

Entropy- and Duality methods for Dissipative PDE Models.

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Abstract:

Many PDE models in applied mathematics feature a dissipative structure, which can be captured, for instance, by the monotone decay (or increase) of an entropy functional.

Over the last decades, exploiting such entropy structures has attracted a large amount of mathematical attention leading to such important results as the Di-Perna Lions theory of renormalised solutions to Boltzmann's equation or the Desvillettes-Villani approach of explicit convergence to equilibrium for Boltzmann's equation.

Also in the context of reaction-diffusion systems, entropy methods have recently been used and developed to obtain global existence results and quantitative convergence to equilibrium. Concerning global existence, the introduction of entropy density variables combines well with duality-methods to derive global, dimension-independent a-priori estimates.