ELECTRONIC CIRCUITS 1
Homework 4
(Ast. Prof. Dr. Vedat TAVAS)

For the circuit given below:

a. Determine the type of amplifier? Describe.
b. Redraw the circuit for DC analysis.
c. Redraw the circuit for AC analysis.
d. Redraw the circuit utilizing an appropriate small signal BJT model.
e. Determine \( R_i \), \( R_o \), and \( A_{\text{in}} \).
f. Sketch the two-port model the circuit utilizing the parameters calculated in “e”.
g. Determine \( A_V \) and \( G_V \).
h. Change \( R_S \) to 0.5kΩ and \( R_t \) to 2.2kΩ and calculate \( A_V \) and \( G_V \). What are the effects of alteration of resistance values on the voltage gains?
i. Determine \( R_o \) if \( R_S \) changed to 0.5kΩ with all other parameters as appearing in the Figure. How is \( R_o \) affected by changing levels of ?
j. Determine \( R_i \) if is \( R_L \) reduced to 2.2kΩ. What is the effect of changing levels of \( R_L \) on the input impedance?
k. For the original network of Figure, determine \( A_i = i_o/i_i \).
l. Confirm your results using Spice for “e”, “g”, and “k”.

\( V_{\text{BEon}} = 0.7\text{V}, V_{\text{CEsat}} = 0.2\text{V}, V_T = 25\text{mV} \)

\[ \begin{align*}
&V_i, R_S, 4.7 \mu\text{F}, 2.2\text{k}\Omega, \alpha=1, Z_j, \text{and } R_L, 5.6\text{k}\Omega
\end{align*} \]

Deadline: 04 May 2015