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BERILMU BERBAKTI

INSPEM WEEKLY SEMINAR

32/2019



#UNSDG

Date & Time

Friday, 30th August 2019 @ 3.15 pm

Venue

Al-Farabi Seminar Room, Second Floor,
INSPEM

Presenter

Prof. Dr. Tanka Nath Dhamala

Central Department of Mathematics,
Tribhuvan University



Topic

Optimal Network Topology for the Maximization of Dynamic Flows

Abstract

Because of today's rapid increasing disasters, evacuation planning is among one of the most emerging problems of research in emergency management. A wide range of mathematical fields, mainly, differential equations, functional analysis, optimal control theory, network optimization, mathematical programming, and many simulation approaches have been used to model these scenarios. However, none of them are perfect in solving the existing real-world problems in general, and only a particular method can be applied for a particular case only. A number of operational research models have been investigated to address these complex issues. Among them, we focus on the dynamic network optimization models and discuss the efficiency of proposed solution techniques. The considered evacuation planning issues are caused by large scale disasters in urban areas. The discussed problems are the maximization of flows in an evacuation network, where a flow has to be maximized at every point of time, in a priority ordering, and with possible reduction of crossing and merging conflicts. In general cases, the problem is computationally NP-hard. We present a number of efficient and many polynomial time algorithms for particular cases. We mainly focus on the network reconfiguration strategy that seeks to reverse the travel lanes with aims of maximizing the flows and saving unused lanes for an use of emergency supporting vehicles and location-allocation of emergency facilities. Our approach developed for emergency evacuation planning is equally applicable for the rush hour traffic management in different urban events.

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