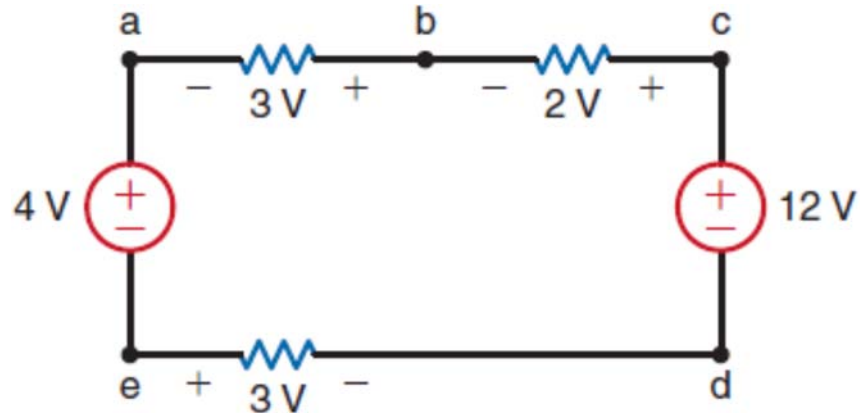


# DEVRE ANALİZİ

## Hafta 7

**Örnek:** Şekildeki devrede  $V_{ad}$  gerilimini bulunuz.

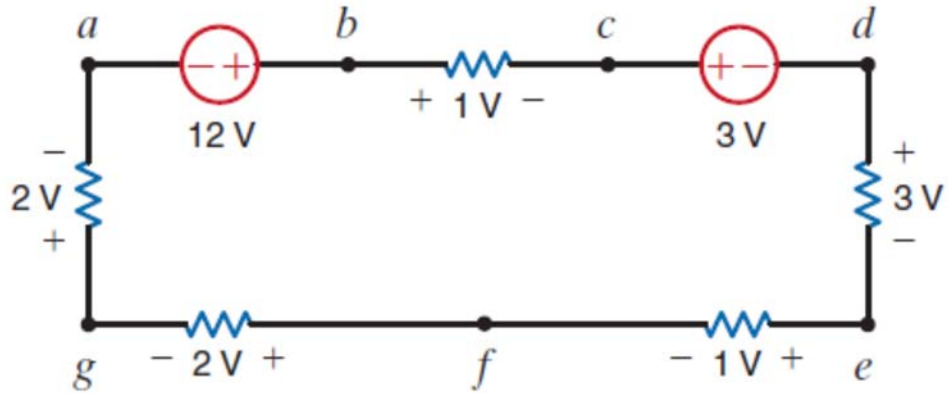


$V_d = 0$  olsun.

Bu durumda  $V_c = 12V$

Bu durumda  $V_a = 12V - (2+3) = 7V$  olur.

**Örnek:** Şekildeki devrede  $V_{fb}$  ve  $V_{ec}$  gerilimlerinin değerini bulunuz.



KVL around fbcdef :

$$V_{fb} + 1 + 3 + 3 + 1 = 0$$

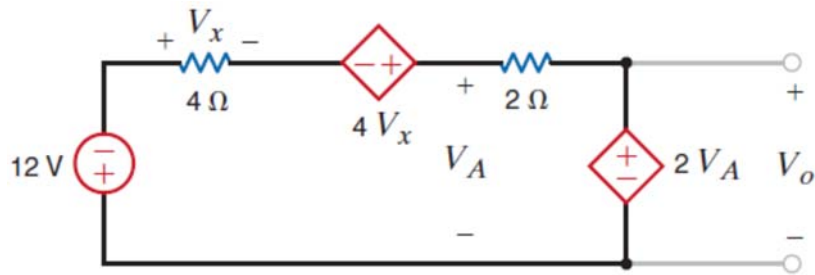
$$V_{fb} = -8V$$

KVL around ecde :

