1081-35-105 **Mohammad A. Rammaha*** (mrammaha1@math.unl.edu), Department of Mathematics, University of Nebraska-Lincon, Lincoln, NE 68588-0130. *Monotone Operator Theory and Applications to PDE's.*

In this talk, I will focus on the treatment of hyperbolic PDE's under the influence of *supercritical interior and boundary sources*. The local solvability of such problems is hopeless via standard fixed point theorems or Galerkin approximations, due to the lack of compactness.

I will describe a general strategy that can handle the local solvability of most monotone problems by using nonlinear semi-groups (Kato's Theorem). However, nonlinear semi-groups can only accommodate a globally Lipschitz perturbation of a monotone problem. Thus, going from globally Lipschitz sources to the full generality of supercritical sources will require a great effort. In addition, I will discuss some recent results on convex integrals on Sobolev spaces (generalization to old results by Brézis-1972) which are essential to this strategy. (Received February 03, 2012)