TOPICS FOR MATHEMATICS 132, WINTER 2004

I. Eigenvalues and eigenvectors

A. Review topics on matrices (Fraleigh and Beauregard, §§1.5, 1.6, 4.2, 4.3)
B. Review topics on linear transformations (Fraleigh and Beauregard, §§2.3, 3.4, 4.4)
1. Basic definitions (Fraleigh and Beauregard, §5.1)
2. Diagonalization (Fraleigh and Beauregard, §5.2)
3. Differential and difference equations (Fraleigh and Beauregard, §5.3)

II. Perpendicularity (Orthogonality)

A. Review topics (Fraleigh and Beauregard, §§1.2, 3.5)
1. Orthogonal bases (Fraleigh and Beauregard, §6.2)
2. Orthogonal projections and adjoints (Fraleigh and Beauregard, §§6.1, 6.4)
3. Orthogonal matrices (Fraleigh and Beauregard, §6.3)

III. Change of bases

A. Review topics (Fraleigh and Beauregard, §§2.3, 5.2)
1. Similarity of matrices (Fraleigh and Beauregard, §§7.1, 7.2)
2. Invariants of similarity (Fraleigh and Beauregard, §§7.1, 7.2)

IV. Complex linear algebra

1. Complex numbers (Fraleigh and Beauregard, §9.1)
2. Complex matrices (Fraleigh and Beauregard, §9.2)
3. Complex eigenvalues and eigenvectors (Fraleigh and Beauregard, §9.3)
4. Jordan form (Fraleigh and Beauregard, §9.4)
5. Differential equations revisited (Fraleigh and Beauregard, §9.4)

V. Quadratic forms

1. Diagonalization of real symmetric matrices (Fraleigh and Beauregard, §§6.3, 8.1)
2. Classification of quadrics (Fraleigh and Beauregard, §8.2)
3. Classification of critical points (Fraleigh and Beauregard, §8.3)