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“A Shipper-carrier Dynamic Freight Assignment Model Using a Variational Inequality Approach”

Thursday, October 6, 2005
3:30 – 4:30 pm

Location:
Room M164
McCormick School of Engineering and Applied Science,
2145 Sheridan Road, Evanston, IL

Abstract: This research develops a dynamic freight assignment model that captures the shipper-carrier mechanism of the freight industry. The shippers minimize their cost by choosing a carrier with the lowest shipping cost for each shipment. The market reaches equilibrium when no shipper can reduce its cost further by changing the carrier for any shipment. Each carrier optimizes its operations so that it can reduce its shipping costs and attract more business from the shippers. An iterative Variational Inequality (VI) formulation is used to model the market equilibrium including the feedback from the carriers to the shippers. The cost function in the VI is obtained from a carrier sub-model that is a dynamic multi-modal multi-commodity network assignment model based on a Linear programming formulation. The solution algorithms for the formulation are used in a test network to demonstrate the applicability of the model. Current development includes modeling of empty truck movements in the carrier sub-model and the incorporation of contractual agreements between shippers and carriers in the freight industry.

Bio: Bhuwan Agrawal is currently a PhD Candidate in the Department of Civil and Environmental Engineering at Northwestern University. He completed his undergraduate degree in Civil Engineering from the Indian Institute of Technology, Delhi in 2000 and joined NU for graduate studies in Fall 2000. He has been working on various research projects with Prof. Ziliaskopoulos at NU. He had the opportunity to intern with the Regional Transportation Authority, Chicago during summer 2004 to gain a non-academic perspective to transportation. Bhuwan was awarded a Transportation Center Dissertation Year Fellowship in 2005.