Magnetostatic equilibrium in the magnetotail

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We have examined possible configuration of the magnetotail magnetic field satisfying the magnetostatic equilibrium condition grad p = [jB]. A two-dimensional axisymmetrical problem with a magnetic dipole in the coordinate center was formulated, with the magnetopause being modeled by two horizontal planes. The problem is reduced to solution of the Grad-Shafranov equation with the plasma pressure dependent on the Euler magnetic potential. The equation was solved numerically. The equilibrium pressure and magnetic field in the distant plasma sheet appear to be quasiperiodical functions of the tailward distance, the spatial period decreasing with the distance and with the growth of the near-Earth plasma pressure. The field lines in the distant plasma sheet have the shape of loops or magnetic islands which are not connected with the Earth dipole. Thus the magnetic configuration is an infinite set of the neutral points of X and O types. Since the magnetotail parameters are controlled by the solar wind one can expect that any change in the solar wind conditions will lead to non-linear variations in the plasma sheet structure.