

CSM EECS 20N Lecture Notes

Authored by Dun-Ming Huang, SID: 303*****2

0.1 Preface

Preface will be written later.

Contents

0.1 Preface	2
I Linear Algebra is A Really Near Algebruh	5
1 The Fundamentals of Linear Algebra	6
2 Arithmetics of Vectors and Matrices	7
3 Gaussian Elimination	8
4 Linear Dependence	9
5 Vector Spaces	10
6 Eigen Show You The World: Eigenvalues, Eigenvectors, and Eigenpain	11
7 Eigenspaces and Change of Basis	12
8 Inner Products and Norms, Orthogonality	13
9 Least Squares Algorithm: Where Machine Learning Starts	14
II It is All About the Functions and Sets	15
10 An Integral Review for Integration	16
11 Set!	17
12 Functions	18
III Introduction to Signals and Systems	19
13 Introduction to Signals	20
14 Introduction to Systems	21

15 Mathematical Definitions for Functions and Signals	22
16 Mathematical Properties of A System	23
17 States	24
18 Linear	25
19 Linear Systems and Its States	26
 IV Signal Processing	 27
20 Linear Systems and Its States	28
21 It's Time to Get a Little Complex	29
22 Frequency, Phase, Domain	30
23 Fourier Expansion: Infinite Terms	31
24 Linear Time-Invariant Systems	32
25 Frequency Response and Fourier Series	33
26 Introduction to Filtering	34
27 Impulse Resopnse Filters	35
 V Sampling and Fourier Transform	 36
28 The Four Fourier Transforms, Part I	37
29 The Four Fourier Transforms, Part II	38
30 Fourier Transform vs. Fourier Series	39
31 Sampling and Reconstruction	40
32 The Nyquist-Shannon Sampling Theorem	41

Part I

Linear Algebra is A Really Near Algebruh

Chapter 1

The Fundamentals of Linear Algebra

Hello

Chapter 2

Arithmetics of Vectors and Matrices

Hello

Chapter 3

Gaussian Elimination

Hello

Chapter 4

Linear Dependence

Hello

Chapter 5

Vector Spaces

Hello

Chapter 6

Eigen Show You The World: Eigenvalues, Eigenvectors, and Eigenpain

Hello

Chapter 7

Eigenspaces and Change of Basis

Hello

Chapter 8

Inner Products and Norms, Orthogonality

Hello

Chapter 9

Least Squares Algorithm: Where Machine Learning Starts

Hello

Part II

It is All About the Functions and Sets

Chapter 10

An Integral Review for Integration

Hello

Chapter 11

Set!

Hello

Chapter 12

Functions

Hello

Part III

Introduction to Signals and Systems

Chapter 13

Introduction to Signals

Hello

Chapter 14

Introduction to Systems

Hello

Chapter 15

Mathematical Definitions for Functions and Signals

Hello

Chapter 16

Mathematical Properties of A System

Hello

Chapter 17

States

Hello

Chapter 18

Linear

Hello

Chapter 19

Linear Systems and Its States

Hello

Part IV

Signal Processing

Chapter 20

Linear Systems and Its States

Hello

Chapter 21

It's Time to Get a Little Complex

Hello

Chapter 22

Frequency, Phase, Domain

Hello

Chapter 23

Fourier Expansion: Infinite Terms

Hello

Chapter 24

Linear Time-Invariant Systems

Hello

Chapter 25

Frequency Response and Fourier Series

Hello

Chapter 26

Introduction to Filtering

Hello

Chapter 27

Impulse Resopnse Filters

Hello

Part V

Sampling and Fourier Transform

Chapter 28

The Four Fourier Transforms, Part I

Hello

Chapter 29

The Four Fourier Transforms, Part II

Hello

Chapter 30

Fourier Transform vs. Fourier Series

Hello

Chapter 31

Sampling and Reconstruction

Hello

Chapter 32

The Nyquist-Shannon Sampling Theorem

Hello