[Lecture on 1.1]

0 Introduction

Professor: Nam Tran

0.1 Topics

- (0) Introduction
- (1) Overview of Random Variables
  - Random signals
- (2) Filtering of Random Signals
  - Filtering is effectively convolution - how can we apply a convolution to a function without known exact output (i.e. a random signal)?
- (3) Estimation Theory
- (4) Power Spectral Density Estimation
- (5) Wiener Filter Theory
- (6) Linear Estimator / Adaptive Linear Filter
- (7) Channel Equalisation
- (8) Image Processing

Lectures will not be recorded.

No material will be taught in week 12 (per plan).

0.2 Assessment

Component	**Timing**	**Weight**	**Topic**
Assignment 1	Week 5	15%	Topic (4)
Assignment 2	Week 8/9	15%	Topic (6)
Assignment 3	Week 12	20%	Topic (8)
Final Exam		50%	

1 Review of Random Variables

Random Variable: Numerical description of the outcome of an experiment **Sample Space**: All possible values of an RV **Sample Point**: One possible

value of an RV

If the sample space takes form $\{x_1, x_2, x_3, ..., x_N\}$ we have a *discrete* RV.

Capital letters are normally used.

Example Sending a packet has 0.9 success rate. Let X be the number of times you need to send a packet to get it through.

P(X=1) = 0.9 P(X=2) = 0.09 E(x) = 1.1111

[Lecture on 1.2]

Notes in a notebook currently. Need to decide whether to migrate them to LaTeX or migrate this to notebook. Probably the latter.