Math 4500
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Problem Set 9

Practice problems
for the final exam

1. Text exercise 10.3.5, page 456.

2. Text exercise 10.4.3, page 469.

3. Text exercise 10.4.9, page 471.

4. Consider the problem

$$u_{tt} = c^2 u_{xx}, \qquad x \geq 0, \quad t \geq 0$$

with

$$u(x,0) = f(x), \qquad u_t(x,0) = 0 \qquad \text{and} \qquad u(0,t) = 0.$$

Use a Fourier Sine Transform to show that

$$u(x,t) = \frac{1}{2}\left[F(x-ct) + F(x+ct)\right]$$

where $F(x)$ is related to $f(x)$.