Trabalho - Parte I

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Parametros

```
n = 500

## ParÃfÂ¢metros da distribuiÃfÂ§ao
mu = 13
sigma2 = 8
nu = 0.2

#ParÃfÂ¢metros das distribuiÃfÂ§ÃfÂµes a priori
m = 11
V = 1
a = 3
d = 5
```

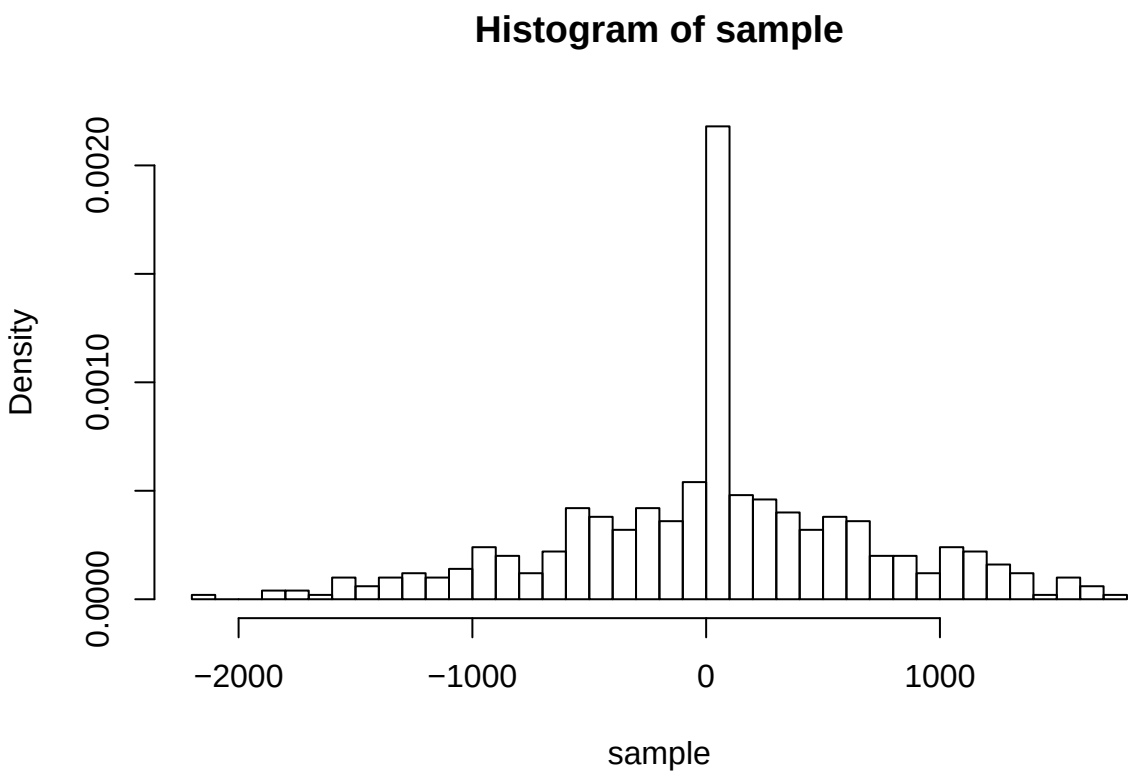
Gerando a amostra

Definindo a pdf para uma indicadora de U_i:

```
IU_pdf <- function(n, nu, a = 0, b = 1) {
  unif = runif(n)
  (unif < nu)*a + (unif >= nu)*b
}
```

Gerando uma amostra de tamanho n:

```
IU = IU_pdf(n, nu)
sample = IU * (mu + sigma2*100*rnorm(n)) + (1 - IU)*(mu + sigma2*rnorm(n))
hist(sample, breaks = 50, prob=T)
```



Definindo *a posteriori*

```
A <- function(X, mu, sigma2, nu) {
  n = length(X)
  sum_arg = 0;
  for (i in 1:n) {
    a = (nu/10)*exp(-(X[i]-mu)^2/(2*100*sigma2))
    b = (1 - nu)*exp(-(X[i]-mu)^2/(2*sigma2))

    if (a > b) {
      sum_arg = sum_arg + log(a) + log(1+(c/a))
    } else {
      sum_arg = sum_arg + log(c) + log(1+(a/c))
    }
  }
  exp(sum_arg)
}

h <- function(aux, n, mu, sigma2, nu, m, V, a, d) {
  aux * (1/sigma2)^((n+1)/2 + a + 1) * exp(-((mu-m)^2/(2*V) + d) / sigma2)
}
```

Quadratura

Definindo as regioes de aproximacao

```
L = 1000

mu_bounds = 10
mu_grid = seq(m-mu_bounds, m+mu_bounds, 2*mu_bounds/L)

sigma2_grid = seq(0.1, sigma2*2, (sigma2*2 - 0.1)/L)

nu_grid = seq(0, 1, 1/L)
```

Estimando o K

```
inv_k = 0
n = length(sample)

# for (i in 1:length(mu_grid)) {
#   for (j in 1:length(sigma2_grid)) {
#     for (k in 1:length(nu_grid)) {
#       aux = A(sample, mu_grid[i], sigma2_grid[j], nu_grid[k])
#       inv_k = inv_k + h(aux, n, mu_grid[i], sigma2_grid[j], nu_grid[k], m, V, a, d)
#     }
#   }
# }

inv_k
```

```
## [1] 0
```

Gerando uma amostra de tamanho n.