WORKING GROUPS PDE

DATE: WEDNESDAY, SEPTEMBER 14, STARTING FROM 15:00 [1]

Vanishing viscosity method for an optimal control problem of scalar conservation laws in the presence of shocks

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To reduce the computational cost for optimal control problems of the inviscid Burgers equation in the presence of shocks, Zuazua et al. have developed an alternating descent method, and revisited it by the method of vanishing viscosity. In this talk we study theoretically the vanishing viscosity limit of such a problem for 1-D scalar conservation laws with a general nonlinearity. The discontinuities of coefficients in those equations lead to difficulties when passing to the limits in the sensitivity analysis. Thus we employ the method of matched asymptotic expansions to construct approximate solutions to the smoothed nonlinear, the linearized and the dual problems, respectively. It is then proved that the approximate solutions satisfy the corresponding equations asymptotically, and converge to the solutions of the corresponding inviscid problems with certain convergent rates. The equations for the shock and the variation of its position are derived, and specifically, the latter equation approaches, as a parameter tend to infinity, to the one derived by Bressan and Marson.

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Determination of a calcium channel distribution in the olfactory system

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In this work we are interested in the study of the calcium channel's distribution in the olfactory system. This problem can be addressed as a non-local inverse problem, where we are interested in to obtain the density of Ca^{2+} channels, which corresponds to a kernel of the current. In our case our measurement is the total current during an interval of time. We show that this problem can be written in a similar way to the well-known potential inverse problem. We proof an identifiability result under suitable assumptions.

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[1]Each presentation will last about 30 minutes + further questions and discussions