

# Homework 7

Math 330

Type (in  $\text{\LaTeX}$ ) your solutions to the following problems. Submit them either on Moodle or in the homework mailbox (RMS level 3, near the fireplace) by 4:00pm on **Thursday, November 2**.

Exercises from the textbook:

1. Problem 5.3.3

2. Problem 5.3.5

3. Problem 5.3.9

*Hint:* “equidimensional” means this is a Cauchy-Euler equation (see page 74), so we should look for solutions of the form  $\phi(x) = x^r$ . Also, don’t forget about Euler’s formula.

4. Problem 5.4.1 — For this problem, you don’t have to explicitly find the eigenvalues or eigenfunctions. Your answers can be in terms of  $\lambda_n$  and  $\phi_n$ . See also Section 5.2.1.

5. Problem 5.4.6 — Again, you don’t have to explicitly find the eigenvalues or eigenfunctions; your answer can be in terms of  $\lambda_n$  and  $\phi_n$ .