A7-Introducción a series de tiempo. Series estacionarias

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Problema #1

```
t = c(1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)
y = c(17, 21, 19, 23, 18, 16, 20, 18, 22, 20, 15, 22)
```

##Promedio movil

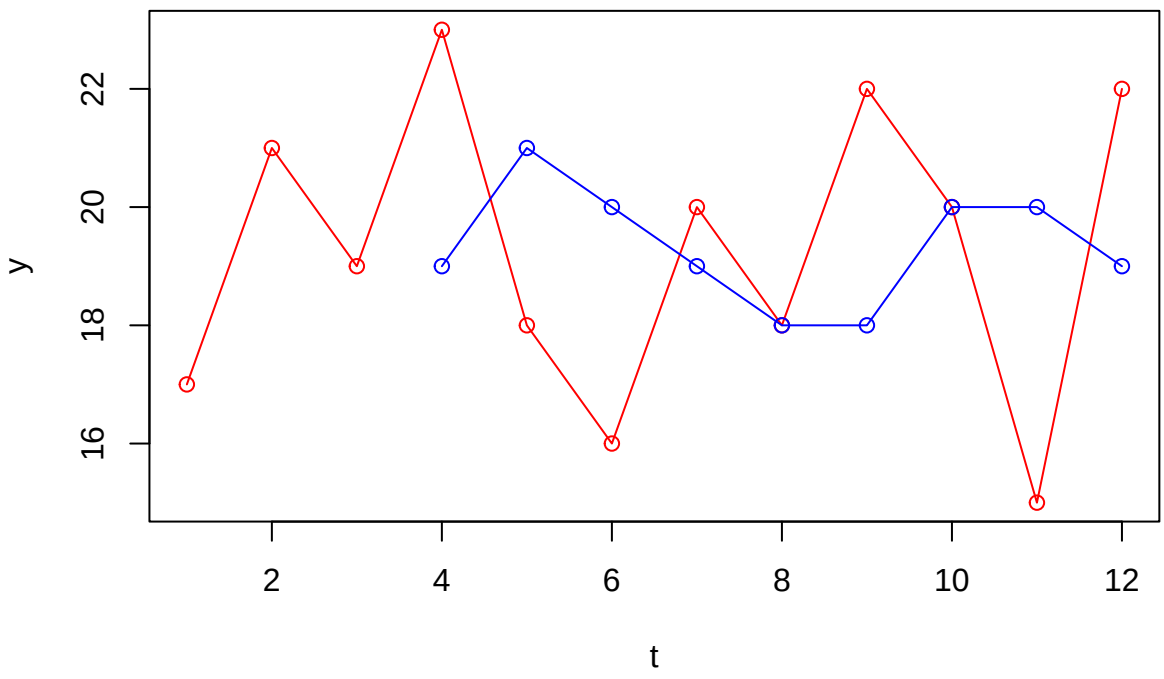
```
t = t
n = length(y)
p = NA
e = NA
for(i in 1:(n-3)){p[i+3]=(y[i]+y[i+1]+y[i+2])/3; e[i+3] = p[i+3] - y[i+3]}

# Utiliza data.frame() para organizar una tabla:
T = data.frame(t,y,p,e^2)
# Calcula el cuadrado medio de los errores sin NA:
CME=mean(e^2,na.rm=TRUE)
T
```

```
##     t  y  p e.2
## 1   1 17 NA  NA
## 2   2 21 NA  NA
## 3   3 19 NA  NA
## 4   4 23 19  16
## 5   5 18 21   9
## 6   6 16 20  16
## 7   7 20 19   1
## 8   8 18 18   0
## 9   9 22 18  16
## 10 10 20 20   0
## 11 11 15 20  25
## 12 12 22 19   9
```

```
CME
```

