Package ‘AdaptFit’

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Title Adaptive Semiparametric Regression
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Depends SemiPar, MASS, nlme, cluster
Description Based on the function ```spm``` of the SemiPar package fits semiparametric regression models with spatially adaptive penalized splines.
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R topics documented:

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Description


Usage

data(absent)
Format

This data frame contains the following columns:

- **id**  employee’s ID
- **absent**  number of days of absenteeism
- **status**  1 for the uncensored last day of absenteeism
- **date**  date of the first day of a sick leave
- **day**  day of the week of the first day of a sick leave
- **month**  month

Source


References

Fast Adaptive Penalized Splines  
*Journal of Computational and Graphical Statistics.*

Examples

```r
library(adaptfit)
data(absent)
attach(absent)
```

asp  
*Fit a semiparametric regression model with spatially adaptive penalized splines*

Description

asp fits semiparametric regression models using the mixed model representation of penalized splines with spatially adaptive penalties, based on the "spm" function of the SemiPar-package.

Usage

```r
asp(form, adapt=TRUE, random=NULL, group=NULL, family="gaussian", spar.method="REML", omit.missing=NULL, niter=20, niter.var=50, tol=1e-06, returnFit=FALSE, we
```
Arguments

form a formula describing the model to be fit. Note, that an intercept is always included, whether given in the formula or not.
adap TRUE (default) if an adaptive fit should be performed, otherwise the fit is identical to that of function "spm".
random "random=~1" specifies inclusion of a random intercept according to the groups specified by the "group" argument.
group a vector of labels for specifying groups.
family for specification of the type of likelihood model assumed in the fitting. May be "gaussian","binomial" or "poisson".
spar.method method for automatic smoothing parameter selection. May be "REML" (restricted maximum likelihood) or "ML" (maximum likelihood).
omit.missing a logical value indicating whether fields with missing values are to be omitted.
niter a maximum number of iterations for the mean estimation, default is 20.
niter.var a maximum number of iterations for the variance of random effects estimation, default is 50.
tol tolerance for the convergence criterion. Default is 1e-6.
returnFit a logical value indicating whether the fitted object should be returned when the maximum number of iterations is reached without convergence of the algorithm. Default is FALSE.
weights to use only with grouped binary data.
correlation correlation structure of the response; see documentation to "nlme".
control see lmeControl in the documentation to "nlme".

Details

See the SemiPar Users’ Manual for details and examples.

Value

A list object of class "spm" containing the fitted model. The components are:
fitted fitted values.
coef.mean estimated mean coefficients.
design.matrices design matrices both for knots und subknots.
x x values.
knots knots.
y.cov estimated covariance matrix of the response.
random.var estimated covariance matrix of the random effects.
subknots subknots.
coef.random estimated spline coefficients of the covariance matrix of the random effects.
var.random.var estimated variance of the spline coefficients of the covariance matrix of the random effects.

fit mimics fit object of lme() for family="gaussian" and glmmPQL() for family="binomial" or family="poisson".

info information about the inputs.

aux auxiliary information such as variability estimates.

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References


SemiPar 1.0 Users’ Manual.
http://www.maths.unsw.edu.au/~wand/papers.html

Semiparametric Regression Cambridge University Press.
http://stat.tamu.edu/~carroll/semiregbook/

See Also
gam (in package ‘mgcv’) lme (in package ‘nlme’) glmmPQL (in package ‘MASS’)

Examples

## scatterplot smoothing

```r
x <- 1:1000/1000
mu <- exp(-400*(x-.06)^2)+5*exp(-500*(x-.075)^2)/3+2*exp(-500*(x-.09)^2)
y <- mu+0.5*rnorm(1000)

#fit with default knots
y.fit <- asp(y=f(x))
plot(y.fit)
```

## one more scatterplot smoothing with specified knots and subknots

```r
x <- 1:400/400
mu <- sqrt(x*(1-x))*sin((2*pi*(1+2^((9-4*x)/5)))/(x+2^((9-4*x)/5))))
y <- mu+0.2*rnorm(400)

kn <- default.knots(x,80)
kn.var <- default.knots(kn,20)

y.fit <- asp(y=f(x,knots=kn,var.knot=kn.var))
plot(y.fit)
```
## additive models

\begin{verbatim}
x1 <- 1:300/300
x2 <- runif(300)
mu1 <- exp(-400*(x1-0.6)^2+5*exp(-500*(x1-0.75)^2)/3+2*exp(-500*(x1-0.9)^2)
mu2 <- sin(2*pi*x2)
y2 <- mu1+mu2+0.3*rnorm(300)
y2.fit <- asp(y2-f(x1)+f(x2))
par(mfrow=c(2,2))
y21.fit <- asp(y2-f(x1,adapt=FALSE)+f(x2)) # switch off adaptive fitting for the first function
plot(y2.fit)
plot(y21.fit)
par(mfrow=c(1,1))

## spatial smoothing

mu3 <- x1*sin(4*pi*x2)
y3 <- mu3+diff(range(mu3))*rnorm(300)/4

# for the specified knots and subknots use
# kn <- default.knots.2D(x1,x2,12^2) # !!! interactive function !!!
# kn.var <- default.knots.2D(kn[,]kn[,]2,5^2)
# y3.fit <- asp(y3-f(x1,x2,knots=kn.var,knot=kn.var))

## non-normal response

x <- 1:1000/1000
mu <- exp(-400*(x-0.6)^2)+5*exp(-500*(x-0.75)^2)/3+2*exp(-500*(x-0.9)^2)
y4 <- rbinom(1000,5,1/(1+exp(-mu)))
nn <- rep(5,1000)
y4.fit <- asp(cbind(y4,nn-y4)-f(x),family="binomial")
### same as ### y4.fit <- asp(y4/nn-f(x),family="binomial",weights=nn)
plot(y4.fit) # plot of systematic component

## correlated errors

y5 <- sin(2*pi*x1)+0.3*arima.sim(300,model=list(ar=0.6))
y5.fit <- asp(y5-f(x1),adapt=FALSE,correlation=corAR1())
plot(y5.fit)

# see also SemiPar User Manual

# The current version of the SemiPar User Manual is posted on the web-site:
# www.maths.unsw.edu.au/~wand/papers.html
\end{verbatim}
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