$\rm MAP555:$ Signal Processing 1

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 $^{^1\}mathbf{Warning}$: This document is currently being written and should be considered unfinished and full of mistakes and typos. It should not be used yet as a pedagogical support for a course.

Contents

1	Introduction		5
	1.1	Signal processing	5
	1.2		5
	1.3	Bibliographical notes	5
2	Fourier analysis and analog filtering		
	2.1	Fourier transform	7
	2.2	Frequency response and filtering	7
	2.3	Applications of analog signal processing	7
3	Digital signal processing		
	3.1	Sampling and Analog/Digital conversion	9
	3.2	Digital filtering	9
	3.3		9
	3.4	Applications of DSP	9
4	Random signals 1		
	4.1	Random Signals and Correlations	11
	4.2	Frequency representation of random signals	11
	4.3	AR modeling and linear prediction	11
5	Signal representations 1		
	5.1	Short Time Fourier Transform	13
	5.2		13
	5.3		
	5.4	Machine learning for signal processing	13

4 CONTENTS

Introduction

1.1 Signal processing

See Chap 2 for intro to Fourier

- 1.2 Definitions and signal properties
- 1.3 Bibliographical notes

[Haykin and Van Veen, 2007, Oppenheim et al., 1997]

Fourier analysis and analog filtering

- 2.1 Fourier transform
- 2.2 Frequency response and filtering
- 2.3 Applications of analog signal processing

Digital signal processing

- 3.1 Sampling and Analog/Digital conversion
- 3.2 Digital filtering
- 3.3 Finite signals
- 3.4 Applications of DSP

Random signals

- 4.1 Random Signals and Correlations
- 4.2 Frequency representation of random signals
- 4.3 AR modeling and linear prediction

Signal representations

- 5.1 Short Time Fourier Transform
- 5.2 Common signal representations
- 5.3 Source separation and dictionary learning
- 5.4 Machine learning for signal processing

Bibliography

[Haykin and Van Veen, 2007] Haykin, S. and Van Veen, B. (2007). Signals and systems. John Wiley & Sons.

[Oppenheim et al., 1997] Oppenheim, A. V., Willsky, A. S., and Nawab, S. H. (1997). Signals and systems prentice hall. *Inc.*, *Upper Saddle River*, *New Jersey*, 7458.