THE MONGE-AMPERE PARTIAL DIFFERENTIAL EQUATION
$rt - s^2 + \lambda^2 = 0$

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Introduction. Recently the study of the propagation of a plane shock wave moving into a quiet atmosphere, and leaving a nonisentropic disturbance behind it, has been reduced [6] to the solution of a Problem of Cauchy for a Monge-Ampère equation of the type

$$(1) \qquad rt - s^2 + \lambda^2 = 0, \ \lambda = X(x)Y(y).$$

The present paper is devoted to a study of the Problem of Cauchy for this partial differential equation with a view to later applications to shock propagation.

In the first section we determine those functions $X(x)$, $Y(y)$ for which (1) has intermediate integrals. A summary of the results will be found in the seven cases in Theorem 1.

The linearization (without approximation) of the seven equations found in § 1 is carried out in § 2 with results summarized in Theorem 2. The individual results (particularly on cases 3, 5) are of interest for the applications in mind.

The solution of the Problem of Cauchy is taken up in § 3 and reduced to the solution of the Problem of Cauchy for linear partial differential equations. A summary of the results will be found in Theorem 3.

1. Intermediate integrals. In this section we investigate the intermediate integrals of (1).

If either X or Y is zero, or both are constant, then $\lambda =$ const., and (1) has intermediate integrals [3, pp. 154-155]

$$q - \lambda x = \phi(p + \lambda y), \ q + \lambda x = \psi(p - \lambda y),$$

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