

Spectral stability of shock profiles for hyperbolically regularized systems of conservation laws

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Abstract

This talk reports a proof that under natural assumptions shock profiles viewed as heteroclinic travelling wave solutions to a hyperbolically regularized system of conservation laws of the form

$$g(v)_t + f(v)_x = B \square v := B(v_{xx} - v_{tt}) \quad (v \in \mathbb{R}^n)$$

are spectrally stable if the shock amplitude is sufficiently small. This means that an associated Evans function $\mathcal{E} : \Lambda \rightarrow \mathbb{C}$ with $\Lambda \subset \mathbb{C}$ an open superset of the closed right half plane $\mathbb{H}^+ \equiv \{\lambda \in \mathbb{C} : \operatorname{Re} \lambda \geq 0\}$, has only one zero, namely a simple zero at 0. The result is analogous to the one obtained in [1] and [2] for parabolically regularized systems of conservation laws, and also distinctly extends findings on hyperbolic relaxation systems in [2], [3], [4].

References

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