J. Sharikadze

I. Javakhishvili Tbilisi State University
Tbilisi, Georgia

SOLUTIONS OF BOUNDARY LAYER CONDUCTING FLUID PROBLEMS IN THE STRONG MAGNETIC FIELD

When external magnetic field is strong, the problem of solution of the boundary layer equation of conducting fluid is reduced to the problem of solution of integro-differential equations with parameter $\frac{1}{N}$, where N is magnetohydrodynamical interaction factor and it is very large. We have considered four cases.

1. The motion is steady and not similar.

The velocity of external flow is a function of x, and the external magnetic field is constant.

2. The motion is steady and similar.

The velocity of external flow is proportional to x^m and the external magnetic field is proportional to $x^{\frac{m-1}{2}}$, where m is constant.

3. The motion is unsteady and not similar.

The velocity of external flow is a function of x and t, and the external magnetic field is constant.

4. The motion is unsteady and similar.

To determine the velocity of external flow, we considered four cases, when solutions exist. The magnetic field is selected accordingly. Solutions of the examine problems are sought in terms of a series with degrees $\frac{1}{N}$. For every problem the Green's functions are constructed, the expressions of three approximations are written out and all physical boundary layer characteristics are found.