GUÍAS RECTANGULARES

MODOS TE_{mn}

$$
\begin{aligned}
H_z &= P_{mn} \cos\left(\frac{m\pi x}{a}\right) \cos\left(\frac{n\pi y}{b}\right) e^{-\gamma_{mn} z} \\
H_x &= \frac{\gamma_{mn} m\pi}{k_c^2 a} P_{mn} \sin\left(\frac{m\pi x}{a}\right) \cos\left(\frac{n\pi y}{b}\right) e^{-\gamma_{mn} z} \\
H_y &= \frac{\gamma_{mn} n\pi}{k_c^2 b} P_{mn} \cos\left(\frac{m\pi x}{a}\right) \sin\left(\frac{n\pi y}{b}\right) e^{-\gamma_{mn} z} \\
E_x &= \frac{j\omega\mu n\pi}{k_c^2 b} P_{mn} \cos\left(\frac{m\pi x}{a}\right) \sin\left(\frac{n\pi y}{b}\right) e^{-\gamma_{mn} z} \\
E_y &= \frac{-j\omega\mu m\pi}{k_c^2 a} P_{mn} \sin\left(\frac{m\pi x}{a}\right) \cos\left(\frac{n\pi y}{b}\right) e^{-\gamma_{mn} z}
\end{aligned}
$$

$$
\gamma_{mn} = \sqrt{-\omega^2\mu\epsilon + \left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2}
$$

MODOS TM_{mn}

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\begin{aligned}
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E_x &= \frac{-\gamma_{mn} m\pi}{a k_c^2} P_{mn} \cos\left(\frac{m\pi x}{a}\right) \sin\left(\frac{n\pi y}{b}\right) e^{-\gamma_{mn} z} \\
E_y &= \frac{-\gamma_{mn} n\pi}{b k_c^2} P_{mn} \sin\left(\frac{m\pi x}{a}\right) \cos\left(\frac{n\pi y}{b}\right) e^{-\gamma_{mn} z} \\
H_x &= \frac{j\omega\epsilon n\pi}{b k_c^2} P_{mn} \sin\left(\frac{m\pi x}{a}\right) \cos\left(\frac{n\pi y}{b}\right) e^{-\gamma_{mn} z} \\
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\end{aligned}
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\gamma_{mn} = \sqrt{-\omega^2\mu\epsilon + \left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2}
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