Lab 2

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1 Non-Uniform Random Number Generation

Accept-reject method
Generate uniformly distributed random numbers, while rejecting those lying outside of the distribution. Suppose random numbers are to be generated such that f(x) = 2x for x ϵ $[0,6)$

Inverse Transform Method

Find and apply an algebraic expression to uniformly distributed random numbers to convert them to produce random numbers distributed following a desired distribution. You will need the probability distribution function you want the random numbers to follow and a uniform random number u $\epsilon[0,1]$.

Example :

Determine the cdf from the pdf :

$$f(x) = \lambda e^{-\lambda x} \tag{1}$$

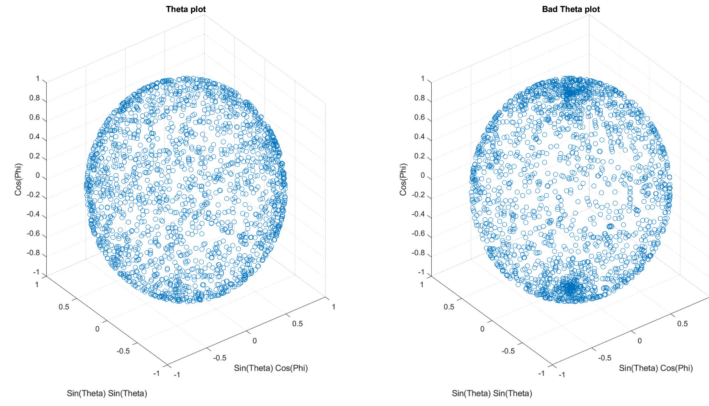# 2 QUESTIONS

1/ Generate points on a sphere of radius 1 using the accept/reject method contrasting distributions uniformly between ϕ ϵ $[0, 2\pi]$ *and* θ ϵ $[0, \pi]$
for the following probability density function :

$f(\theta) = A sin(\theta)$

Contrast the result to when θ *and* ϕ *are* $[0, \pi]$.

Contrasted data should look like this :

2 Use Accept/Reject method according to the following function :
$f(x) = \frac{10x^2}{32} + 17(2)$ for x ϵ $[-6, 10]$
using random numbers uniformly generated on the interval $[0, 1]$.