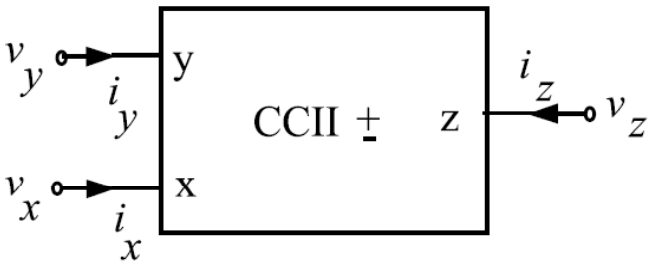
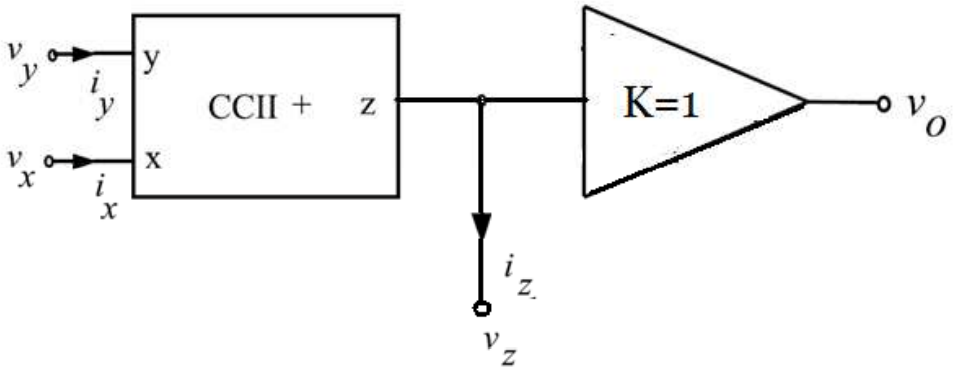
CFOA Tabanlı Osilatörler

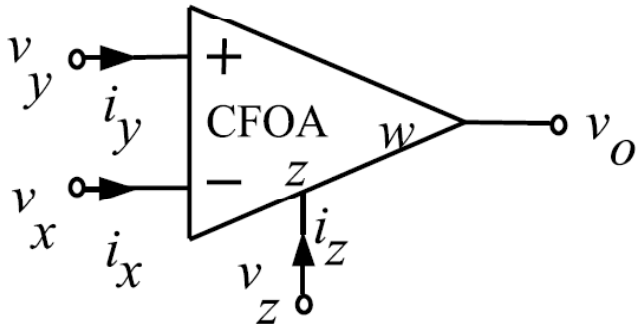
CFOA Sembolü, Tanım Bağıntıları

$$\begin{bmatrix} i_y \\ v_x \\ i_z \\ v_o \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} v_y \\ i_x \\ v_z \end{bmatrix}$$

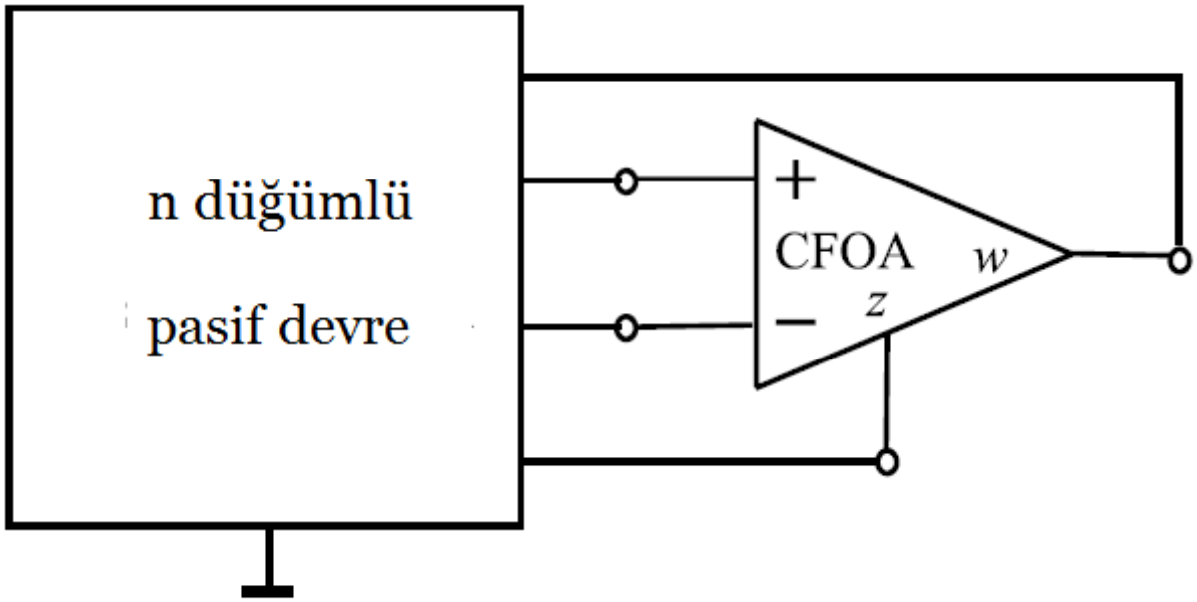


(a)

