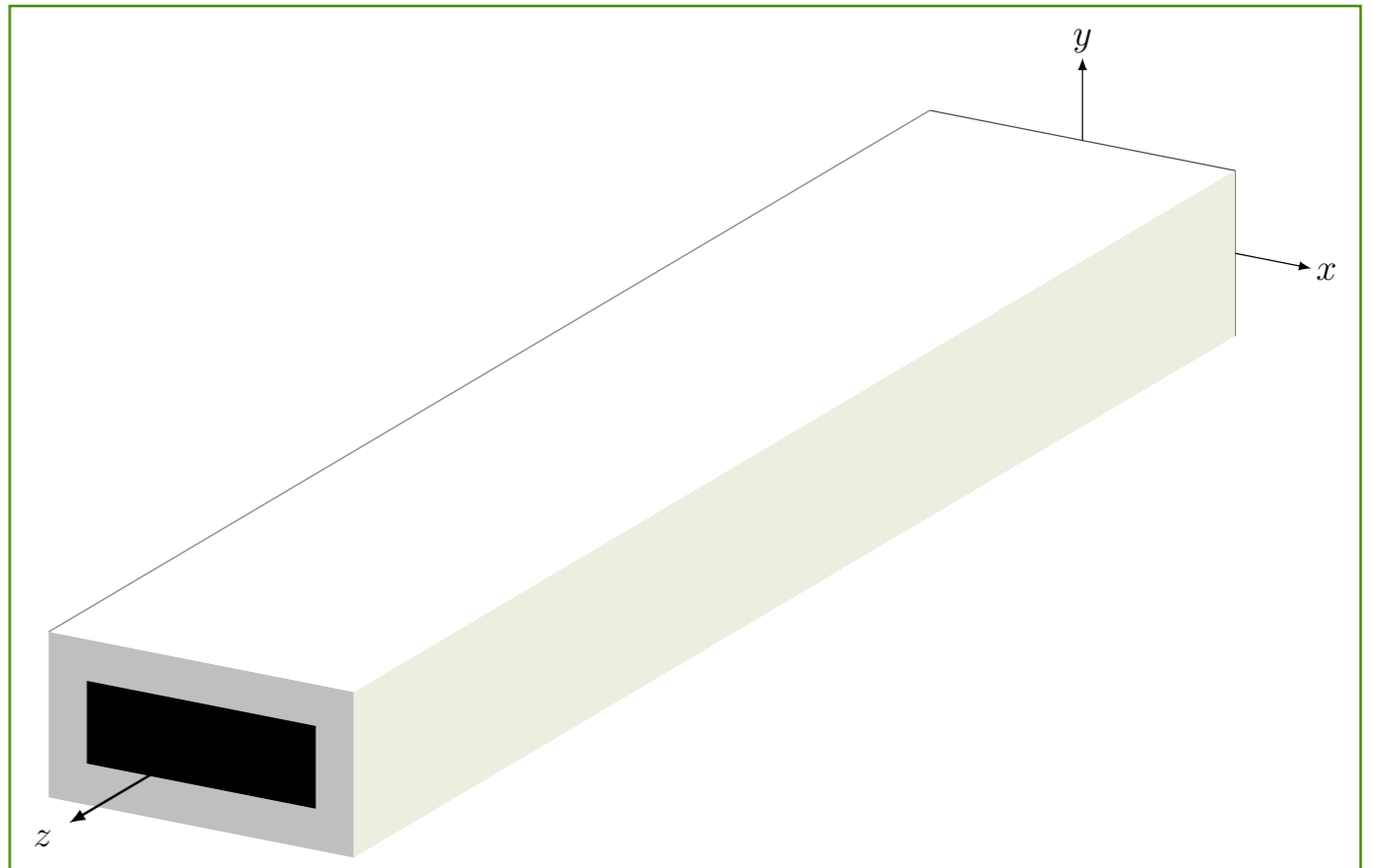


Eletrromagnetismo Avançado

25 de setembro
Ondas Eletromagnéticas

Propagação em guias de onda

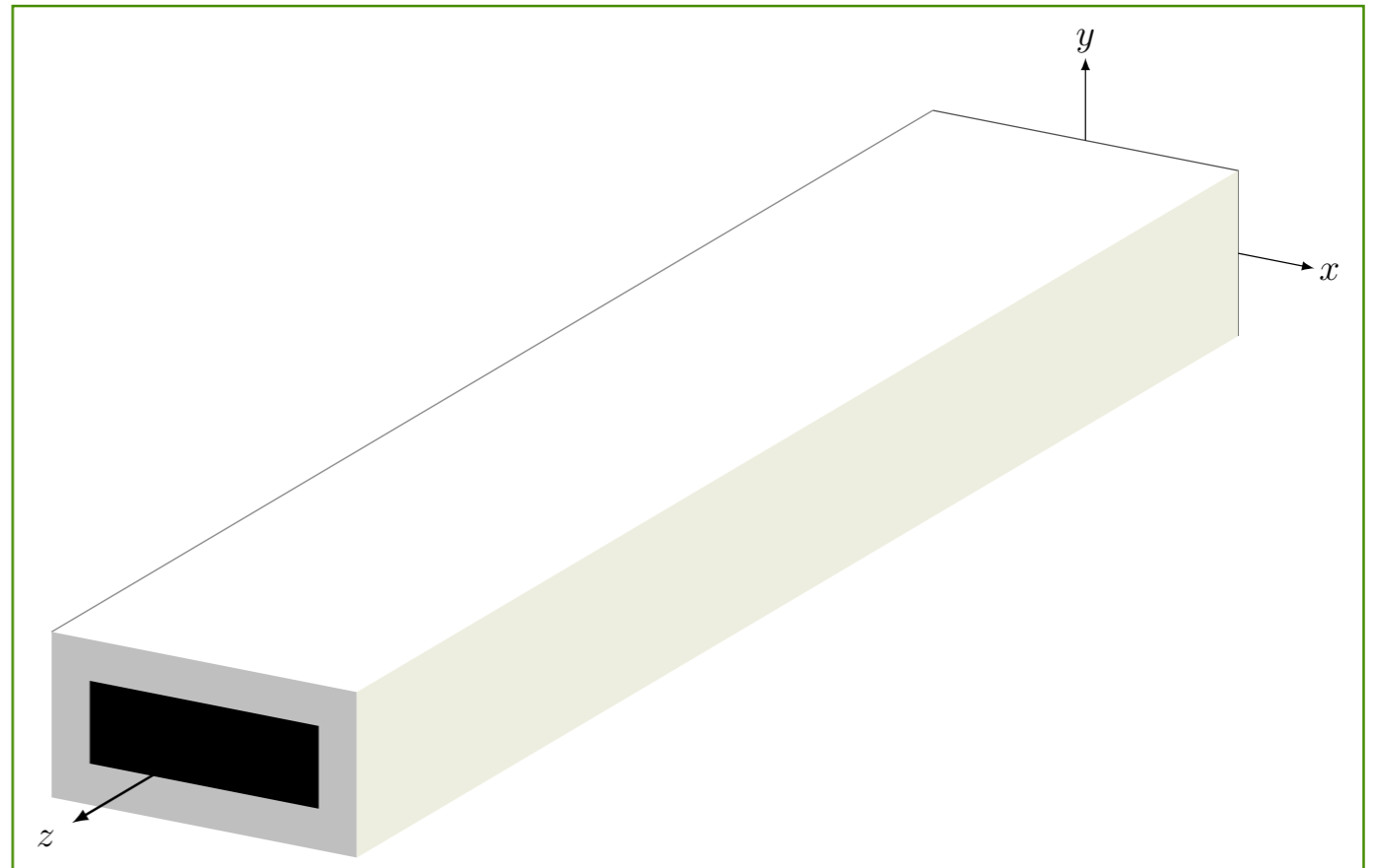
$$\vec{E}_{\parallel} = \vec{B}_{\perp} = 0$$



