

ANALYTICAL SOLUTION OF THE PROBLEM ON THE MHD FLOW IN THE INITIAL PART OF THE PLANE CHANNEL IN A TRANSVERSE MAGNETIC FIELD IN OSEEN APPROXIMATION

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The MHD problem on the inflowing of conducting fluid into the plane channel through the channel's lateral side in the transverse magnetic field is considered. It is supposed, that sufficiently far from the entrance region, there is the Hartmann flow in the channel. External magnetic field is perpendicular to the walls of the channel. The solution of the problem is obtained in Oseen approximation by using Fourier transform. Solving the problem on a flow of viscous fluid in the initial part of the channel by using Oseen approximation, it is usually supposed that the velocity and the pressure of the fluid are given at the entrance of the channel ([2],[3]). These boundary conditions overdetermine the problem. In this report the solution of the problem is obtained with condition that only the velocity of fluid, flowing into the channel, is given.

The length of the initial part at which the velocity of the fluid differs from the Hartmann flow at less than 1% is found. The asymptotic solution of the problem at Hartmann number tends to infinity is obtained. The similar problem was solved in article [1] for a longitudinal magnetic field.

REFERENCES

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