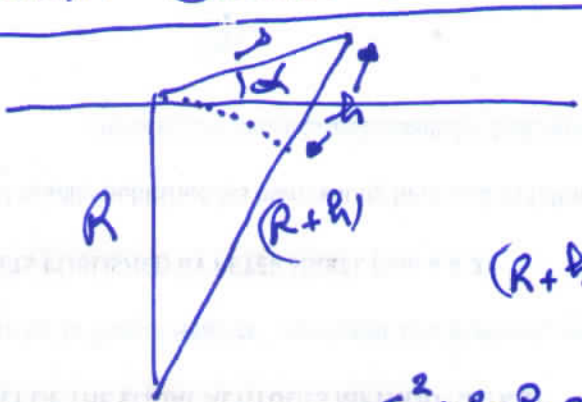
AIRCRAFT DISTANCE vs. AIRCRAFT HEIGHT "h" and OBSERVER'S ALTITUDE "a"



On suppose la terre Sphérique

$$(R+h)^2 = R^2 + s^2 + 2sR\sin\alpha$$

$$s^2 + 2sR\sin\alpha - \left[(R+h)^2 - R^2\right] = 0$$

$$s^2 + 2R\sin\alpha\, s - h(2R+h) = 0$$

$$\Delta = 4R^2\sin^2\alpha + 4h(2R+h)$$

$$\sqrt{\Delta} = 2\sqrt{R^2\sin^2\alpha + h(2R+h)}$$

Racine positive uniquement

$$s = \frac{-2R\sin\alpha + 2\sqrt{R^2\sin^2\alpha + h(2R+h)}}{2}$$

$$s = -R\sin\alpha + \sqrt{R^2\sin^2\alpha + h(2R+h)}$$

$$\frac{s}{R} = -\sin\alpha + \sqrt{\sin^2\alpha + \frac{h}{R}\left(2 + \frac{h}{R}\right)}$$

Si "a" est l'altitude l'observateur :
- le "Rayon" de la sphère terrestre devient : (R+a). Et :
- l'altitude "h" de l'avion devient (h−a). Ainsi :

$$\boxed{\frac{s}{(R+a)} = -\sin\alpha + \sqrt{\sin^2\alpha + \frac{(h-a)}{(R+a)}\left(2 + \frac{(h-a)}{(R+a)}\right)}}$$

mean R 6371009 m

6371.009

(R01) R 6378137 m (1) a = 72m α = 0.78° SLR: 175,802546…

(R02) a m (2) a = 72m α = 0.78° − 19′ = 0°463333 SLR: 191,618734±

(R03) α ° (3) α = 0m α = 0.78° SLR: 176,404404±

(R04) h ′ (4) α = 0m α = 0.78° − 19′ = 0°463333 SLR = 192,228226±

325 442,84832 (1) 325 586.3157 m

(R05) (R+a) 354 704,2292 (2) 354 877,5958 m (3)−(1) = +1112.788900 m 1112,193…

326 555,04235 (3) 326 699,1046 m

(R06) (h−a) (4) 356 006,6742 m (4)−(2) = +1128.7784 m 1128,19…

355 833,08015

10 oct 2021 [signature]