



## Operations Research Seminar

# Optimal Path Finding for Direction, Location and Time Dependent Costs, with Application to Vessel, UAV and Robot Routing

**Irina Dolinskaya**

Department of Industrial and Operations Engineering at the University of Michigan

---

Real-time determination of an optimal path in a changing medium (such as winds and ocean waves) requires explicit incorporation of this cost function location- and time- dependency into the model. Furthermore, the direction-dependency of a cost function adds another layer of difficulty to the problem at hand. In this talk, we present methods to efficiently incorporate the complex structure of the cost function into the path planning process. We also integrate the system's operability and dynamics constraints in the optimization model, hence combining traditionally separated optimal-path finding and path-following stages of problem solving. An application to ship routing is introduced throughout the talk to motivate this research.

Irina Dolinskaya is a Ph.D. candidate in the Department of Industrial and Operations Engineering at the University of Michigan planning to defend in summer 2009. Irina is currently working with Dr. Robert L. Smith on a project funded by the Office of Naval Research MURI grant entitled "Optimum Vessel Performance in Evolving Nonlinear Wave Field." She is the 2008 recipient of the Bonder Scholarship for Applied Operations Research in Military Applications. Her contribution to the university community has been recognized by awarding her the College of Engineering Distinguished Leadership Award in April 2008.

---

**Date: Thursday, February 5, 2009**

**Time: 15:00-16:00**

**Location: GL-115**