

normal_plot3.R

John

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```
# normal_plot3.r
# Normal probability densities

# Load necessary libraries
library(ggplot2)

# Three sets of normal parameters here
mu_1 <- 0
sig2_1 <- 1
mu_2 <- 2
sig2_2 <- 2
mu_3 <- 2
sig2_3 <- 0.5

# Minimum and maximum values of y
ymin <- -4
ymax <- 6
ystep <- 0.1

# Normal probability density function
y <- seq(ymin,ymax,ystep)
fy_1 <- dnorm(y,mu_1,sqrt(sig2_1))
fy_2 <- dnorm(y,mu_2,sqrt(sig2_2))
fy_3 <- dnorm(y,mu_3,sqrt(sig2_3))

# Make data frame for ggplot2
normdata <- as.data.frame(cbind(y,fy_1,fy_2,fy_3))

# Print data
normdata
```

```
##      y      fy_1      fy_2      fy_3
## 1  -4.0 1.338302e-04 3.481326e-05 1.308651e-16
## 2  -3.9 1.986555e-04 4.687565e-05 4.301641e-16
## 3  -3.8 2.919469e-04 6.280272e-05 1.385986e-15
## 4  -3.7 4.247803e-04 8.372172e-05 4.377210e-15
## 5  -3.6 6.119019e-04 1.110520e-04 1.355034e-14
## 6  -3.5 8.726827e-04 1.465693e-04 4.111658e-14
## 7  -3.4 1.232219e-03 1.924812e-04 1.222920e-13
## 8  -3.3 1.722569e-03 2.515139e-04 3.565275e-13
## 9  -3.2 2.384088e-03 3.270125e-04 1.018831e-12
## 10 -3.1 3.266819e-03 4.230534e-04 2.853814e-12
## 11 -3.0 4.431848e-03 5.445711e-04 7.835433e-12
## 12 -2.9 5.952532e-03 6.974972e-04 2.108699e-11
## 13 -2.8 7.915452e-03 8.889122e-04 5.562630e-11
## 14 -2.7 1.042093e-02 1.127207e-03 1.438335e-10
## 15 -2.6 1.358297e-02 1.422254e-03 3.645473e-10
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## 16 -2.5 1.752830e-02 1.785580e-03 9.056529e-10
## 17 -2.4 2.239453e-02 2.230539e-03 2.205382e-09
## 18 -2.3 2.832704e-02 2.772483e-03 5.264051e-09
## 19 -2.2 3.547459e-02 3.428912e-03 1.231602e-08
## 20 -2.1 4.398360e-02 4.219612e-03 2.824456e-08
## 21 -2.0 5.399097e-02 5.166746e-03 6.349117e-08
## 22 -1.9 6.561581e-02 6.294921e-03 1.398962e-07
## 23 -1.8 7.895016e-02 7.631185e-03 3.021431e-07
## 24 -1.7 9.404908e-02 9.204966e-03 6.396370e-07
## 25 -1.6 1.109208e-01 1.104793e-02 1.327298e-06
## 26 -1.5 1.295176e-01 1.319375e-02 2.699713e-06
## 27 -1.4 1.497275e-01 1.567776e-02 5.382461e-06
## 28 -1.3 1.713686e-01 1.853653e-02 1.051861e-05
## 29 -1.2 1.941861e-01 2.180726e-02 2.014882e-05
## 30 -1.1 2.178522e-01 2.552716e-02 3.783163e-05
## 31 -1.0 2.419707e-01 2.973257e-02 6.962653e-05
## 32 -0.9 2.660852e-01 3.445807e-02 1.256054e-04
## 33 -0.8 2.896916e-01 3.973543e-02 2.221040e-04
## 34 -0.7 3.122539e-01 4.559250e-02 3.849624e-04
## 35 -0.6 3.332246e-01 5.205200e-02 6.540250e-04
## 36 -0.5 3.520653e-01 5.913028e-02 1.089142e-03
## 37 -0.4 3.682701e-01 6.683609e-02 1.777824e-03
## 38 -0.3 3.813878e-01 7.516932e-02 2.844509e-03
## 39 -0.2 3.910427e-01 8.411990e-02 4.461078e-03
## 40 -0.1 3.969525e-01 9.366674e-02 6.857825e-03
## 41 0.0 3.989423e-01 1.037769e-01 1.033349e-02
## 42 0.1 3.969525e-01 1.144048e-01 1.526237e-02
## 43 0.2 3.910427e-01 1.254921e-01 2.209586e-02
## 44 0.3 3.813878e-01 1.369674e-01 3.135552e-02
## 45 0.4 3.682701e-01 1.487464e-01 4.361453e-02
## 46 0.5 3.520653e-01 1.607328e-01 5.946514e-02
## 47 0.6 3.332246e-01 1.728187e-01 7.947085e-02
## 48 0.7 3.122539e-01 1.848867e-01 1.041040e-01
## 49 0.8 2.896916e-01 1.968109e-01 1.336722e-01
## 50 0.9 2.660852e-01 2.084592e-01 1.682398e-01
## 51 1.0 2.419707e-01 2.196956e-01 2.075537e-01
## 52 1.1 2.178522e-01 2.303830e-01 2.509843e-01
## 53 1.2 1.941861e-01 2.403853e-01 2.974929e-01
## 54 1.3 1.713686e-01 2.495709e-01 3.456374e-01
## 55 1.4 1.497275e-01 2.578152e-01 3.936217e-01
## 56 1.5 1.295176e-01 2.650035e-01 4.393913e-01
## 57 1.6 1.109208e-01 2.710337e-01 4.807706e-01
## 58 1.7 9.404908e-02 2.758185e-01 5.156305e-01
## 59 1.8 7.895016e-02 2.792879e-01 5.420674e-01
## 60 1.9 6.561581e-02 2.813904e-01 5.585758e-01
## 61 2.0 5.399097e-02 2.820948e-01 5.641896e-01
## 62 2.1 4.398360e-02 2.813904e-01 5.585758e-01
## 63 2.2 3.547459e-02 2.792879e-01 5.420674e-01
## 64 2.3 2.832704e-02 2.758185e-01 5.156305e-01
## 65 2.4 2.239453e-02 2.710337e-01 4.807706e-01
## 66 2.5 1.752830e-02 2.650035e-01 4.393913e-01
## 67 2.6 1.358297e-02 2.578152e-01 3.936217e-01
## 68 2.7 1.042093e-02 2.495709e-01 3.456374e-01
## 69 2.8 7.915452e-03 2.403853e-01 2.974929e-01

