Department of Systems Engineering and Engineering Management

Student Seminar Series

A Two-echelon wind farm layout planning model

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Date	25 November 2015 (Wednesday)
Time	10:30am
Venue	P6921, 6/F, AC1

Abstract

The wind farm layout physically determines the power generation upper limits in the life cycle of a wind power project. This paper proposes a two-echelon layout planning model to determine the optimal wind farm layout to maximize its expected power output. In the first echelon, a grid composed of cells with equal size is utilized to model the wind farm while the center of each cell is the potential slot for locating a wind turbine. Optimization models are developed to determine the optimal size of grid cells and the optimal cells for locating wind turbines. In the second echelon, the selected grid cells are then translated to sets of Cartesian coordinates. The model for determining the optimal coordinate rather than the center in a grid cell for locating each wind turbine is formulated. Due to the model complexity in both echelons, the random key genetic algorithm (RKGA) and particle swarm optimization (PSO) algorithm are applied to obtain the optimal solutions in the first and second echelon separately. The comparative analysis between the proposed two-echelon planning model and the traditional grid/coordinate based planning models is conducted.

About the Speaker

Huan Long received the B.Eng. degree in Automation from Huazhong

University of Science and Technology, Wuhan, China, in 2013. She is currently working towards the Ph.D. degree in Department of Systems Engineering and Engineering Management at the City University of Hong Kong, Hong Kong, China. Her research interests focus on computational intelligence and data-driven methods applied in modeling, monitoring, optimization and operation of systems in wind energy.

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SEEM Seminar 2015-2016/012