

studentUpload

- Homework upload / return: <https://math.uzh.ch/my>
- Filetype: depending on the lecture, only images or code files are allowed.
- Maximum Filesize: 20 MB per file.
- Start by clicking on Upload Solution

Lecture

◀ FS 17 HS 17 FS 18 ▶

STA402 Likelihood Inference Worksheets: 20/14

?

1.00

University of Zurich
Department of Mathematics

Exercise 9

Deadline: Fri, 22.11.2019 08:45
Files uploaded: 4
Acting Score: 0.00 / 1.00

Upload Solution

Problem 15

Let $X_1, \dots, X_n$ denote a random sample from a continuous $\theta \in \mathbb{R}^+$. The density function of the uniform distribution

Open

?

1.00

Department of Mathematics

Exercises 14

Ching Wang and Hanna Flury

Problem 20

Assume the following Bayesian hierarchical model:
$$Z_1, \sigma^2 \sim N(\mu, \sigma^2)$$
$$\mu \sim N(\mu_0, \tau^2)$$
$$\sigma^2 \sim IG(\alpha, \beta)$$

Find the posterior distribution of (μ, σ^2) , and the full conditional distributions of $\mu|Z, \sigma^2$ and $\sigma^2|Z, \mu$.

Exercise 14

Deadline: Fri, 22.12.2017 08:45

View Correction

In Progress

?

1.00

Department of Mathematics

Exercises 13

Ching Wang and Hanna Flury

Problem 24

The aim of this exercise is to provide a first insight on the usage of receiver operating characteristic (ROC) and the area under the curve (AUC).
Let us assume that we are dealing with a tumour marker X such that a physician concludes a subject is diseased if $X > c$, where c is a certain threshold. In addition, we model the population of healthy and sick patients with $X_H \sim N(\mu_H, \sigma_H^2)$ and $X_D \sim N(\mu_D, \sigma_D^2)$ respectively.
(a) Define the ROC, the AUC, the specificity and the sensitivity in general and under the above described

Exercise 13

Deadline: Wed, 20.12.2017 08:45

View Correction

In Progress

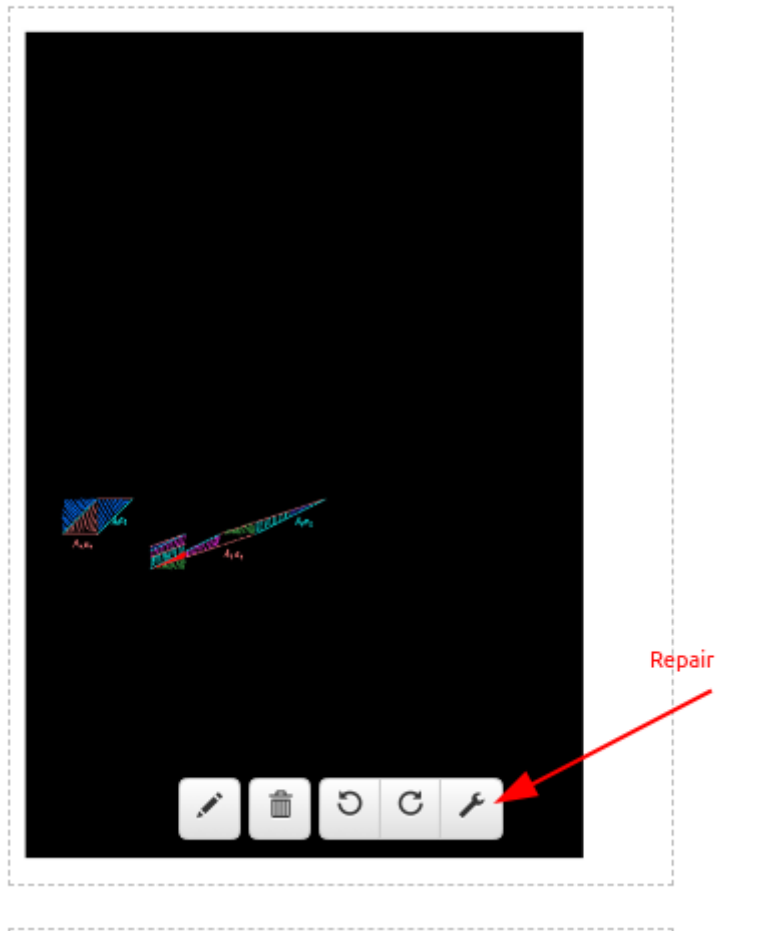
Show all

- Upload new files. Already uploaded files are shown too. If the image is rotated, click on left or right arrow to rotate.

