

TOPICS FOR MATHEMATICS 132, WINTER 2004

I. Eigenvalues and eigenvectors

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

II. Perpendicularity (Orthogonality)

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

III. Change of bases

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

IV. Complex linear algebra

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

V. Quadratic forms

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