

Europa is one of the Jovian icy moons with confirmed subsurface ocean. Circulation of the ocean in presence of the Jovian ambient magnetic field leads to generation of the ocean-induced magnetic field (OIMF). On Earth, the OIMF has potential to provide us with informations about water flow and electrical conductivity. However, the OIMF in Europa has been addressed only briefly in the available literature. This thesis is focused on numerical modelling of motionally driven process of the electromagnetic induction (EMI) in the subsurface ocean of Europa. Firstly, the EMI equation is introduced with its corresponding weak formulation. Its solutions are obtained by the means of finite element method (FEM) in combination with spherical harmonic functions. I discuss the structure of the linear problem and subroutines applied in the numerical solver. The code is successfully tested against a set of independent semi-analytical solutions. Three models of flow in the Europa's ocean are explored, using simple analytical expressions of ocean velocities and Jovian magnetic field.