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Evolution of Shock Structures in Gases and Solids

Regions with large variations on a small length scale of the thermodynamic fields mass density, velocity, temperature, concentration and strain may appear in gases as well as in solids.

In gases, these shock structures are formed by waves that are described by symmetric hyperbolic systems. In solids, the shock structures represent propagating interface boundaries and these are governed by so called phase field equations which are of parabolic type.

We discuss thermodynamic and kinetic principles that are used to establish those field equations for Maxwell and Bose gases and for binary alloys, consisting of two phases.

Some selected initial and boundary value problems are used to study common features and differences of both applications.