$$V_{ec} + 3 + 3 = 0$$

$$V_{ec} = -6V$$

**Örnek:** Şekildeki devrede  $V_o$  geriliminin değerini bulunuz.



$$\text{KVL: } 4V_x = 12 + 4I + 2I + 2V_A$$

$$V_x = 4I$$

$$4(4I) = 12 + 6I + 2V_A$$

$$2V_A = 10I - 12$$

$$V_A = 5I - 6$$

$$\text{KVL: } 4V_x = 12 + V_x + V_A$$

$$4(4I) = 12 + 4I + V_A$$

$$V_A = 12I - 12$$

$$I = \frac{V_A + 12}{12}$$

$$V_A = 5\left(\frac{V_A + 12}{12}\right) - 6$$

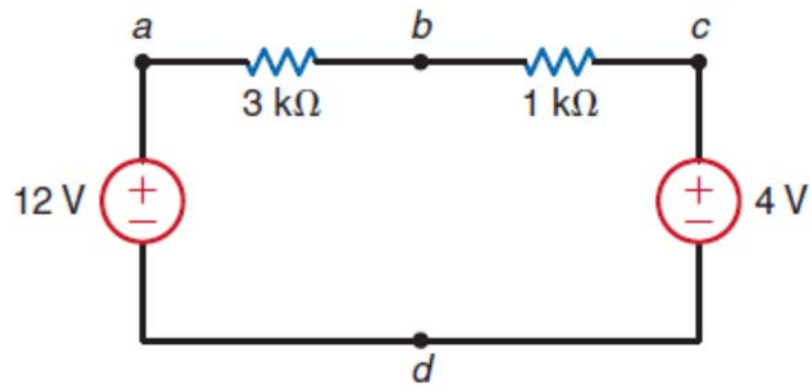
$$12V_A = 5V_A + 60 - 72$$

$$7V_A = -12$$

$$V_A = -\frac{12}{7} \text{ V}$$

$$V_o = 2V_A = 2\left(-\frac{12}{7}\right) = -\frac{24}{7} \text{ V}$$

**Örnek:** Şekildeki devrede  $V_{bd}$  gerilimini bulunuz.



$$\text{KVL: } 12 = 3KI + 1KI + 4$$

$$4KI = 8$$

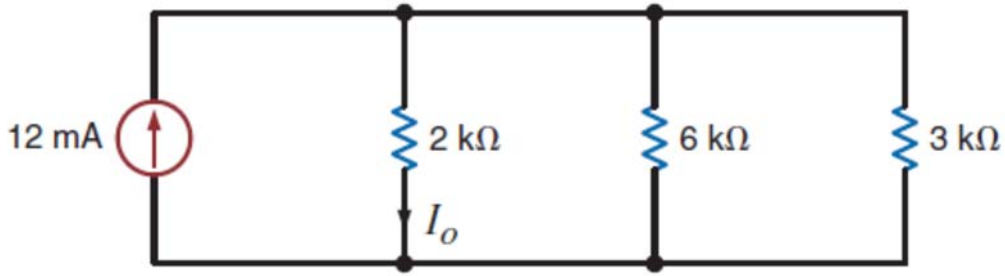
