

ON THE EQUILIBRIUM EQUATIONS OF LINEAR 6-PARAMETER ELASTIC SHELLS*

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Dedicated to Dr. Dan Tiba on the occasion of his 70th anniversary

Abstract

We consider the linearized theory of 6-parameter elastic shells with general anisotropy. We derive the equilibrium equations from the virtual power statement and formulate the corresponding variational problem in the suitable functional framework. Then, using a Korn-type inequality for the linearized strain measures we prove the existence and uniqueness of weak solutions. Finally, we show that our general theorem can be applied to obtain existence results in the case of isotropic elastic shells. We illustrate this procedure by investigating three different linear shell models established previously in the literature, namely the simplified isotropic 6-parameter shell, the Cosserat isotropic model, and the higher-order 6-parameter Cosserat model.

MSC: 74K25, 74B15, 74A05, 74A60, 74G65.

keywords: linear elastic shells, 6-parameter shells, Cosserat model, weak solutions, existence and uniqueness.

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