Presentation

```r
k <- 8
lb <- -3
rb <- 3
size <- 100
x <- c(-Inf, seq(lb, rb, (rb - lb)/(k - 2)), Inf)
sample <- rnorm(size)
n <- vector(mode = "numeric", length = k)
p <- vector(mode = "numeric", length = k)
intervals <- vector(mode = "character", length = k)
for (i in 1:k) {
    p[i] <- pnorm(x[i + 1]) - pnorm(x[i])
    for (element in sample) {
        if (x[i] <= element & element < x[i + 1])
            n[i] <- n[i] + 1
    }
    if (i == 1) {
        intervals[i] <- paste("(-\\infty,", toString(x[i + 1]), ")", sep = "")
    } else if (i == k) {
        intervals[i] <- paste("[", toString(x[i]), ",+\\infty)", sep = "")
    } else {
        intervals[i] <- paste("[", toString(x[i]), ",", toString(x[i + 1]), ")",
            sep = "")
    }
}
np <- size * p
n_np <- n - np
chi_comp <- n_np^2/np
n <- c(n, sum(n))
p <- c(p, sum(p))
np <- c(np, sum(np))
n_np <- c(n_np, sum(n_np))
chi_sample <- sum(chi_comp)
chi_comp <- c(chi_comp, chi_sample)
interval_num <- as.character(1:k)
interval_num <- c(interval_num, "\\Sigma")
intervals <- c(intervals, "$-$")
p <- round(p, digits = 4)
np <- round(np, digits = 2)
n_np <- round(n_np, digits = 2)
chi_comp <- round(chi_comp, digits = 2)
content <- data.frame(interval_num, intervals, n, p, np, n_np, chi_comp)
frac_col <- "$\\dfrac{(n_i-np_i)^2}{np_i}$"
col_names <- c("$i$", "$\\Delta_i$", "$n_i$", "$p_i$", "$np_i$", "$n_i-np_i$", frac_col)
file_name <- "resources\\chi2test.pdf"
knitr::kable(content, format = "latex", col.names = col_names, align = rep("c", length(col_names)),
    escape = F) %>% column_spec(1, border_left = T) %>% column_spec(length(col_names),
    border_right = T) %>% save_kable(file_name)
file_handler <- file("resources\\chiComparison.tex", open = "wt", encoding = "UTF-8")
chi8 <- 14.1
if (chi_sample < chi8) {
    writeLines(paste(toString(round(chi_sample, digits = 2)), "=\\chi_{\\text{ }}^2<\\chi_{0.95}^2(",
        toString(k - 1), ")\\;\\Longrightarrow\\;H_0\\text{       }", sep = ""),
        file_handler)
} else {
    writeLines(paste(toString(round(chi_sample, digits = 2)), "=\\chi_{\\text{ }}^2\\not<\\chi_{0.95}^2(
        toString(k - 1), ")\\;\\Longrightarrow\\;H_0\\text{                   }",
        sep = ""), file_handler)
}
close(file_handler)
```

```
k <- 5
lb <- -1.5
rb <- 1.5
size <- 20
x <- c(-Inf, seq(lb, rb, (rb - lb)/(k - 2)), Inf)
sample <- rlaplace(size, s = 1/2^(1/2))
n <- vector(mode = "numeric", length = k)
p <- vector(mode = "numeric", length = k)
intervals <- vector(mode = "character", length = k)
for (i in 1:k) {
    p[i] <- pnorm(x[i + 1], s = 1/2^(1/2)) - pnorm(x[i], s = 1/2^(1/2))
    for (element in sample) {
        if (x[i] <= element & element < x[i + 1])
            n[i] <- n[i] + 1
    }
    if (i == 1) {
        intervals[i] <- paste("(-\\infty,", toString(x[i + 1]), ")", sep = "")
    } else if (i == k) {
        intervals[i] <- paste("[", toString(x[i]), ",+\\infty)", sep = "")
    } else {
        intervals[i] <- paste("[", toString(x[i]), ",", toString(x[i + 1]), ")",
            sep = "")
    }
}
np <- size * p
n_np <- n - np
chi_comp <- n_np^2/np
n <- c(n, sum(n))
p <- c(p, sum(p))
np <- c(np, sum(np))
n_np <- c(n_np, sum(n_np))
chi_sample <- sum(chi_comp)
chi_comp <- c(chi_comp, chi_sample)
interval_num <- as.character(1:k)
interval_num <- c(interval_num, "\\Sigma")
intervals <- c(intervals, "$-$")
p <- round(p, digits = 4)
np <- round(np, digits = 2)
