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Weak shock waves and shear bands in compressible, inextensible thermoelastic solids.

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Summary: A study of weak shock waves propagating into a solid, which is compressible but temperature-dependent extensible in a specified direction is presented. The inextensible solid is also considered. The constitutive equations of constrained thermoelastic material are written as the summation of constrained and unconstrained counterparts of the relevant quantities. The equation of motion of weak shock waves, which is recovered by the theory of singular surfaces, reduces to an eigenvalue problem. The solution of this eigenvalue problem yields the speeds of propagation of weak shock waves. In the case of an undeformed solid, the speeds of these waves are explicitly expressed. Additionally, a discussion on the ductility limits of constrained thermoelastic material subjected to the uniaxial and biaxial extensions is presented.

MSC:

[74J40](#) Shocks and related discontinuities in solid mechanics

[74F05](#) Thermal effects in solid mechanics

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[weak shock wave](#); [constrained materials](#); [thermoelasticity](#); [shear bands](#)

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