Propagação em guias de onda

$$\vec{E}_{\parallel} = \vec{B}_{\perp} = 0$$

$$\vec{E} = \vec{E}_0(x, y)e^{i(kz - \omega t)}$$

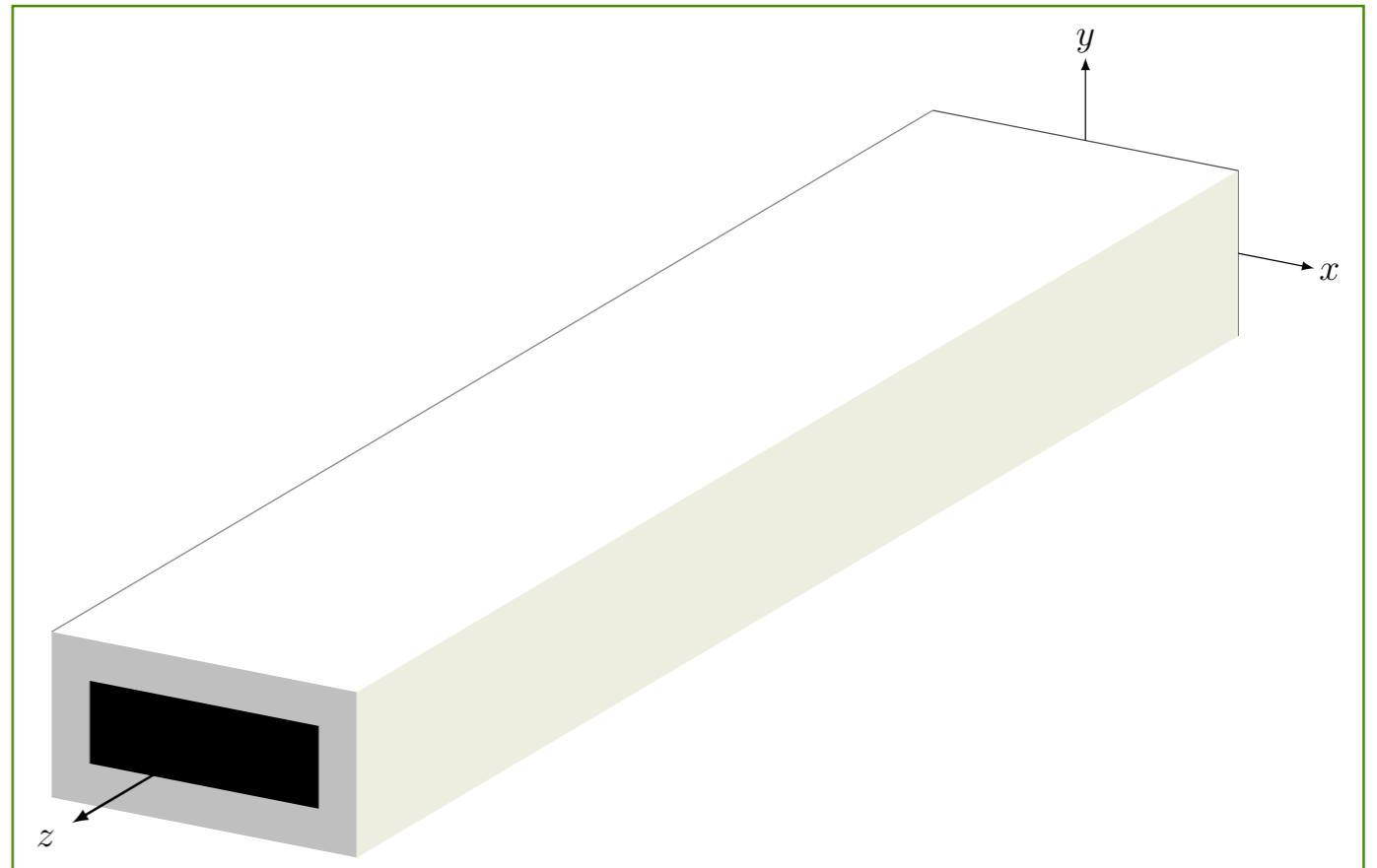


