

中原大學 95 學年度碩士班入學考試

3 月 18 日 16:00~17:30 電子工程系數位類比組

誠實是我們珍視的美德，
我們喜愛「拒絕作弊，堅守正直」的你！

科目：電子學

(共 2 頁第 1 頁)

！ 可使用計算機，惟僅限不具可程式及多重記憶者 不可使用計算機

1. An amplifier has the transfer characteristic $V_O = 12 - (V_I - 1)^2$ where V_I and V_O are in volts. This transfer characteristic applies for $1 \leq V_I \leq V_O + 1$ and V_O positive. At the limits of this region the amplifier saturates.

- Sketch and clearly label the transfer characteristic. What are the saturation levels L_+ and L_- and the corresponding value of V_I ? (20%)
- Bias the amplifier to obtain a dc output voltage of 8V. What value of input dc voltage V_I is required? (10%)
- Calculate the value of the small-signal voltage gain at the bias point. (20%)

2. In Fig. 1, a transconductance amplifier with $R_i = 30k\Omega$, $G_m = 40 \text{ mA/V}$ and $R_o = 20k\Omega$ is fed with a voltage source having a source resistance of $1k\Omega$ is loaded with a $1k\Omega$ resistance. Find the voltage gain realized. (20%)

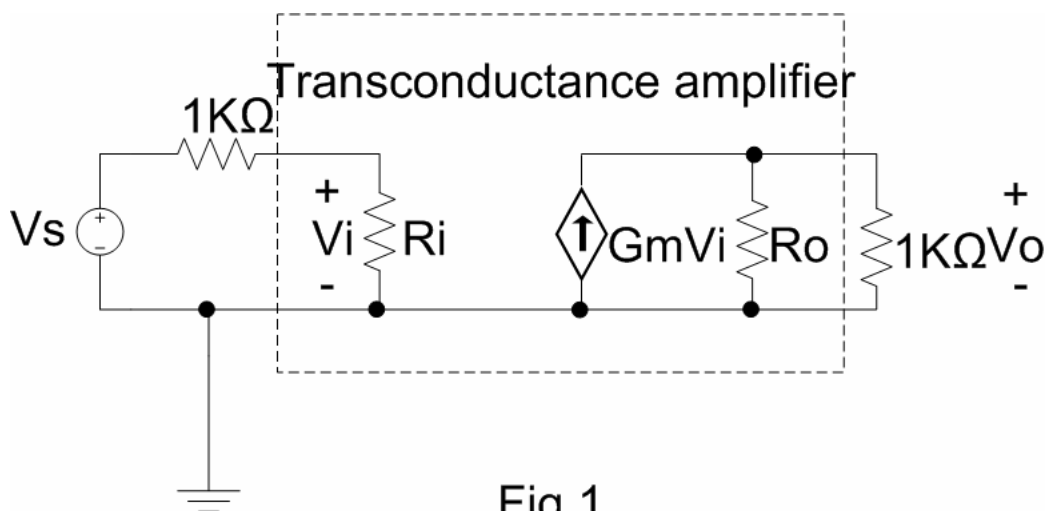


Fig. 1

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3. Find the output voltage V_o of the circuit shown in Fig.2. The amplifier is an ideal operational amplifier. (30%)

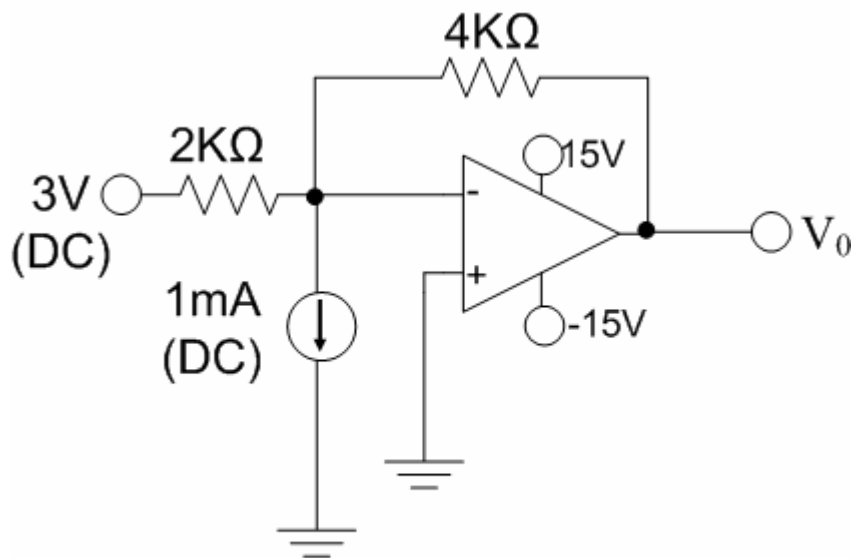


Fig.2