DATA130062: Homework 2

Due via eLearning at 23:59 on October 8, 2024

1. Rizzo book (2nd edition) Exercises 6.2, 6.3, 6.6, 6.7, 6.8, 6.9, 6.10 and 6.11.

2. Monte Carlo method can be used to approximate the fraction of a d-dimensional hypersphere which lies in the inscribed d-dimensional hypercube. Simulate with different dimensions $d = 2, 3, 4, \ldots, 10$. (Hint: use `apply` function.)

   (1) Derive the formula for the EXACT values for the above problem for each d-dimension.

   (2) Using the above formula, approximate the value of π. Find the sample size needed to approximate π to its 5th digit, i.e., the first time when you have an estimate as 3.14159x, for each dimension d. Set the random seed with `set.seed(123)` at the beginning of your R code.