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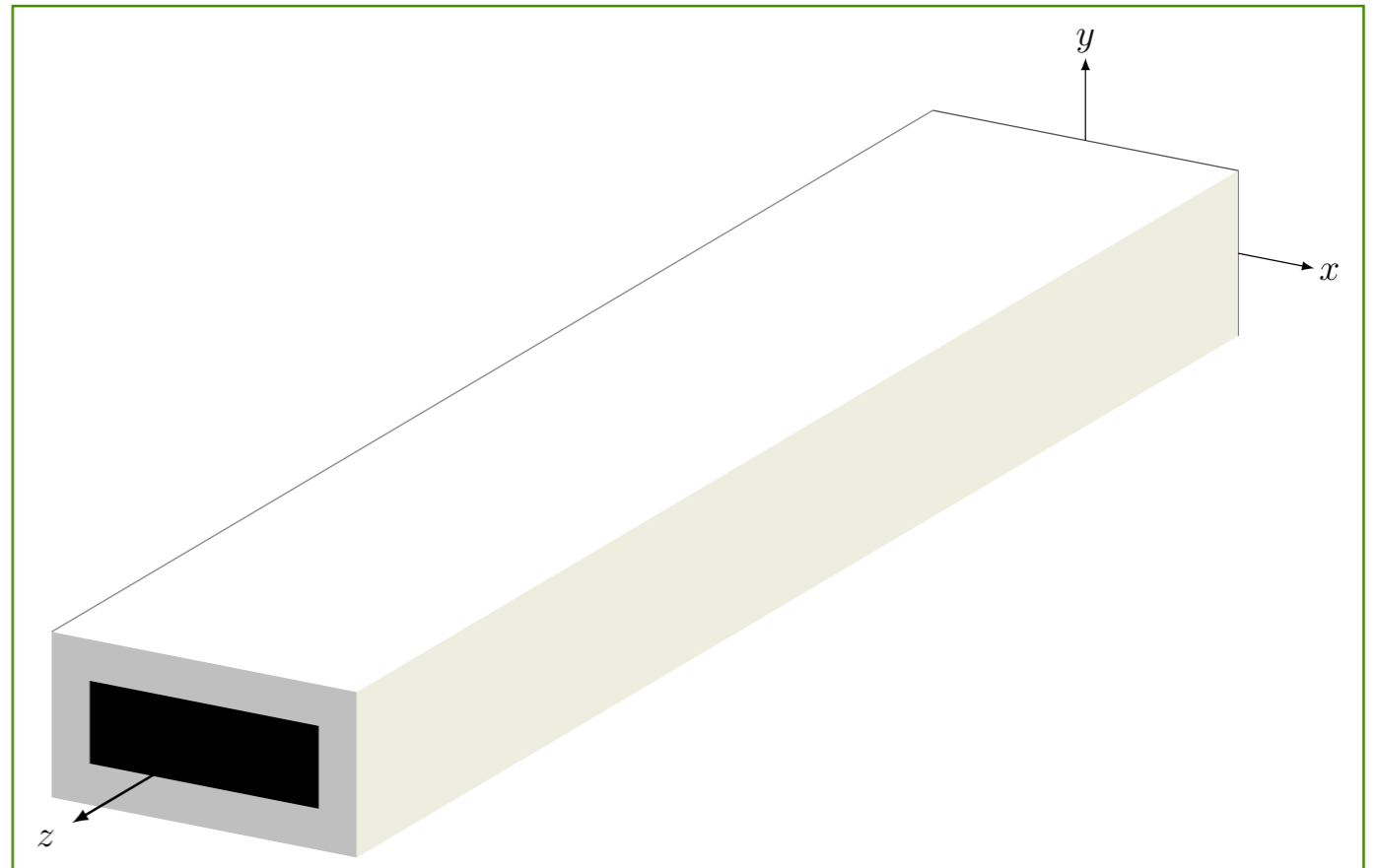
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$$\vec{E}_0, \vec{B}_0 \perp \vec{k}?$$



