LINEARIZED RAYLEIGH'S PROBLEM IN MAGNETOГАSDYNAМICS.
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by

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1. - Introduction and position of the problem

This paper presents some results obtained on Rayleigh's problem in Magnetogasdynamics. A more comprehensive and full treatement of this subject will follow elsewhere.

Rayleigh's problem is a standard one in the theory of incompressible viscous fluids. The problem is related to the evaluation of the unsteady motion of a semi-infinite fluid, when a plate, submerged in it and originally at rest, is set impulsively in motion in its own plane with constant velocity.

For incompressible viscous fluids the problem was first formulated by Stokes in 1850 [12], and generalized by Rayleigh [8]. The problem which is easily solved for an incompressible viscous fluid greatly complicates when compressibility is taken into account. Various approximate solutions of the problem were obtained with the aid of the boundary-layer theory by Illingworth [7], Van Dyke [13], Stewartson [11], or by linearization: Howarth [6] and Hanin [4]. Recently numerical calculations were performed by Harlow and Meixner [5].

In the last years, owing to the increasing interest in plasma physics, extensions of the problem have been made to Magnetohydrodynamics. Rossow [10], Chang and Yen [3], Bryson and Rosciszewski [2], have studied the problem for an incompressible conducting fluid, when a constant magnetic field is applied perpendicularly to the plate.

We will examine here the above problem for a compressible viscous fluid of finite conductivity in which a perfectly conducting plate