

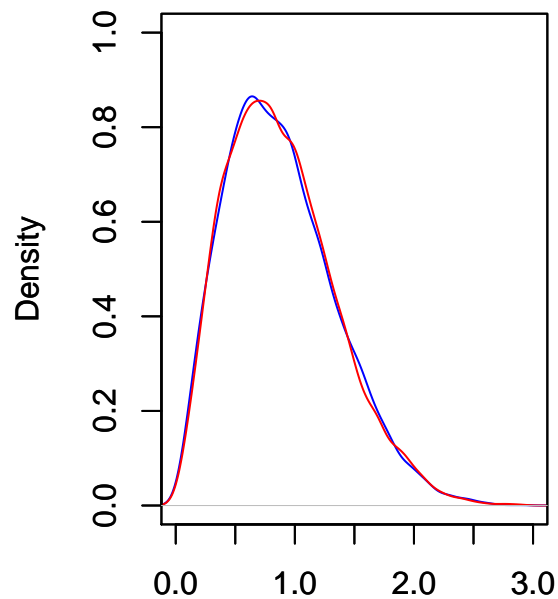
# 1-simulations

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## R Markdown

```
#Inverse Transforms
set.seed(124345)
NSim <- 10^4
U <- runif(NSim)
X <- sqrt(-log(U))
Y <- rweibull(10000, shape = 2, scale = 1)
par(mfrow = c(1,2))
plot(density(X), xlim =c(0,3), ylim = c(0,1), main = "", xlab=NA, col = "blue")
par(new = TRUE)
plot(density(Y), xlim =c(0,3), ylim = c(0,1), main = "", xlab=NA, col = "red")
#par(new = TRUE)
```



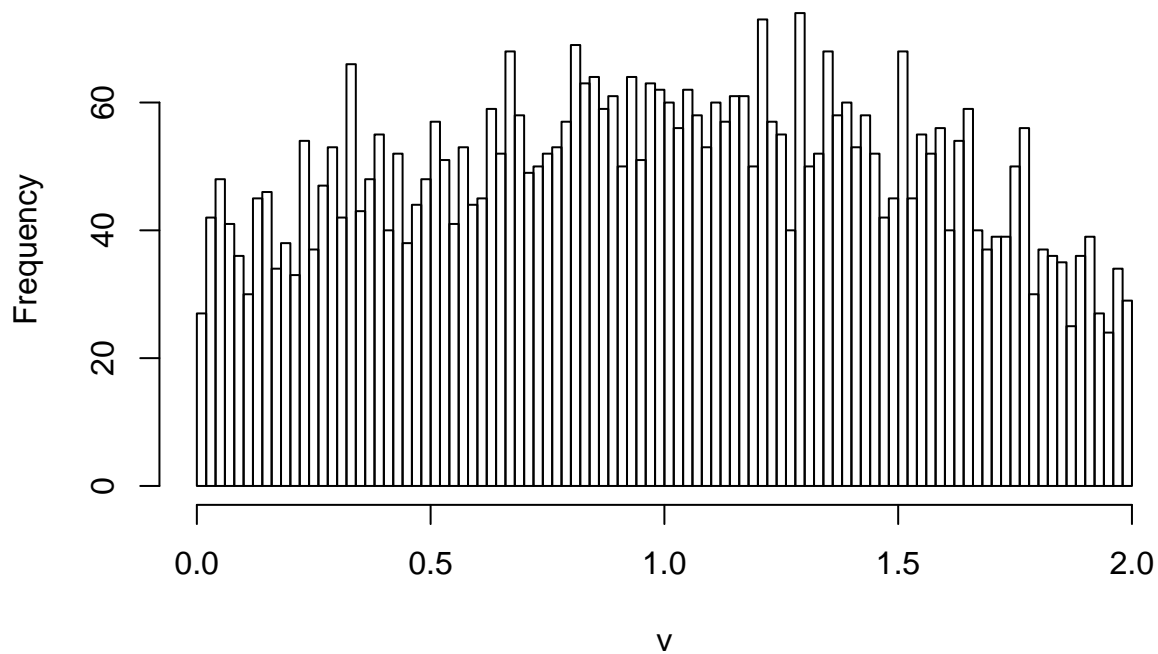
```
#Accept Reject Method
set.seed(123456)
NSim1 <- 10^4
f <- function(y) {
  r <- 3/10 * ((-(y)^2) + 2*y + 1)
}
```

```

    return(r)
  }
  y <- runif(NSim1, max = 2, min = 0)
  x <- runif(NSim1, max = 1, min = 0)
  v <- y[x<f(y)]
  hist(v, breaks = 100)

```

**Histogram of v**



```

#Monte Carlo Simulation for Heteroskedasticity
set.seed(12345)
b0 <- 0.2
b1 <- 0.5
reps <- 500
n <- 1000
sigma.est<-numeric(reps)
par.est <- matrix(NA, nrow = reps, ncol = 2)
X2 <- runif(n,-1,1)
gamma<-5
for(i in 1:reps) {
  Y2<- b0 + b1*X2 + rnorm(n,0, ((exp(X2*gamma))/50) )
  model <- lm(Y2 ~ X2)
  sigma.est[i]=summary(model)$sigma
  par.est[i,1]<-model$coef[1]
  par.est[i,2]<-model$coef[2]
}
mean(sigma.est)

```

```
## [1] 0.6503022
```

```
plot(density(par.est[,1]), lty=2, xlab=NA, main="", xlim = c(0,1), ylim=c(0,20), col="red")  
par(new=TRUE)  
plot(density(par.est[,2]), lty=2, xlab=NA, main="", xlim = c(0,1), ylim=c(0,20), col="blue")
```

