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Title:

Global attractors and stability in 2-D Kirchoff-Boussinesq models;

Abstract

Dynamics for a class of nonlinear 2D Kirchhoff-Boussinesq models will be considered. These nonlinear plate models are characterized by a presence of a nonlinear source that alone leads to finite-time blow up of solutions. In order to counteract, restorative forces are introduced, which however are of a supercritical nature. This raises natural problems related to existence and wellposedness of finite energy (weak) solutions.

It is shown that finite energy solutions do exist globally , are unique and satisfy Hadamard wellposedness criterium. In addition, solutions corresponding to "smooth" initial data (ie strong solutions) likewise enjoy the full Hadamard wellposedness. The proof is based on logarithmic control of the lack of Sobolev's embedding along with the method introduced in [3].

In addition to wellposedness, long time behavior is analyzed. Viscous damping added to the model controls the long time behaviour. It is shown that there exists global attractor corresponding to both weak and strong solutions. The dimension of the attractor is finite and can be calculated from the parameters describing the model. Thus, the long time dynamics is characterized by finite dimensional structures, that can be approximated. These results are obtained by exploiting recently introduced abstract theory for atractiveness [2], along with the method introduced in [1].

References

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[3] V. Sedenko, *Initial boundary value problem of nonlinear oscillations theory of shallow shells*, Doklady AN SSSR, **316** (1991), 1319–1322,

This is joint work with Igor Chueshov, University of Kharkov..