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## 70 2.9 5.952532e-03 2.303830e-01 2.509843e-01
## 71 3.0 4.431848e-03 2.196956e-01 2.075537e-01
## 72 3.1 3.266819e-03 2.084592e-01 1.682398e-01
## 73 3.2 2.384088e-03 1.968109e-01 1.336722e-01
## 74 3.3 1.722569e-03 1.848867e-01 1.041040e-01
## 75 3.4 1.232219e-03 1.728187e-01 7.947085e-02
## 76 3.5 8.726827e-04 1.607328e-01 5.946514e-02
## 77 3.6 6.119019e-04 1.487464e-01 4.361453e-02
## 78 3.7 4.247803e-04 1.369674e-01 3.135552e-02
## 79 3.8 2.919469e-04 1.254921e-01 2.209586e-02
## 80 3.9 1.986555e-04 1.144048e-01 1.526237e-02
## 81 4.0 1.338302e-04 1.037769e-01 1.033349e-02
## 82 4.1 8.926166e-05 9.366674e-02 6.857825e-03
## 83 4.2 5.894307e-05 8.411990e-02 4.461078e-03
## 84 4.3 3.853520e-05 7.516932e-02 2.844509e-03
## 85 4.4 2.494247e-05 6.683609e-02 1.777824e-03
## 86 4.5 1.598374e-05 5.913028e-02 1.089142e-03
## 87 4.6 1.014085e-05 5.205200e-02 6.540250e-04
## 88 4.7 6.369825e-06 4.559250e-02 3.849624e-04
## 89 4.8 3.961299e-06 3.973543e-02 2.221040e-04
## 90 4.9 2.438961e-06 3.445807e-02 1.256054e-04
## 91 5.0 1.486720e-06 2.973257e-02 6.962653e-05
## 92 5.1 8.972435e-07 2.552716e-02 3.783163e-05
## 93 5.2 5.361035e-07 2.180726e-02 2.014882e-05
## 94 5.3 3.171349e-07 1.853653e-02 1.051861e-05
## 95 5.4 1.857362e-07 1.567776e-02 5.382461e-06
## 96 5.5 1.076976e-07 1.319375e-02 2.699713e-06
## 97 5.6 6.182621e-08 1.104793e-02 1.327298e-06
## 98 5.7 3.513955e-08 9.204966e-03 6.396370e-07
## 99 5.8 1.977320e-08 7.631185e-03 3.021431e-07
## 100 5.9 1.101576e-08 6.294921e-03 1.398962e-07
## 101 6.0 6.075883e-09 5.166746e-03 6.349117e-08
```

```
# Plot probability density functions
ggplot(normdata,aes(x=y,y=fy_1))+
geom_line(color="black",size=1)+
geom_line(aes(y,fy_2),color="blue",size=1)+
geom_line(aes(y,fy_3),color="red",size=1)+
ggtitle("Normal probability densities")
```

Normal probability densities

