

Exercise 26

Apply the triple Fourier transform to solve the initial-value problem

$$\begin{aligned}u_t &= \kappa(u_{xx} + u_{yy} + u_{zz}), & -\infty < x, y, z < \infty, t > 0, \\u(\mathbf{x}, 0) &= f(\mathbf{x}) & \text{for all } x, y, z,\end{aligned}$$

where $\mathbf{x} = (x, y, z)$.