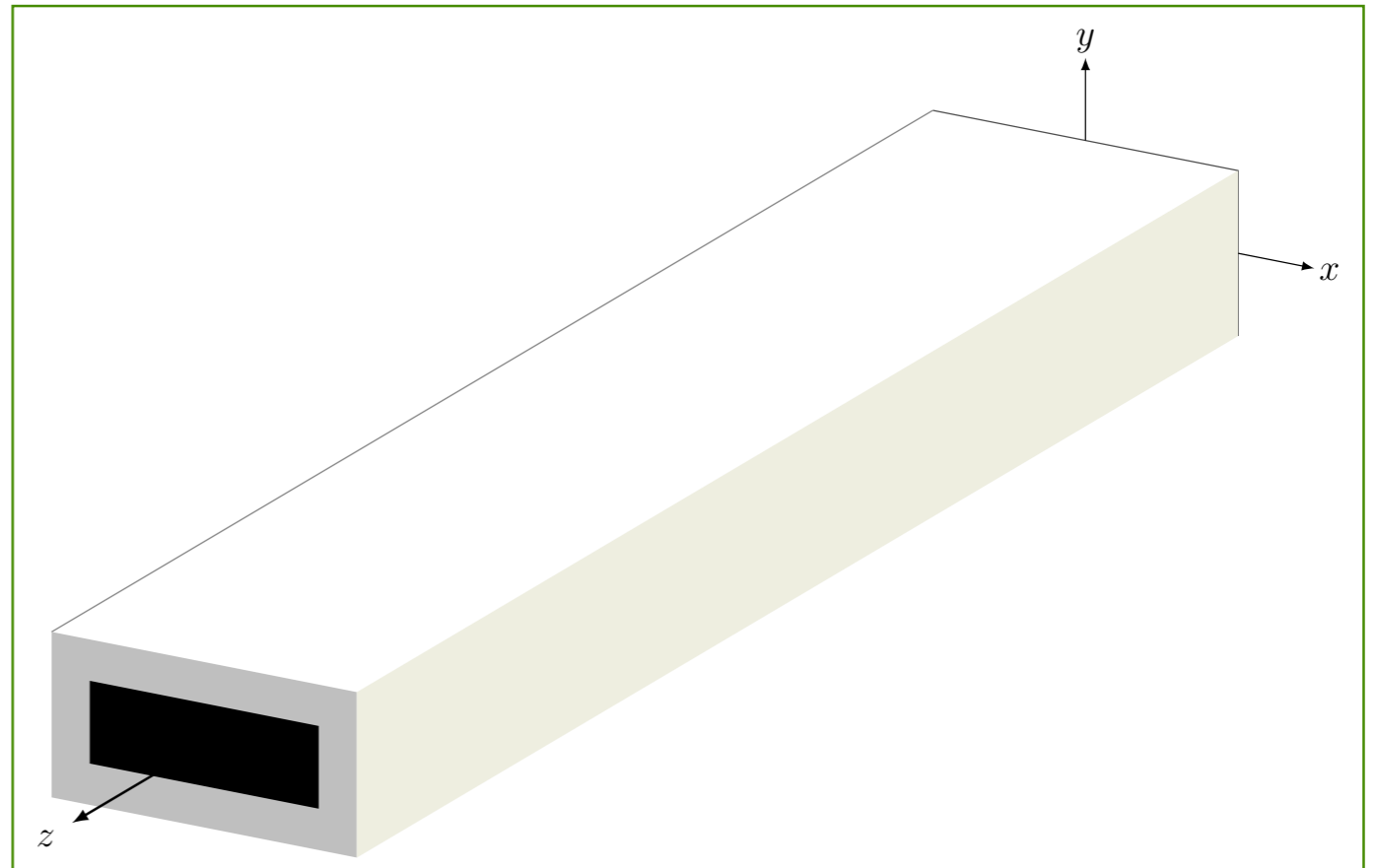
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Supor $\vec{E}_{0z} = \vec{B}_{0z} = 0$



