Final Exam Outline


2.3 The span of a set of vectors. Linear dependence. Linear dependence and independence. Determining whether a set $\{\vec{v}_1, \ldots, \vec{v}_k\}$ of vectors in $\mathbb{R}^n$ is linearly dependent or independent.


3.5 Subspaces of $\mathbb{R}^n$. $\{0\}$ and $\mathbb{R}^n$ as subspaces of $\mathbb{R}^n$. The subspace span($v_1, \ldots, v_k$). The the row, column and null spaces of a matrix. Basis, dimension. Using Gaussian elimination to find a bases for subspaces of the form span($v_1, \ldots, v_k$) and for null($A$). The nullity of a matrix. Characterizations of rank: rank($A$) = dim(col($A$)) = dim(row($A$)). The rank theorem. The Fundamental Theorem of Invertible Matrices. Coordinates with respect to a basis. Theorems 3.23-3.26, 3.27 (parts), 3.28 and 3.29.

4.1, 4.3 Eigenvalues, eigenvectors and eigenspaces. The characteristic polynomial. Finding a basis for an eigenspace.


5.1 Orthogonal sets in $\mathbb{R}^n$. Orthogonal and orthonormal bases. Orthogonal matrices. Theorems 5.1-5.8.

5.2 The orthogonal complement $W^\perp$ of a subspace $W$. The orthogonal projection. Theorem 5.9, parts (a), (c) and (d). Theorem 5.11. (The Orthogonal Decomposition Theorem.)

5.3 The Gram-Schmidt procedure.

5.4 The eigenvalues and eigenvectors of real, symmetric matrices. Orthogonal diagonalization of real, symmetric matrices. Theorems 5.17-5.19.