Asociación Argentina
de Mecánica Computacional

Mecánica Computacional Vol XXXVIII, págs. 11-11 (resumen)
H.G. Castro, J.L. Mroginski, R.R. Paz, M.A. Storti (Eds.)
Resistencia, 1-5 Noviembre 2021

TOWARDS REDUCED-ORDER DESCRIPTIONS FOR VISCOELASTIC COMPOSITE MEDIA VIA MEAN-FIELD HOMOGENIZATION

Martín I. Idiart

Centro Tecnológico Aeroespacial / Departamento de Aeronáutica, Facultad de Ingeniería, Universidad Nacional de La Plata, Avda. 1 esq. 47, La Plata, B1900TAG, Argentina

Abstract. The time-dependent mechanical behavior of composite media is the result of intricate interactions between elastic and inelastic deformation processes operating within the different constitutive phases. A key consequence of these interactions is that microscopic constitutive descriptions based on finite sets of internal variables give rise to macroscopic constitutive descriptions with an infinity of internal variables. This fact has motivated several attempts to generate approximate macroscopic descriptions based on reduced sets of effective internal variables that provide a partial but hopefully accurate characterization of the evolving microscopic state of the composite. In this talk we will present recent advances on the development of a class of reduced-order descriptions for viscoelastic composite media based on mean-field homogenization. The focus here is placed on the structure of the effective viscoelastic constitutive relations, and on accurate approximations of those relations granted the underlying microstructure is known with sufficient precision so that purely elastic properties can be accurately determined. Sample results for rigidly reinforced viscoelastic solids subject to complex deformation histories are reported to highlight the capabilities and limitations of the scheme and to motivate possible improvements.