CGGM.mean	*Corner-Preserving Smoothing*

Description

Computation of two dimensional redescending M-kernel estimators.

Usage

```
CGGM.mean(data, h, g=NULL, silent=FALSE)

CGGM.lts(data, h, g=NULL, trim=0, silent=FALSE)

CGGM.autoscale(data, h, silent=FALSE)
```

Arguments

data	numerical matrix of observed data.
h	positive number. Bandwidth for the kernel.
g	optional positive number. Scale parameter. If g is NULL (default), the scale parameter is determined automatically by the function CGGM.autoscale.
trim	optional number within [0,1). Part of observations trimmed by CGGM.lts
silent	optional boolean. If true, CGGM.autoscale produces no output.

Details

CGGM.mean implements a corner-preserving smoothing method introduced by Chu et al. (1998) which is based on a redescending M-kernel estimator. As kernel and score function the density of the standard normal distribution is used. A robust version of this estimator is introduced by Hillebrand (2002) and implemented in CGGM.lts.

CGGM.autoscale calculates the median of the interquartile ranges within the 'windows' used in CGGM.mean and CGGM.lts. This can be used as scale parameter.

Value

Return value is a numerical matrix containing the smoothed data.

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References

Chu, C.K., Glad, I.K., Godtliebsen, F., Marron, J.S. (1998) Edge-Preserving Smoothers for Image Processing, *J. Amer. Statis. Assoc.* 93, 526-541.

Hillebrand, M. (2002) On Robust Corner-Preserving Smoothing in Image Processing, *Carl-von-Ossietzky-Universität Oldenburg, Dissertation* (http://docserver.bis.uni-oldenburg.de/publikationen/dissertation/2003/hilonr(

Examples

```
y <- matrix(rep(0,60*60),nrow=60)
y[21:40,21:40]<-1
y <- y + matrix(rnorm(60*60,0,0.1),nrow=60)
image(y,col=gray(seq(0,1,1/255)))

ymean <- CGGM.mean(y,0.04)
image(ymean,col=gray(seq(0,1,1/255)))
```