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Nonlinear damping vs. formation of singularities

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We explore the boundaries of damping estimates by comparing and contrasting two closely related models of combustion, the Majda and ZND models. We show that singularities form in the unweighted Lipschitz norm in finite time on both sides of the shock for both models, extending classical results of John and Liu to suitable variable coefficient systems. On the other hand, we show some energy estimates on the Majda model in exponentially weighted norms, which allows us to obtain an orbital asymptotic stability result, and also that the ZND model does not admit such estimates. This work is joint with Paul Blochas.

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