

Spectral Stability of Small Shock Waves

H. Freistühler* and P. Szmolyan†

Abstract

In this talk, spectral stability of small amplitude shock waves associated with simple modes in systems of viscous conservation laws is shown to be a direct consequence of the spectral stability of shock waves in scalar viscous conservation laws. This relationship is established through a precise description of the behaviour of Evans functions in the zero amplitude limit. The eigenvalue problem is studied via flows it induces on suitable Grassmann manifolds. An appropriate scaling allows to exploit the slow-fast nature of the problem. The stability theorem covers nonlinearities of arbitrary finite order, extending previous results on the second order (“genuinely nonlinear”) case. The applicability of the method is not restricted to the abovementioned specific situation.

*Max-Planck-Institut für Mathematik in den Naturwissenschaften, D-04103 Leipzig, Germany

†Institut für Angewandte und Numerische Mathematik, Technische Universität Wien, A-1040, Austria.