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relate $K_c\left(\frac{1+\frac{1}{2}}{1\frac{1}{10}}\right)$ to R_1 R_2 & C in the circuit

↓ simplified to

$K_c\left(\frac{2+S}{2} + \frac{P}{P+S}\right)$ ← looks like a voltage divider

$P = R_2 \quad S = R_1$

$Z = \frac{1}{C}$ then we get $1 + RC$ ← τ for filter

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mag lev system w/ sensor

$f(I_0, \chi_0) + K_c i + K_x \chi - mg = K_i i + K_x \chi$

Desired Position looks like a differential amplifier out put offset

$$\frac{dV}{dt} = \frac{R_1 + R_2}{R_1} + \frac{dR}{dt}\frac{dI}{dt} - \frac{R_2}{R_1}\frac{dI}{dt}$$

↑ variable resistor

Current offset Circuit
inverting amplifier

$V_{in}(t) - V_-(t) = i_{input}(t) R$

$$V_{out} = \frac{10K}{\frac{R_3}{10_K + \frac{dR}{dt} + R_3}} V_{in} = \boxed{V_0(t) = \frac{10_K\left(20_K + \frac{dR}{dt}\right)}{R_3} V_i(t)}$$

↑ variable resistor