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**Some problems in nonlinear dynamic elasticity.** (English. Russian original) Zbl 1138.74349

Proc. Steklov Inst. Math. 251, 165-191 (2005); translation from Tr. Mat. Inst. Steklova 251, 173-199 (2005).

Summary: The paper contains a survey of recent studies of small-amplitude quasi-transverse one-dimensional waves in elastic and viscoelastic media. The following issues are addressed: We study small-amplitude nonlinear waves in elastic media under a more accurate consideration of the internal energy compared with the earlier works. We describe new properties of shock waves and Riemann waves of small amplitude in an anisotropic medium whose properties are invariant under the rotation through  $120^\circ$  about the wave normal. We formulate similarity conditions for one-dimensional problems of nonlinear elasticity. We discuss reasons for the earlier discovered nonuniqueness of solutions to self-similar problems for waves in elastic media, and formulate a criterion that allows one to predict, based solely on the properties of the shock adiabat, the nonuniqueness or the nonexistence of self-similar solutions to systems of hyperbolic equations that express conservation laws. We consider the structure of shock waves in elastic media in the framework of the Kelvin-Voigt model of a viscous medium. The results of the numerical analysis of the nonlinear stability of the structure of metastable shock waves are also presented.

For the entire collection see [\[Zbl 1116.34001\]](#).

**MSC:**

- [74J30](#) Nonlinear waves in solid mechanics
- [35Q72](#) Other PDE from mechanics (MSC2000)
- [74B20](#) Nonlinear elasticity
- [74D10](#) Nonlinear constitutive equations for materials with memory
- [74H99](#) Dynamical problems in solid mechanics
- [74J40](#) Shocks and related discontinuities in solid mechanics

Cited in **2** Documents

**Full Text:** [MNR](#)