TimeSeries

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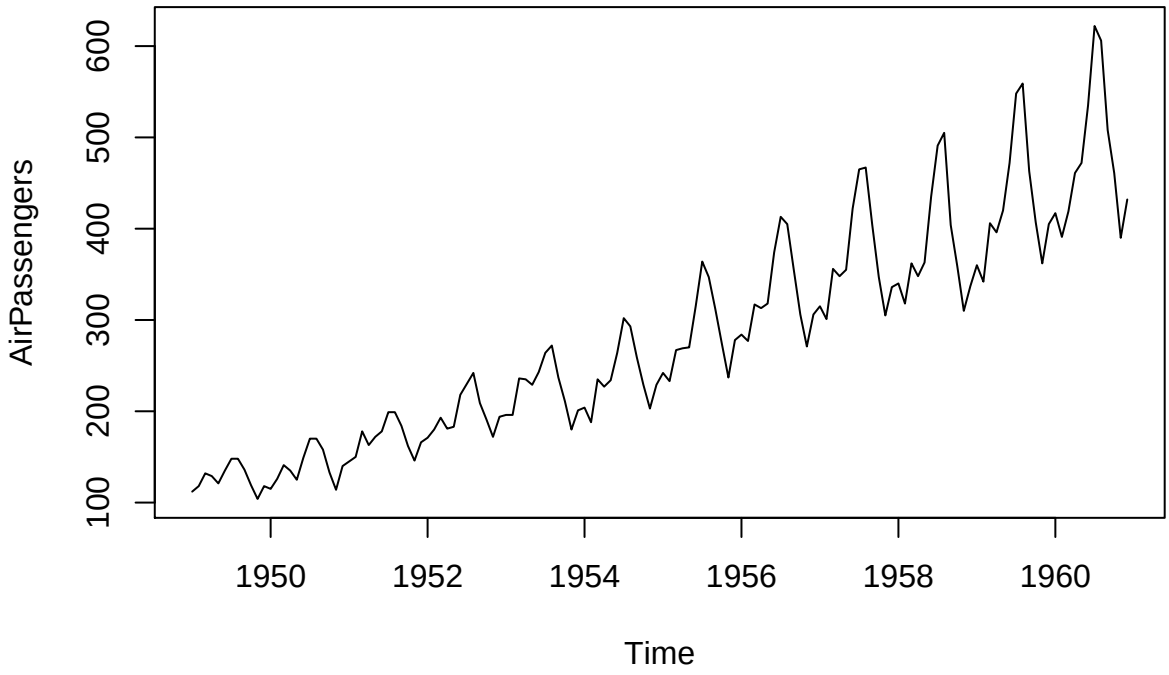
Pruebas series de tiempo de Time Series Analysis and its applications

```
# Plot AirPassengers
plot(AirPassengers)
```




```
# View the start and end dates of AirPassengers
start(AirPassengers)
```

```
## [1] 1949    1
```

```
end(AirPassengers)
```

```
## [1] 1960   12
```

```
# Use time(), deltat(), frequency(), and cycle() with AirPassengers
time(AirPassengers)
```

```
##           Jan      Feb      Mar      Apr      May      Jun      Jul
## 1949 1949.000 1949.083 1949.167 1949.250 1949.333 1949.417 1949.500
## 1950 1950.000 1950.083 1950.167 1950.250 1950.333 1950.417 1950.500
## 1951 1951.000 1951.083 1951.167 1951.250 1951.333 1951.417 1951.500
## 1952 1952.000 1952.083 1952.167 1952.250 1952.333 1952.417 1952.500
## 1953 1953.000 1953.083 1953.167 1953.250 1953.333 1953.417 1953.500
## 1954 1954.000 1954.083 1954.167 1954.250 1954.333 1954.417 1954.500
## 1955 1955.000 1955.083 1955.167 1955.250 1955.333 1955.417 1955.500
## 1956 1956.000 1956.083 1956.167 1956.250 1956.333 1956.417 1956.500
## 1957 1957.000 1957.083 1957.167 1957.250 1957.333 1957.417 1957.500
```

```
## 1958 1958.000 1958.083 1958.167 1958.250 1958.333 1958.417 1958.500
## 1959 1959.000 1959.083 1959.167 1959.250 1959.333 1959.417 1959.500
## 1960 1960.000 1960.083 1960.167 1960.250 1960.333 1960.417 1960.500
##           Aug       Sep       Oct       Nov       Dec
## 1949 1949.583 1949.667 1949.750 1949.833 1949.917
## 1950 1950.583 1950.667 1950.750 1950.833 1950.917
## 1951 1951.583 1951.667 1951.750 1951.833 1951.917
## 1952 1952.583 1952.667 1952.750 1952.833 1952.917
## 1953 1953.583 1953.667 1953.750 1953.833 1953.917
## 1954 1954.583 1954.667 1954.750 1954.833 1954.917
## 1955 1955.583 1955.667 1955.750 1955.833 1955.917
## 1956 1956.583 1956.667 1956.750 1956.833 1956.917
## 1957 1957.583 1957.667 1957.750 1957.833 1957.917
## 1958 1958.583 1958.667 1958.750 1958.833 1958.917
## 1959 1959.583 1959.667 1959.750 1959.833 1959.917
## 1960 1960.583 1960.667 1960.750 1960.833 1960.917
```

```
deltat(AirPassengers)
```

```
## [1] 0.08333333
```

```
frequency(AirPassengers)
```

```
## [1] 12
```

```
cycle(AirPassengers)
```

```
##      Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
## 1949   1   2   3   4   5   6   7   8   9  10  11  12
## 1950   1   2   3   4   5   6   7   8   9  10  11  12
## 1951   1   2   3   4   5   6   7   8   9  10  11  12
## 1952   1   2   3   4   5   6   7   8   9  10  11  12
## 1953   1   2   3   4   5   6   7   8   9  10  11  12
## 1954   1   2   3   4   5   6   7   8   9  10  11  12
## 1955   1   2   3   4   5   6   7   8   9  10  11  12
## 1956   1   2   3   4   5   6   7   8   9  10  11  12
## 1957   1   2   3   4   5   6   7   8   9  10  11  12
## 1958   1   2   3   4   5   6   7   8   9  10  11  12
## 1959   1   2   3   4   5   6   7   8   9  10  11  12
## 1960   1   2   3   4   5   6   7   8   9  10  11  12
```