Propagação em guias de onda

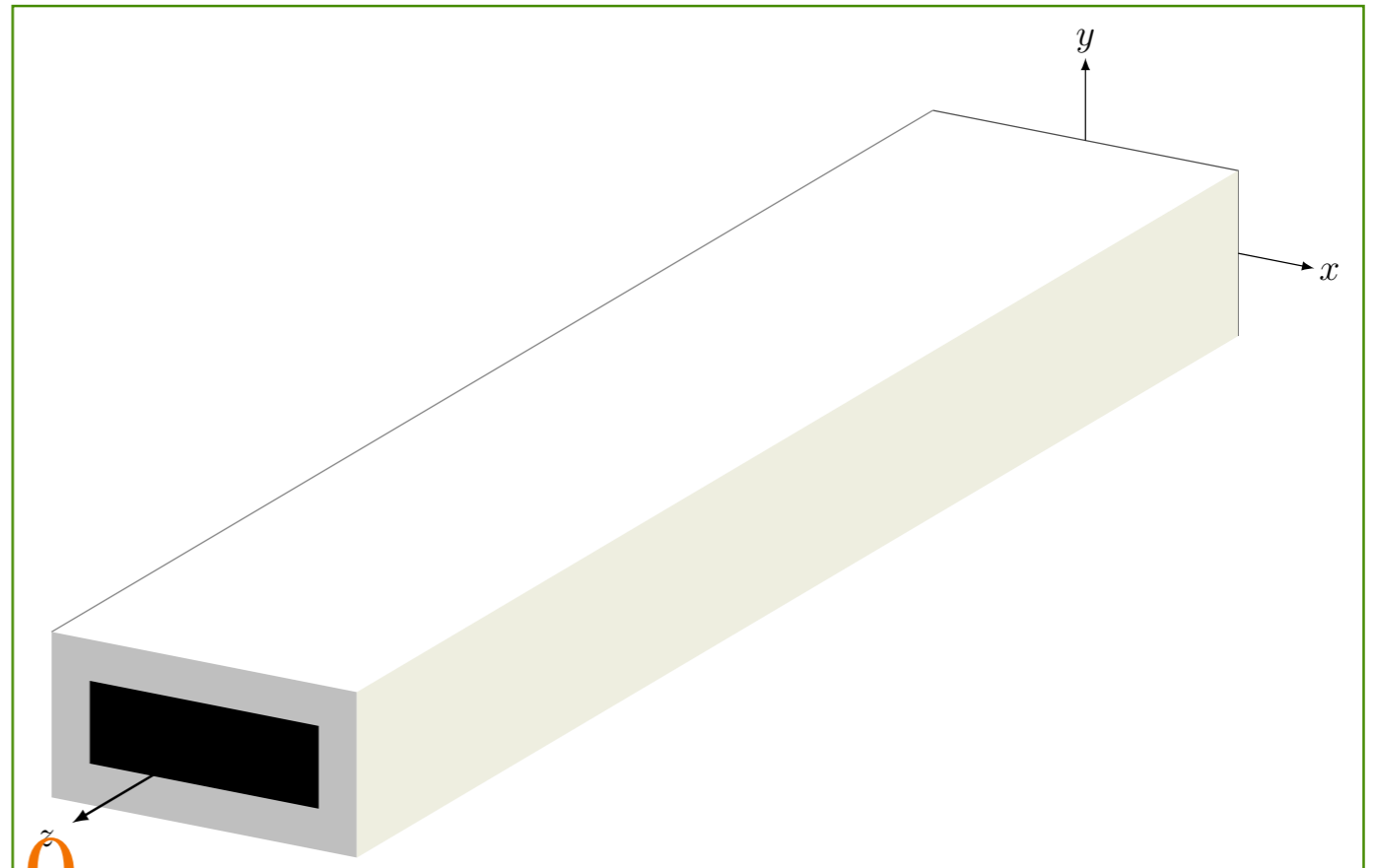
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Propagação em guias de onda

