

1. For the circuit with ideal operational amplifiers shown in Fig. 1, please find the output voltage V_o . (20分)

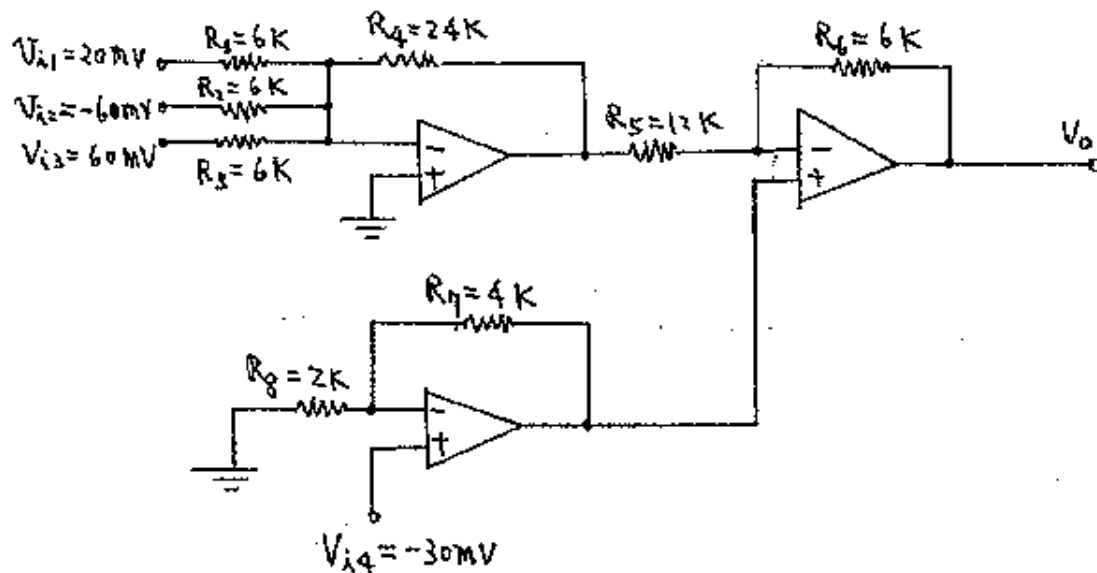


Fig. 1

參考用

2. For a bipolar junction transistor (BJT) amplifier circuit, please draw and explain three methods to stabilize the operating point of the amplifier circuit. (15分)
3. For the circuit with ideal operational amplifiers shown in Fig. 2, please find its oscillation frequency. (20分)

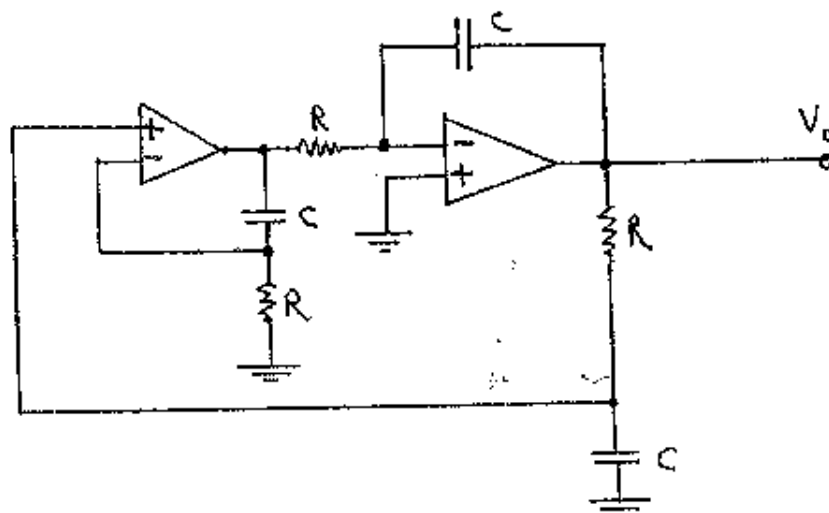


Fig. 2

4. The amplifier in Fig. 3 is biased to operate at $I_D = 1 \text{ mA}$ and $g_m = 1 \text{ mA/V}$. Neglecting γ_0 , (20 分)
- Find the value of C_S that places the corresponding pole at 10 HZ.
 - What is the frequency of the transfer-function zero introduced by C_S ?
 - Give an expression for the gain function $V_O(s)/V_i(s)$.
 - What is the gain of the amplifier at DC?

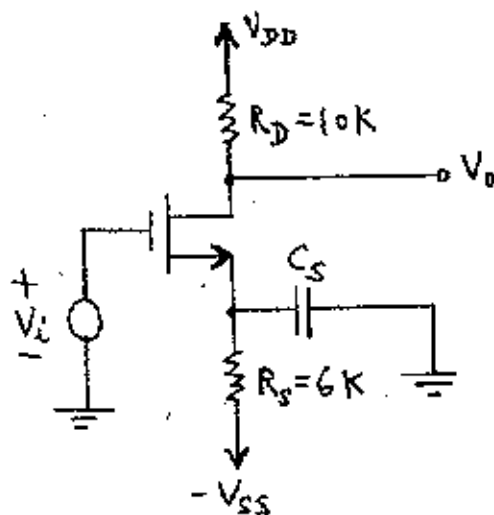


Fig. 3

參考用

- For an amplifier without feedback, its gain is $A_0 \text{ dB}$, upper 3-dB frequency is $f_h \text{ HZ}$, and lower 3-dB frequency is $f_l \text{ HZ}$. When this amplifier is modified as an amplifier with feedback factor $\beta \text{ dB}$, find (a) the gain (7 分) and (b) 3-dB bandwidth (8 分) of this feedback amplifier? (共 15 分)
- (a) For a p-n diode, what are purposes for applying in forward bias and reverse bias, respectively? (5 分)
 (b) For an n-channel depletion type MOSFET, if you like that it can operate at high frequency and high speed, how to design this MOSFET? (5 分)