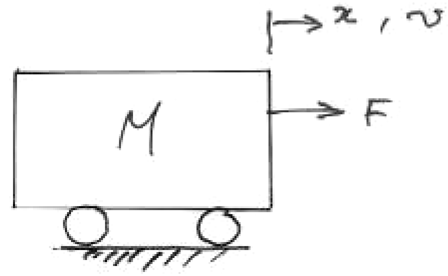
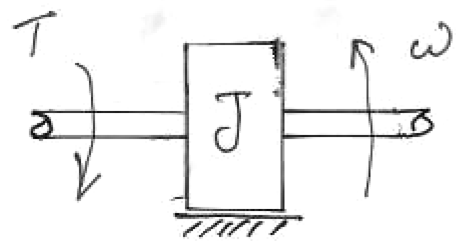
(1)

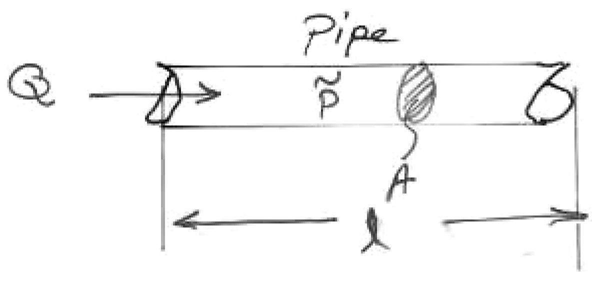


M = Mass
F = force
x = displacement
v = velocity



J = Inertia
T = Torque
ω = angular velocity

L = Inductor
i = current
e = voltage

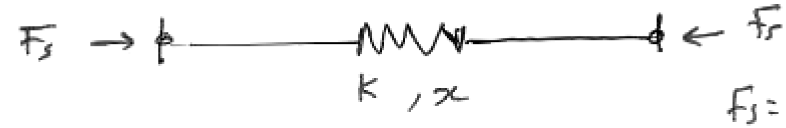


Q = Flow rate
A = Cross-sectional area
I_w = Water inertia
$\tilde{P}$ = pressure difference
ρ = Water density
l = pipe length

$$I_w = \frac{A}{\rho l}$$

(2)

Spring



Fs = Force

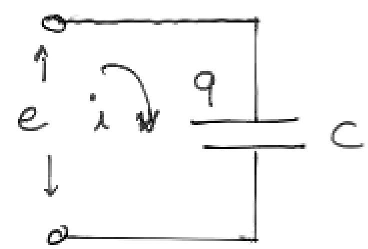
Rotary Spring

T = torque

K = spring stiffness factor

x, θ = displacements linear, angular

Capacitor



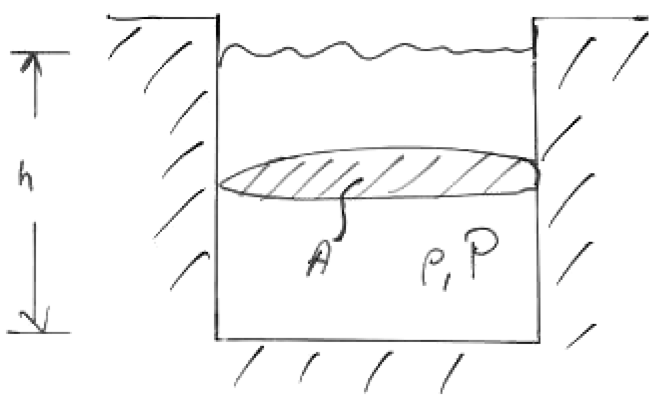
C = Capacitor

i = current

q = charge

e = voltage

Tank



h = hight

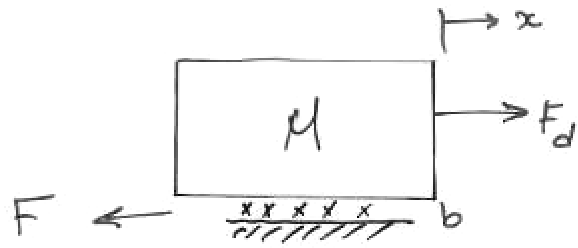
P = pressure

ρ = density

g = gravity

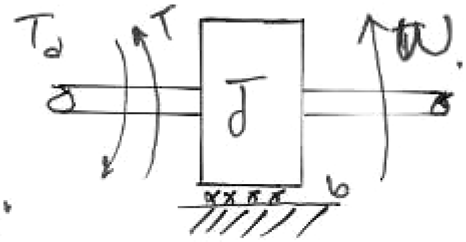
A = crossectional area

(3)