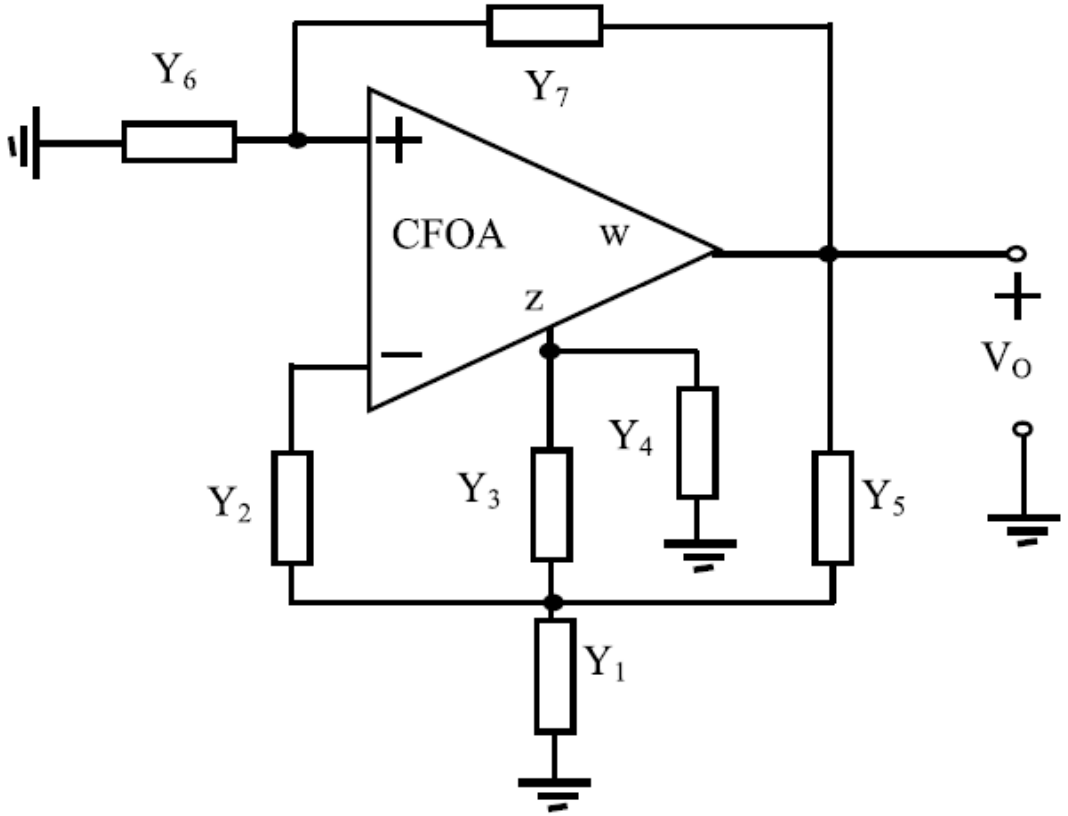




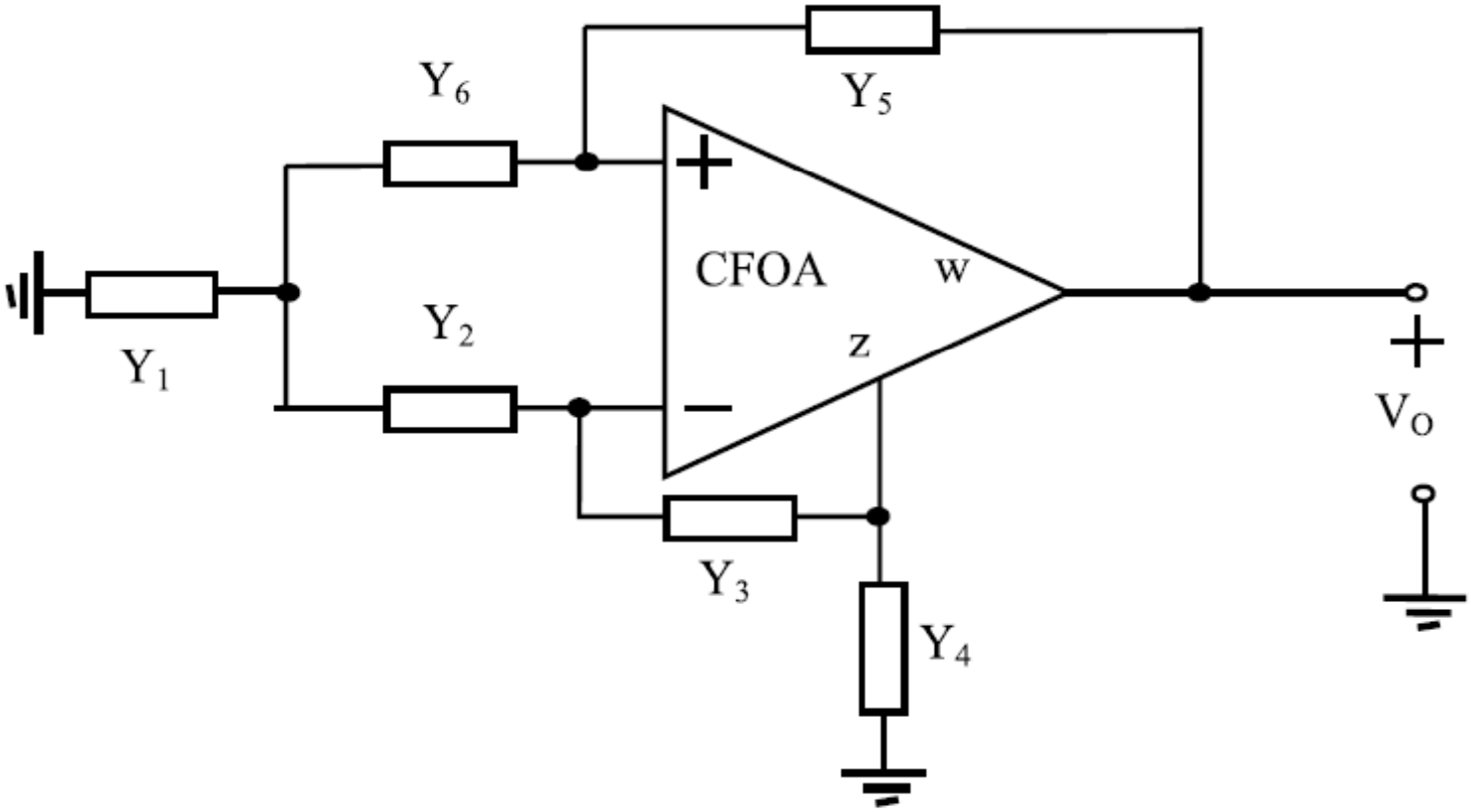
CFOA Tabanlı Osilatör Yapısı



CFOA Tabanlı Osilatör Genel Yapıları, Devre-1



CFOA Tabanlı Osilatör Genel Yapıları, Devre-2



CFOA Tabanlı Osilatör Yapıları, Devre-1

$$Y_1Y_3(Y_6+Y_7)+Y_2Y_6(2Y_3+Y_5)+Y_4(Y_1+Y_2+Y_3+Y_5)(Y_6+Y_7)=Y_1Y_2Y_7$$

(a) $$Y_4=0,\ Y_5=0$$

$$Y_1Y_2Y_7=Y_1Y_3(Y_6+Y_7)+2Y_2Y_3Y_6$$

$$Y_i\ (i=1,2,\ldots,7)$$

$$Y_1=G_1,\quad Y_2=sC_2,\quad Y_3=G_3,\quad Y_6=sC_6\quad\text{and}\quad Y_7=G_7.$$

$$C_2G_7=C_6G_3,\quad \omega_0^2=\frac{G_1G_7}{2C_2C_6}$$

CFOA Tabanlı Osilatör Yapıları,Devre-1

(b) $Y_6 = 0$

$$Y_1 Y_2 = Y_1 Y_3 + Y_4(Y_1 + Y_2 + Y_3 + Y_5)$$

$$Y_1 = sC_1, \quad Y_2 = G_2, \quad Y_3 = sC_3, \quad Y_4 = G_4 \quad \text{and} \quad Y_5 = G_5$$

$$C_1 G_2 = C_1 G_4 + C_3 G_4, \qquad \omega_0^2 = \frac{G_4(G_2 + G_5)}{C_1 C_3}$$

