

Statistical Computing Project 4

Mario Ibanez

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Plotting the true distribution

```
proportion <- 0.35
sample_size <- 1000

sample1_size <- rbinom(n = 1, size = sample_size, prob = proportion)
sample2_size <- sample_size - sample1_size

sample1 <- rnorm(n = sample1_size, mean = 0.0, sd = 1)
sample2 <- rnorm(n = sample2_size, mean = 2.5, sd = 1)

x_axis <- seq(from = min(sample1), to = max(sample2), by = 0.1)

# Plot distribution of full sample
plot(x = density(c(sample1, sample2)),
     ylim = c(-0.01, .28),
     lwd = 2)

# Plot true population distribution
lines(x = x_axis,
      y = (proportion * dnorm(x = x_axis, mean = 0, sd = 1)) +
        (1 - proportion)*dnorm(x = x_axis, mean = 2.5, sd = 1),
      lty = 2)

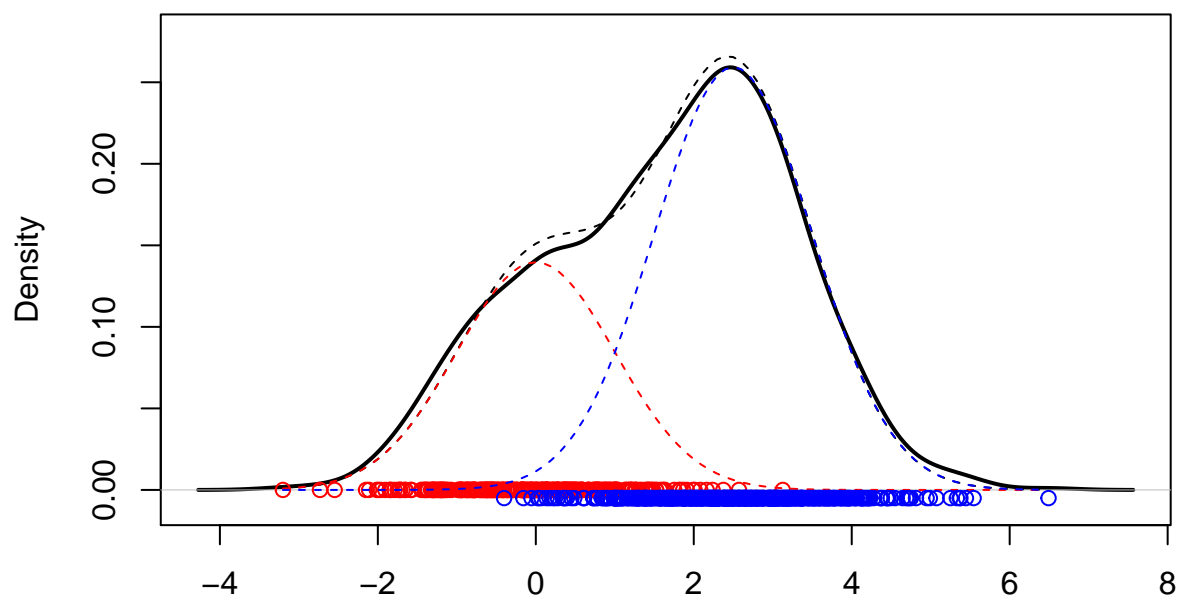
# Plot distribution of sample 1
points(x = sample1,
       y = rep(0, sample1_size),
       col = "red")

# Plot true normal N(0, 1)
lines(x = x_axis,
      y = proportion * dnorm(x = x_axis, mean = 0, sd = 1),
      col = "red",
      lty = 2)

# Plot distribution of sample 2
points(x = sample2,
       y = rep(-0.005, sample2_size),
       col = "blue")

# Plot true normal N(2.5, 1)
lines(x = x_axis,
      y = (1 - proportion)*dnorm(x = x_axis, mean = 2.5, sd = 1),
      col = "blue",
      lty = 2)
```

density.default(x = c(sample1, sample2))



N = 1000 Bandwidth = 0.3577