Exam Covers

Sections 4.8, 5.1 - 5.4

Page Rank, Norms of matrices,

Polar Decomposition

Things to Know

Signals

- the definition

- What a linear difference equation is and how to show a given signal satisfies such an equation

- What a homogeneous linear difference equation is

- How to find the dimension of the space of signals satisfying a given homogeneous linear difference equation

- What the Casorati matrix is, how to find it and use it to establish linear independence of signals all satisfying the same homogeneous linear difference equation (2x2 for 2 signals, 3x3 for 3 signals, etc)

Chapter 5

- What an eigenvalue is and how to find them

- What an eigenvector associated to a given eigenvalue is

- All vectors v satisfying $Av = \lambda v$ for a given matrix A and number λ is a subspace

- definition of the characteristic polynomial

- What it means to diagonalize a matrix

- How to use the eigenvectors and eigenvalues to diagonalize a given matrix

- Definitions of orthogonal and positive semi-definite matrices and what these definitions give you in terms of the eigenvalues

- how to find a formula for the nth power of a diagonalizable matrix

- any symmetric matrix is diagonalizable via an orthogonal similarity matrix

Page Rank

- How to find it for a given problem!

- You don't need to check that $\lambda = 1$ is an eigenvalue

- Take an eigenvector for $\lambda = 1$ with all positive entries, divide by the sum of the entries. The new vector has the PageRank as its entries

Norms

- The definition

- How to find the norm of an $m \times n$ matrix using eigenvalues

Polar Decomposition

- only for $n \times n$ matrices

- the definition

- How to find it using eigenvalues and eigenvectors of an invertible matrix