

R-Notes for Reliability of Ship Structures

Commenting

is the comment operator

Data Operations

Load script source `('./simR.r')` | **Import table data** `data=read.table("./ga01.txt")`

Column Names `colnames(data)` | **First column of the data** `data[1]`

First un-named column as vector `data$V1`

Elementwise operation `datacolumn<-(data[1]-data[3])/data[1]`

Elements which satisfies certain criteria `a<5`

Generate number sequence `seq(-3.14,3.14,0.1)`

Distributions

Distribution fitting library `library(MASS)` | **Fit distribution** `distr01<-fitdistr(vec,"lognormal")`

Distribution types normal, lognormal, beta, geometric, Poisson, exponential, hypergeometric, weibull

Density, Cumulative Probability, Quantile, Random (d, p, q, r)

Types beta, binom, cauchy, exp, chisq (chi-squared), f, gamma, geom, hyper (hypergeometric), lnorm (lognormal), logis, nbinom, norm (normal), pois (Poisson), t, unif (Uniform), weibull (Weibull), wilcox

Usage `dnorm(-1,mean=0,sd=1)`, `pnorm(-1,mean=0,sd=1)`, `qnorm(0.5,mean=0,sd=1)`

Random

Random number generation `rnorm(1000,mean=0,sd=1)`

Sampling with replacement `sample(1:15,replace=T,100)`

Plot

Plot density of vector `plot(density(vec))` | **Histogram** `hist(vec)`

Add density plot `curve(dnorm(x, mean=0.01938, sd=0.0169554), add=TRUE)`

Regression

`d1=read.delim("./data.dat", header=F)` #similar to read.table

Skip variable name use for columns `attach(d1)`

BoxCox functions `library(car)`

Optimum output transformation `boxcox(V3~I(V1^2)+I(V2^2),d1)`

Fit linear regression model `mdl=lm(V3~I(V1^2)+I(V2^2),d1)`

Print regression model `summary(mdl)`

Latin HyperCube library `library(lhs)`

Optimum LHS design `optimumLHS(4, 3, 5, .05)` #no of samples, no of variables, no of iterations, precision

Examples

Central limit theorem verification example

```
a=rnorm(10000) | dim(a)<-c(10,1000) | a=colMeans(a) | hist(a)
```

Check binomial distribution by Monte Carlo

```
for(i in 1:100) { a[i]=sum(runif(6)>0.3) } | hist(a) | curve(dbinom(x,6,0.7))
```