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On the propagation of weak shock waves in compressible thermohyperelastic solids. (English)

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Summary: In the present paper, a study of the weak shock waves propagation into thermohyperelastic solids is presented using the theory of singular surfaces. The equation of motion of the weak shock waves, which is obtained by the later theory, reduces to an eigenvalue problem. The propagation speeds of weak shock waves are obtained from the eigenvalues of the isentropic acoustic tensor for a particular state of deformation. The constitutive equation of a near-incompressible thermohyperelastic solid is considered. This constitutive model derives from a Helmholtz free energy which does not seem to be used in published scientific literature. The shock waves speeds are expressed in the framework of standard loadings: simple uniaxial tension, biaxial stretching, and uniform dilatation. The material seems to be always stable, and no singularity of the isentropic acoustic tensor has been found which corresponds to a critical state.

MSC:

74J40 Shocks and related discontinuities in solid mechanics

74J15 Surface waves in solid mechanics

Full Text: [DOI](#)

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