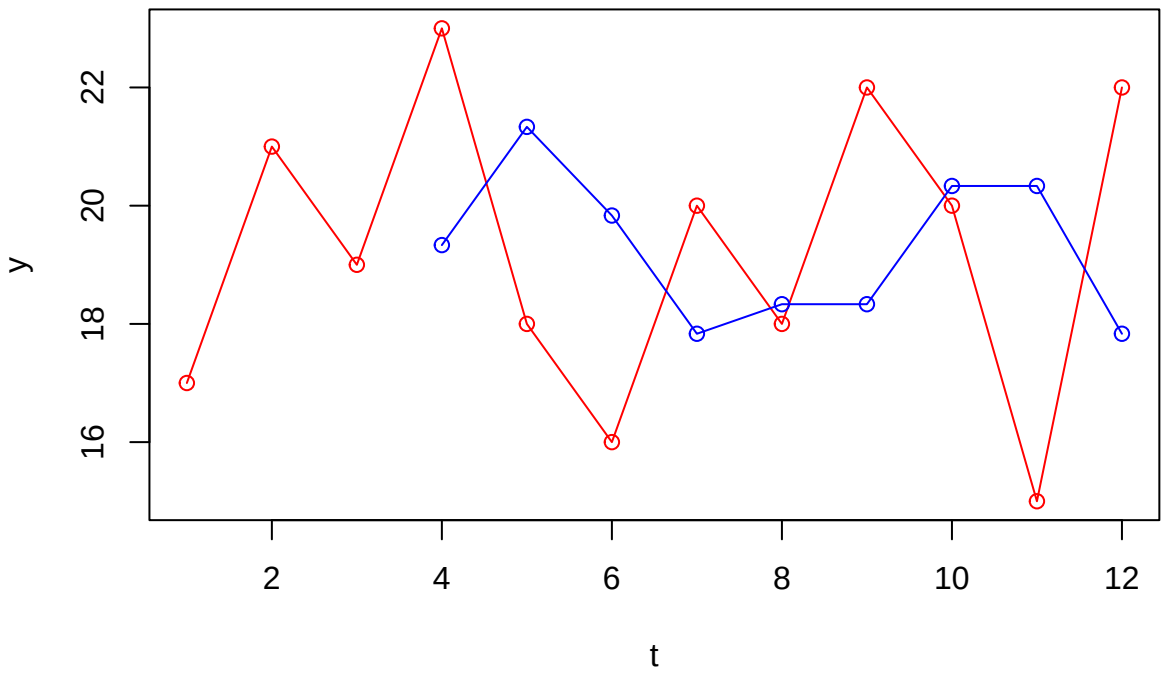
```
## [1] 10.22222
```

```r
# Utiliza plot() para graficar:
plot(t, y, type='o', col='red')
x = (3+1):n
lines(x, p[x],type='o',col='blue')
```



##Promedio moviles ponderados

```r
t2 = t
n2 = length(y)
p2 = NA
e2 = NA
for(i in 1:(n-3)){p2[i+3]=(1/6)*y[i]+(2/6)*y[i+1]+(3/6)*y[i+2];
e2[i+3] = p2[i+3] - y[i+3]}

# Utiliza data.frame() para organizar una tabla:
T2=data.frame(t,y, p2,e2^2)
# Calcula el cuadrado medio de los errores sin NA:
CME2=mean(e2^2,na.rm=TRUE)

# Utiliza plot() para graficar:
plot(t, y, type='o', col='red')
x = (3+1):n
lines(x, p2[x],type='o',col='blue')
```

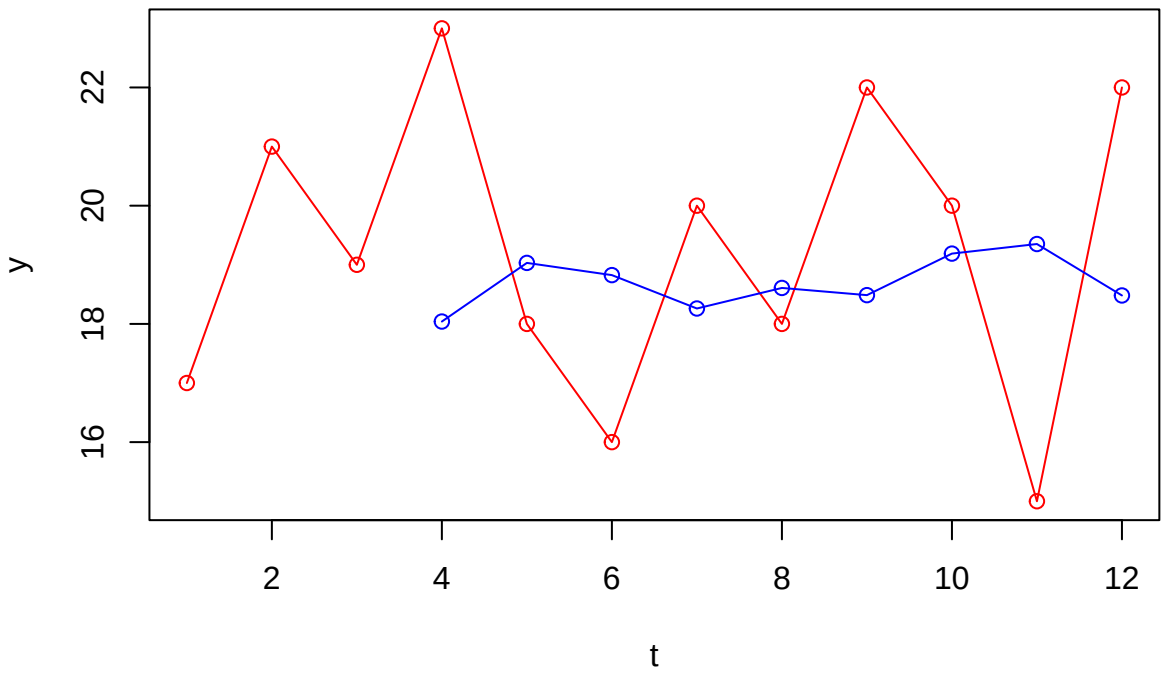



```
CME2
```

```
## [1] 11.49074
```

