

# Stable manifolds for a class of degenerate evolution equations and exponential decay of kinetic shocks

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## **Abstract**

We construct stable manifolds for a class of singular evolution equations including the steady Boltzmann equation, establishing in the process exponential decay of associated kinetic shock and boundary layers to their limiting equilibrium states. Our analysis is from a classical dynamical systems point of view, but with a number of interesting modifications to accommodate ill-posedness with respect to the Cauchy problem of the underlying evolution equation.