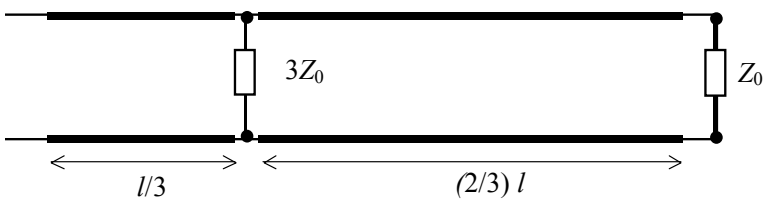
R_0= 9.38 Ω/km L_0=1.62 mH/km G_0= 4.58 μS/km C_0= 6.7 nF/km ω = 508 Hz $L_0 \leftarrow 10 \times L_0$ *ako sa zmenia:* α_1 =?, α_2=? v_{f1} =?, v_{f2} =?	 *Vypočítajte vstupnú impedanciu, ideálneho vedenia premosteného impedanciou podľa obrázku* Z_0 = 75 Ω, β = 0.2 km^{-1}, l = 300 km *a napíšte ako sa táto zmení pri zmene frekvencie na2 násobok*

Riešenie 1. úlohy:

L_0=1.62 mH/km

$$\gamma = \sqrt{(R_0 + j\omega L_0)(G_0 + j\omega C_0)} = \sqrt{R_0 + j\omega L_0}\sqrt{G_0 + j\omega C_0} =$$

$$= \sqrt{9.38 + j\underbrace{508\times 1.62\times 10^{-3}}_{0.823}}\sqrt{4.58\times 10^{-6} + j\underbrace{508\times 6.7\times 10^{-9}}_{3.404\times 10^{-6}}} =$$

$$= \sqrt{9.38 + j0.823}\sqrt{(4.58 + j3.404)\times 10^{-6}} = \sqrt{9.42\angle 5°}\times 10^{-3}\sqrt{5.71\angle 36.6°}$$

$$\gamma = 3.07\angle 2.5° \times 2.39\angle 18.3° = 7.34\angle 20.8° = (6.86 + j2.61)\times 10^{-3.}$$

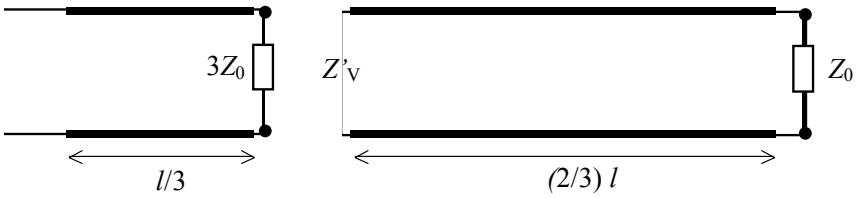
$$\alpha_1 = 6.86\times 10^{-3},\quad \beta_1 = 2.61\times 10^{-3} \quad \Rightarrow \quad v_{f1} = \frac{\omega}{\beta_1} = \frac{508}{2.61}\times 10^3 = 194640 \text{ km/s}$$

L_0=16.2 mH/km

$$\gamma = \sqrt{9.38 + j8.23}\times 10^{-3}\sqrt{5.71\angle 36.6°} = 3.53\angle 20.6° \times 2.39\angle 18.3° = 8.44\angle 38.9° = (6.57 + j5.3)\times 10^{-3.}$$

$$\alpha_2 = 6.57\times 10^{-3},\quad \beta_2 = 5.3\times 10^{-3} \quad \Rightarrow \quad v_{f2} = \frac{\omega}{\beta_2} = \frac{508}{5.3}\times 10^3 = 95850 \text{ km/s}$$

Riešenie 2. úlohy:



Vstupná impedancia Z'_V pravej časti vedenia o dĺžke (2/3)l je Z_0 - je to prispôsobené vedenie!

Po pripojení je preto prvá časť vedenia o dĺžke (1/3)l zakončená *paralelnou kombináciou:* $Z_2 = \frac{3Z_0 \times Z_0}{3Z_0 + Z_0} = Z_0\frac{3}{4}$,

a vstupná impedancia celého vedenia je potom pri $\beta\frac{l}{3} = 20$:

$$Z_V = Z_0\frac{\frac{3}{4}\cos(20) + j\sin(20)}{\cos(20) + j\frac{3}{4}\sin(20)} = 75\frac{3\cos(20) + j4\sin(20)}{4\cos(20) + j3\sin(20)} = 75\frac{3\times 0.41 + j4\times 0.91}{4\times 0.41 + j3\times 0.91} = 75\frac{1.23 + j3.64}{1.64 + j2.73} =$$

$$= 75\frac{3.84\angle 1.24}{3.18\angle 1.03} = 81.53\angle 0.24 = 90.57\angle 13.7°$$

Po zdvojnásobení frekvencie by bolo $Z_V = Z_0\frac{\frac{3}{4}\cos(40) + j\sin(40)}{\cos(40) + j\frac{3}{4}\sin(40)}$, lebo $\beta = \omega\sqrt{L_0C_0}$.