

VANDERBILT UNIVERSITY

MATH 4110 – PARTIAL DIFFERENTIAL EQUATIONS

Study guide for the final exam

The test will include all material taught during the semester, with emphasis on material covered after the first test.

- Make sure you absolutely understand the difference between linear and non-linear equations.
- Know how to reproduce the results established in class for Burger's equation.
- Know how to solve the Cauchy problem for the wave equation using D'Alembert's formula.
- For piece-wise initial data for the wave equation, know how to draw the different regions of influence and dependence as done in class.
- Know how to solve initial-boundary value problems for the wave and heat equations in one spatial dimension.
- Be ready to state and use the theorems on convergence of Fourier series discussed in class.
- Know the derivation of solutions to Poisson's equation done in class.
- Know how to solve the inhomogeneous wave equation using Duhamel's principle.
- Know the properties of eigenvalues for the Laplacian discussed in class, including their proofs when a proof was given.

Finally, make sure to review the class material available, in particular:

- Review the posted homework and test solutions.
- Review the posted class notes.
- No formula will be given in the exam. Memorize or know how to derive any formula that might be needed for the test (e.g., D'Alembert's formula).