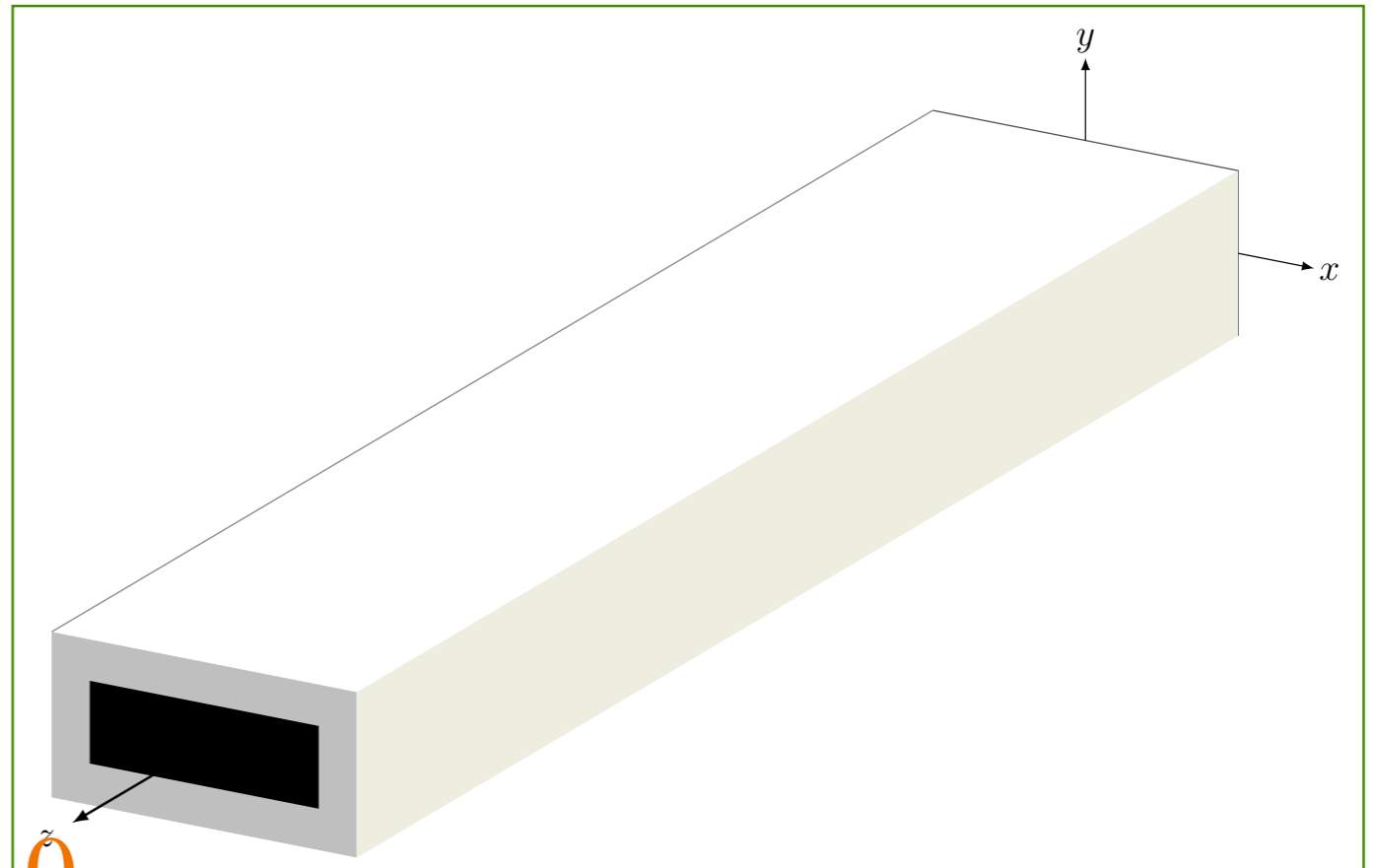
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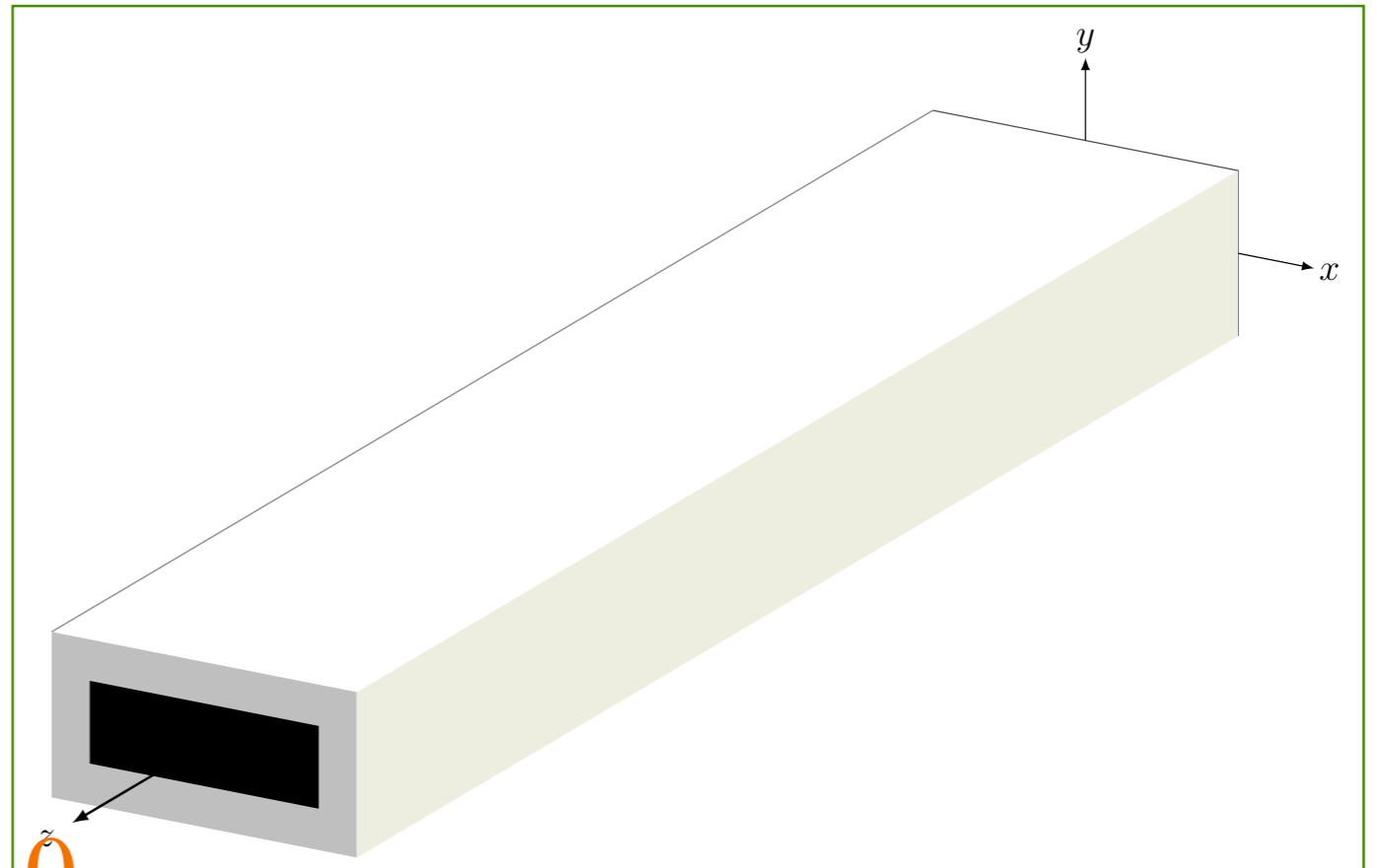
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$$\Rightarrow \vec{E}_0 = \vec{\nabla} \phi$$



