

O objetivo deste exercício é comparar uma distribuição cauchy ordenada com os quantis de probabilidade $\frac{i}{194+1}, i = 1, \dots, 194$ dessa população e de uma população normal com valor esperado $\mu = 3.8$ e variância $\sigma^2 = 4$. Para tal, recorreu-se ao seguinte trecho de código em R:

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1 SEED <- 1657
2 SAMPLE_SIZE <- 194
3 CAUCHY_LOCALIZATION <- 3.2
4 CAUCHY_SCALE <- 1.2
5 NORMAL_EXPECTED <- 3.8
6 NORMAL_VARIANCE <- 4
7 set.seed(SEED)
8
9 cauchy_sample <- rcauchy(SAMPLE_SIZE, CAUCHY_LOCALIZATION, CAUCHY_SCALE)
10
11 prob_quantiles <- seq(1/195, 194/195, by = 1/195)
12 cauchy_quantiles <- quantile(cauchy_sample, probs = prob_quantiles)
13
14 normal_sample <- rnorm(SAMPLE_SIZE, mean = NORMAL_EXPECTED, sd = sqrt(NORMAL_
    VARIANCE))
15 normal_quantiles <- quantile(normal_sample, probs = prob_quantiles)
16
17 ordered_cauchy_sample <- sort(cauchy_sample)
18
19 plot(ordered_cauchy_sample, normal_quantiles, main = "QQ Plot: Ordered Cauchy
    Sample vs Quantiles",
20       xlab = "Ordered Cauchy Sample", ylab = "Quantiles",
21       xlim = range(ordered_cauchy_sample), ylim = range(normal_quantiles, cauchy
    _quantiles))
22
23 points(ordered_cauchy_sample, cauchy_quantiles, col = "red", pch = 16)
24 abline(0, 1, col = "gray", lty = 2)
25
26 legend("topleft", legend = c("Normal Quantiles", "Cauchy Quantiles", "y = x"),
27       col = c("black", "red", "gray"), pch = c(16, 16, NA), lty = c(NA, NA, 2))

```

