FARADAY ROTATION

$B := 51692 \cdot 10^{-9}$ Magnetic field in nTesla [1] [2]

$n := .25 \cdot 10^{12}$ Average electron density in the E and F layer in electrons/cubic meter

$a := 90 \cdot 10^{3}$ Lower limit of E layer in meters [2]

$b := 600 \cdot 10^{3}$ Upper limit of F layer in meters [2]

$\alpha := 90 \cdot \frac{\pi}{180}$ wrt horizon $muf := 5$ in MHz

From [4], n above wrt MUF: $n := \left(\sin(\alpha) \cdot \frac{muf}{9 \cdot 10^{-3}} \right)^2 \cdot 10^6$

$n = 3.086 \times 10^{11}$ Electron density with an MUF of 5 MHz at α degrees

$D := 2.62 \cdot 10^{-13}$ [3] $RM := D \cdot \left(\int_a^b n \cdot B \, ds \right)$ Rotational Measure in Radians per meter squared [3]

$RM = 2.132$

EXAMPLES

$\lambda := .7$ wavelength in meters $Rev := RM \frac{\lambda^2}{\frac{\pi}{2}}$

$Rev = 0.665$ Polarity reversals

$\lambda := 2$ wavelength in meters $Rev := RM \frac{\lambda^2}{\frac{\pi}{2}}$

$Rev = 5.429$ Polarity reversals

$\lambda := 6$ wavelength in meters $Rev := RM \frac{\lambda^2}{\frac{\pi}{2}}$

$Rev = 48.858$ Polarity reversals

1. http://ngdc.noaa.gov/geomag/magfield.shtml
2. http://genesis2.jpl.nasa.gov/archive/200212016/
3. http://en.wikipedia.org/wiki/Faraday_effect
4. http://en.wikipedia.org/wiki/Ionosphere