ME 303 M.M. Yovanovich

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.

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.

- 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.