DATA130004: Homework 2

Due in class on October 18, 2021

1. Rizzo book (1st edition) Exercises 5.6, 5.7, 5.8 and 5.10.

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 number of points needed to approximate π to its 4-th digit for each dimension d. Set the random seed with `set.seed(123)` at the beginning of your R code.