Package 'gamlss.demo'

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Description Demos for smoothing and gamlss.family distributions.

Title Demos for GAMLSS

LazyLoad yes

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Depends R (>= 2.4.0), rpanel (>= 1.1-1), gamlss.dist, gamlss.tr, tcltk, graphics, stats, grDevices

Suggests MASS

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demo.BSplines *Demos for smoothing techniques*

Description

These are demos for teaching smoothing techniques to students

Usage

```
demo.BSplines()
demo.RandomWalk(y = NULL, ...)
demo.histSmo(y = NULL, ...)
demo.interpolateSmo(y = NULL, w = NULL, ...)
demo.PSplines(y = NULL, x = NULL, ...)
```

Arguments

y	for y variable if needed otherwise it is generated
w	for weights if needed
x	for explanatory variable if needed
...	for adding parameters in the plot

Value

An rpanel plot

Author(s)

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References

Bowman, Bowman, Gibson and Crawford (2008) rpanel, CRAN

Eilers, P. H. C. and Marx, B. D. (1996). Flexible smoothing with B-splines and penalties (with comments and rejoinder). *Statist. Sci*, **11**, 89-121.

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape, (with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/).

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

Examples

```
demo.PSplines()
```

`demo.LocalRegression` *Local Regression Smoothing*

Description

This function demonstrate some characteristics of local regression Smoothing

Usage

```
demo.LocalRegression(y = NULL, x = NULL, span = 0.5,
                position = trunc((n - 1)/2),
                deg = 1)
LPOL(y, x, span = 0.5, position = trunc((n - 1)/2),
                w = rep(1, length(y)), deg = 1)
WLPOL(y, x, sd = 0.5, position = trunc((n - 1)/2),
                w = rep(1, length(y)), deg = 1)
```

Arguments

`y`	The response variable
`x`	the explanatory variable
`span`	The smoothing parameters
`sd`	The standard deviation of a normal kernel used as smoothing parameter
`position`	The position of the target values in the x axis
`w`	weights
`deg`	The degree of the local polynomial

Details

The function `demo.LocalRegression` demonstrates some aspects of the Local (unweighed) polynomial regression. The functions `LPOL()` and `WLPOL()` produce plots related to unweighed and weighted local polynomial regression respectively.

Value

All function produce plots.

Author(s)

Mikis Stasinopoulos

References

R Development Core Team (2010) tcltk package, CRAN.

Bowman, Bowman, Gibson and Crawford (2008) rpanel, CRAN

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape,(with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/).

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

See Also

See also demoDist, gamlss.demo

Examples

```
demo.LocalRegression()
n <- 100
x <- seq(0, 1, length = n)*1.4
y <- 1.2 + .3*sin(5  * x) + rnorm(n) * 0.2
op <- par(mfrow=c(2,2))
LPOL(y,x, deg=0, position=5)
title("(a) moving average")
LPOL(y,x, deg=1,  position=75)
title("(b) linear poly")
WLPOL(y,x, deg=2, position=30)
title("(c) quadratic poly")
WLPOL(y,x, deg=3, position= 50)
title("(b) cubic poly")
par(op)
```

---

demo.Locmean *Demos for local polynomial smoothing*

Description

Those are four demos to show weighed and unweighed local mean and polynomial smoothing.

Usage

```
demo.Locmean(y = NULL, x = NULL, ...)
demo.Locpoly(y = NULL, x = NULL, ...)
demo.WLocpoly(y = NULL, x = NULL, ...)
demo.WLocmean(y = NULL, x = NULL, ...)
```

Arguments

y	the response variable. If null it generates its own data
x	explanatory variable
...	for extra argument in the plot

Value

It produces an rpanel plot

Author(s)

Mikis Stasinopoulos <d.stasinopoulos@londonmet.ac.uk>

References

Bowman, Bowman, Gibson and Crawford (2008) rpanel, CRAN

Eilers, P. H. C. and Marx, B. D. (1996). Flexible smoothing with B-splines and penalties (with comments and rejoinder). *Statist. Sci*, **11**, 89-121.

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape, (with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/).

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

See Also

demo.PSplines

Examples

```
demo.Locmean()
```

---

demo.NO *Demos for different gamlss.family distributions*

Description

The demo functions for showning the gamlss.family distributions. The functions use the package Rpanel.

