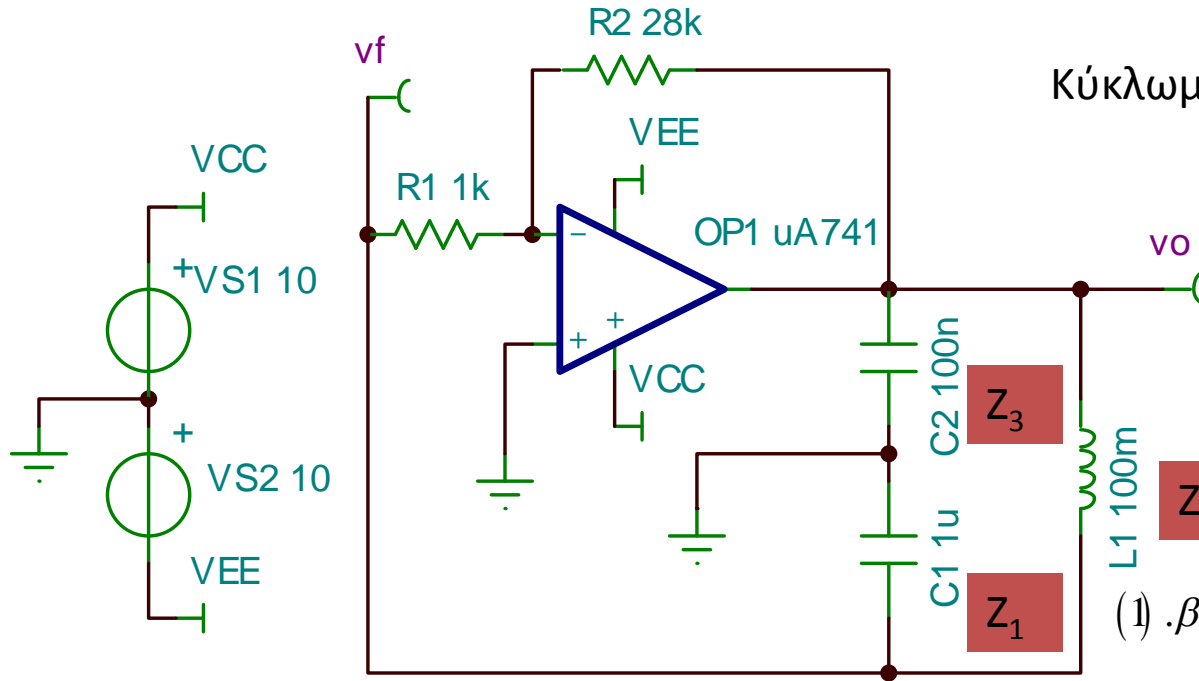


# Σημειώσεις στα Ηλεκτρονικά Κυκλώματα Αρμονικών Ταλαντωτών με Διακριτά Στοιχεία

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ΤΜΗΜΑ ΗΛΕΚΤΡΟΝΙΚΩΝ ΜΗΧΑΝΙΚΩΝ  
Τεχνολογικό Εκπαιδευτικό Ίδρυμα  
ΑΘΗΝΑΣ

Κύκλωμα LC ταλαντωτή Colpitts.

