

Conservation laws, hodograph transformation and boundary value problems of plane plasticity

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1. Introduction

The Riemann method is widely used for solution of Cauchy problem for hyperbolic linear equation for one function of two independent variables. The real reason for the introduction of adjoint equation to obtain Riemann function is to make available the line integral vanishes around closed paths. In other words there is a conservation law of the special form.

The same method is applied for linear system obtained from quasi-linear one by hodograph transformation. This linearization is valid only when the Jacobian of transformation is not equal to zero, that is unknown before the solution of the system.

Conservation laws of quasi-linear homogeneous hyperbolic system for two functions of two independent variables, related with the solution of corresponding linearized system are used in the present talk for the solution of the Cauchy and Goursat problems. The vanishing of Jacobian is not a restriction now, that allows to construct the characteristic fields including the simple waves.

Some applications for plane plasticity and gas dynamics are considered. In particular the Mikhlin problem for the loaded cavity is solved for any concave form of contour.

The possibility of generalization of the method for non-homogeneous system is discussed.

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