23-Oct-2024

$$F_1 = \sqrt{\frac{r(R-r)c}{fR}}$$ max. radius @ $r = R/2$

R = equidistant distance

r = distance from source

$$= \sqrt{\frac{R/2\,(R-R/2)c}{fR}}$$

$$= \sqrt{\frac{(R^2/2 - R^2/4)c}{fR}}$$

$$= \sqrt{\frac{R^2(1/2 - 1/4)c}{fR}}$$

$$= \sqrt{\frac{R(1/2 - 1/4)c}{f}}$$

$$= \sqrt{\frac{1/4\,Rc}{f}}$$

$$\max(F_1) = 1/2\sqrt{Rc/f}$$ ← FRESNELMAX

Q. Equidistant distance from max. radii?

$$F_1 = 1/2\sqrt{Rc/f}$$

$$\Rightarrow 2F_1 = \sqrt{Rc/f}$$

$$\Rightarrow 4F_1^2 = Rc/f$$

$$\Rightarrow Rc = 4F_1^2 f$$

$$\therefore R = \frac{4F_1^2 f}{c}$$ ← FRESNELDIST

* As it turns out (nice relation) if $R = 540$ km, F_1 max $= 9$ Km!