MAST30027 Modern Applied, Statistics Assignment2

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Tutorial time: Tue 2.15pm

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```
# Load the dataset
(d = 1+2)
```

```
## [1] 3
```

Q1.(a)

```
# Load the dataset
library(MASS)
data(quine)

r = 1.5
k_hat = mean(quine[,'Days'])

#MLE
(p_hat_mle = k_hat/(r+k_hat))
```

```
## [1] 0.916476
```

```
alpha = 0.5+sum(quine[,'Days'])
beta = 0.5+1.5*length(quine[,'Days'])
```

```
simulation<- function(c,d) {
  x = rnorm(1)
  y = runif(1,0,dnorm(x))
  while (x < -(1/c)||y > f(x,c,d)) {
    x = rnorm(1)
    y = runif(1,0,dnorm(x))
  }
  return(x)
}

f <- function(x,c,d){
  return(exp(g(x,c,d)))
}

g <- function(x,c,d){
  return(d*log((1+c*x)^3) - d*(1+c*x)^3+d)
}



mygamma = function(n,alpha,lambda){
```

```
  d = alpha -1/3
  c = 1/sqrt(9*d)

  result = rep(0,n)
  for(i in 1:n) {
    result[i] = ((d * (1 + c*simulation(c,d))^3) / lambda)
  }
  return(result)
}


set.seed(666)
sim = mygamma(1000,1.2,3)
plot(qgamma(1:1000/1001,1.2,3),sort(sim))
abline(0,1,col="red")
```