PRIMIJENJENI ELEKTROMAGNETIZAM – FORMULE ZA MEĐUISPIT

$$-\frac{\partial v}{\partial x} = R \cdot i + L\frac{\partial i}{\partial t}, \qquad -\frac{\partial i}{\partial x} = G \cdot v + C\frac{\partial v}{\partial t}$$

$$\xrightarrow{slijedi} \qquad -\frac{\partial^2 v}{\partial x^2} = LC\frac{\partial^2 v}{\partial t^2} + (RC + LG)\frac{\partial v}{\partial t} + RG \qquad \rightarrow \text{VALNA JEDNADŽBA NAPONA}$$

- LINIJA BEZ GUBITAKA: (R=0, G=0)

$$\frac{\partial^2 v}{\partial x^2} = LC\frac{\partial^2 v}{\partial t^2} \qquad \rightarrow \text{TELEGRAFSKE JEDNADŽBE}$$

$$\frac{\partial^2 i}{\partial x^2} = LC\frac{\partial^2 i}{\partial t^2} \qquad \rightarrow \text{TELEGRAPHER EQUATIONS}$$

- LINIJA UZ SINUSNU POBUDU:

$$\frac{\partial^2 V}{\partial x^2} = ZY \cdot V, \qquad \frac{\partial^2 I}{\partial x^2} = ZY \cdot I$$

$$V(x) = Ae^{\gamma x} + Be^{-\gamma x}$$

$$I(x) = \frac{A}{Z_0}e^{\gamma x} + \frac{B}{Z_0}e^{-\gamma x}$$

$$\gamma = \sqrt{ZY} = \alpha + j\beta$$

$$\Gamma = \frac{V_r}{V_i} = \frac{Be^{-\gamma x}}{Ae^{\gamma x}} = \frac{B}{A}e^{-2\gamma x}|_{x=0} = \frac{B}{A} \qquad \rightarrow \text{KOEFICIJENT REFLEKSIJE}$$

$$Z_0 = \sqrt{\frac{Z}{Y}} \qquad \rightarrow \text{KARAKTERISTIČNA IMPEDANCIJA LINIJE}$$

$$v(t) = Ae^{\alpha x}\cos(\omega t + \beta x)$$

$$A = \frac{V_R}{2}\left(1 + \frac{Z_0}{Z_R}\right), \qquad B = \frac{V_R}{2}\left(1 - \frac{Z_0}{Z_R}\right)$$

$$V(x) = \frac{V_R}{2}\left[\left(1+\frac{Z_0}{Z_R}\right)e^{\gamma x} + \left(1-\frac{Z_0}{Z_R}\right)e^{-\gamma x}\right] \xrightarrow{slijedi} V(x) = V_R\left[\cosh(\gamma x) + \frac{Z_0}{Z_R}\sinh(\gamma x)\right]$$

$$I(x) = \frac{I_R}{2}\left[\left(\frac{Z_R}{Z_0}+1\right)e^{\gamma x} - \left(\frac{Z_R}{Z_0}-1\right)e^{-\gamma x}\right] \xrightarrow{slijedi} I(x) = I_R\left[\cosh(\gamma x) + \frac{Z_R}{Z_0}\sinh(\gamma x)\right]$$

$$\Gamma = \frac{Z_R - Z_0}{Z_R + Z_0} = \sqrt{\frac{P_r}{P_i}} = \frac{Z_{DESNO} - Z_{LIJEVO}}{Z_{DESNO} + Z_{LIJEVO}} \qquad \rightarrow \text{KOEFICIJENT REFLEKSIJE}$$

$$P_i = \frac{A^2}{Z_0}e^{2\alpha x} = \frac{|V_i|^2}{Z_0}e^{2\alpha x} \quad \rightarrow \quad \alpha = \frac{\frac{\partial P}{\partial x}}{2P} \qquad \rightarrow \text{PRIGUŠENJE SNAGE}$$

$$P_i = \frac{\left|V_{i,ef}\right|^2}{Z_0} = \frac{|V_i|^2}{2Z_0} \qquad \rightarrow \text{INCIDENTNA SNAGA}$$

$$P_r = P_i|\Gamma_T|^2 \qquad \rightarrow \text{REFLEKTIRANA SNAGA}$$

$$P_t = P_i(1-|\Gamma_T|^2) \qquad \rightarrow \text{SNAGA PREDANA TERETU}$$

$$Z_{IN} = Z_0\frac{Z_R + Z_0\tanh(\gamma x)}{Z_0 + Z_R\tanh(\gamma x)} \quad \xrightarrow{\alpha=0} \quad Z_{IN} = Z_0\frac{Z_R + jZ_0\tan(\beta x)}{Z_0 + jZ_R\tan(\beta x)} \rightarrow \text{ ULAZNA IMPEDANCIJA}$$

$$\rho = OSV = SWR = \frac{V_{MAX}}{V_{MIN}} = \frac{1+|\Gamma_T|}{1-|\Gamma_T|}, \qquad 1 < SWR < \infty$$

$$\frac{Y_C}{Y_0} + \frac{Y_{ST}}{Y_0} = 1 \qquad \rightarrow \text{UVJET ZA PRILAGOĐENJE}$$

$$d_1 = W_C - W_B, \qquad d_2 = W_{ST} - W_*, \qquad *\in \{OK, KS, L, C\} \qquad \rightarrow \text{PRILAGOĐENJE}$$