

“ ज्ञान विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार ”

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Vivekanand College Kolhapur (Empowered Autonomous)

Department of Statistics

Notice regarding Series of Guest Lectures

Date: - 20/04/2024

All students of M.Sc. of the department of statistics are hereby informed that there will be a series of guest lectures on “**Frailty Models in Survival Analysis**”, by Dr. Arvind Pande, Professor, Department of Statistics, Central university, Rajasthan from 21st April, 2024 to 25th April 2024 in online mode. The lectures are scheduled as below

Sr. No.	Date	Content	Time
1	21/04/2024	Comparison of two groups of survival data	11:00AM-1:00PM
2	22/04/2024	Random effects, Individual frailty, Shared frailty	02:30PM-4:30PM
3	24/04/2024	Frailty distributions: The gamma frailty distribution; Lognormal frailty effects, Testing for the presence of frailty	02:30PM-4:30PM
4	25/04/2024	The shared frailty model; Fitting the shared frailty model, Comparing shared frailty models.	02:30PM-4:30PM

Note: The attendance of students is compulsory.

for Arvind Pande
HEAD
DEPARTMENT OF STATISTICS
VIVEKANAND COLLEGE, KOLHAPUR
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“Education for Knowledge, Science and Culture”
-Shikshanmaharshi Dr. Bapuji Salunkhe
Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE, KOLHAPUR
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DEPARTMENT OF STATISTICS
Online Guest Lecture
on
“Frailty Models in Survival Analysis”

- **Aim:** To learn more about the concept of 'Frailty Models in Survival Analysis'.
- **Objectives:**
 1. To understand the need of Survival Analysis.
 2. To educate students on the advanced concepts in Survival Analysis.
- **Date:** From 21st April 2024 To 25th April 2024
- **Venue:** Department of Statistics
- **Resource Person:** Prof. Dr. Arvind Pandey, Professor, Department of Statistics, Central University of Rajasthan.
- **Number of Students** – 20
- **Number of Teachers:** 2
- **Brief description:**

The dignitary Prof. Dr. Arvind Pandey, Professor, Department of Statistics, Central University of Rajasthan was welcomed with a token of appreciation by Mr. A. B. Bhosale. He delivered a lecture series from 21st April 2024 to 25th April 2024. In this, he briefly explained comparison of two groups of survival data. He started from introduction to frailty models and further covered concepts like shared frailty, frailty distribution, various tests to testing the shared frailty with simulation using R software. The vote of thanks was presented by Mr. A. B. Bhosale.
- **Outcomes:**
 - After the guest lecture students,
 - Understood the need of Survival Analysis.
 - Learned the concepts like frailty models, testing shared frailty in Survival Analysis.

The screenshot shows a Zoom meeting interface. The main window displays a presentation slide titled "Extension of Cox PH Model" with the following bullet points:

- This effect, or frailty, is not directly estimated from the data, but instead is assumed to have unit mean and finite variance, which is to be estimated.
- This shared frailty parameter is due to some genetic factors or environmental factors which are unobserved in an individual and are common and shared by both paired organs in human or twins in a family.
- This shared frailty parameter is also responsible for the dependence between the two components.

The right side of the screen shows a "People" list with the following participants:

- Add people
- Rutuja Alavane
- sabir mulani
- Sanjivani Gurav
- Shamal Kumbhar
- Shubham Chavan
- Supriya Mane
- Swati Chougale
- Vedika Etal
- Yuvraj Chougale

At the bottom of the screen, the time is 11:52 AM and the meeting ID is hms-fwjj-gfy.

Dr. Arvind Pandey (Presenting)

Analysis of Kidney Infection data

To illustrate the Bayesian estimation procedure we use kidney infection data of McGillchrist and Arbett (1991). The data related to recurrence times counted from the moment of the catheter insertion until its removal due to infection for 38 kidney patients using portable dialysis equipment. For each patient, the first and the second recurrence times (in days) of infection from the time of insertion of the catheter until it has to be removed owing to infection is recorded. The data consists of five risk variables age, sex and disease type GN, AN and PKD where GN, AN and PKD are short forms of Glomerulo Nephritis, Acute Nephritis and Poly cystic Kidney Disease.

3:48 PM | pbe-ldpc-ovb

Dr. Arvind Pandey (Presenting)

Likelihood Specification

$$L_j(t_{1j}, t_{2j}) = \begin{cases} f_1(t_{1j}, t_{2j}), & t_{1j} < c_{1j}, t_{2j} < c_{2j}, \\ f_2(t_{1j}, c_{2j}), & t_{1j} < c_{1j}, t_{2j} > c_{2j}, \\ f_3(c_{1j}, t_{2j}), & t_{1j} > c_{1j}, t_{2j} < c_{2j}, \\ f_4(c_{1j}, c_{2j}), & t_{1j} > c_{1j}, t_{2j} > c_{2j}. \end{cases}$$

and the likelihood function is,

$$L(\theta) = \prod_{j=1}^{n_1} f_1(t_{1j}, t_{2j}) \prod_{j=1}^{n_2} f_2(t_{1j}, c_{2j}) \prod_{j=1}^{n_3} f_3(c_{1j}, t_{2j}) \prod_{j=1}^{n_4} f_4(c_{1j}, c_{2j}) \quad (32)$$

The counts n_1, n_2, n_3 and n_4 are the number of individuals for which first and second failure times (t_{1j}, t_{2j}) lie in the ranges $t_{1j} < c_{1j}, t_{2j} < c_{2j}; t_{1j} < c_{1j}, t_{2j} > c_{2j}; t_{1j} > c_{1j}, t_{2j} < c_{2j}$ and $t_{1j} > c_{1j}, t_{2j} > c_{2j}$ respectively and

$$\begin{aligned} f_1(t_{1j}, t_{2j}) &= \frac{\partial^2 S(t_{1j}, t_{2j})}{\partial t_{1j} \partial t_{2j}} \\ f_2(t_{1j}, c_{2j}) &= \frac{\partial S(t_{1j}, c_{2j})}{\partial t_{1j}} \\ f_3(c_{1j}, t_{2j}) &= \frac{\partial S(c_{1j}, t_{2j})}{\partial t_{2j}} \\ \text{and } f_4(c_{1j}, c_{2j}) &= S(c_{1j}, c_{2j}) \end{aligned} \quad (33)$$

3:07 PM | pbe-ldpc-ovb



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