

PHYS 241: Signal Processing

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Abstract

Contents

1	Introduction	1
2	Prerequisite knowledge	1
3	Basics & Voltage, Current and Resistance	1
3.1	Signal Types	1
3.1.1	Digital Signal	1
3.1.2	Analogue	1
3.2	Circuits	1
3.2.1	DC	1
3.2.2	AC	1
3.3	Linear Systems	2
3.4	Current flow	2
3.5	Ohm's Law	2
4	Circuit Theory Beyond Electronic	2
5	Capacitors & Inductors	2
6	RC and LR Circuits with AC Driving	2
7	Impedance	2
8	RLC Circuits	2
8.1	Transient Response	2
8.2	Driven RLC Circuits	2
8.3	Power Input to RLC and Circuit Network	2
9	Circuit Networks	2
10	Fourier Series	2
11	Fourier Transforms	2
12	Appendix	2
13	Useful Links	2

1 Introduction

2 Prerequisite knowledge

3 Basics & Voltage, Current and Resistance

3.1 Signal Types

3.1.1 Digital Signal

Definition 1. *A discretely sampled signal with a sequence of quantized values.*

3.1.2 Analogue

Definition 2. *A continuous signal (e.g., in time) representing (analogous to) some other quantity.*

Example 1. *Examples of analogue devices and computers are:*

- *thermometers*
- *sextants*
- *tide-predicting machine*

3.2 Circuits

3.2.1 DC

Definition 3. *Direct Current (DC) is a form of current where voltage and current are constant over time.*

DC Offset We often talk about adding a **DC offset** to an AC signal. This means adding a constant DC value to an AC signal. Doing this shifts the entire signal up or down relative to the 0 V level, without changing the shape of the AC signal.

Example 2. *Example of a source of DC current is a battery.*

3.2.2 AC

Definition 4. *Alternating Current (AC) is a form of current that changes over time, often in a sinusoidal manner.*

Example 3. *Example of a source of AC current is a transformer. Other examples of AC current are wall outlets.*

- 3.3 Linear Systems
- 3.4 Current flow
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- 7 Impedance
- 8 RLC Circuits
 - 8.1 Transient Response
 - 8.2 Driven RLC Circuits
 - 8.3 Power Input to RLC and Circuit Network
- 9 Circuit Networks
- 10 Fourier Series
- 11 Fourier Transforms
- 12 Appendix
- 13 Useful Links