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Assignment #19 notes added: Thu Nov 10 10:22:19 MST 2005

/m333.fa05/handouts333/t3\_333\_B11/review\_suggestions\_3.tex

1 This list is not in final form. Like, stuff may yet be added to it.

2 Test #3 is

Friday  
11/11/05.

3 The test will cover the material of Assignments #16 – #19, *at least*.

4 The old final exam, from 12/13/04, has relevant problems 4, 5, 8.

5 Know the basic definitions:

- (a) augmented matrix
- (b) row operation
- (c) pivot
- (d) matrix inverse
- (e) linear combination
- (f) span of a set
- (g) linear dependence
- (h) linear independence
- (i) linear independence
- (j) vector space
- (k) subspace
- (l) basis for a space or subspace
- (m) vector space
- (n) subspace
- (o) basis for a space or subspace
- (p) dimension of a space or subspace

- (q) characteristic polynomial of a square matrix.
- (r) eigenvector
- (s) eigenvalue
- (t) **RREF** and how it helps find eigenvectors.
- (u)
- (v)
- (w)

**6** Review the following:

- (a) How to use the Gauss-Jordan Elimination Method (GEM) to solve systems of linear equations.
- (b) How to write a vector formula for the infinitely many solutions of a system of linear equations.
- (c) System 8 D on the fall-2004 final has just one solution.
- (d) How to recognize when GEM is telling you a system has no solutions.
- (e) How to multiply matrices (and get the product to be of the proper size).
- (f) How to write a product of a matrix with a column vector as a linear combination of the columns of the matrix.
- (g) How to compute the inverse of a matrix.
- (h) The genesis of the *Characteristic Equation* for  $\begin{bmatrix} \mathbf{a} & \mathbf{b} \\ \mathbf{c} & \mathbf{d} \end{bmatrix}$  for the case where  $\mathbf{a}$ ,  $\mathbf{b}$ , and  $\mathbf{c}$  are real-number constants.
- (i) Given a system of form

$$\begin{aligned} \mathbf{x}' &= \mathbf{ax} + \mathbf{by} \\ \mathbf{y}' &= \mathbf{cx} + \mathbf{dy}, \end{aligned}$$

be able to sketch a *Direction-Field Plot* showing

- (i) the locus where  $\mathbf{x}' = \mathbf{0}$  and the field direction at points thereon
- (ii) the locus where  $\mathbf{y}' = \mathbf{0}$  and the field direction at points thereon

- (iii) solutions which lie on straight lines through the origin (such solutions may not exist)
- (j) Computing eigenvalues for two-by-two and three-by-three matrices.
- (k) Computing eigenvectors for two-by-two and three-by-three matrices.
- (l)
- (m)

**7** Notes on Assignment #19

- (i) When you believe you have factored a quadratic, take a moment to check.
- (ii) Going for the RREF eases eigenvector computation.
- (iii) When announcing answers to these sorts of problems, give your **eigenpairs**.