

NONLINEAR GEOMETRIC OPTICS AND APPLICATIONS TO STABLE SINGULARITY FORMATION

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Abstract

Quasilinear hyperbolic systems are evolution-type PDEs that arise in many physical and geometric contexts. In this talk, I will describe some of my recent work on stable singularity formation in solutions to large classes of such systems. The methods have robust features and apply in particular to systems in multiple spatial dimensions with multiple speeds of propagation. The framework of the proofs relies on new geo-analytic constructions, notably the development of a theory of nonlinear geometric optics for transport operators that is dynamically adapted to the singularity. I will also highlight some important open problems and connect my work to the broader goal of obtaining a rigorous mathematical theory modeling the long-time behavior of solutions.