Model Identification and Data Analysis 1

B(OTTO) - INFO

A.Y. 2022-2023

Lecture notes from the 2022-2023 master degree course of Model Identification and Data Analysis, given by professor Simone Formentin at Politecnico di Milano. This course covers COVERS. Credit for the material in these notes is due to professor PROFESSOR, while the structure is loosely taken from the LOCATION. The credit for the typesetting is my own.

Disclaimer: This document will inevitably contain some mistakes— both simple typos and legitimate errors. Keep in mind that these are the notes of a in the process of learning the material himself, so take what you read with a grain of salt. If you find mistakes and feel like telling me, I will be grateful and happy to hear from you, even for the most trivial of errors. You can reach me by email, in english or italian or klingon at gioarriciati@gmail.com.

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Summer Term: 2022,
Last Update: A.Y. 2022-2023,
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Contents

Lecture 1: Stochastic Processes

Definition 1.1

Stochastic Process A stochastic process is a sequence of random variables all defined on the same probability space.

Example. ... v(1,S), v(2,S), v(3,S), ... v(t, S), ...
where: S is the outcome of a random experiment realization t is the time, index of the sequence

- REMARK: A SP extends the notion of a random variable to a sequence of random variables.
example: a deterministic time signal
example: a random variable in a given time

Widesense characterization of a SP

Theorem 1.1. mean value Let $m(t)$ be the mean value of $v(t, S)$ for all t and all S.
Then $m(t)$ is a deterministic time signal.
$m(t) = \mathbb{E}[v(t, S)]$
$= \int_\Omega v(t, S)\, dP(S)$
where $P(S)$ is the probability measure of the random experiment. and Ω is the sample space of the random experiment.

Theorem 1.2. variance Let $v(t, S)$ be a SP.
Then $v(t, S)$ is a SP if and only if $v(t, S)$ is a SP for all t and all S.
$v(t, S) = \mathbb{E}[(v(t, S) - m(t))^2]$
$= \int_\Omega (v(t, S) - m(t))^2\, dP(S)$ or $v(t, S) = \mathbb{E}[v(t, S)^2] - m(t)^2$

It's the correlation between $v(t, S)$ and $v(t', S)$

Corollary 1.1. Remember that $gamma(t_1, t_2) = gamma(t_3, t_4 i) \leftrightarrow t_1 - t_2 = t_3 - t_4$.

Oct 19 2022 Wen (12:28:10)

Lecture 2: Lecture Title

2.1 Sub Section 2

Theorem 2.1. This is a theorem.

Proof. This is a proof. 😄

Example. This is an example.

Proof. This is an explanation. 😄

Claim 2.1. This is a claim.

Corollary 2.1. This is a corollary.

Proposition 2.1. This is a proposition.

Lemma 2.1. This is a lemma.

Question 1

This is a question.

Solution:-

This is a solution.

Exercise 2.1. This is an exercise.

Definition 2.2: Definition

This is a definition.

Note:-

This is a note.

Oct 17 2022 Mon (13:18:57)

Lecture 3: Todo Notes

The original todo note withouth changed colours.
Here's another line.

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Is this correct?

I'm unsure about also!

Change this!

This can help me in chapter seven!

This really needs to be improved! What was I thinking?!

The following section needs to be rewritten!

Sed feugiat. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Ut pellentesque augue sed urna. Vestibulum diam eros, fringilla et, consectetuer eu, nonummy id, sapien. Nullam at lectus. In sagittis ultrices mauris. Curabitur malesuada erat sit amet massa. Fusce blandit. Aliquam erat volutpat. Aliquam euismod. Aenean vel lectus. Nunc imperdiet justo nec dolor.

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Lecture 4: Graphs

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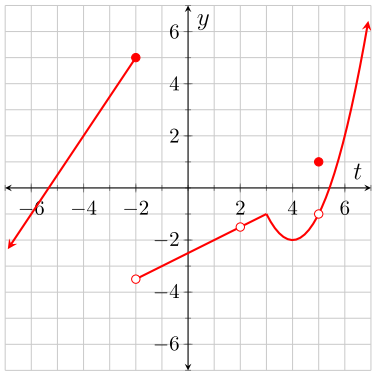

Figure 1: $y = g(t)$

Notes