$$I = 2\text{mA}$$

$$\text{KVL left loop: } 12 = 3KI + V_{bd}$$

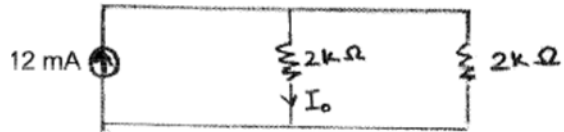
$$V_{bd} = 12 - 3K(2\text{mA})$$

$$V_{bd} = 6\text{V}$$

**Örnek:** Şekildeki devrede  $I_o$  akımını bulunuz.



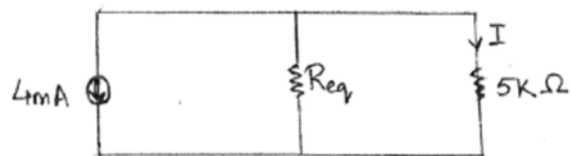
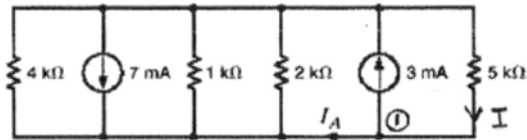
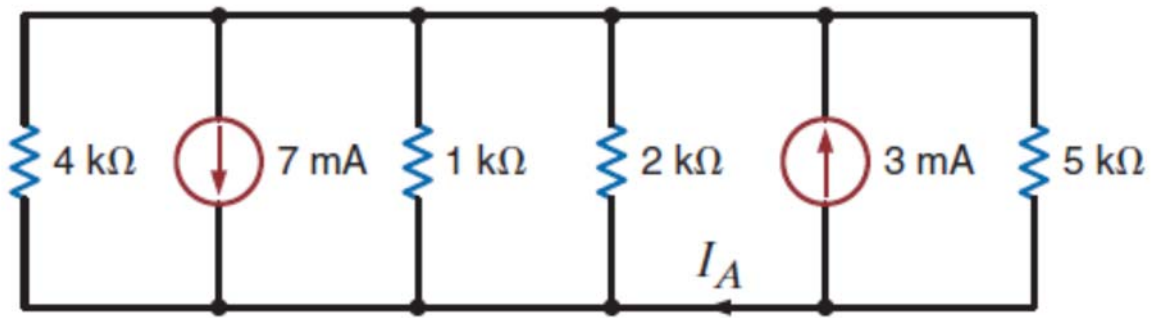
$$6\text{ k}\Omega + 3\text{ k}\Omega = 9\text{ k}\Omega$$



$$I_o = \left( \frac{2\text{ k}\Omega}{2\text{ k}\Omega + 9\text{ k}\Omega} \right) (12\text{ mA})$$

$$I_o = 6\text{ mA}$$

**Örnek:** Şekildeki devrede  $I_A$  akımını bulunuz.



$$I = \left( \frac{R_{eq}}{R_{eq} + 5k} \right) (-4m)$$

$$I = -0.41mA$$

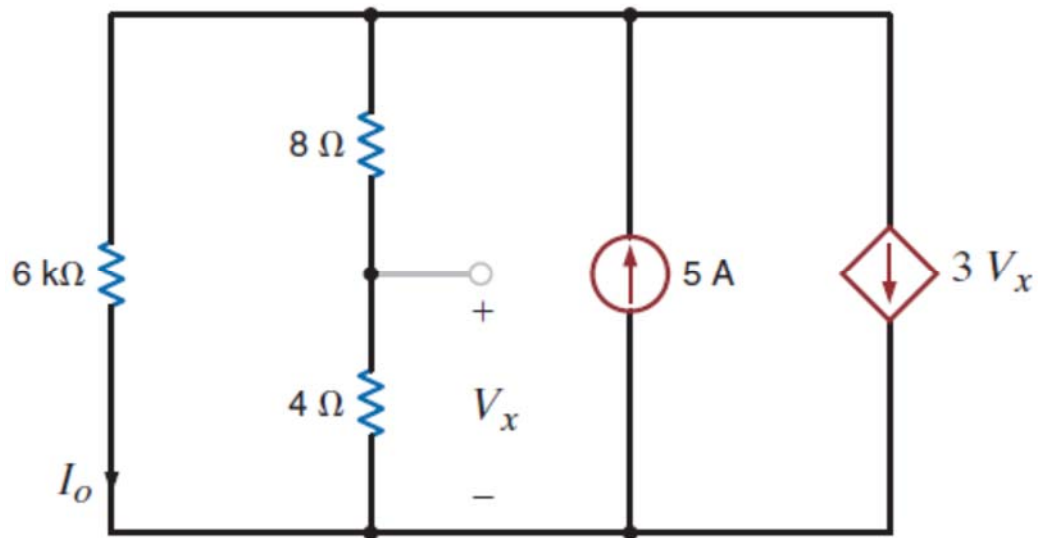
KCL at ① :

