DATA130004: Homework 2

Due in class on October 16, 2019

1. Rizzo book (1st edition) Excercise 5.3, 5.4, 5.5, 5.9 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.