(u) (a) $X^Y \rightarrow |X^Y| = |X|^{|Y|}$
 (b) $(X \times Y)^Z \rightarrow \text{card}(X \times Y) = |X| \cdot |Y|$
 $\text{card}((X \times Y)^Z) = (|X| \cdot |Y|)^{|Z|}$
 (c) $X \setminus Y, Y \subset X$
 ~~$\text{card}(X \setminus Y) = |X| - |Y|$~~
 (5) $A, B \in \mathcal{P}(X)$
 (a) $\subseteq$: Teilordnung auf $\mathcal{P}(X)$ (R ist $\subseteq$)
 (i) reflexiv $\forall A \in \mathcal{P}(X)$:
 $A \subseteq A$: $A \subseteq A$ korrekt, eine Menge A
 ist auch in der Teilmenge von sich selbst.
 (ii) Symmetrisch
 $A \subseteq B$
 (c) antisymmetrisch: $\forall A, B \in \mathcal{P}(X)$ gilt
 $(A \subseteq B) \wedge (B \subseteq A) \Rightarrow A = B$
 (3) transitiv: $\forall A, B, C \in \mathcal{P}(X)$
 $(A \subseteq B) \wedge (B \subseteq C) \Rightarrow A \subseteq C$
 Die Relation $R = "\subseteq"$ auf $\mathcal{P}(X)$ ist
 reflexiv, antisymmetrisch & transitiv
 also eine Teilordnung auf $\mathcal{P}(X)$.
 (5b) $X = \{1, 2\}$
 $\mathcal{P}(X) = \{\emptyset, \{1\}, \{2\}, \{1, 2\}\}$
 $A = \{1\} \in \mathcal{P}(X) \wedge B = \{2\} \in \mathcal{P}(X)$
 $A \not\subseteq B \wedge B \not\subseteq A$
 es gilt NICHT $(A \subseteq B) \vee (B \subseteq A)$
 es ist also nicht total $\Rightarrow$ keine Totalordnung.
 (5c) Es gibt ein kleinstes Element, die leere
 Menge $\emptyset$. $\emptyset \in \mathcal{P}(X)$ und $\emptyset$ ist in
 jeder Teilmenge von $\mathcal{P}(X)$ enthalten.
 Es ist also minimal und da die leere
 Menge eindeutig ist, also auch das
 kleinste Element. nicht zwingend ein
 Es gibt aber kein größtes Element.
 Betrachte: $X = \{1, 2, 3\}$
 $\mathcal{P}(X) = \{\emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\}$
 $\{1, 2\} \not\subseteq \{1, 3\}$ und $\{1, 3\} \not\subseteq \{1, 2\}$
 $\Rightarrow$ es gilt NICHT $\forall A \in \mathcal{P}(X): A \subseteq X$
 $\rightarrow$ kein größtes Element
 aber $\exists$ ein maximales Element denn die
 Menge X selbst ist in $\mathcal{P}(X)$ enthalten.
 $X \in \mathcal{P}(X)$ mit $\forall A \in \mathcal{P}(X):$
 $A \subseteq X$
 $(X \subseteq A \rightarrow A = X)$
 X ist auch das größte Element denn es gilt
 $\forall A \in \mathcal{P}(X): A \subseteq X$

