

**Exercise 23**

Apply the Fourier transform to solve the equation

$$u_{xxxx} + u_{yy} = 0, \quad -\infty < x < \infty, y \geq 0,$$

satisfying the conditions

$$u(x, 0) = f(x), \quad u_y(x, 0) = 0 \quad \text{for } -\infty < x < \infty,$$

and  $u(x, y)$  and its partial derivatives vanish as  $|x| \rightarrow \infty$ .