1. **POLINOMI TRIGONOMETRICI ALEATORI**

 Modificare il valore di N

N=30

nt=200; T=seq(0,pi,(2\*pi)/nt)

Z = rnorm(N)

Sin = matrix(nrow=nt, ncol=N)

for (i in 1:nt){

Sin[i,]=sin((1:N)\*i\*(2\*pi)/nt)

}

X = Sin%\*%Z

ts.plot(X)

N.ripet=10000

X.2 = 1:N.ripet

N=10; sin=1:N

for (i in 1:N.ripet){

Z = rnorm(N)

sin = sin((1:N)\*2)

X.2[i] = sin%\*%Z

}

par(mfrow=c(1,2))

hist(X.2,30)

qqnorm(X.2)

1. **MOTO BROWNIANO**

 Notare sqrt(h). Provare N=100, 1000, 10000.

N=10000

h=0.01

DB = rnorm(N,0,sqrt(h))

B=cumsum(DB)

ts.plot(B)

par(mfrow=c(1,1))

N=100000

h=0.01

DB = rnorm(N,0,sqrt(h))

B=cumsum(DB)

ts.plot(B)

 White noise

N=10000

h=0.01

DB = rnorm(N,0,sqrt(h))

ts.plot(DB/h)

 Nel piano:

N=100000

h=0.01

DB1 = rnorm(N,0,sqrt(h)); DB2 = rnorm(N,0,sqrt(h))

B1=cumsum(DB1); B2=cumsum(DB2)

par(mfrow=c(1,1)); plot(B1,B2,type= "l")

1. **EQUAZIONE DIFFERENZIALE LINEARE**

N=2000; dt=0.01; sig=0

X=1:N

X[1]=3

for (i in 1:(N-1)) {

X[i+1]=X[i]+dt\*(-X[i])+sig\*sqrt(dt)\*rnorm(1)

}

ts.plot(X)

sig=0.1

for (i in 1:(N-1)) {

X[i+1]=X[i]+dt\*(-X[i])+sig\*sqrt(dt)\*rnorm(1)

}

lines(X,col="red")

for (i in 1:(N-1)) {

X[i+1]=X[i]+dt\*(-X[i])+sig\*sqrt(dt)\*rnorm(1)

}

lines(X,col="blue")