Hw10_Q5

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Q_5
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(a)

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getwd()
## [1] "C:/Users/95223/OneDrive - Texas A&M University/TAMU/STAT 630/R files"
setwd("C:/Users/95223/OneDrive - Texas A&M University/TAMU/STAT 630/R files")
data <- read.csv("poisson_sample.csv")</pre>
lambda data <- mean(data$T)</pre>
sigma_data <- sqrt(lambda_data)</pre>
n <- 150
confidence_level <- 0.95</pre>
z_critical <- qnorm((1 + confidence_level) / 2)</pre>
margin_of_error <- z_critical * sigma_data</pre>
wald_interval <- c(lambda_data - margin_of_error, lambda_data + margin_of_error)</pre>
cat("Wald Confidence Interval:", wald_interval, "\n")
## Wald Confidence Interval: -0.8604037 4.220404
(b)
observed_information <- 1 / lambda_data</pre>
margin_of_error <- z_critical * sqrt(observed_information / n)</pre>
score interval <- c(lambda data - margin of error, lambda data + margin of error)
cat("Score Confidence Interval:", score_interval, "\n")
## Score Confidence Interval: 1.556534 1.803466
(c)
B <- 10000
bootstrap_samples <- numeric(B)</pre>
for (i in 1:B) {
  bootstrap_sample <- sample(data$T, replace = TRUE)</pre>
  lambda_bootstrap <- mean(bootstrap_sample)</pre>
  sigma_bootstrap <- sqrt(lambda_bootstrap)</pre>
```

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bootstrap_samples[i] <- sigma_bootstrap
}

bootstrap_se <- sd(bootstrap_samples)
margin_of_error <- z_critical * bootstrap_se
bootstrap_interval <- c(lambda_data - margin_of_error, lambda_data + margin_of_error)

cat("Bootstrap Confidence Interval:", bootstrap_interval, "\n")</pre>
```

Bootstrap Confidence Interval: 1.603008 1.756992