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"Conservation laws in heterogeneous media"

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In this talk, we present results concerning some properties of weak solutions to conservation law (CL) with flux function explicitly dependent on space variable. We consider vanishing viscosity and diffusion-dispersion approximation to conservation law. Beside standard techniques (entropy-entropy flux pair, genuine nonlinearity...) we use the measure theoretical tools (measure-valued solutions such as Young measures, H-measures, transport equation) and generalized solution concept in Colombeau algebras of generalized functions.

More precisely, we give results on: precompactness of the family of solutions to diffusion-dispersion approximation to CL [1,2] , precompactness of the family of solutions to vanishing viscosity approximation to CL [3], equivalence between measure-valued solution concept and generalized solutions[4], existence and uniqueness for Colombeau generalized solution to CL[5].

References:

[1] Aleksić, Jelena; Mitrovic, Darko; Pilipović, Stevan Hyperbolic conservation laws with vanishing nonlinear diffusion and linear dispersion in heterogeneous media. *J. Evol. Equ.* 9 (2009), no. 4, 809--828.

[2] Holden, H.; Karlsen, K. H.; Mitrovic, D. Zero diffusion-dispersion-smoothing limits for a scalar conservation law with discontinuous flux function. *Int. J. Differ. Equ.* **2009,** Art. ID 279818, 33 pp.

[3] Aleksić, Jelena; Mitrovic, Darko On the compactness for two dimensional scalar conservation law with discontinuous flux. *Commun. Math. Sci.* 7 (2009), no. 4, 963--971.

[4] Aleksić, J.; Colombeau, J.-F.; Oberguggenberger, M.; Pilipović, S. Approximate generalized solutions and measure-valued solutions to conservation laws. *Integral Transforms Spec. Funct.* 20 (2009), no. 3-4, 163--170.

[5] Aleksić, J.; Generalized solutions to conservation laws in heterogeneous media, submitter to ITSF