n_np <- round(n_np, digits = 2)
chi_comp <- round(chi_comp, digits = 2)
```

```r
content <- data.frame(interval_num, intervals, n, p, np, n_np, chi_comp)
frac_col <- "$\\dfrac{(n_i-np_i)^2}{np_i}$"
col_names <- c("$i$", "$\\Delta_i$", "$n_i$", "$p_i$", "$np_i$", "$n_i-np_i$", frac_col)
file_name <- "resources\\chi2testLaplace.pdf"
knitr::kable(content, format = "latex", col.names = col_names, align = rep("c", length(col_names)),
    escape = F) %>% column_spec(1, border_left = T) %>% column_spec(length(col_names),
    border_right = T) %>% save_kable(file_name)
file_handler <- file("resources\\chiComparisonLaplace.tex", open = "wt", encoding = "UTF-8")
chi5 <- 9.5
if (chi_sample < chi5) {
    writeLines(paste(toString(round(chi_sample, digits = 2)), "=\\chi_{\\text{ }}^2<\\chi_{0.95}^2(",
        toString(k - 1), ")\\;\\Longrightarrow\\;H_0\\text{       }", sep = ""),
        file_handler)
} else {
    writeLines(paste(toString(round(chi_sample, digits = 2)), "=\\chi_{\\text{ }}^2\\not<\\chi_{0.95}^2(
        toString(k - 1), ")\\;\\Longrightarrow\\;H_0\\text{                   }",
        sep = ""), file_handler)
}
close(file_handler)
```

```r
k <- 5
lb <- -1.5
rb <- 1.5
size <- 20
x <- c(-Inf, seq(lb, rb, (rb - lb)/(k - 2)), Inf)
sample <- runif(size, min = lb, max = rb)
n <- vector(mode = "numeric", length = k)
p <- vector(mode = "numeric", length = k)
intervals <- vector(mode = "character", length = k)
for (i in 1:k) {
    p[i] <- pnorm(x[i + 1]) - pnorm(x[i])
    for (element in sample) {
        if (x[i] <= element & element < x[i + 1])
            n[i] <- n[i] + 1
    }
    if (i == 1) {
        intervals[i] <- paste("(-\\infty,", toString(x[i + 1]), ")", sep = "")
    } else if (i == k) {
        intervals[i] <- paste("[", toString(x[i]), ",+\\infty)", sep = "")
    } else {
        intervals[i] <- paste("[", toString(x[i]), ",", toString(x[i + 1]), ")",
            sep = "")
    }
}
np <- size * p
n_np <- n - np
chi_comp <- n_np^2/np
n <- c(n, sum(n))
p <- c(p, sum(p))
np <- c(np, sum(np))
n_np <- c(n_np, sum(n_np))
chi_sample <- sum(chi_comp)
chi_comp <- c(chi_comp, chi_sample)
interval_num <- as.character(1:k)
interval_num <- c(interval_num, "\\Sigma")
intervals <- c(intervals, "$-$")
p <- round(p, digits = 4)
np <- round(np, digits = 2)
n_np <- round(n_np, digits = 2)
chi_comp <- round(chi_comp, digits = 2)
content <- data.frame(interval_num, intervals, n, p, np, n_np, chi_comp)
frac_col <- "$\\dfrac{(n_i-np_i)^2}{np_i}$"
col_names <- c("$i$", "$\\Delta_i$", "$n_i$", "$p_i$", "$np_i$", "$n_i-np_i$", frac_col)
file_name <- "resources\\chi2testUnif.pdf"
knitr::kable(content, format = "latex", col.names = col_names, align = rep("c", length(col_names)),
    escape = F) %>% column_spec(1, border_left = T) %>% column_spec(length(col_names),
    border_right = T) %>% save_kable(file_name)
file_handler <- file("resources\\chiComparisonUnif.tex", open = "wt", encoding = "UTF-8")
chi5 <- 9.5
if (chi_sample < chi5) {
    writeLines(paste(toString(round(chi_sample, digits = 2)), "=\\chi_{\\text{ }}^2<\\chi_{0.95}^2(",
        toString(k - 1), ")\\;\\Longrightarrow\\;H_0\\text{       }", sep = ""),
        file_handler)
} else {
    writeLines(paste(toString(round(chi_sample, digits = 2)), "=\\chi_{\\text{ }}^2\\not<\\chi_{0.95}^2(
        toString(k - 1), ")\\;\\Longrightarrow\\;H_0\\text{                   }",
        sep = ""), file_handler)
}
close(file_handler)
```