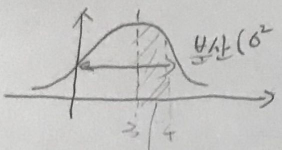
Xilinx Zynq FPGA, TI DSP, MCU 기반의 프로그래밍 및 회로 설계 전문가 과정

#62

강사:Innova Lee(이 상훈)

학생: 김시윤

$$\Gamma(x)=\int_0^\infty e^{-t}t^{x-1}\,dt$$



3보다 크고 4보다 작은 확률

두개의 확률x100 =%

전체 면적은 1이다.

확률밀도 함수를 구해야 한다 그래야만

확률밀도함수가 들어간 필터 (칼만필터)

$$\Gamma(x)=\int_0^1[-\ln(u)]^{x-1}\,du$$

$$t=-\ln(u);\ du=-e^{-t}dt$$

$$\Gamma(x+1)=\int_0^\infty e^{-t}t^{x}\,dt$$

$$=[-e^{-t}t^{x}]_0^\infty-\int_0^\infty -e^{-t}xt^{x-1}\,dt$$

$$=x\Gamma(x)$$

*0! 아무것도 없을 확률=1

$\Gamma(1)=1$ 팩토리얼 함수의 일반화, & 정규분포 해석용이

→ 정규분포

$$\int_{-\infty}^{\infty}e^{-ax^2}\,dx=S$$

e^{iwx} = 푸리

푸리에 적분가능

$$\int_{-\infty}^{\infty}e^{-ay^2}\,dy$$

→ y

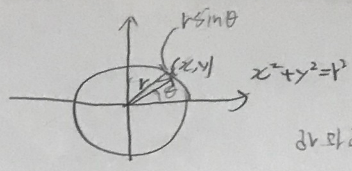
e의 $\int_{-\infty}^{\infty}e^{-at^2}\,dt=S$ 라고가정

$$\int_{-\infty}^{\infty}\int_{-\infty}^{\infty}e^{-a(x^2+y^2)}\,dxdy=S^2$$

원의방정식 $x^2+y^2=r^2$

$$\int_{-\infty}^{\infty}\int_{-\infty}^{\infty}e^{-ar^2}\,dxdy=S^2$$

r은 x,y에 종속 극좌표로 바꾼다.



dr 와 $d\theta$로 바꿔야 나옴

$$\lim_{\theta\to 0} r\sin\theta = r\theta$$

$$dxdy=r\,dr\,d\theta.$$

적분구간이 바뀌어야한다.

$$\int_0^{2\pi}\int_0^{\infty}e^{-ar^2}\,r\,dr\,d\theta=S^2$$

치환적분이 딱이다.

$t=ar^2$이라가정. $\quad dr=\frac{dt}{2ar}$

$dt=2ar\,dr$

$$\int_0^{2\pi}\int_0^{\infty}e^{-t}\frac{1}{2a}\,dt\,d\theta$$

$$\int_0^{2\pi}\left[-\frac{1}{2a}e^{-t}\right]_0^{\infty}d\theta.$$

$$\int_0^{2\pi}\frac{1}{2a}\,d\theta.$$

$$=\frac{\pi}{a}=S^2.$$

$$\therefore S=\sqrt{\frac{\pi}{a}}$$

$$\hookrightarrow \int_{-\infty}^{\infty}e^{-ax^2}\,dx=\sqrt{\frac{\pi}{a}}$$

정규분포는 모든구간더하면 1이므로

$$y=\sqrt{\frac{a}{\pi}}e^{-ax^2}$$

분산   평균=0   정규분포에서는 일반식의 a가 분산을 결정한다.

$$\sigma^2=\int(x-m)^2\cdot y\,dx$$

*여기서 m=평균

가우시안 분포 평균=0

$$=\int_{-\infty}^{\infty}x^2\sqrt{\frac{a}{\pi}}e^{-ax^2}\,dx$$

$$=\sqrt{\frac{a}{\pi}}\int_{-\infty}^{\infty}x\cdot xe^{-ax^2}\,dx$$

$y'=1 \quad s=-\frac{1}{2a}e^{-ax^2}$

$y=x \quad s'=xe^{-ax^2}$

$$\left[-\frac{1}{2a}e^{-ax^2}\right]_{-\infty}^{\infty}-\int_{-\infty}^{\infty}-\frac{1}{2a}e^{-ax^2}\,dx$$

$t = ax^2 \quad dx = \frac{1}{2ax}dt$

$dt = 2ax\,dx$

$\frac{1}{2a}\int_{-\infty}^{\infty} e^{-t}\frac{1}{2ax}dt$

$\left[-\frac{1}{2a}e^{-ax^2}\right]_{-\infty}^{\infty} - \boxed{\int_{-\infty}^{\infty} -\frac{1}{2a} e^{-ax^2}dx}$

$= \sqrt{\frac{a}{\pi}} \cdot \frac{1}{2a} \cdot \sqrt{\frac{\pi}{a}} = \frac{1}{2a}$

$\Rightarrow 2a = \frac{1}{\sigma^2}$

$\therefore a = \frac{1}{2\sigma^2}$

$y = \sqrt{\frac{a}{\pi}}e^{-\frac{x^2}{2\sigma^2}}$

$= \sqrt{\frac{1}{2\pi\sigma^2}}\,e^{-\frac{x^2}{2\sigma^2}}$

엄밀하게 다시 표시 (평균값 있을경우 평균값 고려)

