

Attractors in nonlinear thermoelasticity

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Abstract

This talk will present recent developments in the area of long time behavior of nonlinear flows arising in thermoelasticity. Issues such as : existence of global attractors, their smoothness and dimensionality will be discussed. Of particular interest are flows whose dynamics changes characteristics from hyperbolic to parabolic. Our aim is to show that these differences persisting in finite-time, disappear asymptotically, when time $t \rightarrow \infty$. In fact, our main result states that the ultimate behavior of hyperbolic flow is both "smooth" and finite-dimensional. In addition, the dimension of the attractor and the "smoothness" can be made uniform with respect to the parameters characterizing both hyperbolicity and parabolicity.

At the technical level, some of the related mathematical results of independent interest include:

1. Inverse estimates reconstructing mechanical energy of thermoelastic system from the nonlinear source and thermal dissipation.
2. Positive solution to backward uniqueness in *nonlinear* thermoelasticity.

References

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