

ECE 580, HW-4 Solutions

$$Q_1 \text{ (a)} \quad V_o(z) = \frac{(V_1(z) - V_2(z)) z^{-1} C_1}{C_1 + C_2(1 - z^{-1})}$$

(b) Poles must be inside the unit circle. $\left| \frac{C_2}{C_1 + C_2} \right| < 1$
This circuit is unconditionally stable.

$$(c) \quad V_o(z) = \frac{(V_1(z) - V_2(z)) z^{-1} C_1}{\left(\frac{A+1}{A}\right) (C_1 + C_2(1 - z^{-1})) + \frac{C_F}{A} (1 - z^{-1})}$$

$$Q_2 \quad V_o = \frac{2C_1}{C_2} \left(V_{in} - \frac{V_{ref}}{2} \right)$$

$$Q_3 \quad V_o = V_{in} \left(\frac{C_1 + C_2}{C_1} \right)$$