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Wave motion in solids

We present a rapid and personal survey of the mathematics and mechanics of finite amplitude waves in nonlinear elasticity and related theories. We first compare the determining equations derived from the point of view of the phenomenological theory of continuum mechanics with the equations derived from microscopic considerations. Then we discuss how to approximate the full determining equation via the various “model” equations used in nonlinear acoustics and this also in the case of prestressed and pre-strained material.