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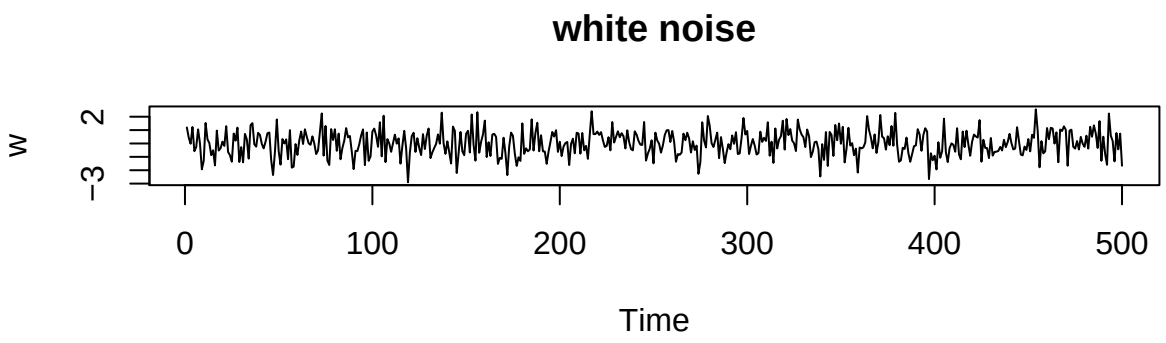
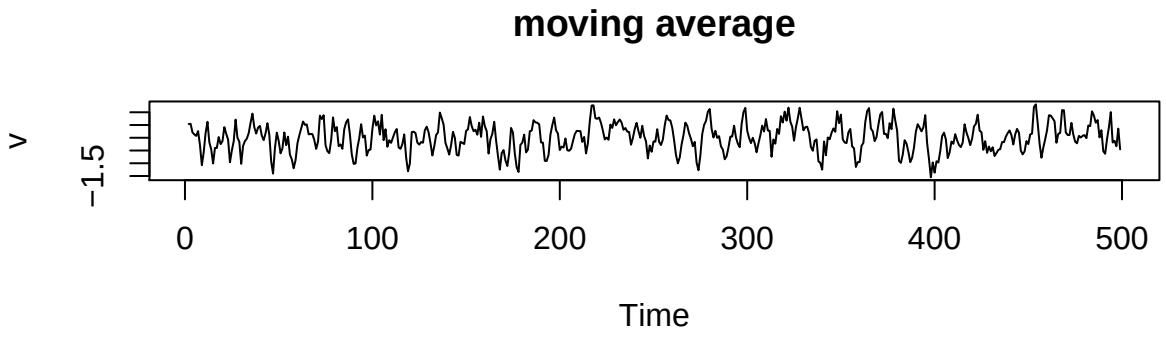
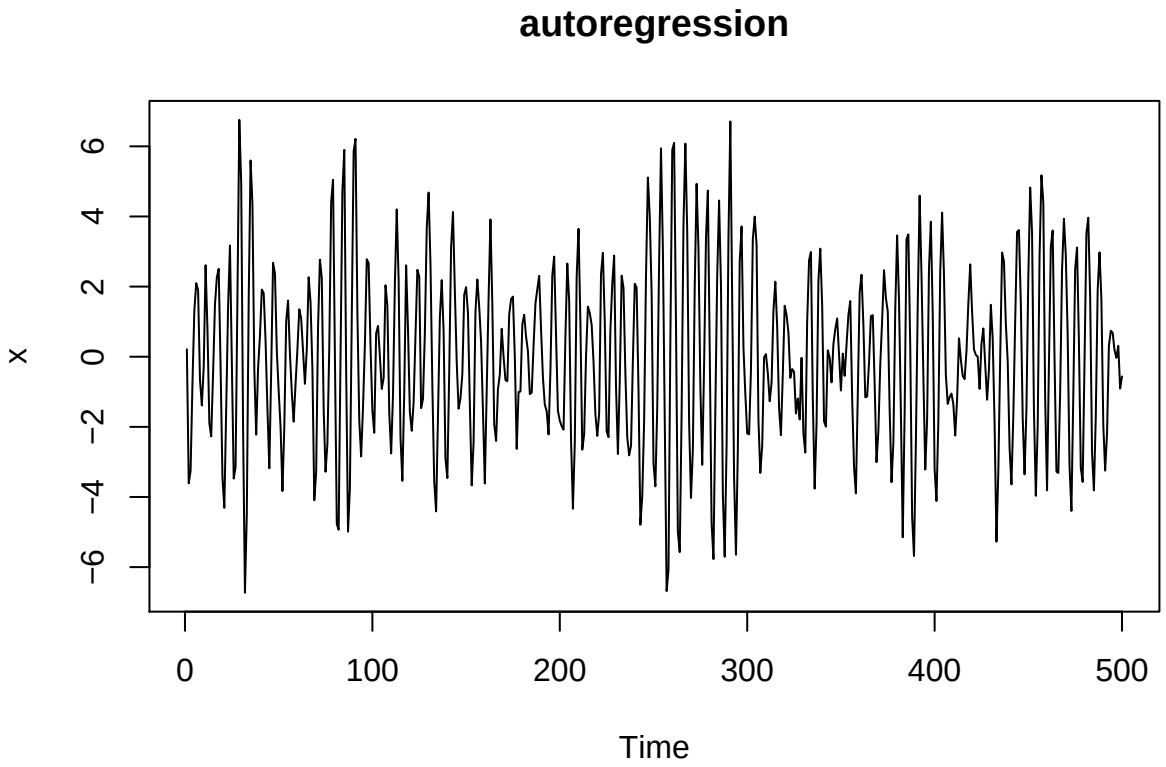
```
w = rnorm (500,0,1)
v = filter(w, sides = 2, rep(1/3,3))
par(mfrow=c(2,1))
plot.ts(w,main = "white noise")
plot.ts(v, main = "moving average")
```





