TEMPLE UNIVERSITY

Department of Mathematics

Analysis Seminar

Room 617 Wachman Hall

Monday, November 3, 2014, 2:40 p.m.

Pressureless Euler-Poisson systems

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We study the initial value problem for pressureless Euler/Euler-Poisson systems modeling the evolution of a sticky particle system. In the one dimensional case, we show that the system with or without viscosity admits a unique entropy-admissible weak solution. This general global existence result is established by employing the "sticky particles" model and letting the number of particles go to infinity. Furthermore, an explicit rate of convergence of these sticky particle solutions to the solution for the continuous model is obtained via a contraction principle in the Wasserstein metric. In the two or more space dimensions, we construct initial data showing that the Cauchy problem can have (i) two distinct sticky solutions, or (ii) no sticky solution, not even locally in time. This is joint work with Adrian Tudorascu (the one dimensional case) and with Alberto Bressan (the higher dimensional case).