

The necessary and sufficient conditions are obtained, for a two-component $(2 + 1)$ -dimensional quasi-linear system to possess solutions describing non-linear interactions of n planar simple waves. These solutions can be viewed as natural dispersionless analogues of n - gap solutions. Such two-component systems (called ‘integrable’) [1] are characterized as follows:

- there exists a 15-parameter family of such systems,
- all such systems possess three conservation laws of hydrodynamic type and, therefore, are symmetrizable in Godunov’s sense,
- the system is integrable iff it possesses a scalar pseudopotential which plays the role of the ‘dispersionless Lax pair’.

A complete classification is given for the case of two-component $(2+1)$ -dimensional systems possessing a convex quadratic entropy [2].

References

- [1] E.V.Ferapontov and K.R. Khusnutdinova, The characterization of two-component $(2+1)$ - dimensional integrable systems of hydrodynamic type, nlin.SI/0310021; J. Phys. A: Math. Gen. 37 (2004) 1-15.
- [2] E.V. Ferapontov and K.R. Khusnutdinova, On the integrability of $(2+1)$ - dimensional quasilinear systems, nlin.SI/0305044; to appear in Comm. Math. Phys. (2004).