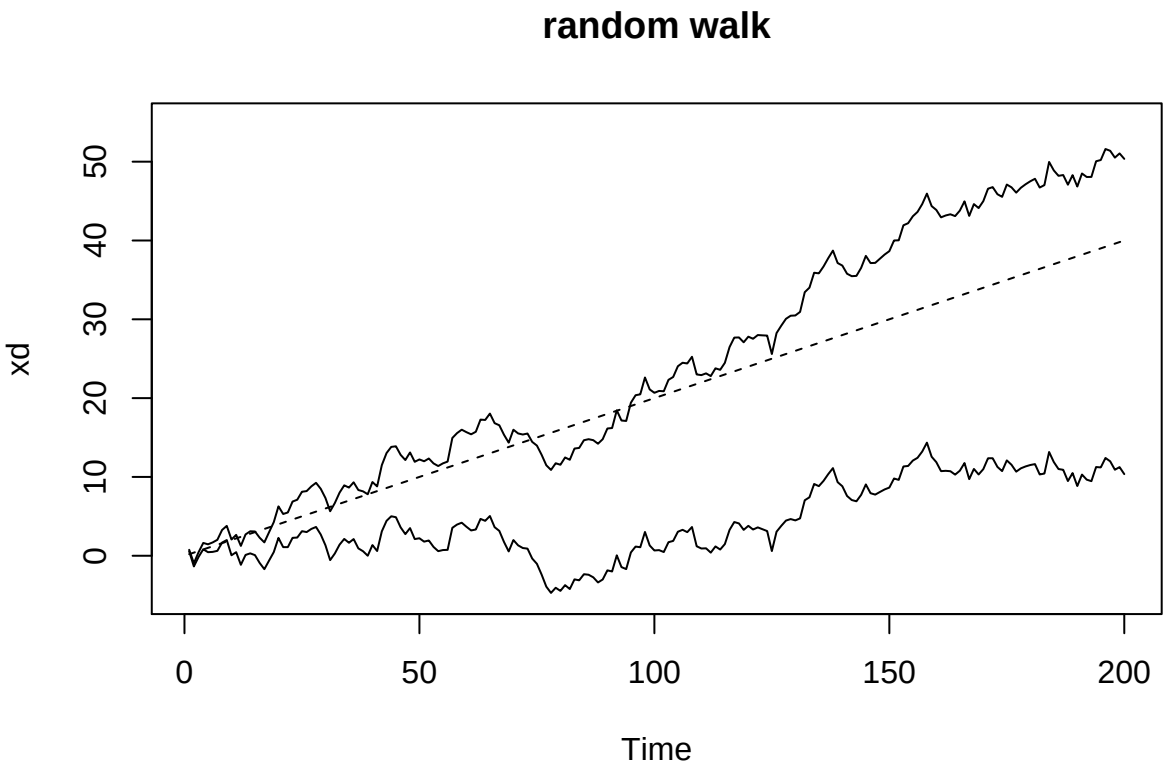
Autoregesivo

```
w = rnorm(550,0,1)
x = filter (w, filter = c(1,-0.9), method = "recursive")[-(1:50)]
plot.ts(x, main = "autoregression")
```



