STAT 3023/3923/4023

Semester 2	Statistical Inference	2021

Computer Lab Week 4

1. (a) Generate 100 iid Unif(0,1) (use `runif`) random variables and store them in `u`. Apply the function $-\log(1-u)$ to each element, and store the results in `x`.

   (b) Plot the histogram of `x` and overlay it with the density curve of exponential(1) (use `dexp(x,rate=1)`) . Why do we have good agreement here? (Hint: $-\log(1-u)$ is the inverse function of the c.d.f. of exponential(1).)

2. Transformation of random variables.

   (a) Generate 100 random variables from a t distribution with 5 degrees of freedom (use `rt(100,df=5)`). Store them in `t`. Make another vector `f` by `f <- t^2`. Overlay the histogram of `f` with the density curve of a $F_{1,5}$ distribution (use `df(x, df1=1, df2=5)`). Comment on the plot.

   (b) Generate 100 random variables from a $F_{5,2}$ disrtibution (use `rf(100, df1=5, df2=2)`). Store them in `y`. Make another vector `w <- 1/y`. Overlay the histogram of `w` with the density curve of a $F_{2,5}$ distribution. Comment on the plot.

   (c) Generate 100 random variables from a beta$(2,1)$ distribution (use `rbeta(100, shape1=2, shape2=1)`). Store them in `z`. Make another vector `v <- 2*z/(4*(1-z))`. Overlay the histogram of `v` with the density curve of a $F_{4,2}$ distribution. Comment on the plot.