

# Linux and Its Applications (EC831)

Test T2 May 2015

Max Marks:45 Time:3 Hr

GENERAL INSTRUCTIONS: Write your name and roll number in the author's place and submit everything in the form of a pdf file. Mail the zip file to svb.juit@gmail.com.

## SECTION A

1. Answer the following questions each question carries half mark. (7 marks)

- Can you write a Latex file using a text editor? From looking at the name of a file how does a compiler recognize that it is a Latex file?
- How does a Latex compiler treat the brackets { and }?
- In a Latex document what is the effect of many white spaces between words?
- How does Latex treat \$\$\$\$?
- what is the meaning of 'set isosamples 25'?
- What is the meaning of \usepackage [] {}? What is written in the square brackets and what in the curly brackets?
- What is the meaning of  $x \cdot x$ , where  $x$  is a vector? (Total:7)

## SECTION B

2. Do the following questions

(a) Write the following equations in Latex (6 marks)(Total 13)

$$f_{A,\Phi}(a, \phi) da d\phi = \frac{a}{\sigma_N^2(2\pi)} e^{-[a^2/(2\sigma_N^2)]} da d\phi \quad 0 \leq a \leq \infty; \quad -\pi \leq \phi \leq \pi$$

$$x(t) = \begin{cases} +A + w(t) & \text{when 1 was sent} \\ -A + w(t) & \text{when 0 was sent} \end{cases} \quad (1)$$

(b) Draw the following function in gnuplot (6 marks)(Total 19)

$$f_{A,\Phi}(a, \phi) a = \frac{a}{\sigma_N^2(2\pi)} e^{-[a^2/(2\sigma_N^2)]}$$

and include it in your pdf file. (See Figure 1)

(c) Do the following explaining the command which you used using verbatim

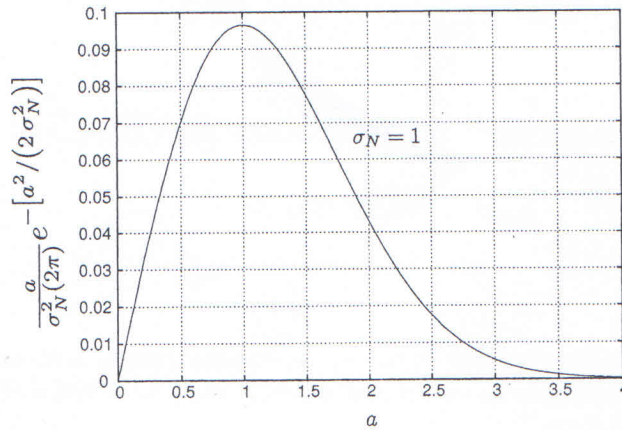


Figure 1: Graph of  $a f_{A,\Phi}(a, \phi)$ .  $A$  is Rayleigh distributed and  $\Phi$  is uniformly distributed.

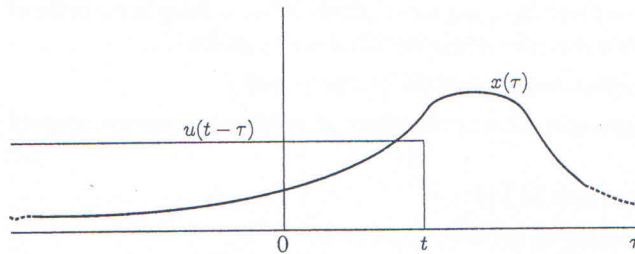


Figure 2: Figure for problem 3a

i. (3 marks)(Total 22)

$$\int \frac{\tan^{-1}(x)}{1+x^2} dx$$

ii. Find the all the roots of (2 marks)(Total 24)

$$x^4 + 3x + 1 = 0$$

using Wxmaxima

3. Do the following questions. Write your answers in your pdf file.

(a) Draw Figure 2 in Inkscape (5 marks)(Total 29)

(b) (5 marks)(Total 34) Define  $x$  in terms of 100 elements from 2 to 10. Then

$$y = \frac{x + x^{-1}}{x^x}$$

then plot  $y$  versus  $x$  and include it in your pdf file. Include all the commands which you used. See Figure 3

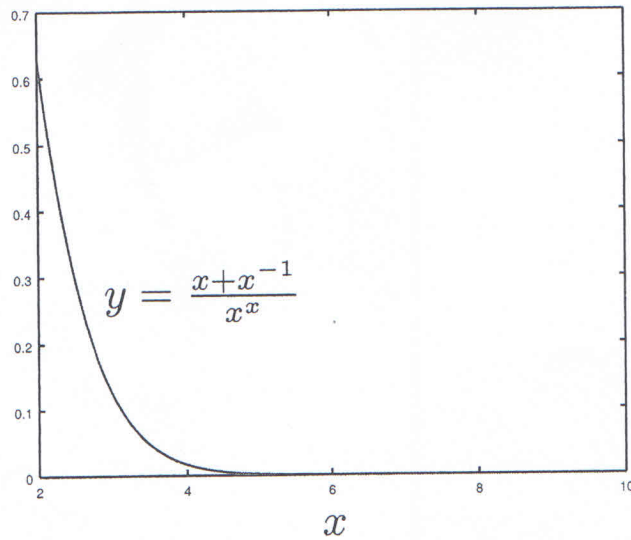


Figure 3:  $y(x)$  for Problem 3b

- (c) The following passage has references.(5 marks)(Total 39) Cite your references at the end of the paper.

Communication systems are vital to our modern society for business, personal life, entertainment and leisure. On this course you will cover the design and analysis of modern communications technologies, telecommunications and data network systems while building the interdisciplinary skills to meet current and future needs of commerce and industry. [3] [2]. For example, in an analog audio signal, the instantaneous voltage of the signal varies continuously with the pressure of the sound waves [1].

- (d) (6 marks) Stop work and spend 15 minutes for neatness and proper formatting of the figures and equations. Name, roll number should be there on the paper.(Total 45)

## References

- [1] Bairns, C "Communication Systems" Wiley International, 2004  
 [3] [http://en.wikipedia.org/wiki/Analog\\_signal](http://en.wikipedia.org/wiki/Analog_signal)  
 [2] Carlson, A. B. "Communication Systems" McGraw-Hill, 2010