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A COUPLED PROBLEM FOR POROUS SHAPE MEMORY ALLOY FLUID-FILLED BEAMS

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We are concerned with the quasi-static bending problem for a beam made of porous shape memory alloy containing interconnected fluid-filled pores. The considered model postulates that when the porous shape memory alloy is subjected to stress, the matrix material may undergo a reversible thermoelastic martensitic transformation and its deformation results in volumetric changes in the pores. A similar problem of poroelastic beams has been considered in [1]. In this contribution we extend the formulation for poroelastic material as developed in [1] to the case of pseudoelastic shape memory material [2]. Flag-type hysteretic effects and the solid strain–temperature–fluid flow couplings are taken into account.

Formulation of the coupled problem in the form of an evolutional variational inequality, its finite element approximation and results of numerical simulations will be presented at the conference.

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