

Derivation of von Kármán plate theory in the framework of three-dimensional viscoelasticity

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We apply a quasistatic nonlinear model for nonsimple viscoelastic materials at a finite-strain setting in the Kelvin's-Voigt's rheology to derive a viscoelastic plate model of von Kármán type. We start from solutions to a model of three-dimensional viscoelasticity considered in [1] where the viscosity stress tensor complies with the principle of time-continuous frame-indifference. Combining the derivation of nonlinear plate theory by Friesecke, James and Müller [4, 5], and the abstract theory of gradient flows in metric spaces by Sandier and Serfaty [6] we perform a dimension-reduction from 3D to 2D and identify weak solutions of viscoelastic form of von Kármán plates. This is a joint work with Manuel Friedrich (Münster).

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