Metodo de suavizamiento exponencial

```
t3 = t
n3 = length(y)
p3 = NA
e3 = NA
p3[1]=y[1]
p3[2]=y[1]
a=0.20
for(i in 3:n){p3[i]=a*y[i-1]+(1-a)*p3[i-1];
e3[i] = y[i]- p3[i]}
# Utiliza data.frame() para organizar una tabla
# Calcula CME
CME3=mean(e3^2,na.rm=TRUE)
# Calcula el cuadrado medio de los errores sin NA
# Utiliza plot() para graficar (OJO: x=2:n)

plot(t, y, type='o', col='red')
x = (3+1):n
lines(x, p3[x],type='o',col='blue')
```




```
CME3
```

```
## [1] 8.280454
```

En el dia 13 sera 8.28

Problema #2

```
t1a = c(1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17)
y1a = c(81.32, 81.10, 80.38, 81.34, 80.54,
        80.62, 79.54, 79.46, 81.02, 80.98,
        80.80, 81.44, 81.48, 80.75, 80.48,
        80.01, 80.33)
```

##Promedio movil

```
t1a = t1a
n1a = length(y1a)
p1a = NA
e1a = NA
for (i in 1:(n1a - 3)) {
  p1a[i + 3] = (y1a[i] + y1a[i + 1] + y1a[i + 2] + y1a[i + 3]) / 4
```

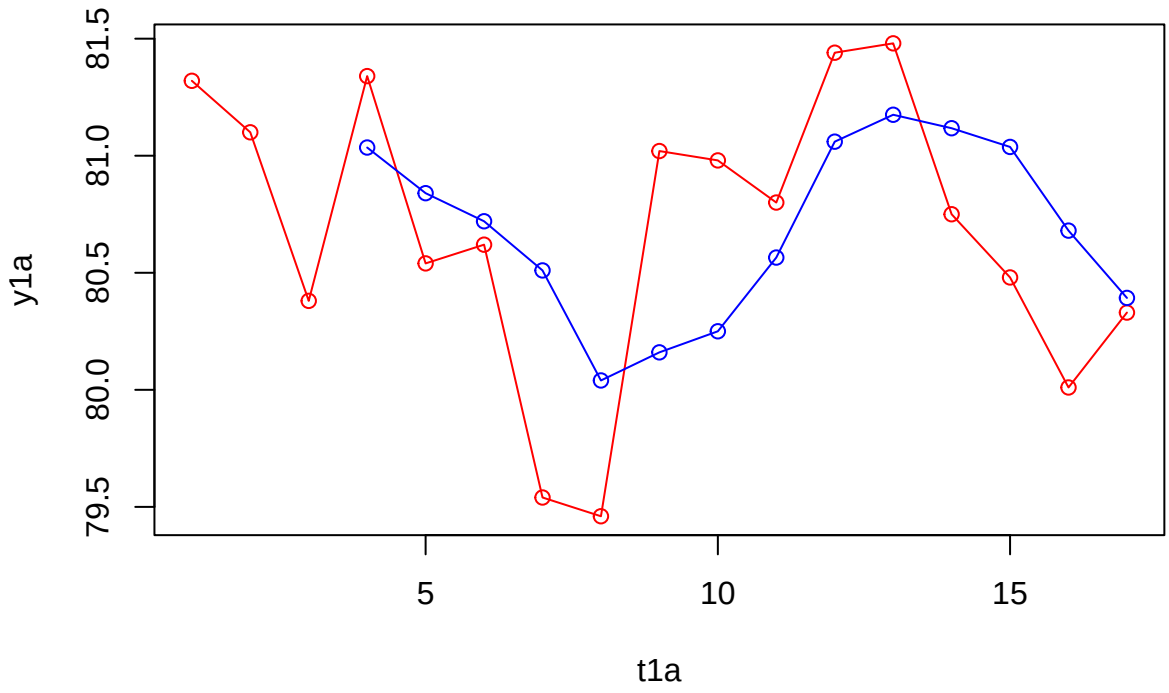
```
  e1a[i + 3] = p1a[i + 3] - y1a[i + 3]
}

# Utiliza data.frame() para organizar una tabla:
T = data.frame(t1a,y1a,p1a,e1a^2)
# Calcula el cuadrado medio de los errores sin NA:
CMEa=mean(e1a^2,na.rm=TRUE)
T
```

```
##    t1a   y1a     p1a      e1a.2
## 1    1 81.32      NA         NA
## 2    2 81.10      NA         NA
## 3    3 80.38      NA         NA
## 4    4 81.34 81.0350 0.09302500
## 5    5 80.54 80.8400 0.09000000
## 6    6 80.62 80.7200 0.01000000
## 7    7 79.54 80.5100 0.94090000
## 8    8 79.46 80.0400 0.33640000
## 9    9 81.02 80.1600 0.73960000
## 10  10 80.98 80.2500 0.53290000
## 11  11 80.80 80.5650 0.05522500
## 12  12 81.44 81.0600 0.14440000
## 13  13 81.48 81.1750 0.09302500
## 14  14 80.75 81.1175 0.13505625
## 15  15 80.48 81.0375 0.31080625
## 16  16 80.01 80.6800 0.44890000
## 17  17 80.33 80.3925 0.00390625
```

```
CMEa
```

