

For more than fifty years simulations of electromagnetic (EM) wave propagation are used to study the Earth's magnetosphere and to analyze EM emissions observed by spacecraft. In this work we focus on the propagation of EM waves in the frequency range from 100 Hz to 10 000 Hz within the region of the inner magnetosphere. We use a numerical procedure which performs ray tracing simulations and finds the wave trajectory along with other wave properties. Using these simulations we study propagation properties of equatorial noise emissions. Another subject of this work is development of a propagation scheme explaining a conjugate observation of quasiperiodic emissions by the Van Allen Probe A (VAP-A) spacecraft and the ground station in Athabasca. In this case we make use of a density distribution model based on measurements of plasmaspheric electron density done by the EMFISIS instrument onboard VAP-A.