

Let

$$K = \frac{CR}{R} = \frac{\text{camera range}}{\text{orbit radius}}$$

$$\frac{K^2}{2} = 1 - \cos\left(\frac{\phi + \omega T}{2}\right)\cos\left(\frac{\phi - \omega T}{2}\right) + \sin\left(\frac{\phi + \omega T}{2}\right)\sin\left(\frac{\phi - \omega T}{2}\right)\cos i$$

$$\cos i = \frac{\frac{K^2}{2} + \cos\theta_+ \cos\theta_- - 1}{\sin\theta_+ \sin\theta_-}$$

where

$$\theta_+ = \frac{\phi + \omega T}{2}$$

$$\theta_- = \frac{\phi - \omega T}{2}$$

and $K = CR/R$

This parametric equation gives ϕ as a function of i for any given T .

$2T$ is the encounter time per orbit.