Métodos Empíricos en Finanzas

Tarea 1

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2020-02-04

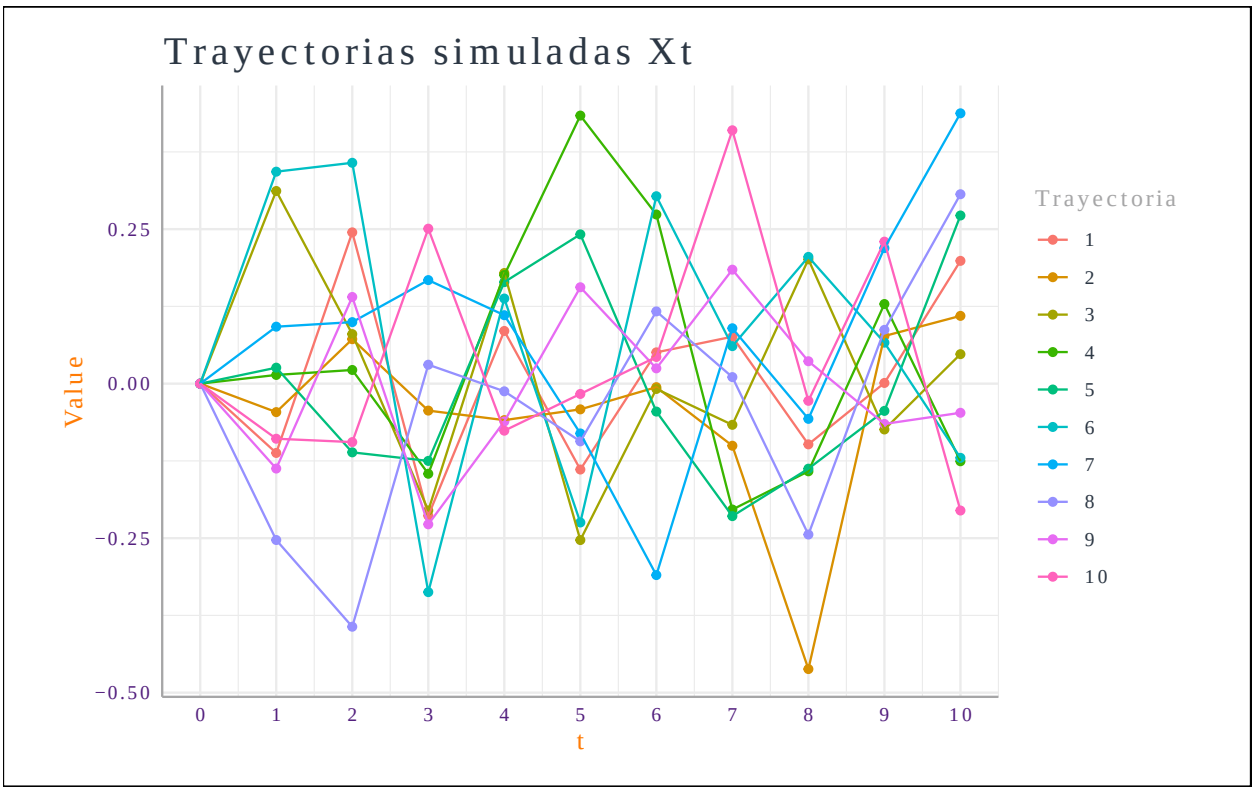
Contents

```
# Librerias
library(dplyr)
library(tidyverse)
```

1 Proceso Xt

d. Simular 10 trayectorias

```
# Simulamos 10 trayectorias de 10 pasos cada una

set.seed(123) #semilla de replica

paths <- data_frame(y0 = seq(from = 0, to = 0, length.out = 10))

for (i in 2:11) {

  paths[,i] <- rnorm(10,0,0.2) # Generamos la secuencia Xt

}

colnames(paths) <- c(0,1,2,3,4,5,6,7,8,9,10)

# Creamos DataFrame largo con una etiqueta para cada trayectoria
paths <- paths %>%
         mutate( Trayectoria = seq(from = 1, to = 10, length.out = 10))


# Gráfica
paths %>% gather("t", "Value", -Trayectoria) %>%
          mutate(t = as.numeric(t),
                 Trayectoria = as.factor(Trayectoria)) %>%
          ggplot(aes(x = t, y = Value, group = Trayectoria, color=Trayectoria )) +
          geom_point() +
          geom_line() +
          theme_pro() +
          scale_x_continuous(breaks =0:10) +
          labs(title = "Trayectorias simuladas Xt")
```


Trayectorias simuladas Xt
Value
0.25
0.00
−0.25
−0.50
0
1
2
3
4
5
6
7
8
9
10
t
Trayectoria
1
2
3
4
5
6
7
8
9
10

2 Proceso Wt

```
zt <- NULL

for (i in 1:(ncol(paths)-1)) {

  if(i == 1){
    zt[i] <- paths[i]

  }else{

    zt[i] <- zt[i-1] + paths[i] # Construir Zt
  }

}

# Construimos Objeto DF
zt_df <- data_frame(z0 = unlist(zt[1]),
                    z1 = unlist(zt[2]),
                    z2 = unlist(zt[3]),
                    z3 = unlist(zt[4]),
                    z4 = unlist(zt[5]),
                    z5 = unlist(zt[6]),
                    z6 = unlist(zt[7]),
                    z7 = unlist(zt[8]),
                    z8 = unlist(zt[9]),
                    z9 = unlist(zt[10]),
                    z10 = unlist(zt[11])

                    )

wt <- NULL

for (i in 2:ncol(zt_df)) {

  wt[i-1] <- zt_df[,i]- zt_df[,i-1] #Construimos WT
}

# Construimos objeto DF
wt_df <- data_frame("0" = unlist(zt_df[1]),
                    "1" = unlist(zt_df[2]),
                    "2" = unlist(zt_df[3]),
                    "3" = unlist(zt_df[4]),
                    "4" = unlist(zt_df[5]),
                    "5" = unlist(zt_df[6]),
                    "6" = unlist(zt_df[7]),
                    "7" = unlist(zt_df[8]),
                    "8" = unlist(zt_df[9]),
                    "9" = unlist(zt_df[10]),
                    Trayectoria = seq(from = 1,
                                      to = 10,
                                      length.out = 10)
                    )
```

```
# Gráfica
wt_df %>% gather("t", "Value", -Trayectoria) %>%
          mutate(t = as.numeric(t),
                 Trayectoria = as.factor(Trayectoria)) %>%
          ggplot(aes(x = t,
                     y = Value,
                     group = Trayectoria,
                     color=Trayectoria )) +
          geom_point() +
          geom_line() +
          theme_pro() +
          scale_x_continuous(breaks =0:10) +
          labs(title = "Trayectorias simuladas Wt")
```