$$I = 3m + I_A$$

$$I_A = -0.41m - 3m$$

$$\boxed{I_A = -3.41mA}$$

**Örnek:** Şekildeki devrede  $I_0$  akımını bulunuz.



$$\text{KCL : } 5 = \frac{V_1}{6} + \frac{V_1}{8+4} + 3V_x$$

$$V_x = \left( \frac{4}{4+8} \right) (V_1)$$

$$V_x = \frac{V_1}{3}$$

$$5 = \frac{V_1}{6} + \frac{V_1}{12} + 3\left(\frac{V_1}{3}\right)$$

$$60 = 2V_1 + V_1 + 12V_1$$

$$15V_1 = 60$$

$$V_1 = 4 \text{ V}$$

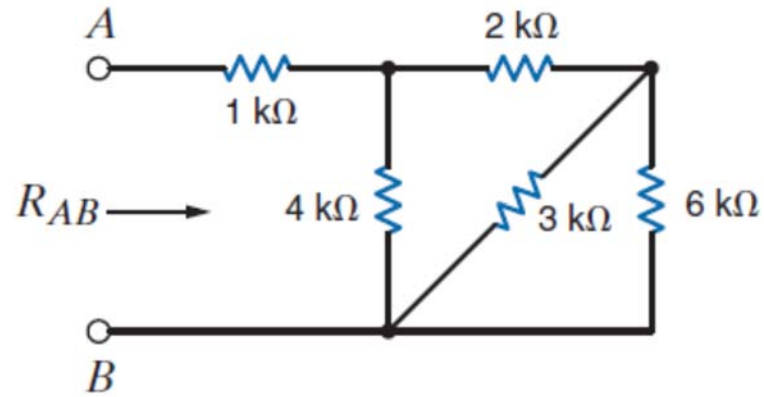
$$V_1 = 6I_0$$

$$I_0 = \frac{V_1}{6}$$

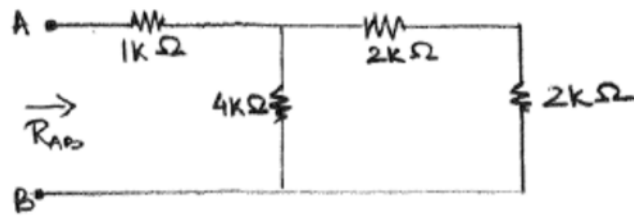
$$I_0 = \frac{4}{6}$$

$$I_0 = \frac{2}{3} \text{ A}$$

**Örnek:** Şekildeki devrede  $R_{AB}$  eşdeğer direnç değerini bulunuz.



$$3\text{ k}\Omega \parallel 6\text{ k}\Omega = 2\text{ k}\Omega$$

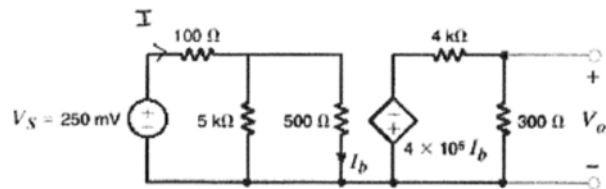
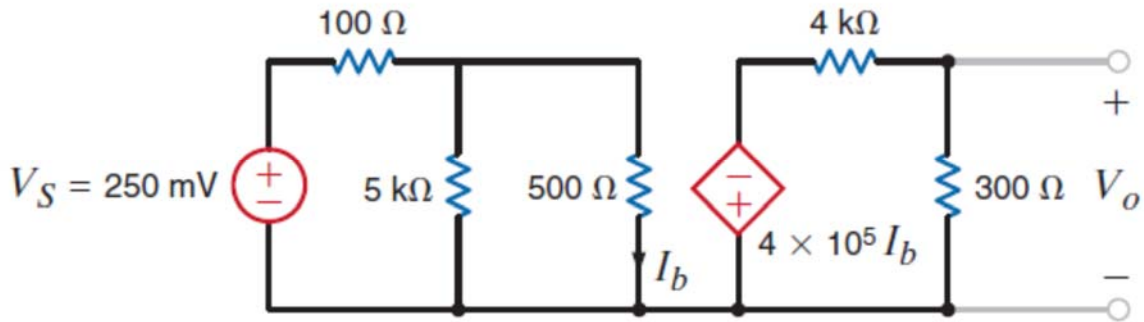


