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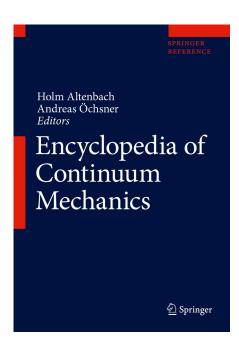*Editors*

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Variational Principles in Numerical Practice

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Synonyms

<u>Bone-resorbable graft interaction</u>; <u>Dissipation in concrete</u>; <u>PEM vibration damping</u>

Definitions

Variational principles represent a general framework for determining the mechanical state of a system, by identifying its motion as a minimum of a pertinent functional. Moreover, finite element methods are naturally based on variational principles and provide a very powerful tool for numerically solving many mechanical as well as other multi-physics problems. The purpose of the present note is to illustrate some recent applications with special reference to biomechanics and dissipation in quasi-brittle materials and piezo-electromechanical structures, in order to confirm the validation and to highlight the bright prospects of this method.

Introduction

Theoretical elegance of the variational approach applied to mechanical problems has long been extensively and thoroughly formalized in fundamental scientific works (Landau and Lifshitz, 1976; Marsden et al., 2001; Berdichevsky, 2009;...

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