1. Use both National Instruments SPICE (Multisim) and LT SPICE (text input mode) to plot the voltage transfer characteristic $V_o$ versus $V_i$ for the circuit shown below for $-5 \text{V} \leq V_i \leq 5 \text{V}$. Assume that the op amp is ideal and that each of the four diodes is a 1N4148 for which $N = 1.8$, $I_S = 0.081 \text{nA}$, and $BV = 100 \text{V}$. The component values are: $V^+ = 15 \text{V}$, $V^- = -15 \text{V}$, $R_1 = 1 \text{k}\Omega$, $R_2 = 3 \text{k}\Omega$, $R_3 = 8.6 \text{k}\Omega$, and $R_4 = 8.6 \text{k}\Omega$. Compare the simulation results with the theoretically expected values with regard to break points and slopes. Also plot the currents in the four diodes as functions of $V_i$.

2. Use both National Instruments SPICE (Multisim) and LT SPICE (text input mode) to plot the output voltage $v_o(t)$ as a function of time for the circuit shown below if the input is $v_i(t) = A \sin(\omega t)$ where $A = 1, 3, 6 \text{V}$ and $f = 1 \text{kHz}$ for two cycles of $v_i(t)$. Compare the peak value of the output with the theoretically expected value.