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الفصل الدراسى الثانى

Sheet (1) : Analog ICs ELE221
Feedback

1- A negative feed back amplifier has a closed loop gain $A_f = 100$ and open loop gain $A = 10^5$.
a) find β ?
b) If a manufacturing error results in A to 10^3, what closed loop gain results ? What is the percentage change in A_f corresponding to this factor of 100 reduction in A ?

2- The non-inverting buffer op-amp configuration shown in figure (1) provides a direct implementation of the feedback loop. Assuming that the op-amp has infinite input resistance and zero output resistance,
a) find β
b) If $A = 100$, what is the closed loop gain ?
c) what is the amount of feedback in dB ?
d) For $V_s = 1$ V, find V_o and V_i.
e) If A decreases by 10%, what is the corresponding decrease in A_f.

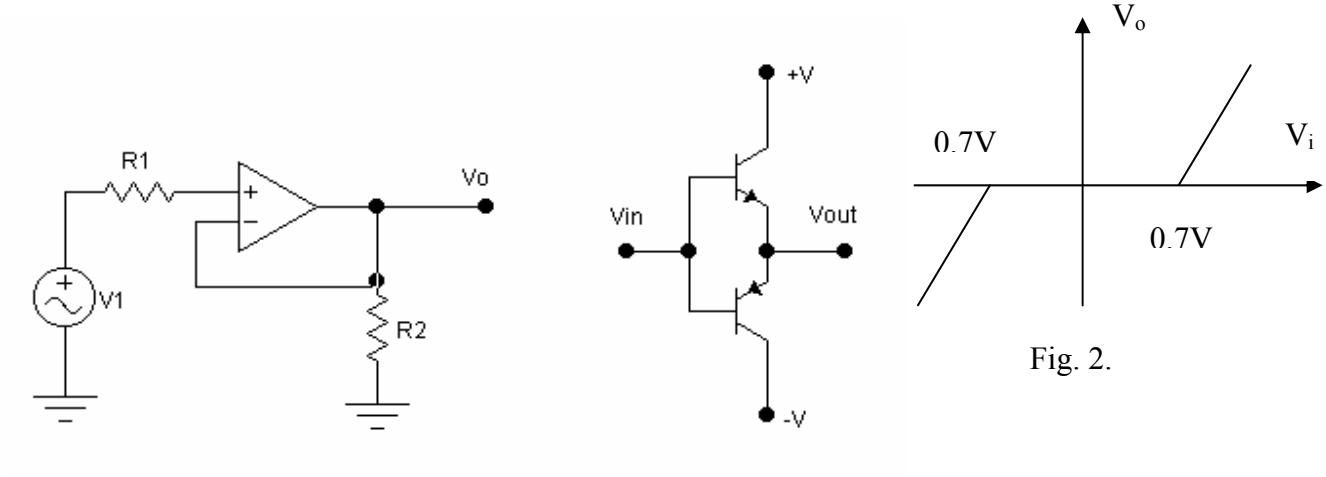

Fig. 1.

Fig. 2.

3- The complementary BJT follower shown in figure (2) has the approximate transfer characteristics shown. Observe that for $-0.7\ V < v_i < +0.7\ V$, the output is zero. This "dead band" leads to crossover distortion. Consider this follower driven by the output of a differential amplifier of gain 100 whose positive input terminal is connected to the input signal source v_s and whose negative input terminal is connected to the emitters of the follower. Sketch the transfer characteristic v_o versus v_s of the resulting feedback amplifier. What are the limits of the dead band and what are the gains outside the dead band ?

4- A series shunt feed back amplifier utilizes the feed back circuit shown in figure (3)

- **a- Find expressions for h-parameters of the feedback circuit.**
- **b- If R_1 = 1 kΩ and β = 0.01. what are the values of all four h-parameters? Give the units of each parameter.**
- **c- For the case of R_1 = 1 kΩ and R_L = 1 kΩ , sketch and label an equivalent circuit following the model in figure (4)**

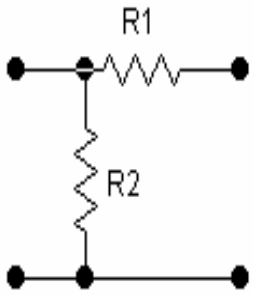

Fig. 3

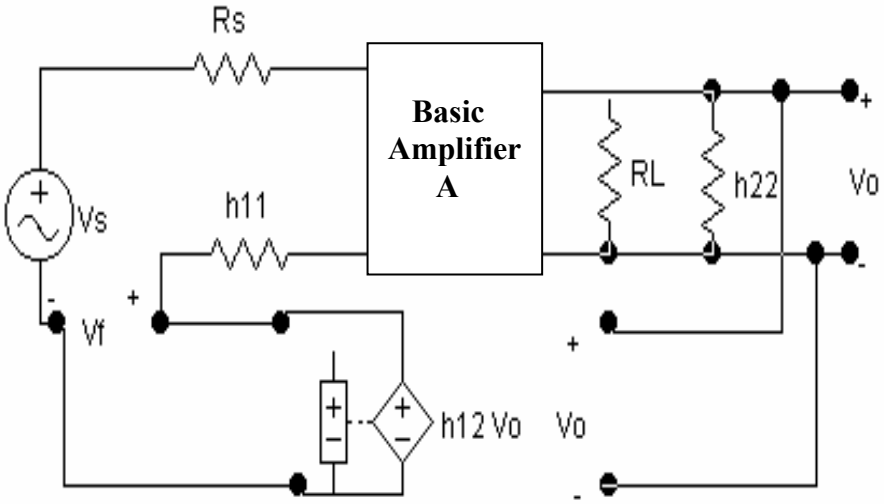

Fig. 4.