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Conservation laws with prescribed eigencurves.

We consider systems of hyperbolic conservation laws for n unknown functions in one space and one time variable. There is a local frame on \mathbb{R}^n , called eigenframe, associated with each system (consisting of the eigenvectors of the Jacobian matrix of the flux). The integral curves of such frame, called eigencurves, contain rarefaction curves and play an important role in solving the Cauchy problems for such systems.

In this talk, we explore the properties of a conservative system that are determined by the frame alone. Given a local frame on \mathbb{R}^n , what degree of freedom do we have, if we want to construct a system of conservation laws with this eigenframe? To what extent does a frame determine the number of companion conservation laws (entropies) associated with a system? A broader goal of this project is to obtain geometric classification of hyperbolic conservation laws that would lead to a better understanding of the properties of their solutions. (Received August 11, 2011)