

$$\vec{\nabla} \times \vec{E} = -j\omega\mu\vec{H}$$

$$\vec{\nabla} \times \vec{H} = +j\omega\epsilon\vec{E}$$

$$\vec{\nabla} \cdot \vec{E} = 0$$

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$$\vec{a} \times (\vec{b} \times \vec{c}) = (\vec{a} \cdot \vec{c})\vec{b} - (\vec{a} \cdot \vec{b})\vec{c}$$

$$Z_{in}' = \frac{Z_L' + j \tan \beta L}{1 + j Z_L' \tan \beta L}$$

$$K(x) = K e^{-2jk(L-x)}$$

$$Z_w = \sqrt{\frac{j\omega\mu}{\sigma + j\omega\epsilon}}$$

$$k_c = \sqrt{\left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2}$$

$$W_r = \iint_{\phi, \theta} P_{\Omega}(\theta, \phi) \sin \theta d\theta d\phi$$

$$A_{eff} = \frac{\lambda^2 G}{4\pi}$$

$$\vec{H}_{\phi} = \frac{j e^{-jkr} k I_m L \sin \theta}{4\pi r} \left(1 + \frac{1}{jkr}\right), \quad \vec{H}_r = \vec{H}_{\theta} = 0$$

$$\vec{E}_{\theta} = \frac{j e^{-jkr} k I_m L Z_0 \sin \theta}{4\pi r} \left(1 + \frac{1}{jkr} - \frac{1}{k^2 r^2}\right)$$

$$\vec{E}_r = \frac{e^{-jkr} I_m L Z_0 \cos \theta}{2\pi r^2} \left(1 + \frac{1}{jkr}\right)$$

$$\vec{E}_{\theta} = \frac{j Z_0 I_m e^{-jkr}}{2\pi r} \cdot \left(\frac{\cos\left(\frac{kL}{2} \cdot \cos \theta\right) - \cos\left(\frac{kL}{2}\right)}{\sin \theta} \right)$$

$$G = 6 \left(\frac{D}{\lambda}\right)^2$$

$$\phi_{3dB} = \left(170 \frac{\lambda}{D}\right)^{\circ}$$

3E - FORMULARIUM: - ANALOGE TRANSMISSIE
- HF-ONTWERPEN



$$\epsilon_{\text{eff}} = \frac{1}{2} (\epsilon_r + 1) + \frac{1}{2} (\epsilon_r - 1) \left(1 + 12 \frac{H}{w}\right)^{-1/2} \quad \text{voor } \frac{w}{H} > 1$$

$$\epsilon_{\text{eff}} = \frac{1}{2} (\epsilon_r + 1) + \frac{1}{2} (\epsilon_r - 1) \left[\left(1 + 12 \frac{H}{w}\right)^{-1/2} + 0,04 \left(1 - \frac{w}{H}\right)^2 \right] \text{ etc}$$

$$\text{LPF: } L_k = \frac{R}{\omega_p} \cdot g_k \quad C_k = \frac{1}{R \cdot \omega_p} \cdot g_k$$

$$\text{BPF: serie: } L_k = \frac{R \cdot g_k}{\omega_0 \cdot B} \quad C_k = \frac{B}{\omega_0 \cdot R \cdot g_k}$$

$$\text{parallel: } L_k = \frac{R \cdot B}{\omega_0 \cdot g_k} \quad C_k = \frac{g_k}{\omega_0 \cdot R \cdot B}$$

$$B = \frac{\omega_2 - \omega_1}{\omega_0}$$

$$\text{BRF: serie: } L_k = \frac{R \cdot g_k \cdot B}{\omega_0} \quad C_k = \frac{1}{\omega_0 \cdot B \cdot R \cdot g_k}$$

$$\text{parallel: } L_k = \frac{R}{\omega_0 \cdot B \cdot g_k} \quad C_k = \frac{B \cdot g_k}{\omega_0 \cdot R}$$

$$B = \frac{\omega_4 - \omega_3}{\omega_0}$$

$$\text{Kuroda: } Z_c = 8 \cdot L \cdot f_0 \quad 25 \leq Z_c \leq 85$$

grafieken / Tabellen: Butterworth / Chebyshev → onbeschreven mee te brengen.

3E - extra Formularium HF-ontwerpen