Usage

```
demo.NO()
demo.LO()
demo.NO.LO()
demo.GU()
demo.RG()
demo.exGAUS()
demo.PE()
demo.PE.NO()
demo.TF()
demo.TF.NO()
demo.EGB2()
demo.GT()
demo.JSU()
demo.JSUo()
demo.NET()
demo.SHASH()
demo.SEP1()
demo.SEP2()
demo.SEP3()
demo.SEP4()
demo.ST1()
demo.ST2()
demo.ST3()
demo.ST4()
demo.ST5()
demo.EXP()
demo.GA()
demo.LOGNO()
demo.NO.LOGNO()
demo.IG()
demo.WEI()
demo.WEI2()
demo.WEI3()
demo.BCCG()
demo.GG()
demo.GIG()
demo.ZAGA()
demo.ZAIG()
demo.BCT()
demo.BCPE()
demo.GB2()
demo.EGB2()
demo.BE()
demo.BEo()
demo.GB1()
demo.GT()
demo.BB()
```

```
demo.BEINF()
demo.BEINF0()
demo.BEINF1()
demo.BI()
demo.DEL()
demo.LG()
demo.NBI()
demo.NBII()
demo.PO()
demo.SICHEL()
demo.ZABI()
demo.ZAGA()
demo.ZALG()
demo.ZAP()
demo.ZIBI()
demo.ZIP()
demo.ZIP2()
demo.BCCG()
demo.GG()
demo.PIG()
demo.ZABB()
demo.ZIBB()
demo.ZANBI()
demo.ZINBI()
demo.ZIPIG()
demo.NOtr()
demo.GAtr()
demo.YULE()
demo.WARING()
demo.GEOM()
demo.IGAMMA()
demo.PARETO2()
demo.PARETO2o()
demo.SHASHo()
demo.SHASHo2()
demo.LOGITNO()
demo.LOGNO2()
demo.SN1()
demo.SN2()
demo.SST()
demo.TF2()
demo.DPO()
```

Value

An rpanel plot

Author(s)

Mikis Stasinopoulos <d.stasinopoulos@londonmet.ac.uk>, Bob Rigby <r.rigby@londonmet.ac.uk> with contribution from Larisa Kosidou.

References

Bowman, Bowman, Gibson and Crawford (2008) rpanel, CRAN

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape,(with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/).

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

Examples

```
demo.NO()
```

---

demoDist *Interface for demonstrating the gamlss.family distributions*

Description

The function demoDist is an tcltk interface for plotting all the available gamlss.family distributions.

Usage

```
demoDist()
```

Value

It creates a tcltk menu

Author(s)

Konstantinos Pateras <kostas.pateras@gmail.com>

References

R Development Core Team (2010) tcltk package, CRAN.

Bowman, Bowman, Gibson and Crawford (2008) rpanel, CRAN

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape,(with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/).

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

Examples

```
## do not run
demoDist()
```

`demoLpolyS` *Demo for local polynomial fits*

Description

It starts the gamlss local plynomial demos demos. It is an `tcltk` interface for using the local polynolial demos.

Usage

```
demoLpolyS()
```

Value

It creates a `tcltk` menu

Author(s)

Konstantinos Pateras <kostas.pateras@gmail.com>

References

R Development Core Team (2010) tcltk package, CRAN.

Bowman, Bowman, Gibson and Crawford (2008) rpanel, CRAN

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape,(with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/).

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

See Also

See also demoDist, gamlss.demo,

Examples

```
demoLpolyS()
```

---

demoPsplines *Interface for demonstrating the P-splines and other smoothers*

Description

The function demoPsplines is an tcltk interface for P. Eilers and B. Marx demos for P-splines.

Usage

```
demoPsplines()
```

Value

Create an tcltk menu

Author(s)

Konstantinos Pateras <kostas.pateras@gmail.com>

References

R Development Core Team (2010) tcltk package, CRAN.

Bowman, Bowman, Gibson and Crawford (2008) rpanel, CRAN

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape,(with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/).

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

See Also

See also demoDist, ~~~

Examples

```
demoPsplines()
```

`gamlss.demo` *The demo for gamlss distributions and smoothing*

Description

It starts the gamlss demos. It is an `tcltk` interface for using the gamlss demos.

Usage

```
gamlss.demo()
```

Value

It creates a `tcltk` menu

Author(s)

Konstantinos Pateras <kostas.pateras@gmail.com>

References

R Development Core Team (2010) tcltk package, CRAN.

Bowman, Bowman, Gibson and Crawford (2008) rpanel, CRAN

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape,(with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/).

