

Entropy Dissipation Methods for Nonlinear Evolution Equations

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Abstract

Entropy methods are well-known in the analysis of hyperbolic equations. Recently, so-called entropy dissipation methods have been proved to be a very powerful tool for the analysis of the qualitative behavior of solutions to nonlinear parabolic equations. In this talk we present by examples the principal ideas of these entropy methods. In particular we consider strongly coupled nonlinear parabolic systems and higher-order parabolic equations. For these problems maximum principles are not available. The entropy method will be essential to prove the existence of solutions, explicit long-time decay rates of the solutions, stability of certain numerical schemes, and singular limits.

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