An R code for simulating an AR(2) process.

```
X.20140917 <- rnorm(1000)
E.20140917 <- rnorm(1000)
Y.20140917 <- rep(0,1000)
Y.20140917[1] <- X.20140917[1]
Y.20140917[2] <- X.20140917[2]
for( i in c(3:1000)) {
  Y.20140917[i] <- 0.7*Y.20140917[i-1]+0.3*Y.20140917[i-2]+E.20140917[i]
}
data.sim <- data.frame(X=X.20140917, E=E.20140917, Y=Y.20140917)
rm(X.20140917, E.20140917, Y.20140917)
```

Autoregressive model fitted by `ar` function in R.

```
> ar(data.sim$Y)

Call:
ar(x = data.sim$Y)

Coefficients:
     1       2
0.7183  0.2776

Order selected 2  sigma^2 estimated as  1.225
```

The model formula for the simulation above.

$$Y_t = 0.7Y_{t-1} + 0.3Y_{t-2} + \epsilon_t$$