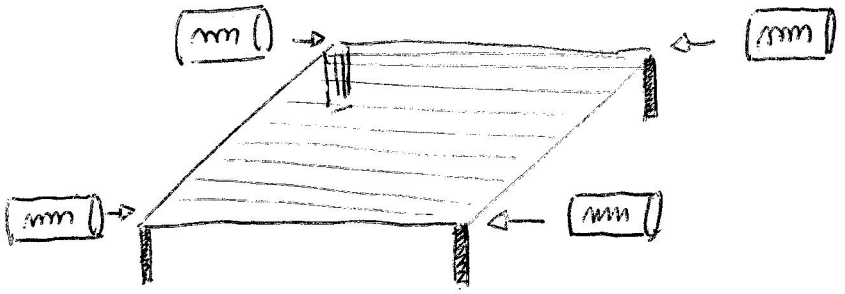
SEPTEMBER 8th 2016



MODELISATION OF AN EARTH QUAKE

ACTUATORS = PISTONS + MOTORS + SCREW

ACTUATORS WORK SINCHRONOUSLY. LEFT COUPLE PUSHES, RIGHT COUPLE NO. AND VICEVERSA

WEIGHT AND SHAPE OF THE OBJECT (TABLE) ARE RELEVANT

PERHAPS FRICTION NOT IMPORTANT, BUT INERTIA IS RELEVANT

$$M = M_0 + \gamma\omega + J\dot{\omega} \qquad PV = \dot{\vartheta}_{TABLE} \qquad V_M = M \qquad V_C = I$$

M_0 = EFFECTIVE TORQUE = $M_T \cdot a_T \cdot b$

b = ARM = RADIUS OF THE SCREW

M_T = MASS OF THE TABLE

a_T = acceleration of the table

$a_T = \dot{\omega}_T = \ddot{\vartheta}_T$

$$M = M_T \cdot s^2\vartheta_T \cdot b + \gamma s\vartheta_T + J s^2\vartheta_T$$

$\gamma = \gamma_{MOTOR} + \gamma_{TABLE}$

$J = J_{MOTOR} + J_{TABLE}$

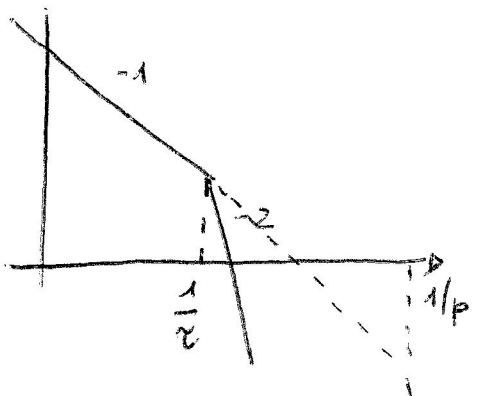
$\vartheta_T = k\,\vartheta_M$ (ROTATION OF THE MOTOR = "ROTATION OF THE TABLE")

BUT THE TABLE DOES NOT ROTATE. IT "VIBRATES" ALONG A HORIZONTAL DIRECTION x. THEREFORE THE PV IS $x_{TABLE} = k'\vartheta_{TABLE} = k''\vartheta_{MOTOR}$ (DUE TO THE SCREW).

$$G = \frac{PV}{V_C} = \frac{PV}{V_M}\cdot\frac{V_M}{V_C} = \frac{x_{TABLE}}{\vartheta_{TABLE}}\cdot\frac{\vartheta_{TABLE}}{\vartheta_{MOTOR}}\cdot\frac{\vartheta_{MOTOR}}{M}\cdot\frac{M}{I} = k'\cdot k\cdot\frac{1}{bkM_Ts^2 + ks\gamma + ks^2J}\cdot k'''$$

