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$$\vec{x} = (x, y, z);\ c = c(\vec{x});\ u = u(t, \vec{x});\ \hat{u} = \hat{u}(\omega, \vec{x}) = \frac{1}{\sqrt{2\pi}} \int_{\mathbb{R}} u(t, \vec{x})\, e^{-i\,\omega\, t}\, dt;\ \nabla^2_{xy} = \partial^2_x + \partial^2_y;\ \nabla^2 = \nabla^2_{xy} + \partial^2_z$$

$$\partial^2_t\, u = c^2 \nabla^2 u \xrightarrow{\mathcal{F}_t} -\omega^2\, \hat{u} = c^2 \nabla^2 \hat{u} \longrightarrow \left(-\nabla^2_{xy} - \frac{\omega^2}{c^2}\right) \hat{u} = \partial^2_z \hat{u} \tag{1}$$

$$u_z = \partial_z\, u;\ \hat{u}_z = \partial_z\, \hat{u};\ \mathbf{M} = \begin{pmatrix} 0 & 1 \\ -\nabla^2_{xy} - \frac{\omega^2}{c^2} & 0 \end{pmatrix}$$

$$\partial_z \begin{pmatrix} \hat{u} \\ \hat{u}_z \end{pmatrix} (\omega, \vec{x}) = \mathbf{M} \begin{pmatrix} \hat{u} \\ \hat{u}_z \end{pmatrix} (\omega, \vec{x}) \tag{2}$$