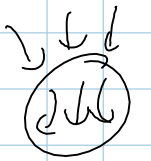
RÜ 10

Dienstag, 28. Juni 2011
15:59

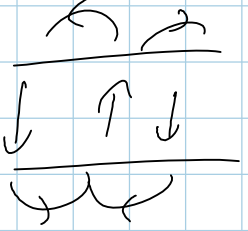
A6 F07

6.1.1) HE_{11}

E-Feld:



Querschnitt



Längsschnitt

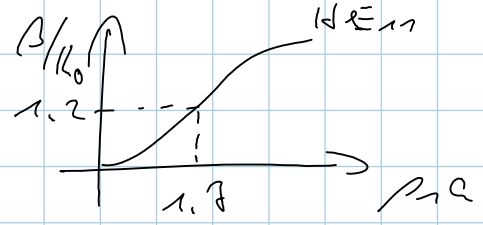
6.1.2) $P_{CHE11} = 0$

6.1.3) slow-Wave: $v_{ph} < c_0$ (Glasfaser)

fast-Wave $v_{ph} > c_0$ Hohlleiter

6.1.4) Glasfaser, Antennen

6.2.1) S. 80



$v(\beta/k_0 = 1{,}2) = 1{,}7$

6.2.2) $v = p_1 a = k_0 a \sqrt{\varepsilon_{r1} - \left(\frac{\beta}{k_0}\right)^2} \overset{!}{=} 1{,}7$

$$\Rightarrow a = \frac{1{,}7}{k_0 \sqrt{\varepsilon_{r1} - \left(\frac{\beta}{k_0}\right)^2}} = 9{,}02\,\mu m$$

6.2.3)

6.2.3) $w = \sqrt{u^2 + v^2} = k_0 a \sqrt{\varepsilon_{r1} - \varepsilon_{r2}}$

$= 2{,}11 \cdot 2 < 2{,}405$

$w < 2{,}405$ Bedingung für Monomode

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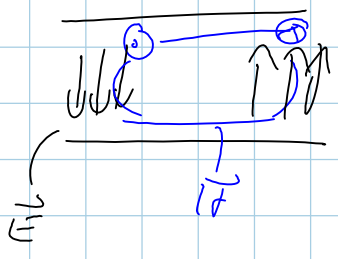
6.3.1) H_{11}

$\vec{E}$ —

$\vec{H}$ —

Querschnitt



Längsschnitt

6.3.2) Feldbilder → Transversale Komponenten sind ähnlich

6.3.3) $f_c = 0{,}293 \frac{c_0}{R} \stackrel{!}{=} 0{,}8 \cdot 10^6 \text{Hz}$

$\Rightarrow R = \frac{0{,}293 \, c_0}{0{,}8 \cdot 10^6 \text{Hz}} = 1{,}1 \text{ cm}$

6.3.4) $\beta = \frac{2\pi}{c_0} \sqrt{f^2 - f_c^2}$

$k_0 = \frac{2\pi}{c_0} f$

$\Rightarrow \frac{\beta}{k_0} = \sqrt{1 - \left(\frac{f_c}{f}\right)^2} = 0{,}6$

6.3.5) nächst höherer Wellentyp: E_{01}

$f_{c\,E_{01}} = 1{,}306 \, f_{c\,H_{11}} = 1{,}0448 \, f$

$= 19486\,\text{Hz} \rightarrow 10\,\text{kHz}$

nicht ausbreitungsfähig!