57.свързване на посл. RLC двуполюсник към изт. На пост. Напрежение:

$$\left| \begin{array}{l} Uc(0-) = Uc(0) = Uc(0+) = 0; U_R + U_L + U_C = E; \\ i(0-) = i(0) = i(0+) = 0; \qquad U_R = Ri; \end{array} \right.$$

$$i = C\frac{dUc}{dt}; U_L = L\frac{di}{dt}; \Rightarrow \left| \begin{array}{l} Ri + L\frac{di}{dt} + U_C = E \\ i - C\frac{dUc}{dt} = 0 \end{array} \right. ;$$

$$U(t) = U_{CB} + U_{CT} = U_{CB} + Uc_{CT};$$

$$\left| \begin{array}{l} Ri_{CB} + L\frac{di_{CB}}{dt} + Uc_{CB} = 0 \\ i_{CB} - C\frac{dUc_{CB}}{dt} = 0 \end{array} \right. \Leftrightarrow \left| \begin{array}{l} \left(R + \frac{d}{dt}\right) i_{CB} + Uc_{CB} = 0 \\ i_{CB} - C\frac{d}{dt}Uc_{CB} = 0 \end{array} \right. ;$$

$$P[k] = \det \begin{pmatrix} P + Lk & 1 \\ 1 & -Ck \end{pmatrix} \Rightarrow -(R + Lk) - 1 = 0$$

$$LCk^2 + RCk + 1 = 0; k^2 + \frac{R}{L}k + \frac{1}{CL} = 0;$$

$$\alpha = \frac{R}{2L}; \omega_0 = \frac{1}{\sqrt{LC}} \Rightarrow k^2 + 2\alpha k + \omega_0{}^2 = 0;$$

нека $к_{1,2} \in R$

$$\Rightarrow \left| \begin{array}{l} i_{CB} = A_1 e^{k_1 t} + A_2 e^{k_2 t} \\ Uc_{CB} = B_1 e^{k_1 t} + B_2 e^{k_2 t} \end{array} \right. ;$$

(1)начин: изсл.на стац. Режим, прек. Вер.и ток не протича: $U_{CT}=0$; $U_{CT}=E$; **(2)**начин: полагаме произв. От диф. У-е да са нули: запи

$$i(t) = i_{CB} = A_1 e^{k_1 t} + A_2 e^{k_2 t};$$

$$Uc(t) = B_1 e^{k_1 t} + B_2 e^{k_1 t} + E;$$

$$\left(\frac{di}{dt}\right)_{t=0+} = ? \left(\frac{dUc}{dt}\right)_{t=0+} = ?$$

сваме систамата за t=0+ $\Rightarrow$

$$\left| \begin{array}{l} \underbrace{Ri(0+)}_{=0} + L\left(\frac{di}{dt}\right)_{t=0+} + \underbrace{Uc(0+)}_{=0} = E \\ i(0+) - C\left(\frac{dUc}{dt}\right)_{t=0+} = 0 \end{array} \right. \Rightarrow$$

$\left(\frac{dUc}{dt}\right)_{t=0+} = 0$, първо зависимо начално у-е.

$$\left(\frac{di}{dt}\right)_{t=0+} = \frac{E}{L} \Rightarrow Uc(0) = B_1 + B_2 + E = 0;$$

$$B_1 + B_2 = -E; \frac{dUc}{dt} = k_1 B_1 e^{k_1 t} + k_2 B_2 e^{k_2 t} = 0;$$

$$\left(\frac{dUc}{dt}\right)_{t=0+} = k_1 B_1 + k_2 B_2 = 0; \Rightarrow$$

$$k_1 B_1 + k_2 B_2 = 0; \Rightarrow \left| \begin{array}{l} B_1 + B_2 = -E \\ k_1 B_1 + k_2 B_2 = 0 \end{array} \right. \Rightarrow \left| \begin{array}{l} B_1 = \\ B_2 = \end{array} \right. \ldots$$