Propagação em guias de onda

$$\vec{E}_{\parallel} = \vec{B}_{\perp} = 0$$

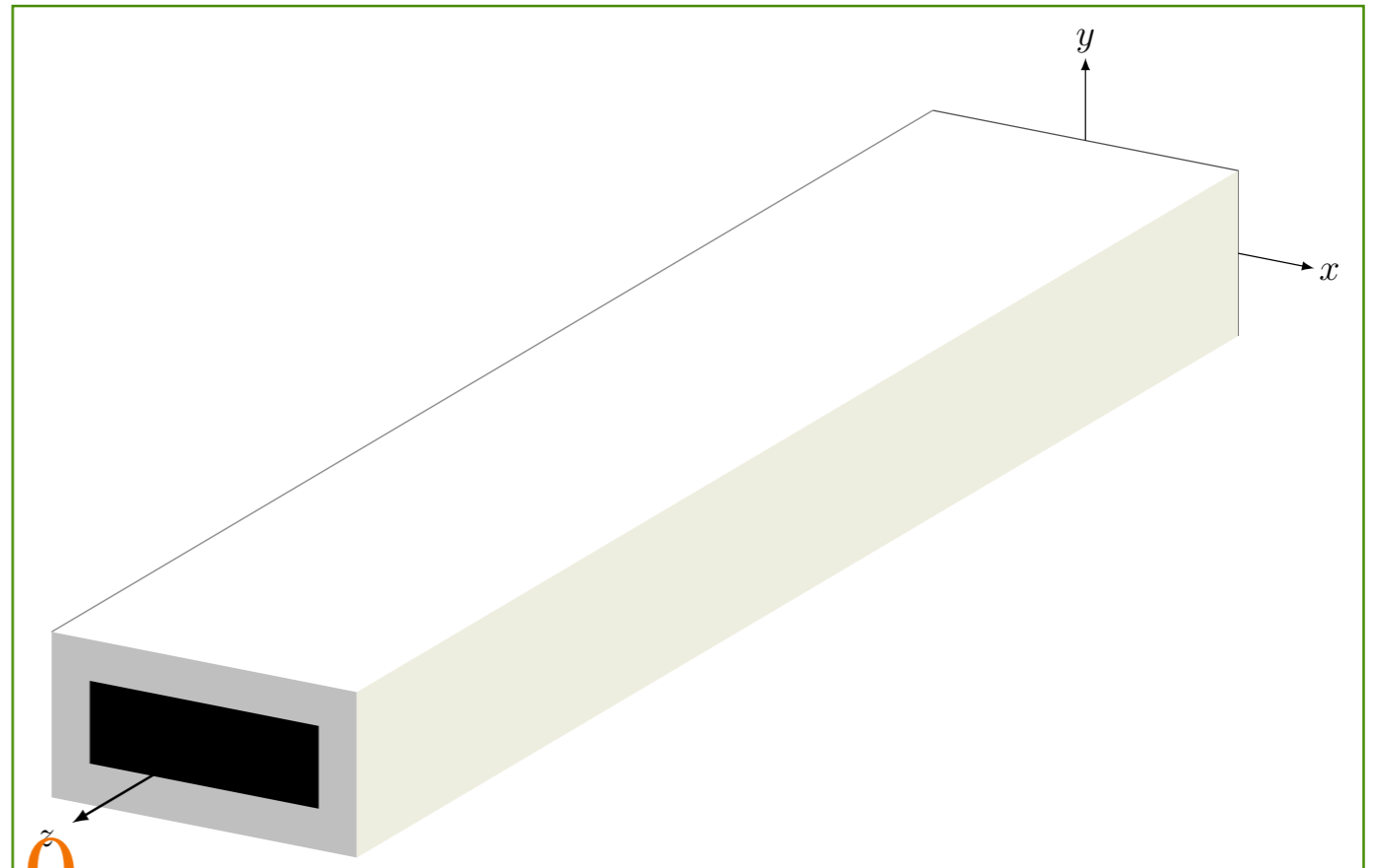
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$$\Rightarrow \vec{E}_0 = \vec{\nabla} \phi \Rightarrow \nabla^2 \phi = 0$$



