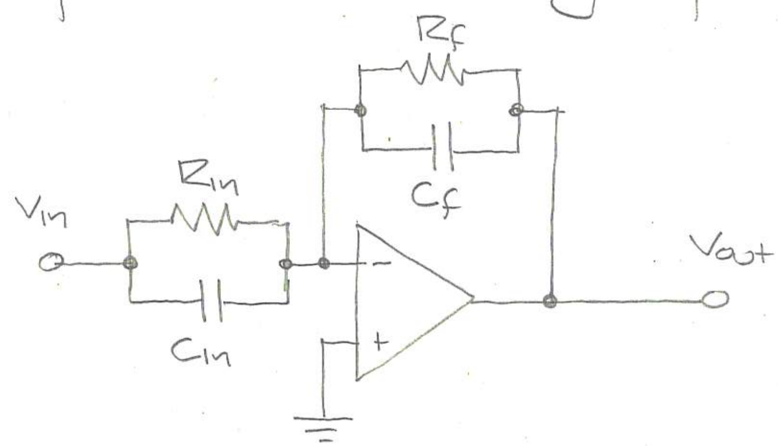
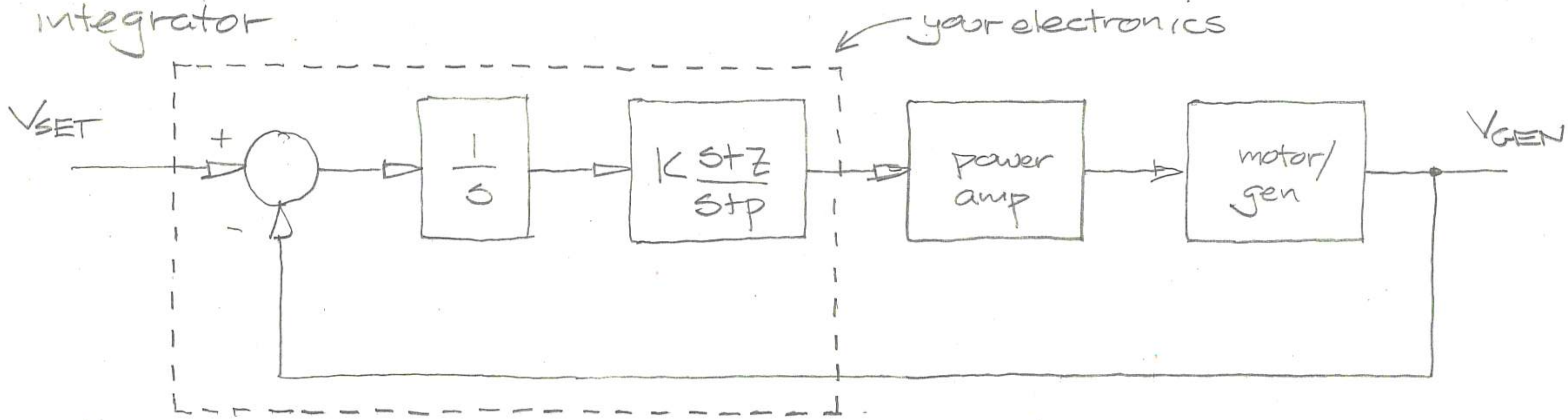
Lab Exam Problem # 3 The Lead Compensator (Controller)

The lead compensator described in Root Locus Design on Canvas is implemented with a single op-amp.



implements $\frac{V_{out}}{V_{in}} = K\left[\frac{s+z}{s+p}\right]$

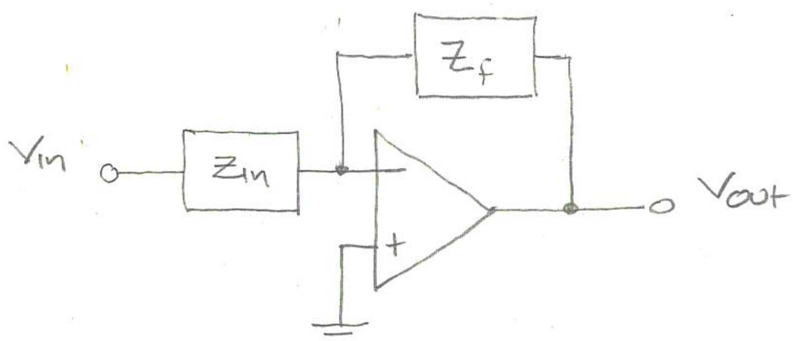
Due to non-linear effects, the lead compensator should follow your integrator



Lab Exam Problem #3 The Lead Compensator

The compensator circuit is in a form of an inverting op-amp and as such has transfer function

$$\frac{V_{out}}{V_{in}} = -\frac{Z_f}{Z_{in}}$$



All that remains is to find Z_{in} and Z_f (the parallel combination of the resistor and capacitor for each impedance)

From the transfer function you will find the critical ratios that set p, z, and K per Root Locus Design Method 3.