CFOA Tabanlı Osilatör Yapıları, Devre-2

$$Y_1 Y_2 Y_5 = Y_1 Y_6 (2Y_3 + Y_4) + (Y_1 + Y_2 + Y_6) Y_4 Y_5$$

$$Y_1 = G_1,\ Y_2 = G_2,\ Y_3 = G_3,\ Y_4 = sC_4,\ Y_5 = sC_5,\ Y_6 = G_6,$$

$$G_2 C_5 = C_4 G_6, \qquad \omega_0^2 = \frac{2G_1 G_3 G_6}{C_4 C_5 (G_1 + G_2 + G_6)}$$

CFOA Tabanlı Osilatör Yapıları

- Burada verilen tüm osilatörlerin osilasyon frekansı tek bir direncin ayarlanmasıyla osilasyon koşulu bozulmaksızın ayarlanabiliyor.
- Devre-1.a'da R1, Devre-1b'de R5, Devre-2'de R3 direnci
- Bu tür osilatörler SRCO (Single Resistor Controlled Oscillator) olarak isimlendirilirler.

Kaynaklar:

- A. Toker, O. Çiçekoğlu and H. Kuntman, 'On the oscillator implementations using a single current feedback op-amp', Computers and Electrical Engineering, 28, No.5, 375-389, 2002.