Autoregesivo con drift

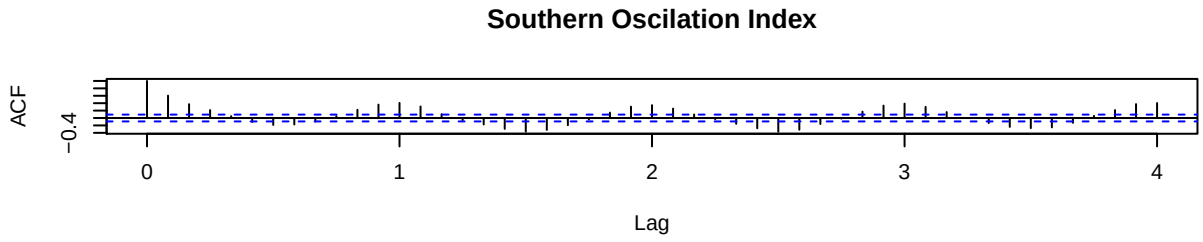
```
set.seed(154)
w = rnorm(200,0,1); x = cumsum (w)
wd = w + .2; xd = cumsum(wd)
plot.ts(xd, ylim = c(-5,55), main = "random walk")
lines(x); lines(0.2*(1:200), lty = "dashed")
```

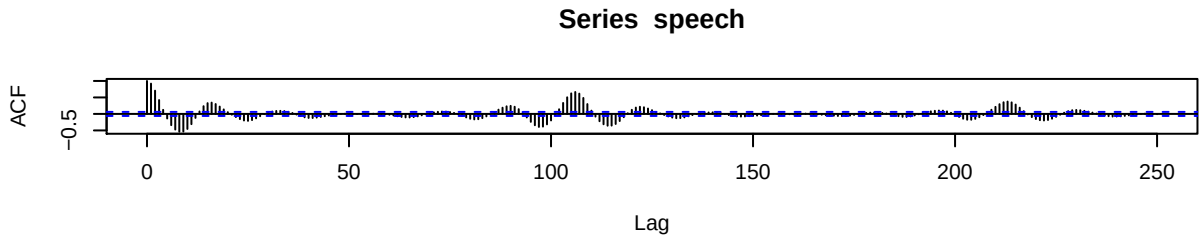


ACF

```
par(mfrow = c(3,1))
acf(soi, 48, main = "Southern Oscilation Index")
acf(speech, 250)

par(mfrow=c(3,1))
```






```
acf(soi, 48, main="Southern Oscillation Index")
acf(rec, 48, main="Recruitment")
ccf(soi, rec, 48, main="SOI vs Recruitment", ylab="CCF")
```