

## Exercise 24

The transverse vibration of a thin membrane of great extent satisfies the wave equation

$$c^2(u_{xx} + u_{yy}) = u_{tt}, \quad -\infty < x, y < \infty, \quad t > 0,$$

with the initial and boundary conditions

$$\begin{aligned} u(x, y, t) &\rightarrow 0 \quad \text{as } |x| \rightarrow \infty, |y| \rightarrow \infty \text{ for all } t \geq 0, \\ u(x, y, 0) &= f(x, y), \quad u_t(x, y, 0) = 0 \quad \text{for all } x, y. \end{aligned}$$

Apply the double Fourier transform method to solve this problem.