MATH40005 Problem Sheet 11 Week 21

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Introduction

The probability density function of a normal distribution with mean μ and variance σ^2 is

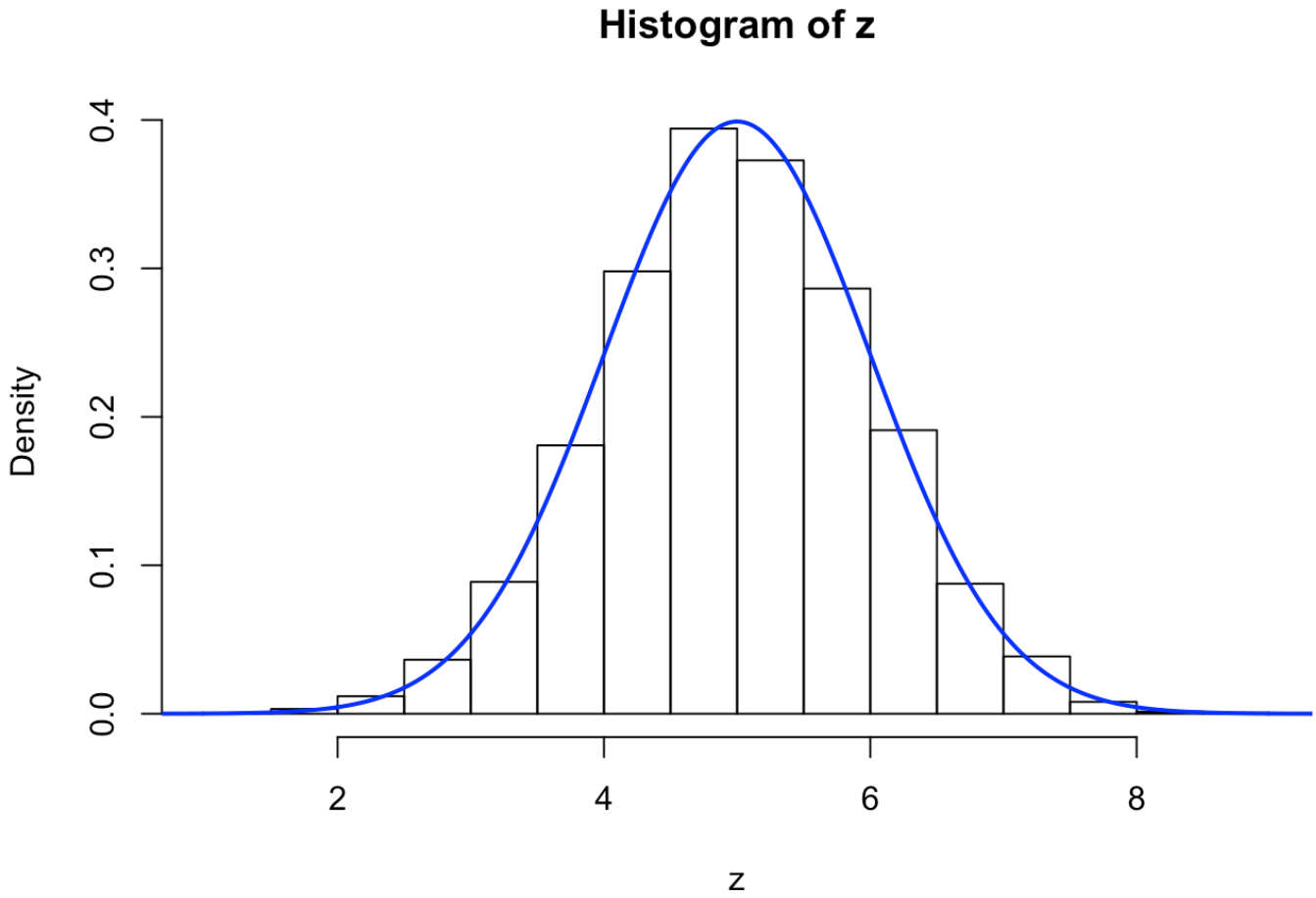
$$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{(x-\mu)^2}{2\sigma^2}\right)$$

A histogram

```
# set the mean and standard deviation for a normal distribution,
# choose your own parameter values
mu <- 5
sigma <- 1

# generate observations following a normal distribution with those parameter value
s
set.seed(1)
z <- rnorm(n=10000, mean=mu, sd=sigma)

# plotting the data, with a histogram and overlaying a density
hist(z, freq=FALSE)
k <- 5
x <- seq(from=mu-k*sigma, to=mu+k*sigma, by=0.01)
y <- dnorm(x, mean=mu, sd=sigma)
lines(x=x, y=y, type='l', lwd=2, col="blue")
```


Histogram of z
Density
0.0
0.1
0.2
0.3
0.4
2
4
6
8
z