بسم الله الرحمن الرحیم

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سوال ۸ :

ابتدا عبارت ها را باز نویسی می کنیم :

$$R = R_5 + (R_3 \mid R_4) = \ 2k + (2k \mid 2k\ ) = 3k$$

$$V'_{C1} = 2 * 10^4 i_{L1}$$
$$V'_{C2} = 10^4 i_{L1} + 10^4 i_{L2}$$

$$i'_{L1} + \frac{R_1 + R}{L1}\ i_{L1} + \frac{R}{L1}\ i_{L2} = \ -\frac{V_{C1}}{L1}\ - \frac{V_{C2}}{L1} + \frac{R_4}{L1(R_3 + R_4)} es$$
$$5 * 10^{-5} i'_{L1}\ + 5 * 10^3 i_{L1} + \ 3 * 10^3 i_{L2} = \ -V_{C1}\ - V_{C2} + 12$$
$$5 * 10^{-5} i''_{L1}\ + 5 * 10^3 i'_{L1} + \ 3 * 10^3 i'_{L2} = \ -V'_{C1}\ - V'_{C2}$$
$$5 * 10^{-5} i''_{L1}\ + 5 * 10^3 i'_{L1} + \ 3 * 10^3 i'_{L2} = -2 * 10^4 i_{L1} - 10^4 i_{L1} - 10^4 i_{L2}$$
$$5 * 10^{-5} i''_{L1}\ + 5 * 10^3 i'_{L1} + 3 * 10^4 i_{L1} = -3 * 10^3 i'_{L2} - 10^4 i_{L2}$$
$$i''_{L1} = f(i'_{L1}, i_{L1}, i'_{L2}, i_{L2})$$
$$i'_{L2} + \frac{R}{L_2} i_{L1} + \frac{R + R_2}{L_2} i_{L2} = \ -\frac{V_{C2}}{L_2} + \frac{R_4}{L_2(R_3 + R_4)} es$$
$$10^{-5} i'_{L2} + 3 * 10^3 i_{L1} + 5 * 10^3\ i_{L2} = -V_{C2} + 12$$
$$10^{-5} i''_{L2} + 3 * 10^3 i'_{L1} + 5 * 10^3\ i'_{L2} = -V'_{C2}$$
$$10^{-5} i''_{L2} + 5 * 10^3\ i'_{L2} + 10^4 i_{L2}\ = \ -3 * 10^3 i'_{L1} - 10^4 i_{L1}$$
$$i''_{L2} = f\left(i'_{L2}, i_{L2}, i'_{L1}, i_{L1p}\right)$$

$$10^{-5} i''_{L2} + 5 * 10^{3}\, i'_{L2} + 10^{4} i_{L2} = -3 * 10^{3} i'_{L1} - 10^{4} i_{L1}$$

$$5 * 10^{-5} i''_{L1} + 5 * 10^{3} i'_{L1} + 3 * 10^{4} i_{L1} = -3 * 10^{3} i'_{L2} - 10^{4} i_{L2}$$