Congestion phenomena in fluid systems

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Abstract

This talk addresses the mathematical analysis of fluid models that include a maximum packing constraint leading to congestion phenomena. These equations arise for instance naturally in the modeling of mixtures like suspensions or in collective motion. I will present recent results on two classes of PDEs systems corresponding to two modeling approaches: the "soft" approach based on compressible equations with singular constitutive laws (pressure and/or viscosities) close to the maximal constraint; and the "hard" approach based on a free boundary problem between a congested domain with incompressible dynamics and a free domain with compressible dynamics.