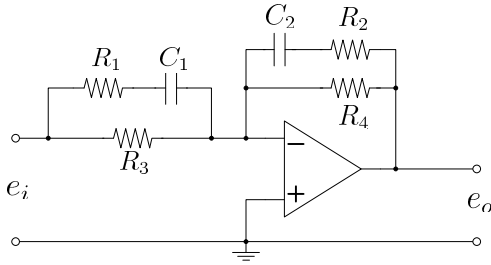
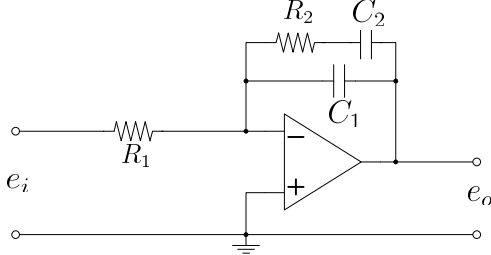
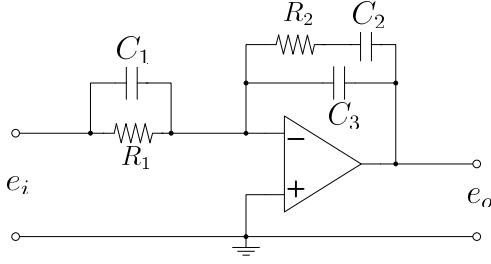


	Control Action	$G(s) = \frac{E_o(s)}{E_i(s)}$	Operational Amplifier Circuits
1	P	$-A$ where: $A = \frac{R_2}{R_1}$	
2	I	$-\frac{1}{s/\omega_0}$ where: $\omega_0 = \frac{1}{R_1 C_1}$	
3	PD	$-A(1 + \frac{s}{\omega_1})$ where: $A = \frac{R_2}{R_1}, \quad \omega_1 = \frac{1}{R_1 C_1}$	
4	PI	$-A \frac{1 + \frac{s}{\omega_2}}{\frac{s}{\omega_2}}$ where: $A = \frac{R_2}{R_1}, \quad \omega_2 = \frac{1}{R_2 C_1}$	
5	PID	$-A \frac{(1 + \frac{s}{\omega_1})(1 + \frac{s}{\omega_2})}{\frac{s}{\omega_2}}$ where: $A = \frac{R_2}{R_1}, \quad \omega_1 = \frac{1}{R_1 C_1}, \quad \omega_2 = \frac{1}{R_2 C_2}$	
6	Lead if $\omega_1 < \omega_2$ or Lag if $\omega_1 > \omega_2$	$-A \frac{1 + \frac{s}{\omega_1}}{1 + \frac{s}{\omega_2}}$ where: $A = \frac{R_2}{R_1}, \quad \omega_1 = \frac{1}{R_1 C_1}, \quad \omega_2 = \frac{1}{R_2 C_2}$	

	Control Action	$G(s) = \frac{E_o(s)}{E_i(s)}$	Operational Amplifier Circuits
7	Lead-Lag	$-A \frac{(1 + \frac{s}{\omega_1})(1 + \frac{s}{\omega_2})}{(1 + \frac{s}{\omega_3})(1 + \frac{s}{\omega_4})}$ <p>where:</p> $A = \frac{R_4}{R_3},$ $\omega_1 = \frac{1}{(R_1 + R_3)C_1}, \quad \omega_2 = \frac{1}{R_2 C_2}$ $\omega_3 = \frac{1}{R_1 C_1}, \quad \omega_4 = \frac{1}{(R_2 + R_4)C_2}$	
8	Integrator with Lead or Lag	$-\frac{\omega_0 (1 + \frac{s}{\omega_1})}{s (1 + \frac{s}{\omega_2})}$ <p>where:</p> $\omega_0 = \frac{1}{R_1(C_1 + C_2)}$ $\omega_1 = \frac{1}{R_2 C_2}$ $\omega_2 = \frac{1}{R_2 \frac{C_1 C_2}{C_1 + C_2}}$	
9	Integrator with Lead	$-\frac{\omega_0 (1 + \frac{s}{\omega_1})(1 + \frac{s}{\omega_2})}{s (1 + \frac{s}{\omega_3})}$ <p>where:</p> $\omega_0 = \frac{1}{R_1(C_2 + C_3)}$ $\omega_1 = \frac{1}{R_2 C_2}, \quad \omega_2 = \frac{1}{R_1 C_1}$ $\omega_3 = \frac{1}{R_2 \frac{C_2 C_3}{C_2 + C_3}}$	
10	Integrator with Lead-Lag	$-\frac{\omega_0 (1 + \frac{s}{\omega_1})(1 + \frac{s}{\omega_2})}{s (1 + \frac{s}{\omega_3})(1 + \frac{s}{\omega_4})}$ <p>where:</p> $\omega_0 = \frac{1}{R_1(C_2 + C_3)}$ $\omega_1 = \frac{1}{R_2 C_2}, \quad \omega_2 = \frac{1}{C_1(R_1 + R_3)},$ $\omega_3 = \frac{1}{R_3 C_1}, \quad \omega_4 = \frac{1}{R_2 \frac{C_2 C_3}{C_2 + C_3}}$	