Thermoelastic Bresse system with dual-phase-lag model

Ivana Bochicchio
Università di Salerno
ibochicchio@unisa.it

The thermoelastic system modeling longitudinal, vertical and angular motion is the so-called Bresse system. It describes the behavior of a thin curved beam and it was introduced in 1856 by Bresse. The Bresse system generalizes the well-known Timoshenko model, obtained in the particular case where the longitudinal displacement is not considered and supposing zero initial curvature. The Bresse model becomes more interesting when also the thermal case is taken into account. It is commonly accepted that the classical heat conduction theory based on the Fourier law implies the fact that the thermal perturbations at any point of the body are felt instantly anywhere. So this work is devoted to analyze a non isothermal Bresse system where the dual-phase-lag heat conduction theory is used to model the heat transfer. In particular, setting the equations in an abstract framework, an existence and uniqueness result is obtained by using the theory of linear semi groups. Furthermore, the polynomial stability and the exponential energy decay are investigated.