$\sqrt{\frac{1}{2\pi\sigma^2}}\,e^{-\frac{(x-m)^2}{2\sigma^2}}$

$\int_{-\infty}^{\infty} e^{-x^2}dx$ (우함수)

$= 2\int_{0}^{\infty} e^{-x^2}dx = \sqrt{\pi}$

$x^2 = t \Rightarrow x = \sqrt{t} = t^{\frac{1}{2}}$

$dx = \frac{1}{2}t^{-\frac{1}{2}}dt$

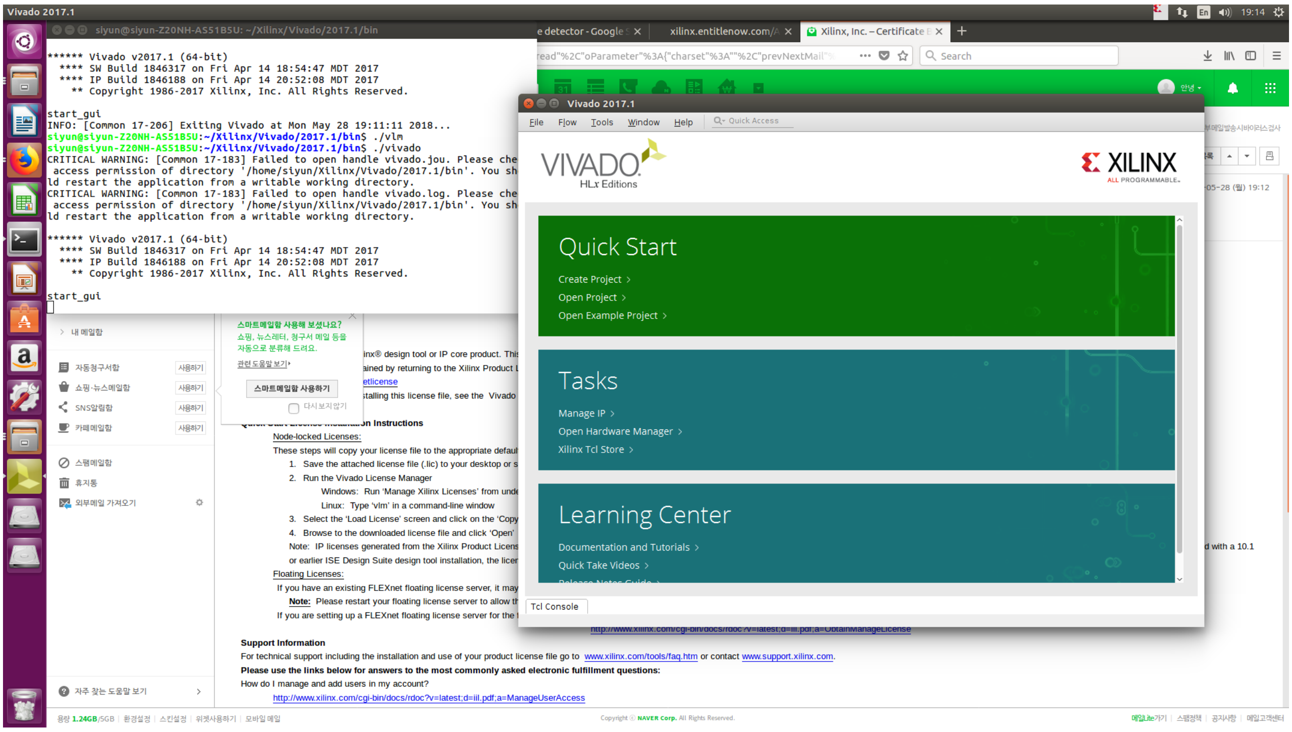
$= 2\int_{0}^{\infty} e^{-t}\frac{1}{2}t^{-\frac{1}{2}}dt$

$= \int_{0}^{\infty} e^{-t}t^{-\frac{1}{2}}dt$

$= \Gamma\left(\frac{1}{2}\right)$

$\therefore \int_{-\infty}^{\infty} e^{-x^2}dx = \Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$

가우시안분포랑 감마함수연결



Vivado 2017.1
****** Vivado v2017.1 (64-bit)
**** SW Build 1846317 on Fri Apr 14 18:54:47 MDT 2017
**** IP Build 1846188 on Fri Apr 14 20:52:08 MDT 2017
** Copyright 1986-2017 Xilinx, Inc. All Rights Reserved.
start_gui
INFO: [Common 17-206] Exiting Vivado at Mon May 28 19:11:11 2018...
siyun@siyun-Z20NH-AS51B5U:~/Xilinx/Vivado/2017.1/bin$ ./vlm
siyun@siyun-Z20NH-AS51B5U:~/Xilinx/Vivado/2017.1/bin$ ./vivado
Quick Start
Create Project
Open Project
Open Example Project
Tasks
Manage IP
Open Hardware Manager
Xilinx Tcl Store
Learning Center
Documentation and Tutorials
Quick Take Videos
Tcl Console
XILINX
Support Information
For technical support including the installation and use of your product license file go to www.xilinx.com/tools/faq.htm or contact www.support.xilinx.com.
Please use the links below for answers to the most commonly asked electronic fulfillment questions:
How do I manage and add users in my account?
http://www.xilinx.com/cgi-bin/docs/rdoc?v=latest;d=iil.pdf;a=ManageUserAccess