

MATH-332: Linear Algebra

Chapter: 6

Orthogonality and Least SquaresSection 6.2: Orthogonal Sets

pgs. 384 - 394

July 27, 2009

Lecture: Orthogonal Sets

Topics:	Orthogonal Sets
	Orthogonal Projection
	Orthonormal sets & Matrices
Problems	Prac: 1-3
	Prob: 3, 7, 11, 13, 23, 24

Section Goals

- Understand how the concept of orthogonality, generated by the concept of angle/inner-products, can be used to simplify the representation in vector spaces and thus solving their associated linear systems.
- Conceptualize these procedures by the projective geometries and the linear transformations they define.

Section Objectives

- Define what it means for a set to be an orthogonal set and show, via theorem 6.2.4 on page 384, how these sets are automatically linearly independent sets.
- Using orthogonal basis sets prove theorem 6.2.5, which shows that representations under such a basis is as simple as we can hope for.
- Define the concept of an orthogonal projection and using it characterize the geometric properties tacit in theorem 6.2.5.
- Building off of the concept of an orthogonal projection define orthogonal matrices and prove their associated properties.