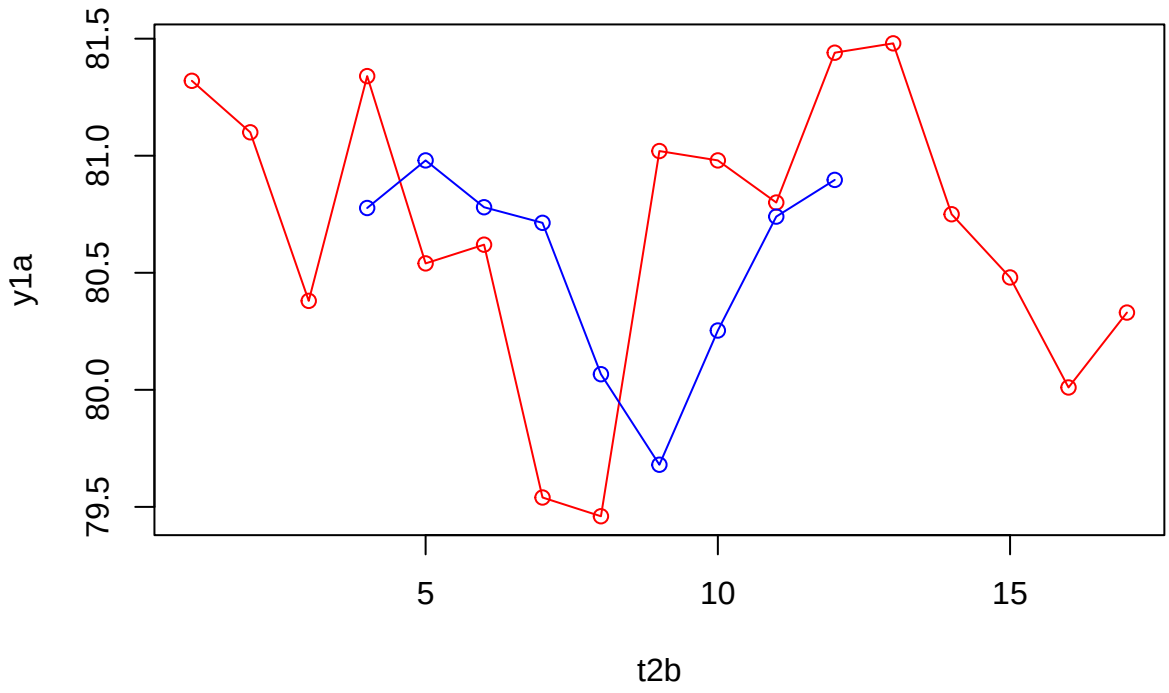
```
## [1] 0.2810103
```

```
# Utiliza plot() para graficar:
plot(t1a, y1a, type='o', col='red')
x1a = (3+1):n1a
lines(x1a, p1a[x1a],type='o',col='blue')
```



