Q3

Chayapon Lee-Isranukul

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Valuing American Options by Simulation: A Simple Least-Squares Approach

```
S0 = K = 100
t = 1/12
r = 0.04
q = 0.02
sigma = 0.2

S0
```

```
## [1] 100
```

```
K
```

```
## [1] 100
```

```
m = 10
# m = c(10,20,30,40,50)
n = 10
# n = c(1000,1000*4, 100*4**2, 1000*4**3, 1000*4**4)
delta_t = t/m
S_df = data.frame(matrix(ncol = 0, nrow = n))
S = rep(S0,n)
S_df[[paste0("S",0)]] = S
for (i in 1:m) {

  delta_S =  S * r * delta_t + sigma * S * sqrt(delta_t) * rnorm(n)
  S = S + delta_S
  S_df[[paste0("S",i)]] = S
}
```

```
i = m - 1
```

```
S_df[paste0("S",2)]
```

```
##          S2
## 1   94.09074
```

```
## 2   103.69973
## 3   104.71118
## 4   101.30082
## 5   102.89279
## 6    98.17883
## 7    99.46042
## 8    99.12216
## 9    99.51790
## 10   97.86691
```