Contribution ID: **100**   Type: **not specified**

RAY TRACING ALONG THE MERIDIAN NEAR EQUATOR : A SIMULATION BY COMPUTER PROGRAMMING

Tuesday, 28 May 2024 14:45 (10 minutes)

Communication using Radio waves transmission from a source, travel through a space medium to carry programmed instructions to another destination. Ray tracing is a procedure of finding the paths of energy flow of the waves. These paths depend on Launch parameters, nature of the medium as well as environment of the wave. Simulation of plane polarized Electromagnetic rays in bi-refringent Ionosphere in the presence of geomagnetic components as azimuthally symmetric third order harmonic field by computing the Associated Legendre polynomials with constants. The complex full Appleton-Hartree formula computes the real refractive index and the imaginary part as the absorption factor to consider collisions. Tracing is along the Meridian near the Equator applying geometrical Optical laws in concentric homogenous shells whose thickness is varied as control for ray reflection. Results illustrate symmetric ray paths at 6MHz and reflected in the F-layer. At vertical incidence the ray never becomes horizontal but has a cusp called the spitze at refractive index of approximately zero when the ray is considered reflected. At oblique incidence, the program performs a premature reflection resulting in the stunting ray tracing. Focusing is achieved for pre-determined range by program adjusting Launch conditions. Absorption of ray is high at peak layers of the ionosphere with maximum at the D- layer. The program is versatile tool to investigate Ray Tracing.

Primary author: Mr UMAR, Adeoba (Nigerian Army University Biu)

Presenter: Mr UMAR, Adeoba (Nigerian Army University Biu)

Session Classification: Technical session 3b

Track Classification: Sciences: Physics