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2D-simulation of stationary MHD flows in the ducts of rectangular cross-section IVAN KHALZOV, ANDREI SMOLYAKOV, University of Saskatchewan, VICTOR ILGISONIS, RRC "Kurchatov Institute" — The numerical code for a calculation of 2D stationary MHD flows of incompressible conducting viscous fluids (liquid metals) in straight and circular ducts of rectangular cross-section is developed. The flows are driven by the electrical current perpendicular both to the duct axis and to the external magnetic field. The code generalizes the well-known iterative Gauss-Seidel method for the case of systems of elliptic equations. The algorithm developed allows us to carry out the calculations of stationary flows in a wide range of Hartmann ($Ha = 1 \div 10^3$) and Reynolds ($Re = 1 \div 10^6$) numbers. The numerical results are presented for the experimental device, which is under construction in Russia.

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