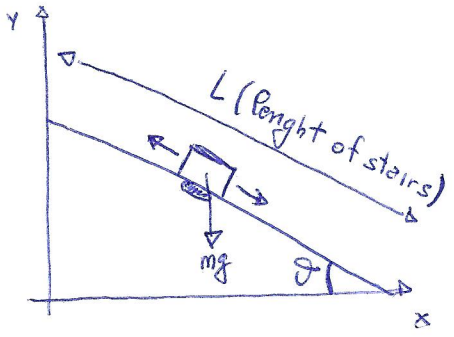
JUNE 13TH 2013

PV = TIME t (ω)

V_M = TORQUE M

V_C = I



$t = \frac{L}{v} \Rightarrow t = \frac{L}{\omega_M R}$ if we measure ω_M we control t, ω_M is the real PV

$G = \frac{PV}{V_C} = \frac{PV}{V_M} \cdot \frac{V_M}{V_C} = \frac{\omega_M}{M} \cdot \frac{M}{I}$

$M = M_0 + \gamma \omega_M + J \dot{\omega}_M$ ω_M = ANGULAR VELOCITY OF THE MOTOR

M_0 = EFFECTIVE TORQUE = F · b (force · arm)

$F = mg f(\vartheta) + m a f(\vartheta) = K + K_1 a$ a = acceleration

$a = \frac{dv}{dt} = R \frac{d\omega_M}{dt} = R \dot{\omega}_M$

therefore $F = K + K_1 R \dot{\omega}_M$

$M = k \dot{b} + K_1 b R \dot{\omega}_M + \gamma \omega_M + J \dot{\omega}_M$

↑ DOES NOT INFLUENCE THE FREQUENCY RESPONSE

$M = \gamma \omega_M + (K_1 b R + J) \dot{\omega}_M$

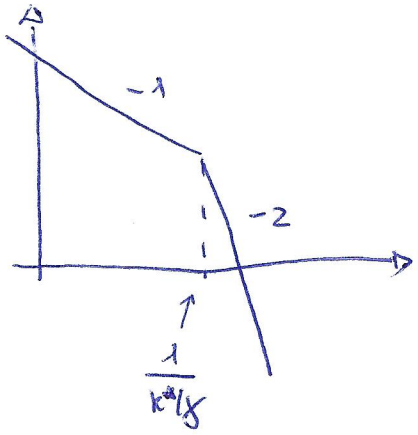
$\frac{M}{\omega_M} = \gamma + k^* s \Rightarrow G = \frac{1}{\gamma + k^* s} \cdot K_2$ $K_2 = \frac{M}{I}$

THE SYSTEM IS STABLE

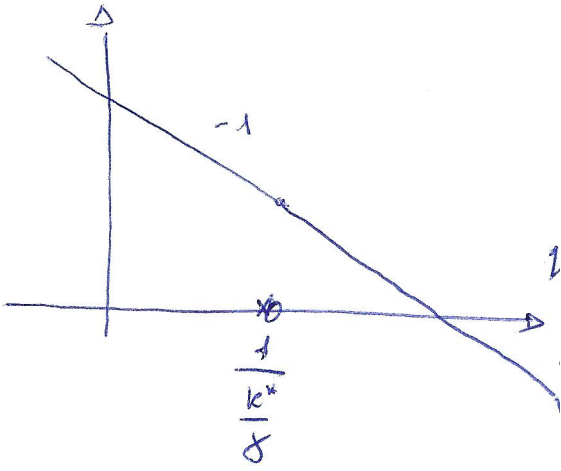
INSTEAD IF WE WOULD CONTROL THE POSITION (time constant)

$x = \int v dt \Rightarrow x \propto \int \omega_M \Rightarrow \frac{x}{\omega_M} = \frac{1}{s}$ $G = \frac{x}{\omega_M} \cdot \frac{\omega_M}{M} \cdot \frac{M}{I} = \frac{1}{s} \cdot \frac{1}{\gamma + k^* s} \cdot K_2$

IN THIS CASE THE SYSTEM IS NOT STABLE



compensation with $\frac{1+S\frac{k^*}{\gamma}}{1+S\tau}$



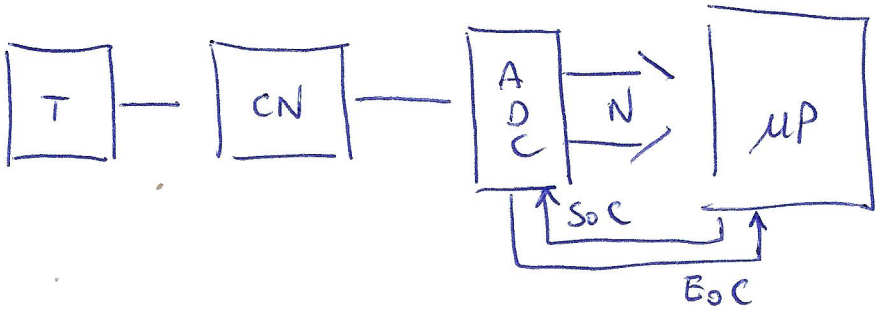
NUMERICAL IMPLEMENTATION

$$\frac{U}{E} = \frac{1+S\frac{k^*}{\gamma}}{1+S\tau} \rightarrow Z \qquad U(1+S\tau) = E(1+Sz) \qquad U_m + \frac{U_m - U_{m-1}}{T_s}\tau = E_m + \frac{E_m - E_{m-1}}{T_s}$$

$$U_m = U_{m-1}\frac{\tau/T_s}{1+\tau/T_s} + E_m\frac{\left(1+\frac{z}{T_s}\right)}{1+\frac{\tau}{T_s}} - E_{m-1}\frac{\frac{z}{T_s}}{1+\frac{\tau}{T_s}}$$

OVERFLOW ?

5) INDUCTION GENERATOR → TRANSDUCERS SLIDES 33-36



ERROR = 2% = 0.02

$\frac{\text{MAX SCALE}}{\text{PRECISION}} = \frac{100}{2}$

BITS = $\log_2 50 \Rightarrow 6$

CONDITIONING NETWORKS SLIDES 15-19 WHAT IS THE RIGHT ONE ?

6) ACTUATORS SLIDE 12-13 (THE LOAD IS THE MOTOR NOT RESISTIVE)

WE HAVE TO REPLACE THE SCR WITH THE TRIAC TO ASSURE A BIDIRECTIONAL MOVEMENT. HOW TO MODIFY THE CIRCUIT ?

7) CONTROL ALGORITHMS SLIDES 3-8