act_SeriesTiempoNE

Carlos David Contreras Chacon

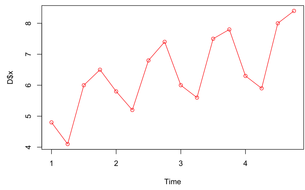
2022-11-17

Analisis

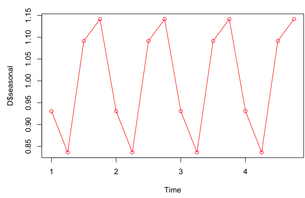
```
año = c(1, 1, 1, 1, 2, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 4)
trimestre  = c(1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4)
ventas = c(4.8, 4.1, 6.0, 6.5, 5.8, 5.2, 6.8, 7.4, 6.0, 5.6, 7.5, 7.8, 6.3, 5.9, 8.0, 8.4)
```

```
T = ts(ventas, frequency = 4, start(c(2016, 1)))
D = decompose(T, type = "M")
```

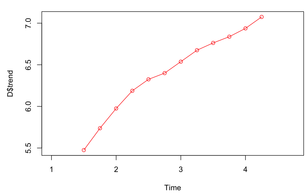
```
plot(D$x, type="o", col="red")
```



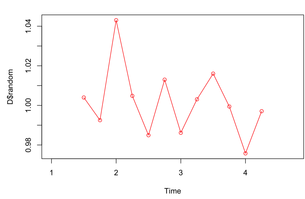

```
plot(D$seasonal, type="o", col="red")
```




```
plot(D$trend, type="o", col="red")
```




```
plot(D$random, type="o", col="red")
```

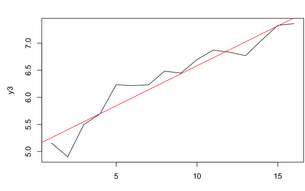


Modelo lineal

```
ventas_desestacionalizadas = (D$x)/(D$seasonal)
x3 = 1:16
y3 = ventas_desestacionalizadas
N3 = lm(y3~x3)
N3
```

```
##
## Call:
## lm(formula = y3 ~ x3)
##
## Coefficients:
## (Intercept)          x3
##      5.1080       0.1474
```

```
plot(x3, y3, type = "l")
abline(N3, col = "red")
```




```
f = function(x) {5.1080 + 0.1474*x}
```

Error CME y EPAM

```
e = NA

for(i in 1:12){
  e[i] = ventas[i] - f(i)
}

e2 = mean(e^2)
e2
```

```
## [1] 0.6378564
```

Predicciones para el año 5

```
f(17)*D$seasonal[1]*1000
```

```
## [1] 7085.872
```

```
f(18)*D$seasonal[2]*1000
```

```
## [1] 6491.284
```

```
f(19)*D$seasonal[3]*1000
```

```
## [1] 8632.585
```

```
f(20)*D$seasonal[4]*1000
```

```
## [1] 9195.263
```

Un problemilla mas

```
año = c(1, 1, 1, 1, 2, 2, 2, 2, 3, 3, 3, 3)
trimestre  = c(1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4)
ventas = c(1960, 940, 2625, 2500, 1800, 900, 2900, 2360, 1850, 1100, 2930, 2615)
```

```
MovingAverage = NA
MovingCenteredAverage = NA
y = ventas

for(i in 1:(length(y)-4)){
  MovingAverage[i+4] = (y[i]+y[i+1]+y[i+2]+y[i+3])/4;
}

for(i in 1:(length(MovingAverage)-1)){
  MovingCenteredAverage[i+1] = (MovingAverage[i] + MovingAverage[i+1])/2;
}

T=data.frame(año, trimestre, ventas,MovingAverage,MovingCenteredAverage, ventas/MovingCenteredAverage)
T
```

```
##    año trimestre ventas MovingAverage MovingCenteredAverage
## 1    1         1   1960            NA                    NA
## 2    1         2    940            NA                    NA
## 3    1         3   2625            NA                    NA
## 4    1         4   2500            NA                    NA
## 5    2         1   1800        2006.25                    NA
## 6    2         2    900        1966.25              1986.250
## 7    2         3   2900        1956.25              1961.250
## 8    2         4   2360        2025.00              1990.625
## 9    3         1   1850        1996.00              2007.500
## 10   3         2   1100        2002.50              1996.250
## 11   3         3   2930        2052.50              2027.500
## 12   3         4   2615        2060.00              2056.250
##    ventas.MovingCenteredAverage
## 1                            NA
## 2                            NA
## 3                            NA
## 4                            NA
## 5                            NA
## 6                     0.4531152
## 7                     1.4786488
## 8                     1.1855573
## 9                     0.9215442
## 10                    0.5510332
## 11                    1.4451295
## 12                    1.2717325
```

```
T$ventas.MovingCenteredAverage[6:length(ventas)]
```

```
## [1] 0.4531152 1.4786488 1.1855573 0.9215442 0.5510332 1.4451295 1.2717325
```

```
IndicesEstacionales = aggregate(T$ventas.MovingCenteredAverage[6:length(ventas)], list(T$trimestre[6:length(venta
s)]), FUN=mean)
IndicesEstacionales
```

```
##   Group.1         x
## 1       1 0.9215442
## 2       2 0.5020742
## 3       3 1.4618891
## 4       4 1.2286449
```

Por lo que se puede observar, el índice estacional nos arroja un pico en el tercer y cuarto trimestre, asi como una caida en los primeros dos trimestres del año, esto se puede deber a un comportamiento estacional muy marcado con periodos fuertes par aun negocio y otros mas debiles pero dependiendo del problema pueden caber dentro de la normalidad.