

Non-linear Stability of Shock Waves for Multi-dimensional Viscous Conservation Laws

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Abstract

The non-linear stability of weak planar shocks for dissipative systems of conservation laws in several space dimensions is proved. The dissipation is of an even order $k+1$. The problem is considered in a finite domain $|x_j| \leq l_j$, $1 \leq j \leq m$ where l_j are large compared with the width of the shock layer $\varepsilon^{-1} = |u_R - u_L|^{-1/k}$. The boundary conditions in the normal direction x_1 preserve one global conservation law while the boundary conditions in the tangential directions to the shock x_j , $j > 1$ are periodic. There are some additional assumptions which are all valid for the compressible Euler equations with $k + 1$ order dissipation.