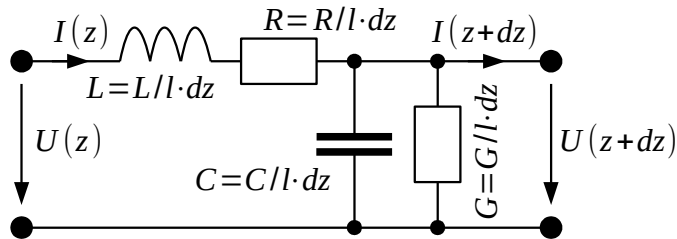# Vod z izgubami

$$\frac{dU(z)}{dz} = -j\omega L/l \cdot I(z) - R/l \cdot I(z)$$

$$\frac{dI(z)}{dz} = -j\omega C/l \cdot U(z) - G/l \cdot U(z)$$
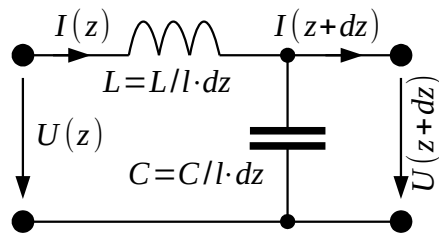
$$\frac{d^2 U(z)}{dz^2} = (j\omega L/l + R/l)(j\omega C/l + G/l) \cdot U(z) = -k^2 U(z)$$

$$k = \beta - j\alpha = \sqrt{-(j\omega L/l + R/l)\cdot(j\omega C/l + G/l)}$$

$$U(z) = U_N(0)\cdot e^{-\alpha z}\cdot e^{-j\beta z} + U_O(0)\cdot e^{+\alpha z}\cdot e^{+j\beta z}$$

$$u(z,t) = Re\left[U_N(0)\cdot e^{-\alpha z}\cdot e^{j(\omega t - \beta z)} + U_O(0)\cdot e^{+\alpha z}\cdot e^{j(\omega t + \beta z)} \right]$$

Brezizgubni vod

$$\frac{d^2 U(z)}{dz^2} = -\omega^2 L/l \cdot C/l \cdot U(z) = -k^2 U(z)$$

$$k = \beta = \omega\sqrt{L/l \cdot C/l} = \frac{\omega}{v}$$

$$U(z) = U_N(0)\cdot e^{-j\beta z} + U_O(0)\cdot e^{+j\beta z}$$

$$u(z,t) = Re\left[U_N(0)\cdot e^{j(\omega t - \beta z)} + U_O(0)\cdot e^{j(\omega t + \beta z)} \right]$$

Napredujoči val

Odbiti (povratni) val