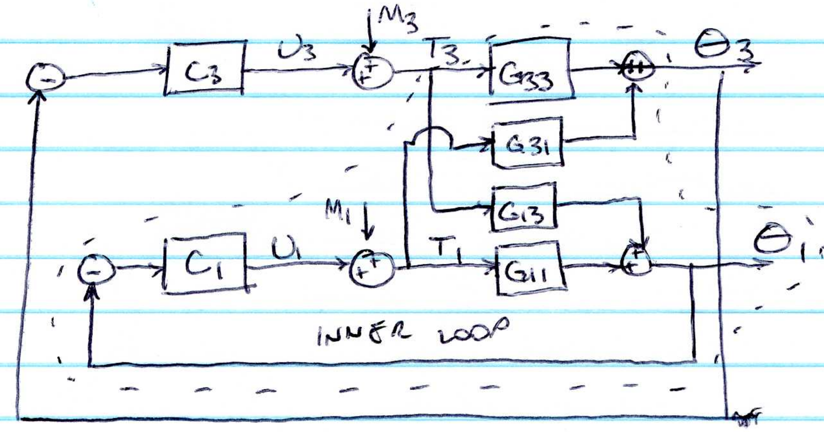
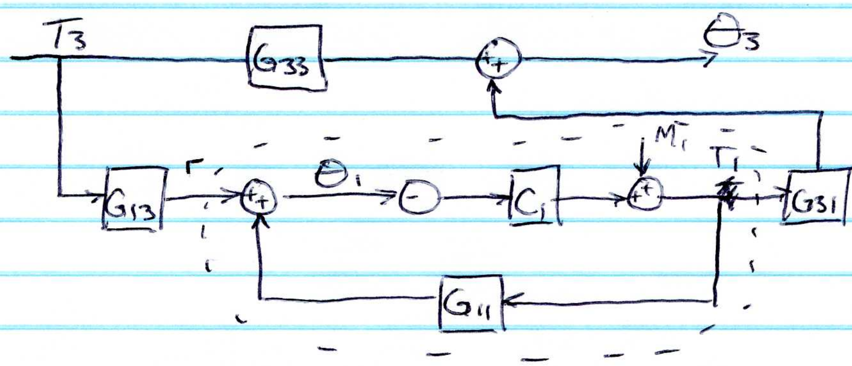
HUBBLE TELESCOPE: 589 km LEO; RXN WHEELS & MAGNETOTORQUERS 4/17/08

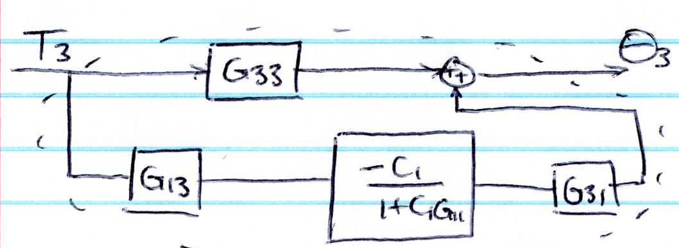
BACK TO TUESDAY'S EXAMPLE



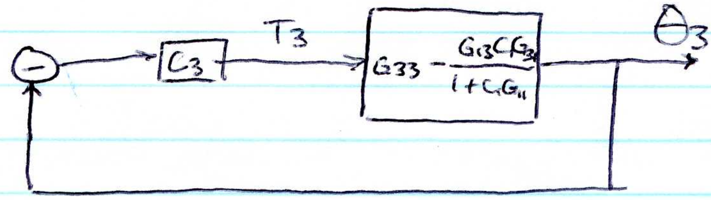
EVERYTHING W/IN THE DOTTED LINE BECOMES OUR NEW PLANT; WE GET A TRANSFER FUNCT. FROM T_3 TO Θ_3.



$$\frac{T_1}{r} = \frac{-C_1}{1 + C_1 G_{11}} \qquad \text{BECAUSE} \quad T_1 = -C_1(r + G_{11} T_{11})$$



$$\frac{\Theta_3}{T_3} = G_{33} + \frac{G_{13}(-C_1)G_{31}}{1+C_1G_{11}}$$



CHAR. EQ^N FOR THIS GUY IS $\quad 1 + C_3\left(G_{33} - \frac{G_{13}C_1G_{31}}{1+C_1G_{11}}\right) = 0$

COUPLING NUMERATOR

$$1 + C_3\left(\frac{N_{33} + C_1 N}{D + C_1 N_{11}}\right) = 0$$

(WE SUBBED $\frac{N}{D}$ FOR G)

$G_{ij} = N_{ij}/D$

$$x = \begin{bmatrix} \theta_1 \\ \dot{\theta}_1 \\ \theta_3 \\ \dot{\theta}_3 \end{bmatrix} \qquad \begin{aligned} \dot{x} &= Ax + Bu = (A-BK)x \\ u_1 &= -k_{p1}\theta_1 - k_{d1}\dot{\theta}_1 - k_{p3}\theta_3 - k_{d3}\dot{\theta}_3 \\ &= k_1^T x \rightarrow u = -Kx \end{aligned}$$

$$\det(sI - (A-BK)) = 0$$