CFD aerodynamic optimization for turbocharger system geometry using evolutionary algorithm. The optimization method covers geometry parameterization of the components, automatic meshing and post processing, and employs a genetic algorithm based optimizer.

About Speaker

Dr. Uswah Khairuddin is a senior lecturer at the Department of Mechanical Precision Engineering, Malaysia-Japan Institute of Technology (MJIIT), UTM and a research member of Centre for Artificial Intelligence and Robotics (CAIRO) UTM. Her research interest includes artificial intelligence, optimization, machine vision and pattern recognition. She holds PhD in Mechanical Engineering from Imperial College London in 2017. Her PhD research was on Turbocharger design optimization where part of the project in under collaboration with Caterpillar Inc. She also holds Masters by research in Electrical Engineering (Research in Artificial Intelligence) from Universiti Teknologi Malaysia (UTM) and bachelor's degree in Mechatronics Engineering from International Islamic University Malaysia. She designed introduction to artificial intelligence module for undergraduate mechanical engineering course and currently developing a basic artificial intelligence module for Malaysia's lower secondary school as part of her consultancy project.