Contribution Title:	DELTA-SHOCK WAVES AND MEDIUMS WHICH CAN BE TREATED AS PRESSURELESS CONTINUUMS
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There are "nonclassical" situations where, in contrast to Lax's and Glimm's classical results, the Cauchy problem for a quasilinear system of conservation laws may admit delta-shock wave type solutions [1]. They are solutions such that their components may contain Dirac functions.

We study delta-shocks in the multidimensional system of conservation laws

$$\rho_t + \nabla \cdot (\rho F(U)) = 0, \quad (\rho U)_t + \nabla \cdot (\rho N(U)) = 0, \quad x \in R^n, \quad t \geq 0, \tag{1}$$

where F and N are given vector and tensor fields, respectively, $\rho = \rho(x,t) \in R$, $U(x,t) \in R^n$. The zero-pressure gas dynamics is a well-known particular case of (1).

We derive the balance laws describing mass, momentum, and energy transport between the volume outside of the delta-shock wave front and the delta-shock moving wave front. We prove that these processes are going on in such a way that the mass of the delta-shock wave front is an increasing quantity, while the energy of the volume (outside of the delta-shock wave front) and the total energy are nonincreasing quantities. The Cauchy problem related to propagation of delta-shock waves is solved.

The systems of the type (1) are appropriate for modeling and studying singular problems in mediums which can be treated as pressureless continuums (dusty gases, two-phase flows with solid particles or droplets, granular gases).

[1] V.M. Shelkovich, δ- and δ'-shock types of singular solutions to systems of conservation laws and the transport and concentration processes, Uspekhi Mat. Nauk, 63:3, 2008, 73-146. English transl. in Russian Math. Surveys, 63:3, 2008, 473-546.