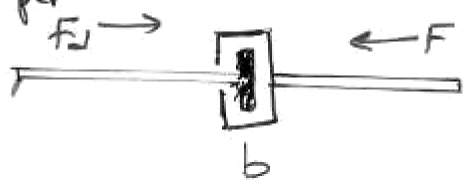
F_d : driving force
F = friction (coulomb)

Friction
- static "coulomb"
- dynamic "viscous"



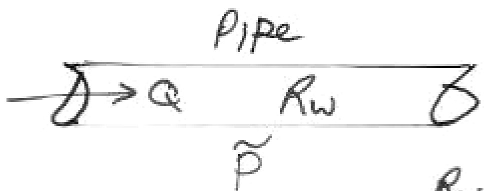
T_d : driving torque
T = rotational friction (coulomb)

Damper



F_d = driving force
F = damping force
b = viscous damping (friction)

R = resistor

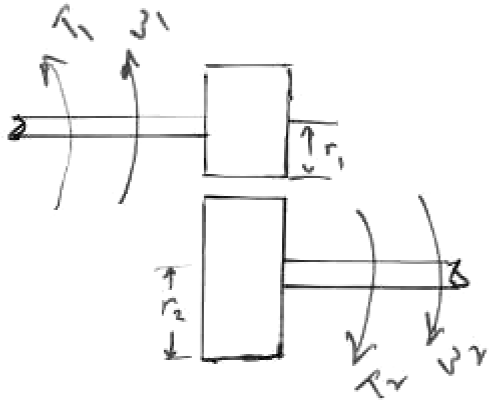


R_w = Water Resistance

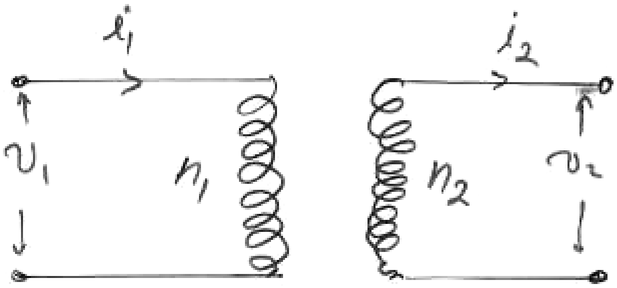
$$= \frac{128 \mu l}{\pi d^4}$$

(4)

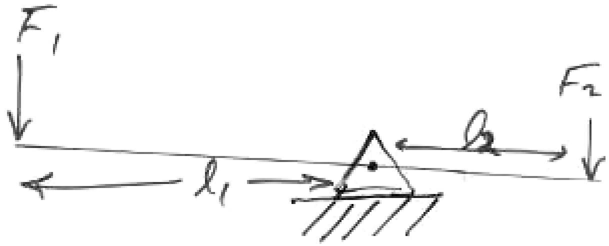
Gear



Transformer

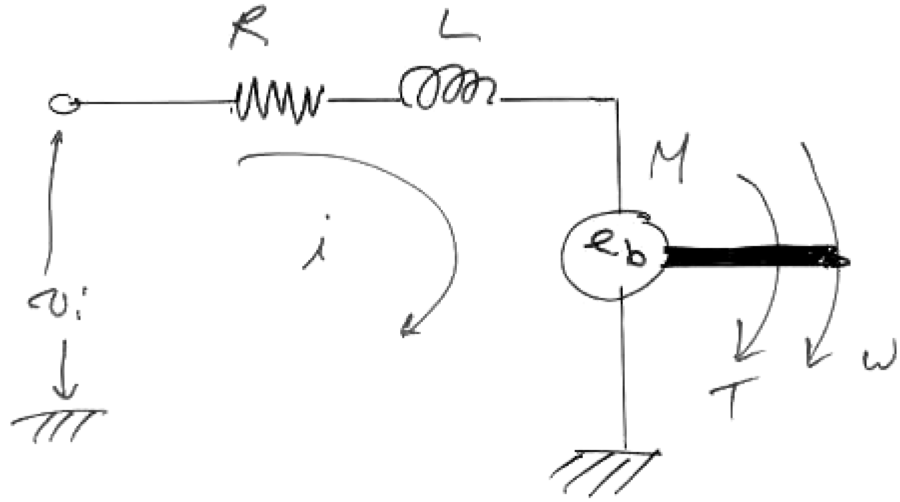


Lever



(5)

Motor



e_b = back emf

K_t = motor constant