Propagação em guias de onda

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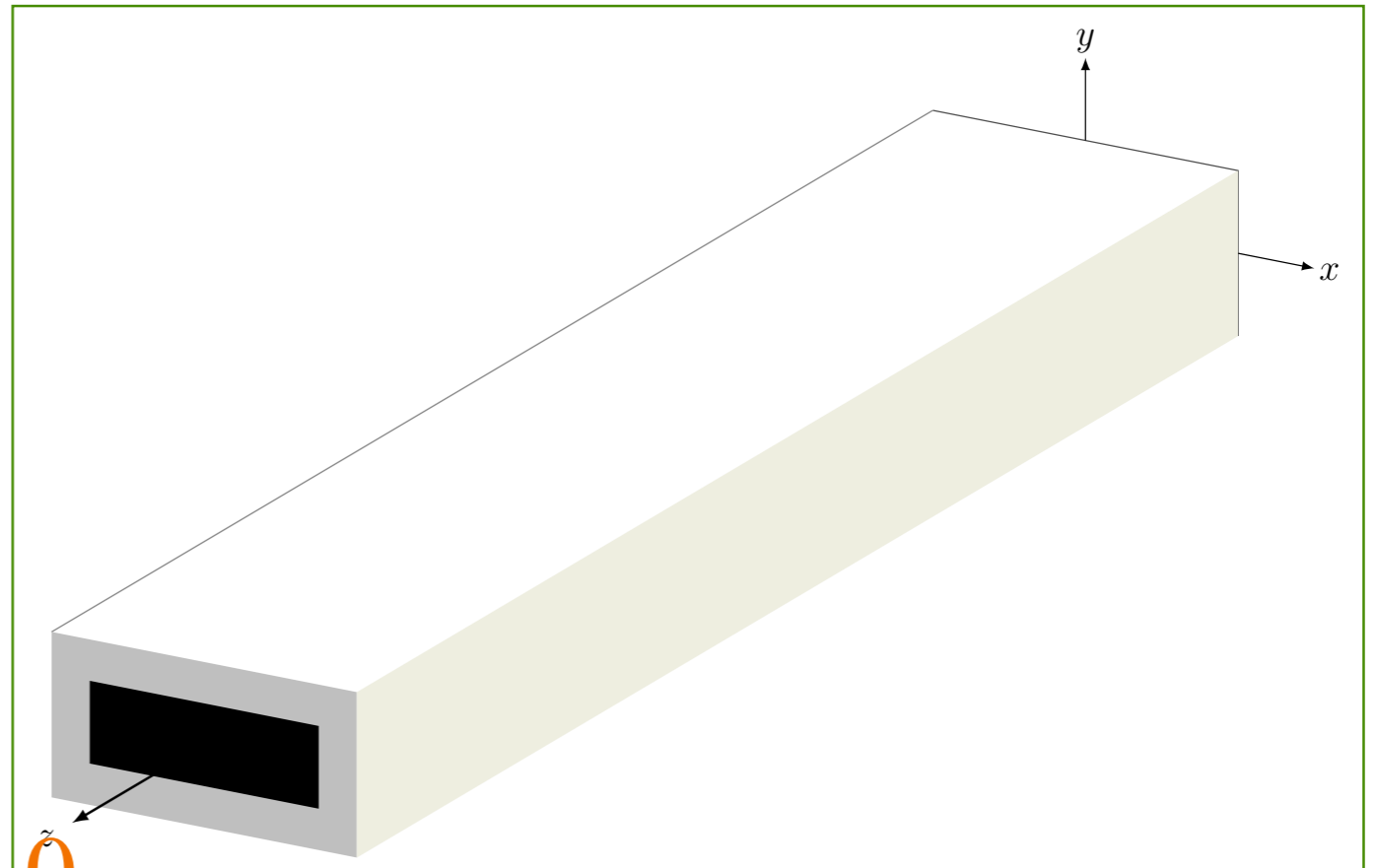
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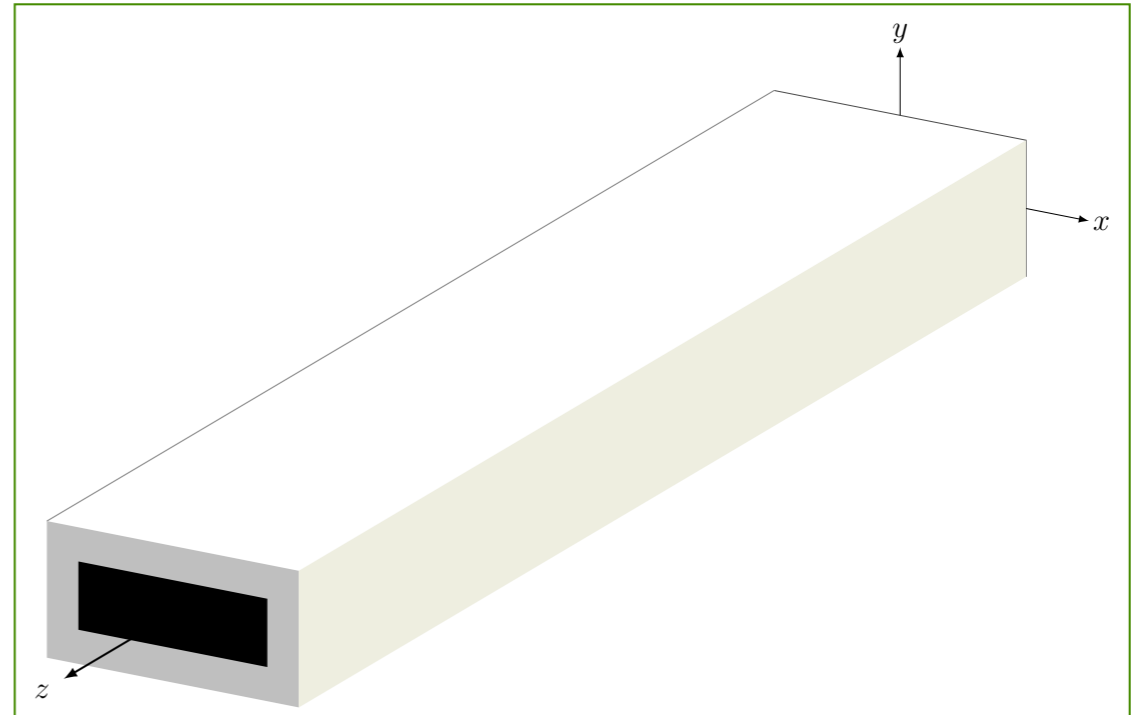
$$\Rightarrow \vec{E}_0 = \vec{\nabla} \phi \Rightarrow \nabla^2 \phi = 0 \quad \text{Não pode ser}$$



Propagação em guias de onda

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$$\left(\partial_x^2 + \partial_y^2 + \frac{\omega^2}{c^2} - k^2\right)E_z = 0$$

$$\left(\partial_x^2 + \partial_y^2 + \frac{\omega^2}{c^2} - k^2\right)B_z = 0$$