

LE 200 Homework #9

Please show all details of your solutions.

1. Kreyszig's 11.9 2-11 (2), 12-15 (1)

2. Show that

$$\mathcal{F}[fg] = \frac{1}{\sqrt{2\pi}} \hat{f} * \hat{g},$$

where $*$ denotes the convolution.

3. Solve the following partial differential equation:

$$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2} \quad (-\infty < x < \infty); \quad u(x) = f(x) = e^{-k|x|}, \quad k > 0,$$

i.e., find $u(x, t)$.

[Optional]

4. Kreyszig's 11.7 1-6 (1), 7-12 (1), 16-20 (1)

5. Kreyszig's 11.8 1-5 (1), 9-13 (1)