Midterm 2 Review Outline

Wenjing Liao

There will be 4 problems; two are from Chapter 4 and the other two are from Chapter 6. When the method of underdetermined coefficients (use Table 4.5.1) is tested, you will be asked to set up the correct form of the particular solution, without solving for the coefficients.

Chapter 4: Second order linear equations

Solve linear homogeneous equations with constant coefficients (use Theorem 4.3.2). Superposition principle (Corollary 4.2.3), linear independence, Wronskian and fundamental set of solutions (Theorem 4.2.6 and Theorem 4.2.7).

Solve non-homogeneous equations using the method of underdetermined coefficients in Section 4.5: (use Table 4.5.1).

Use variation of parameters to solve non-homogeneous linear first order systems of dimension 2 (Theorem 4.7.1); use variation of parameters to solve non-homogeneous linear second order equations (Theorem 4.7.2).

Chapter 6: Systems of first order linear equations

Theory of first order linear equations - linear independence, principle of superposition, the Wronskian, a fundamental set of solutions

Transform a linear nth order equation into a system of linear equations - see Section 6.2, Page 396

Solve first-order linear homogeneous equations $\mathbf{x}' = A\mathbf{x}$

- when A is nondefective with real eigenvalues Section 6.3
- when A is nondefective with complex eigenvalues Section 6.4, use Eq. (4)
- when A is an defective matrix, or A has repeated eigenvalues, use Theorem 6.7.1

Repeated complex eigenvalues are not on the test (Example 4 in Section 6.7).

Compute fundamental matrices.