$$G = \frac{k'}{s\left[(M_Tb+J)s+\gamma\right]}$$

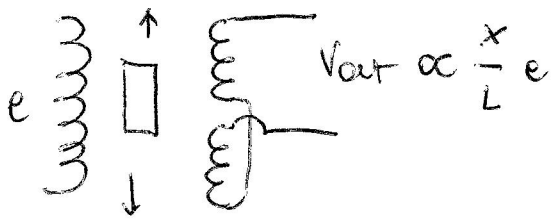
NOT ASYMPTOTICALLY STABLE

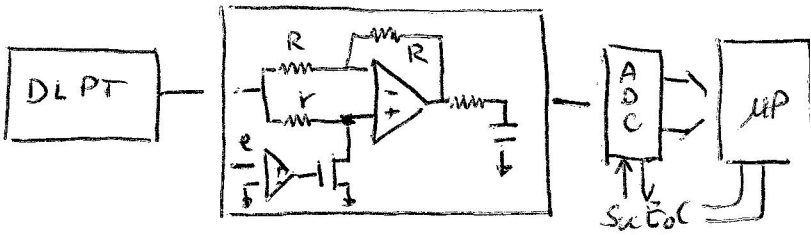


COMPENSATION POLE/ZERO

$$\frac{(1+s\tau)}{(1+sp)} \qquad \frac{1}{\tau} = \frac{\gamma}{M_Tb+J}$$

TRANSDUCER: DIFFERENTIAL LINEAR POSITION TRANSDUCER





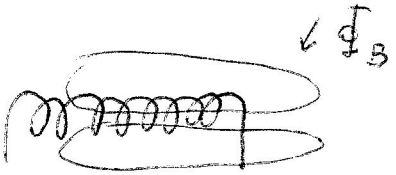
CONDITIONING NETWORK SLIDE 18 TRASNDUCERS SLIDES 12-14

PRECISION ADC ± TOLERANCE ⇒ 2TOLERANCE $N_{bit} = \log \frac{100}{2TOLERANCE} = 4 bit$

QUESTIONS

1) THE ABSOLUTE ENCODER PROVIDES THE NEW ABSOLUTE ANGULAR POSITION OF A ROTATING OBJECT BUT THERE IS NO MEAN TO UNDERSTAND IF IT HAS BEEN REACHED BY ROTATING CLOCKWISE OR COUNTERCLOCKWISE OR AFTER ONE OR MANY ROTATIONS (FULL ROTATIONS)

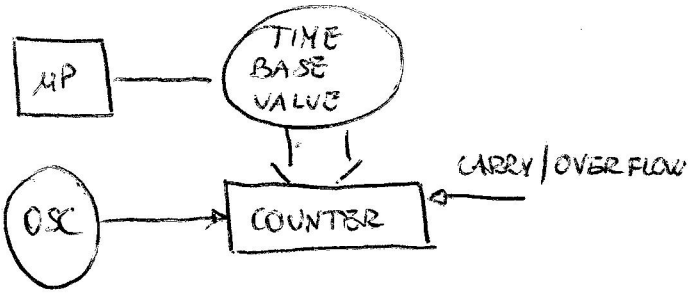
2) $\Phi_C = N \Phi_B$



Φ_B = FLUX ON EVERY COIL

N = N° OF THE INVOLVED COI

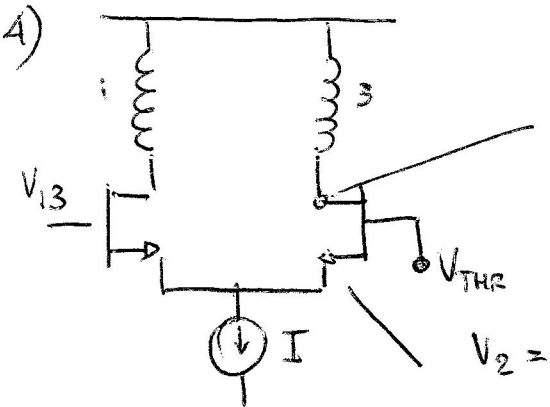
3) DELAY SETUP



A COUNTER IS AN ELECTRONIC DEVICE THAT COUNTS FROM 0 TO TBV WHERE TBV IS A CONSTANT SET BY μ (UPWARDS OR DOWNWARDS) WHEN THE COUNTING ENDS THE CARRY/ OVERFLOW PIN GIVES THE PULSE TO THE S

$TBV \cdot T_{CK} = \tau$

4)



$V_{cc} - L \frac{dI}{dt} - R_L I = V_1$

$V_2 = V_1 - \gamma$ (AT LEALS 0.7)