##Promedio moviles ponderados

```
t2b = t1a
n2b = length(y1a)
p2b = NA
e2b = NA
for(i in 1:(n2b-3)){p2b[i+3]=(1/6)*y1a[i]+(2/6)*y1a[i+1]+(3/6)*y1a[i+2];
e2b[i+3] = p2b[i+3] - y1a[i+3]}

# Utiliza data.frame() para organizar una tabla:
T2b=data.frame(t2b,y1a, p2b,e2b^2)
# Calcula el cuadrado medio de los errores sin NA:
CME2b=mean(e2b^2,na.rm=TRUE)

# Utiliza plot() para graficar:
plot(t2b, y1a, type='o', col='red')
x2b = (3+1):n
lines(x2b, p2b[x2b],type='o',col='blue')
```

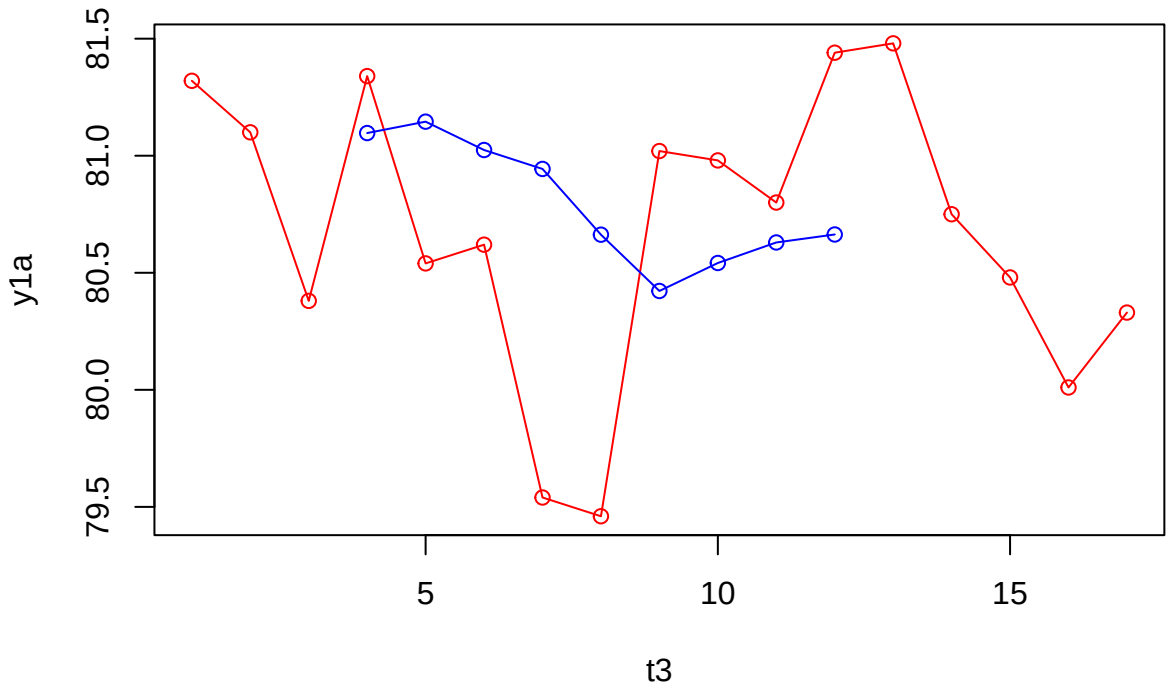



```
CME2b
```

```
## [1] 0.4500796
```

Metodo de suavizamiento exponencial

```
t3 = t1a
n3 = length(y1a)
p3 = NA
e3 = NA
p3[1]=y1a[1]
p3[2]=y1a[1]
a=0.20
for(i in 3:n){p3[i]=a*y1a[i-1]+(1-a)*p3[i-1];
e3[i] = y1a[i]- p3[i]}
# Utiliza data.frame() para organizar una tabla
# Calcula CME
CME3=mean(e3^2,na.rm=TRUE)
# Calcula el cuadrado medio de los errores sin NA
# Utiliza plot() para graficar (OJO: x=2:n)

plot(t3, y1a, type='o', col='red')
x = (3+1):n
lines(x, p3[x],type='o',col='blue')
```




```
CME3
```

```
## [1] 0.5989823
```