Two-dimensional analysis of shape memory alloys under small loadings

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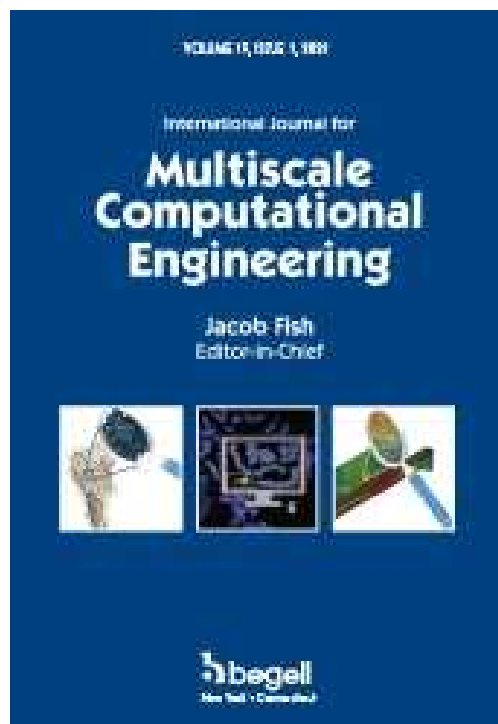
Abstract:

A mathematical model is constructed for modeling the behavior of shape memory alloy (SMA) patches in two dimensions. The effect of phase transformations is included into the model via a specific choice of the free energy functional valid for square-to-rectangular transformations. It is shown that the classical one-dimensional Falk dynamic model, applied to shape memory alloy rods, could be regarded as a special case of the formulated two-dimensional model. The model is analyzed numerically with the method of lines and a series of computational experiments for SMA materials is discussed, in detail, in order to compare the results of simulations to those obtained with conventional one-dimensional models.

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