$$R_{AB} = (4\text{ k}\Omega \parallel 4\text{ k}\Omega) + 1\text{ k}\Omega$$

$$R_{AB} = 3\text{ k}\Omega$$



**Örnek:** Şekildeki devrede çıkış geriliminin, giriş gerilimine oranını (kazancı) bulunuz.



$$I = \frac{V_S}{(500 \parallel 5k) + 100} = \frac{250 \text{ m}}{454.55 + 100}$$

$$I = 0.451 \text{ mA}$$

$$I_b = \left( \frac{5k}{5k + 500} \right) (0.451 \text{ m})$$

$$I_b = 0.41 \text{ mA}$$

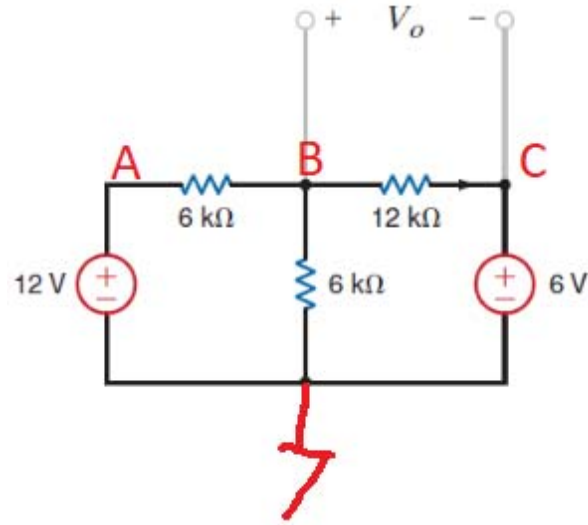
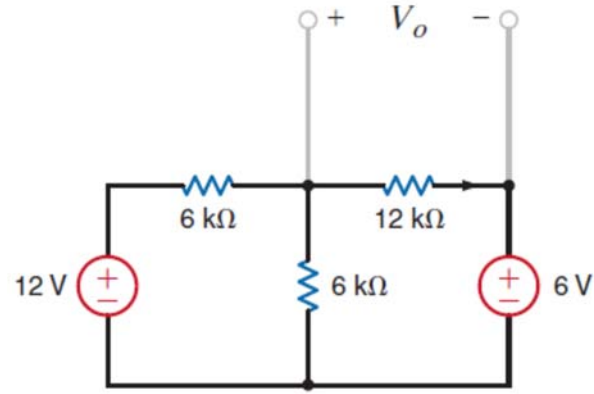
$$V_o = \left( \frac{300}{4k + 300} \right) (-4 \times 10^5) (0.41 \text{ mA})$$

$$V_o = -11.44 \text{ V}$$

$$G = \frac{V_o}{V_S} = \frac{-11.44}{250 \text{ m}}$$

$$G = -45.76$$

**Örnek:** Şekildeki devrede düğüm gerilimleri yöntemi kullanarak  $V_o$  gerilimini bulunuz.



Referans düğüm seçiminden sonra

$$V_A = 12V$$

$$V_C = 6V$$

$$\frac{V_B - V_A}{6k} + \frac{V_B}{6k} + \frac{V_B - V_C}{12k} = 0$$

$5V_B = 30V$  ise  $V_B = 6V$  ve  $V_{BC} = 0V$  olur.

## Kaynaklar

1. Temel Mühendislik Devre Analizi, J. David Irwin, R Mark Nelms, Nobel Yayınevi