1075-65-175 **Malgorzata Peszynska*** (mpesz@math.oregonstate.edu), Department of Mathematics, Oregon State University, Corvallis, OR 97331. *Numerical approximation of scalar conservation law with hysteresis, relaxation, and double-porosity.*

A numerical scheme for a scalar conservation law can be used in a constructive way to define entropy solutions to such equations. In the talk we discuss conservation laws arising in applications to methane evolution and carbon sequestration in coalbeds where models of hysteresis, relaxation, and double-porosity enhance a classical conservation law model with a convex flux term.

We first consider an initial value problem for a scalar conservation law with hysteresis which is represented via an auxiliary monotone coupling or a family of such couplings. We define a numerical scheme for such a law, prove its stability, and discuss the context in which it is consistent. The scheme can be fully implicit, or its regularization can be explicit, and there are advantages and disadvantages of both approaches.

Next we discuss a broader context arising in the applications in coalbeds where the additional terms complicate the analysis. (Received August 29, 2011)