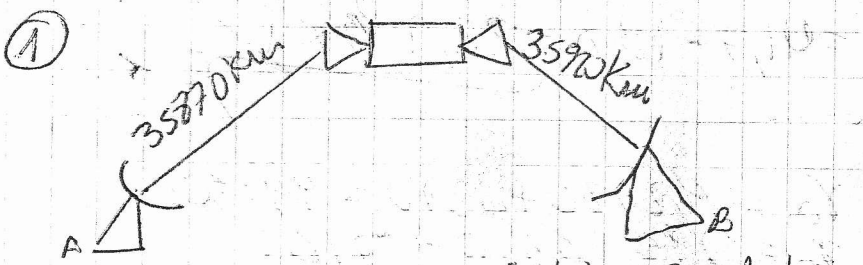
Examen Parcial de Comunicación por Satélite

Nombre: Curay Cunihuaman Anthony Leoncio

Cod: 082064 I

① 

$(G/T) = 22.3 dB/^oK$

PIRE = 52 dBW
$(G/T) = 4.5 dB/^oK$
$L = 0.35 dB$

a) $(C/N_0)_{up} = (PIRE)(1/A_0)(G/T) - K - L_{sup}$ ($-A_0$)

$(C/N_0)_{up} = (PIRE) - A_0 + (G/T) - K - L_{sup}$

$A_0 = 32,4 + 20\log(d.f) = 32,4 + 20\log(35870 \times 14000) = 206,4 dB$

$(C/N_0)_{up} = 52 - 206,4 + 4,5 dB + 228,6 - 0,35 = 78,35 dB$

b) $(C/N_0)_{dbida} = (PIRE) - A_0 + (G/T) - K - L_{sup}$

$A_0 = 32,4 + 20\log(35790 \times 12000) = 205,1 dB$

$(C/N_0)_{dbida} = 46 - 205,1 + 22,8 + 228,6 - 0,35 = 91,95 dB$

c) $(C/N)_T^{-1} = (C/N)_{up}^{-1} + (C/N)_{dbida}^{-1}$

$(C/N)_T^{-1} = \left(\left(\frac{1}{10^{7,835}}\right) + \left(\frac{1}{10^{9,195}}\right)\right)^{-1} = 65530648.19$

$(C/N)_T = 78,16 dB$

e) $D = 1.2\,m$ $\quad T_R = 25°K$

$\eta = 0.65$ $\quad L = 0.30\,dB = 10^{0.03} = 1.07$

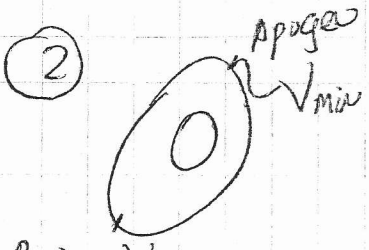
$T_A = 35°K$

$$T = \frac{35}{1.07} + 290\left(1 - \frac{1}{1.07}\right) + 25 = 76.68°K \Big\} = 13,8\,dB/K$$

$$G = 0,65\left(\frac{10\pi}{3} \cdot D \cdot f\right)^2 = 0.65\left(\frac{10\pi}{3}(1.2)(121)\right)^2 = 1478072 = 41,7\,dB$$

$$\therefore \left(G/T\right)_{dB} = G|_{dB} - T|_{dB} = 41,7 - 13,8 = 22,9\,dB/K$$

(2)



$r_a = 42780 + 6370 = 49150$

$r_p = 795 + 6370 = 7165$

$$e = \frac{r_a - r_p}{r_a + r_p} = \frac{49150 - 7165}{49150 + 7165} = 0,75$$

$$r = \frac{r_p}{(1-e)} = \frac{7165}{(1-0,75)} = 28660\,Km.$$

a)

$$T = \sqrt{\frac{4\pi^2 r^3}{\mu}} = \sqrt{\frac{4\pi^2 (28660)^3}{3.986 \times 10^5}} = 48206,47478 \approx 13,41\,horas$$

$$V_{MAX} = \sqrt{3.986 \times 10^5 \left(\frac{2}{7165} - \frac{1}{28660}\right)} = 9.37\,m/s$$

$$V_{min} = \sqrt{3.986 \times 10^5 \left(\frac{2}{49150} - \frac{1}{28660}\right)} = 1,52\,m/s$$

b) Longitud: $76°35'42'' = 76,59°$

Latitud $= 12°37'55'' S = 12,63°$ S

$\phi = 12,63° \Rightarrow \cos\phi = 0.97$

$\Delta l = 82,5° - 76,59° = 5,91° \Rightarrow \cos\Delta l = 0,99$

- angulo de elevacion (θ)

$$\theta = tg^{-1}\left[\frac{(0.97)(0.99) - 0.151267}{\sin(\cos^{-1}(0.97 \times 0.99))}\right] = 70.979 \Rightarrow 70,97°$$

• angulo de azimut (Z).

$$A = tg^{-1}\left(\frac{tg(5,91)}{sen(0,97)}\right) = 80,71^{\circ}$$

$$Z = 360^{\circ} - 80,71^{\circ} = 279,29^{\circ}$$

• distancia (d).

$$d = 42644\sqrt{1 - 0.2954(0,97)(0,99)} = 36092,23\,km$$