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

See Also

See also `demoDist`, `gamlss.demo`,

Examples

```
gamlss.demo()
```

Locmean *Functions to fit local regression*

Description

There are four function here to illustrate the fitting of local regressions. i) Locmean, which uses local means within a symmetric local window, ii) Locpoly, which uses a local polynomial fit within a symmetric local window. iii) WLocmean, which uses a Gaussian kernel and iv) WLocpoly, which uses local polynomials weighted by a Gaussian kernel

Usage

```
Locmean(y, x = seq(1, length(y)), w = rep(1, length(y)), span = 0.5)
Locpoly(y, x = seq(1, length(y)), w = rep(1, length(y)), span = 0.5, order = 1)
WLocmean(y, x = seq(1, length(y)), w = rep(1, length(y)), lambda = 0.5)
WLocpoly(y, x = seq(1, length(y)), w = rep(1, length(y)), lambda = 0.5, order = 1)
```

Arguments

y	the response variable
x	the x-variable
w	prior weights
span	the side of the local window compare as a proportion to the total number of observations
lambda	the smoothing parameter for the Gaussian kernel
order	the order of the polynomial

Details

Those functions can be used for illustration of the basic concepts of smoothing using small data sets. Do not use them with large data because are computationally inefficient.

Value

The functions return a locW object with values

fitted.values	the fitted valus
residuals	the residuals
edf	the effective degrees of freedom
rss	the residual sum of squares
lambda	the smoothing parameter
y	the y variable
x	the x variable
w	the prior weights

Author(s)

Mikis Stasinopoulos, <d.stasinopoulos@londonmet.ac.uk>

References

Rigby, R. A. and Stasinopoulos D. M. (2005). Generalized additive models for location, scale and shape,(with discussion), *Appl. Statist.*, **54**, part 3, pp 507-554.

Stasinopoulos D. M., Rigby R.A. and Akantziliotou C. (2006) Instructions on how to use the GAMLSS package in R. Accompanying documentation in the current GAMLSS help files, (see also http://www.gamlss.org/)

Stasinopoulos D. M. Rigby R.A. (2007) Generalized additive models for location scale and shape (GAMLSS) in R. *Journal of Statistical Software*, Vol. **23**, Issue 7, Dec 2007, http://www.jstatsoft.org/v23/i07.

See Also

loess, ksmooth

Examples

```
library(MASS)
data(mcycle)
# local means
m0<-Locmean(mcycle$accel, mcycle$times, span=.1)
m1<-Locmean(mcycle$accel, mcycle$times, span=.2)
m2<-Locmean(mcycle$accel, mcycle$times, span=.3)
span <- c("span=0.1", "span=0.2", "span=0.3")
plot(accel~times, data=mcycle,main="local mean")
lines(fitted(m0)~mcycle$times, col=1, lty=1)
lines(fitted(m1)~mcycle$times, col=2, lty=2)
lines(fitted(m2)~mcycle$times, col=3, lty=3)
legend(1.5,50, legend = span, col = 1:3,
       lty = 1:3, cex = .8, y.intersp = 1)
#  kernel estimation
k0<-WLocmean(mcycle$accel, mcycle$times, lambda=1)
k1<-WLocmean(mcycle$accel, mcycle$times,  lambda=2)
k2<-WLocmean(mcycle$accel, mcycle$times,  lambda=3)
lambda <- c("lambda=1", "lambda=2", "lambda=3")
plot(accel~times, data=mcycle,main="Gaussian kernel fit")
lines(fitted(k0)~mcycle$times, col=1, lty=1)
lines(fitted(k1)~mcycle$times, col=2, lty=2)
lines(fitted(k2)~mcycle$times, col=3, lty=3)
legend(1.5,50, legend = lambda, col = 1:3,
       lty = 1:3, cex = .8, y.intersp = 1)
# local polymials
l1<-Locpoly(mcycle$accel, mcycle$times, span=.1)
l2<-Locpoly(mcycle$accel, mcycle$times, span=.2)
l3<-Locpoly(mcycle$accel, mcycle$times, span=.3)

span <- c("span=0.1", "span=0.2", "span=0.3")
```

```
plot(accel~times, data=mcycle,main="local linear fit")
lines(fitted(l1)~mcycle$times, col=1, lty=1)
lines(fitted(l2)~mcycle$times, col=2, lty=2)
lines(fitted(l2)~mcycle$times, col=3, lty=3)
legend(1.5,50, legend = span, col = 1:3,
       lty = 1:3, cex = .8, y.intersp = 1)
# weighted local polynomials
lw1<-WLocpoly(mcycle$accel, mcycle$times, lambda=1.5, order=1)
lw2<-WLocpoly(mcycle$accel, mcycle$times, lambda=1.5, order=2)
lw3<-WLocpoly(mcycle$accel, mcycle$times, lambda=1.5, order=3)

span <- c("linear", "quadratic", "cubic")
plot(accel~times, data=mcycle,main="Weighted local linear, quadratic and cubic fits")
lines(fitted(lw1)~mcycle$times, col=1, lty=1)
lines(fitted(lw2)~mcycle$times, col=2, lty=2)
lines(fitted(lw3)~mcycle$times, col=3, lty=3)
legend(1.5,50, legend = span, col = 1:3,
       lty = 1:3, cex = .8, y.intersp = 1)
```

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