
Transverse steady bifurcation of viscous shock solutions of a system of parabolic conservation laws

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Abstract

I will describe how a recent proof of instability of inviscid slow shocks in magneto hydrodynamics (MHD) motivated an analytical study of the existence of nonplanar viscous shocks and also an extensive numerical study (in joint work with Kevin Zumbrun and Blake Barker) of transitions to instability for viscous multi-D MHD.

The talk will focus on nonlinear, steady, bifurcations for a class of strict parabolic models that features $O(2)$ symmetry in a strip . The applications in mind are “cellular instabilities” occurring in detonation and MHD. Curiously, a similar phenomena in MHD was observed by astrophysicists in late 90’s through numerical studies of slow shocks in white dwarf stars.

Time permitting, I will also show further results on instabilities in MHD that involve both numerical and analytical techniques.

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