Package 'VizCompX'

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Type Package

Title Visualisation of Computer Models

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Depends R (>= 2.10.1), lattice, emulator, mlegp

Description Nimrod generates a Latin Hypercube Design using the emulator package. Based on this design, any function can be evaluated on the design points. A generalisation of the Nimrod/O test case is included. A Gaussian model can be fit to the data using the mlegp package. The resulting surface can be viewed using a wireframe plot with choice of viewing and conditioning variables and levels.

License GPL-2

LazyLoad yes

Repository CRAN

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R topics documented:

VizCompX-package *Visualisation of Computer Experiments*

Description

Generates Latin Hypercube Designs, fits Gaussian models to computer model output, and gives a Wireframe visualisation of the fitted surface

Details

Package:	VizCompX
Type:	Package
Version:	0.1
Date:	2010-03-02
License:	GPL-2
LazyLoad:	yes

Use Latin.Hypercube to generate the design, NimrodOfunction to generate the responses for the Nimrod/O test function, mlegp to fit the Gaussian model, and wireframe to get a visualisation of the fitted surface.

Author(s)

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References

http://messagelab.monash.edu.au/

Examples

```
design <- LatinHypercube(50,3,maxs=rep(25,3))
response <- NimrodOexample(design)
mlegpfit <- mlegp(design,response)
wireframe(mlegpfit,c(5,5,4),c(1,2))
```

LatinHypercube *Generates a Latin Hypercube Design*

Description

Generates a Latin Hypercube Design for an arbitrary number of runs and arbitrary number of variables

Usage

```
LatinHypercube(N, d, mins = rep(0, d), maxs = rep(1, d),
varnames = paste("x", seq(1, d), sep = ""))
```

Arguments

N	The number of runs in the computer experiment.
d	The number of variables in the computer experiment.
mins	The minimum levels of the variables. By default the minimums are 0.
maxs	The maximum levels of the variables. By default the maximums are 1.
varnames	The names of the variables. If not given x1, x2, ..., xd are used.

Value

comp1	The Latin Hypercube Design
comp2	The vector of minimums
comp3	The vector of maximums

Note

Just a wrapper for the latin.hypercube function in the emulator package

Author(s)

Neil Diamond

References

http://messagelab.monash.edu.au/

R. K. S. Hankin 2005. Introducing BACCO, an R bundle for Bayesian Analysis of Computer Code Output. Journal of Statistical Software, 14(16)

Examples

```
LatinHypercube(50,3,maxs=rep(25,3))
```

mlegp *Fits Gaussian Model to Computer Experiment*

Description

A wrapper for the fitting function in the mlegp package

Usage

```
mlegp(xlist, yval)
```

Arguments

xlist	A list consisting of the computer experiment design matrix and vectors of minimums and maximums
yval	The computer experiment response vector

Value

comp1	The output of the mlegp function.
comp2	A list giving the computer experiment design matrix and vectors of minimums and maximums

Author(s)

Neil Diamond

References

http://messagelab.monash.edu.au/

Garrett M. Dancik (2009). mlegp: Maximum Likelihood Estimates of Gaussian Processes. R package version 3.1.0. http://CRAN.R-project.org/package=mlegp

Examples

```
design <- LatinHypercube(50,3,maxs=rep(25,3))
response <- NimrodOexample(design)
mlegpfit <- mlegp(design,response)
```

`NimrodOexample` *Generates Nimrod/O test function*

Description

In two dimensions, gives the Nimrod/O test function. In higher dimensions gives a generalisation.

Usage

```
NimrodOexample(xlist)
```

Arguments

`xlist`	A list giving the computer experiment design matrix and vectors of minimums and maximums

Value

A vector of response values corresponding to each row of the design matrix

Note

In two dimensions the function is given by:

f(x1,x2)=cos(pi*x1/6)-sin(pi*x2/12)+pi*x1/12+pi*x2/24

In n dimensions the function is given by:

f(x1,x2,...,xn)=cos(pi*X2/(6*(n-1)))-sin(pi*X1/(12*(n-1)))+pi*X2/(12*(n-1))+pi*X1/(24*(n-1))

where X1=(x2+x3+...+xn) and X2=(x1+x3+...+xn)

Author(s)

Neil Diamond

References

http://messagelab.monash.edu.au/

Examples

```
design <- LatinHypercube(50,3,maxs=rep(25,3))
response <- NimrodOexample(design)
```

`wireframe` *Visualisation of fitted computer model surface*

Description

Takes a mlegp fit of the results of a computer model and generates a visualisation of the fitted surface. The user can specify how many levels to use for each of the variables and which are the primary variables and which are the conditioning variables.

Usage

```
wireframe(mlegpfit, numpredictvals, xandy)
```

Arguments

`mlegpfit`	Fitted mlegp model
`numpredictvals`	Grid of values for which predictions are made
`xandy`	Primary visualisation variables e.g. c(1,3) for the first and third variables

Value

Produces wireframe of the predicted response versus the two primary variables

Author(s)

Neil Diamond

References

http://messagelab.monash.edu.au/

Examples

```
design <- LatinHypercube(50,3,maxs=rep(25,3))
response <- NimrodOexample(design)
mlegpfit <- mlegp(design,response)
wireframe(mlegpfit,c(5,5,4),c(1,2))
```

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