

Math 2250-3

Wed & Dec.

Final exam: Tuesday Dec 14, 1-3 p.m.
here.

Review session: Fri Dec 10, 12:55-1:45
here

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Exam is comprehensive:

also, office hours Monday LCB 204

9:40-10:30

12:55-1:45

15-20% { 1.1-1.5 1st order DE's
2.1-2.3 applications, equilibria & stability

15-25% { 3.1-3.6 matrix algebra & determinants
4.1-4.5, 4.7 vector space concepts

15-25% { 5.1-5.6 linear DE's & spring applications

10-20% { 6.1 eigenvalues & eigenvectors

15-25% { 7.1-7.4 linear systems of DE's; tank & spring systems

15-20% { 10.1-10.4 Laplace transforms; applications to DE's & DE systems

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possible percentages/topic

Analytic solution methods for DE's & systems of DE's

1st order DE's: linear, separable

higher order linear DE's: general soltn = $x_H + x_p$,

how to find x_H , x_p for constant coeff DE's,

use of Euler's formula for complex exponentials,

applications to mass-spring problems

eigenvalue, eigenvector methods, + matrix computations to find $\vec{x}_p(t)$ for

$$\frac{d\vec{x}}{dt} = A\vec{x} + \vec{f}(t)$$

$$\frac{d^2\vec{x}}{dt^2} = A\vec{x} + \cos t \vec{c}$$

applications to tank & mass-spring systems.

Laplace transforms to solve linear DE's or DE systems. → you will get xeroxes of the book covers, i.e. basic Laplace transforms and integrals.

Modeling: springs, spring systems
compartmental analysis (tanks)
population, velocity models, chptr 2

Geometric meaning for soltns to DE's & systems of DE's (and resulting "theorems").
slope fields, phase portraits, equilibrium soltns, stability
tangent vector fields (57.1)
existence/uniqueness for 1st order DE's or DE systems, or nth order DE's.
dimension of solution space for homogeneous DE's or DE systems

Auxillary tools

Linear algebra

new vocabulary, vector spaces, (in)dependence, span, dim, examples, etc.

solving linear systems, matrices, row, matrix algebra, A^{-1} , det's, etc.

evals & evecs

general sol'tn to $L(x) = b$ when L is a linear operator

Laplace transform (def, methods e.g. partial fractions, translation, etc.)
also, use in solving linear IVP's)