

**DEPARTMENT OF MECHANICAL ENGINEERING****SEMINAR****Online**

Title: Optimization of Traffic Assignment with Air Quality Consideration

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Date: 30 March, 2021 (Tuesday)

Time: 11:30 a.m.

Zoom Link: 1) Link to join the meeting:

<https://hku.zoom.us/j/93845265082?pwd=M3FIQ3JXUGVYeitYQmRHHVVMOMGhTQT09>

2) Meeting ID: 938 4526 5082

3) Password: 091758

Abstract:

Emission from the transportation sector is a major contribution to ambient air quality that threatens public health globally. In 2015, it was estimated that 385,000 deaths and one trillion US dollars in health expenses were related to tailpipe emissions. However, tailpipe emissions remain major sources of air pollutants because of the increasing vehicle number. To mitigate the air pollution problems in urban areas, a framework is proposed to optimize traffic volume in road network. Kowloon Peninsula, Hong Kong, is taken as an example. In the optimization framework, the decision variables are the on-road traffic volumes and the objectives are the street-level concentrations of selected

air pollutants (carbon monoxide CO and nitrogen oxides NO_x). Several sites, where residents are susceptible to air quality problems, are selected. The mapping function, which relates the objectives to the decision variables, is implicitly determined. It is derived by the combination of emission model, dispersion model and numerical discretization. In addition, Genetic Algorithm (GA) is adopted to solve the complicated non-convex implicit optimization problems. The results highlight the importance of traffic assignment to residents who are vulnerable to poor air quality. It is also demonstrated that, apart from tightening tailpipe emissions or reducing vehicle number, urban air quality could be improved by proper source configuration and distribution.

ALL INTERESTED ARE WELCOME

For further information, please contact Dr. C.H. Liu at 3917 7901.

Research area: Natural & Built Environment