FULL DISCRETIZATION OF A GALLERY OF WAVE PROPAGATION MODELS ON VISCOELASTIC SOLIDS

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Abstract. We continue a long breadth program started in [1] to characterize, analyze, and discretize and large gallery of models for viscoelastic wave propagation, including all three classical hyperbolic models (Zener, Maxwell, Voigt), their fractional derivative versions, as well as combinations of different models in different parts of the physical domain. We will focus on Finite Element Discretization in space, combined with Convolution Quadrature (of multistep or Runge-Kutta type) in time. The analysis is carried out in the Laplace domain, by carefully studying the continuous and discrete transfer functions associated to the model.

Keywords: Finite Element Method, Viscoelastic solids, Waves, Convolution Quadrature.

Mathematics Subject Classifications (2010): 35B35, 35L05, 46F12, 65M60, 65J08, 74B99.

References

[1] T.S. Brown, S. Du, H. Eruslu, F.J. Sayas. Analysis of models for viscoelastic wave propagation. SIAM *Applied Mathematics and Nonlinear Sciences*, 3(1):55-96, 2018.

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