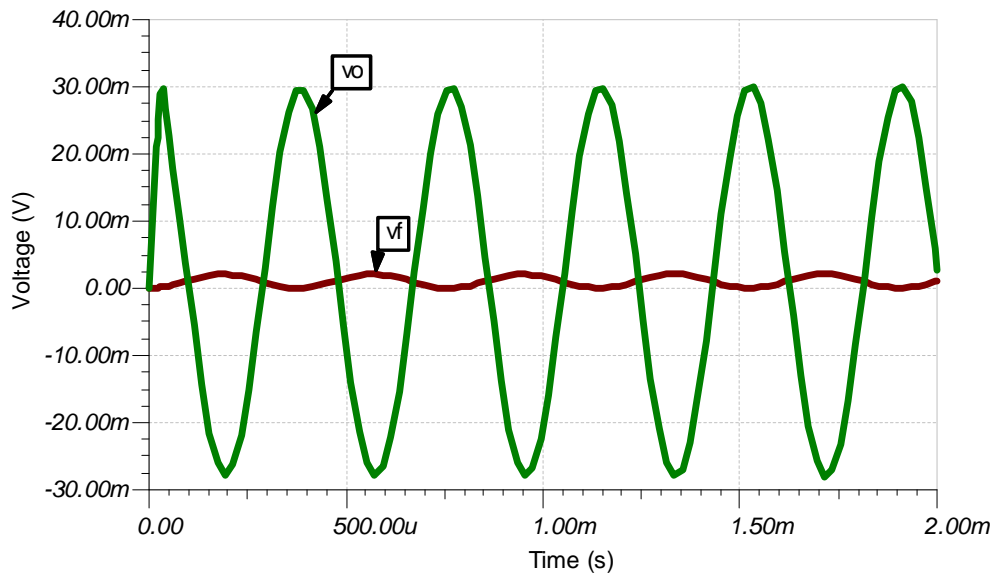


$$(1) \beta = -\frac{Z_1}{Z_1 + Z_3}$$

$$(2) A = -\frac{A_v Z_L}{R_o + Z_L}$$

$$(3) Z_L = (Z_1 + Z_3) \parallel Z_2 = \frac{Z_2(Z_1 + Z_3)}{Z_1 + Z_2 + Z_3}$$

$$(4) A\beta = 1 \Leftrightarrow \left\{ \begin{array}{l} X_1 + X_2 + X_3 = 0 \\ f = \frac{1}{2\pi\sqrt{LC_{eq}}} \\ |A_v| = \frac{R_2}{R_1} \geq \left| \frac{1}{\beta} \right| = \frac{X_3}{X_1} = \frac{C_1}{C_2} \end{array} \right.$$

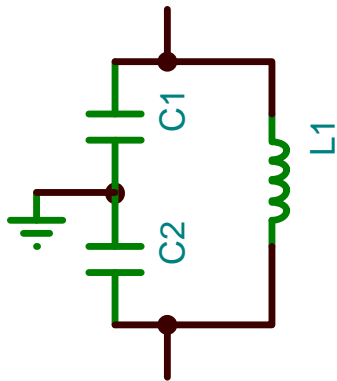


$$X_1 + X_2 + X_3 = 0$$

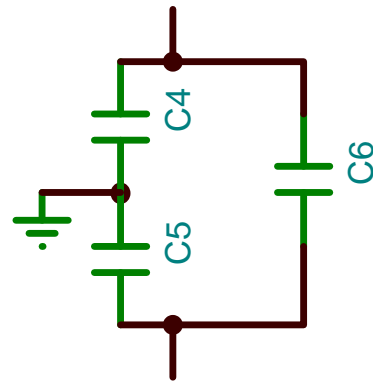
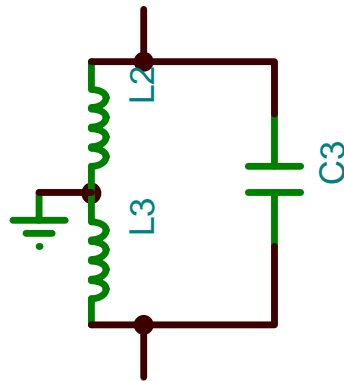
$$f_{Hartley} = \frac{1}{2\pi\sqrt{(L_1 + L_2)C}}$$

$$\omega L_3 - \frac{1}{\omega C_3} + \omega L_2 = 0 \Leftrightarrow \omega^2(L_3 + L_2) = \frac{1}{C_3}$$

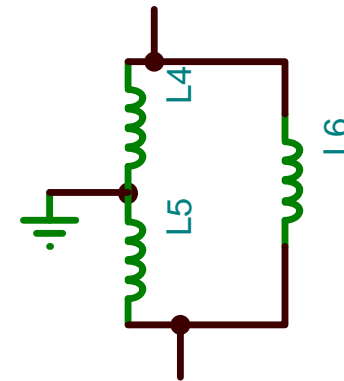
$$\omega L_5 + \omega L_6 + \omega L_4 = 0 \Leftrightarrow \omega(L_5 + L_6 + L_4) = 0$$



$$f_{Colpitts} = \frac{1}{2\pi\sqrt{L \frac{C_1 C_2}{C_1 + C_2}}}$$



$$-\frac{1}{\omega C_5} - \frac{1}{\omega C_6} - \frac{1}{\omega C_4} = 0 \Leftrightarrow -\frac{1}{C_5} - \frac{1}{C_6} - \frac{1}{C_4} = 0$$



$$-\frac{1}{\omega C_2} + \omega L_1 - \frac{1}{\omega C_1} = 0 \Leftrightarrow$$

$$\omega^2 L_1 - \left( \frac{1}{C_2} + \frac{1}{C_1} \right) = 0 \Leftrightarrow \omega^2 L_1 = \left( \frac{1}{C_2} + \frac{1}{C_1} \right)$$