Applied

Mathematics

McGill
Applied Mathematics Seminar Series
Oct. 12, 2001

Dr. Martin Gugat (Technische Universität Darmstadt)

Title: Optimal Control of Flow Through Networks of Channels

Friday Oct. 12, 2001

Time: 2:30 pm

Room: Burnside 1205

Coffee and refreshments will be served after the seminar

Abstract: We consider the optimal control of a network of channels. The flow in each channel is described by the St. Venant equations that form a nonlinear system of conservation laws. The flow is controlled at the boundary nodes of the network by sluice gates, weirs or pumps. The objective function is also given by boundary integrals. We present global controllability results that are based upon the method of characteristics, a numerical method of characteristics and numerical results for a problem of optimal control. Some state constraints are motivated by capacity restrictions for reservoirs. Constraints for the water heights lead to semi–infinite optimization problems.

Flow in a main channel in a network. The discontinuities occur at nodes of the network.