(5b) Sei $X = \{1, 2\}$
 $\mathcal{P}(X) = \{\emptyset, \{1\}, \{2\}, \{1, 2\}\}$
 $A = \{1\} \in \mathcal{P}(X) \wedge B = \{2\} \in \mathcal{P}(X)$
 $A \not\subseteq B \wedge B \not\subseteq A$
 es gilt NICHT $(A \subseteq B) \vee (B \subseteq A)$
 es ist also nicht total $\Rightarrow$ keine Totalordnung.
 (5c) Es gibt ein kleinstes Element, die leere
 Menge $\emptyset$. $\emptyset \in \mathcal{P}(X)$ und $\emptyset$ ist in
 jeder Teilmenge von $\mathcal{P}(X)$ enthalten.
 Es ist also minimal und da die leere
 Menge eindeutig ist, also auch das
 kleinste Element. nicht zwingend ein
 Es gibt aber kein größtes Element.
 Betrachte: $X = \{1, 2, 3\}$
 $\mathcal{P}(X) = \{\emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\}$
 $\{1, 2\} \not\subseteq \{1, 3\}$ und $\{1, 3\} \not\subseteq \{1, 2\}$
 $\Rightarrow$ es gilt NICHT $\forall A \in \mathcal{P}(X): A \subseteq X$
 $\rightarrow$ kein größtes Element
 aber $\exists$ ein maximales Element denn die
 Menge X selbst ist in $\mathcal{P}(X)$ enthalten.
 $X \in \mathcal{P}(X)$ mit $\forall A \in \mathcal{P}(X):$
 $A \subseteq X$
 $(X \subseteq A \rightarrow A = X)$
 X ist auch das größte Element denn es gilt
 $\forall A \in \mathcal{P}(X): A \subseteq X$

- If the image is black or otherwise broken, click on the wrench to start a repair. If the repair fails, try a different file format (make a new picture with a different app, or create the PDF by using a different PDF converter).



- As long as the deadline is still open you can edit all your uploads and change the files if needed or delete them.

View Corrections

- After the deadline, correctors will grade your upload. As soon as this is done you can click on View Corrections and the Worksheet will appear with a green border.

1 / 1.00

STAGE 1: Introduction

Exercises 12

Craig Wang and Roman Flory

Problem 22

The purpose of this exercise is to deal with the bootstrap prediction of a Normal model.

(a) As a preliminary question, discuss the difference between prediction and estimation, providing if possible a relevant example (e.g., consider the OLS approach for linear models).

(b) Let $X_1, \dots, X_n, X_{n+1} \stackrel{iid}{\sim} N(\mu, \sigma^2)$, with a unknown and σ^2 known. Derive the plug-in predictive distribution for $Y = X_{n+1}$.

Exercise 12

Deadline: Wed, 13.12.2017 08:45

View Correction

In Progress

1 / 1.00

STAGE 1: Introduction

Exercises 11

Craig Wang and Roman Flory

Problem 20

Consider the `stata137` dataset in the `Stata` package (type `help stata137` for more information about the dataset). We are interested in quantifying the dependence of the variable "Married" on the variables "Dependent", "Income", "Diversity", and "Trust". The task:

stata137 as data frame `stata137 %>% select(Dependent, Income, Diversity, Trust)`

creates a data frame called `stata137`, containing the variables you're interested in.

(a) Check out some descriptive data (include: "Please use our own software! Please have your solution").

Exercise 11

Deadline: Wed, 06.12.2017 08:45

View Correction

Graded

- On the review feedback you see the achieved points and comments from the correctors including their notes on your papers. By default only the edited pages are displayed, click on the button show all pages to change that.

Review Feedback

Previous Problem 17 & 18 Next

Show all pages

Exercise Problem 17 & 18

Achieved Points: 1/1.00

Absolutely perfect solution.

Please do that again.

3 Problem 3

Problem 3 Part A

Find the equation for the tangent plane to $f(x, y) = ye^{-x^2-y^2}$ at $(3, 2)$.

$\vec{N} = (-\frac{\partial f}{\partial x}, -\frac{\partial f}{\partial y}, 1)$

$\frac{\partial f}{\partial x} \Big|_{3,2} = -2xye^{-x^2-y^2} \Big|_{3,2} = -12e^{-13}$

$\frac{\partial f}{\partial y} \Big|_{3,2} = -2ye^{-x^2-y^2} \Big|_{3,2} = -8e^{-13}$

$f(3,2) = 2e^{-13}$

$\Rightarrow Z = 2e^{-13} - 12e^{-13}x - 8e^{-13}y$

$-2ye^{-x^2-y^2} + e^{-x^2-y^2} \Big|_{3,2} = -7e^{-13}$

Revision #2

Created 2026-06-30 10:57:00 CEST by admino

Updated 2026-06-30 10:57:07 CEST by admino