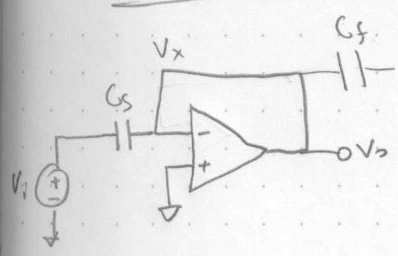
6) Cont'd

Circuit 5

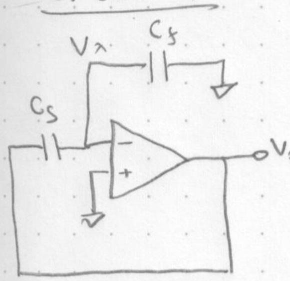


$Q_{f3} = V_i C_s \qquad Q_{s3} = 0$

$V_x = 0 \qquad V_s = V_i - V_x = V_i$

$Q_{s5} = V_i C_s \qquad Q_{f5} = Q_{f3} = V_i C_s$

Circuit 7



$Q_{f5} = V_i C_s \qquad Q_{s5} = V_i C_s$

$V_x \Rightarrow 0, \quad Q_f \rightarrow C_s$

$Q_s = 2 \cdot V_i C_s \qquad Q = V \cdot C \Rightarrow V = \frac{Q}{C}$

$$V_o = \frac{Q_s}{C_s} = \frac{2V_i C_s}{C_s} = 2 \cdot V_i$$

The result is interesting because first, it's not dependent on the relative values of C_f and C_s, that is C_s and C_f don't appear in the gain equation. Second it's interesting because it's non-inverting. If the switches are good and the capacitors aren't leaky this is a neat way to get a precision gain as the component values don't matter.