MATH 341, SPRING 2016
REVIEW FOR THE FINAL EXAM

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1. Overview

The exam will cover the material for the first two exams plus additional material from Axler, notably 6.A, 6.B, and 6.C. In addition, you are responsible for material surrounding our discussion of Markov chains.

2. Things to know

(i) The notion of an isomorphism of vector spaces.
(ii) The fact that a map between finite-dimensional vector spaces is an isomorphism if and only if it is injective if and only if it is surjective.
(iii) The theorem that any finite-dimensional vector space is isomorphic to $\mathbb{R}^n$.
(iv) The definition of eigenvectors, eigenvalues, and eigenspaces.
(v) The characterization of the eigenspace of eigenvectors for λ as the kernel of the operator $A - \lambda I$.
(vi) The fact that distinct eigenvalues have linearly independent eigenvectors.
(vii) The fact that an operator on an n-dimensional vector space has at most n eigenvalues.
(viii) The definition of the characteristic polynomial.
(ix) The fact that an upper triangular matrix has the eigenvalues on the diagonal.
(x) The definition and characterization of diagonalizable operators.
(xi) The definition and properties of an inner product.
(xii) The definition of the norm on an inner product space.
(xiii) The definition of an orthonormal basis.
(xiv) The Gram-Schmidt procedure.
(xv) The definition and properties of the orthogonal complement of a set of vectors.
(xvi) the definition and properties of the orthogonal projection onto a subspace.
(xvii) Approximation via orthogonal projection.
(xviii) The connection between Markov chains and stochastic matrices.
(xix) The PageRank algorithm.

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