
Week 13

Lecture 1

- Sturm-Liouville Problem.
 - This material is usually covered in an ODE Course.
 - See Spiegel's Text, Chapter 8, Section 2
 - See ME 303 Web site for Note on Sturm-Liouville Problem
 - This proves the orthogonality property of eigenfunctions with respect to a weight function on a finite interval.
 - See the two examples in the Note on Sturm-Liouville Problem (SLP), and the examples in the text.
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Lecture 2

- Last lecture of the Spring 1999 Term.
 - Solutions of the Laplace Transform Problems from the Text are available in the Engineering Photocopy Center.
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- Overview of Three Hour Final Exam.
 - Open Book: Text, Calculator, Lecture Notes, Material downloaded from the ME 303 Web site, Solutions to Posted Problems.
 - Five questions of equal value.
 - PDEs: Laplace, Poisson, Heat, Wave, Helmholtz.
 - Classification of PDEs: Elliptic, Parabolic, Hyperbolic.
 - Boundary Conditions: Dirichlet, Neumann and Robin.
 - Fourier Series and Fourier Coefficients; Orthogonality Property.
 - Units and Non-dimensionalization.
 - Separation of Variables Method.
 - Solutions of First and Second-Order ODEs.
 - Eigenfunctions and Eigenvalues.
 - Solution Method for Nonhomogeneous PDEs and/or Nonhomogeneous Boundary Conditions.
 - Similarity Method for 1D Diffusion Equation (heat, mass and momentum) in Half-Space.

- Laplace Transform Method for ODEs and PDEs (Diffusion and Wave Equations).
- Special Functions: Error and Complementary Error Functions; Gamma Function.

- See Old Final Exams with Solutions on Web site.

- Good luck with this exam and others.
