**ECOM90024**

**Forecasting in Economics and Business**

**Tutorial 1**

1. Let be a uniform random variable, defined on the interval [-2,2].
   1. Let . Provide a visual depiction of the density and write down its probability density function.
   2. What is the correlation coefficient of and Provide your reasoning.
2. Consider an experiment in which two dice are rolled. One die is a fair six sided die with faces while the other is a fair four sided die with faces
   1. What is the sample space of the experiment?
   2. What is the probability distribution of the set of outcomes of this experiment?
   3. Suppose that a trial of this experiment takes place. Is the resulting face of the fair six sided die an independent event from the resulting face of the fair four-sided die? Explain your reasoning.
   4. Let be a random variable that is defined as the sum of the numbers on the resulting faces of both die. What is the probability distribution function of ? Compute the mean and variance of .
3. Let and be discrete random variables. Show that .
4. Download the Australian Consumer Price Index (CPI) time series located in Tables 1 and 2 from the following link:

<https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/latest-release#data-downloads>

The data is contained within an Excel spreadsheet named Data1. Make sure to download the Excel file into your specified working directory. You will need to install the readxl package to import the data into your R environment. To do this, run the following lines of code:

install.packages("readxl")

library(readxl)

We only want the data from columns A and J, so run the following lines of code:

date = read\_excel("640101.xlsx", sheet = "Data1", col\_names = "date", range = "A11:A308")

cpi = read\_excel("640101.xlsx", sheet = "Data1", col\_names = "cpi", range = "J11:J308")

Doing so creates two data frames, each with a single column.

1. With the data that you have now imported into R, generate an appropriate time series plot of the Australian Consumer Price Index.
2. Using the CPI data, compute the quarterly inflation rate using the following formula:
3. Generate an appropriate time series plot of the quarterly inflation rate.