

MAE502 Preparation guide for finals

1. Nonhomogeneous PDEs

Sec. **8.2, 8.3** *Sample exercise problem: Ex. 8.3.6, HW4 Prob 1*

Survey old techniques for solving homogeneous PDEs (for example, review HW#1-#4, midterm)

2. PDEs in non-cartesian coordinates

Sec. 1.5 (pp. 24-25, 27-28 only), **2.5.2**, 7.7 (concept only, no need to work on detail)

Sample exercise prob.: Ex. 2.5.7-2.5.9, HW5 Prob 2

3. Fourier transform and PDE

Sec. **10.2, 10.3** (skip appendix), **10.4.1** (p.459 only), **10.4.2, 10.5** +slides #14-15, 10.6.1

Sample exercise prob.: Ex. 10.3.6, 10.3.7, ~~10.5.11~~, ~~10.5.12~~, HW4 Prob 2, HW5 Prob 1

4. Numerical method for PDE

Sec. **6.2**, 6.3 (rudimentary understanding of numerical stability),

6.6 (pp.260-261 only) + **slides #19** + **additional in-class discussion on HW6 Prob.1**

Test will focus on numerical solution for Laplace equation

Sample exercise prob.: HW6 Prob 1, Two examples in slides #20.

5. Method of characteristics

Sec. **12.2, 12.6.1, 12.6.3, 12.6.4** (pp.567-568 only), **12.6.5**

Sample exercise prob.: Ex. 12.2.2, 12.2.6, 12.2.7, 12.6.9, HW6 Prob 2