Package 'homeR'

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Type Package

Title Useful Functions for Building Physics

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Description A collection of functions useful for the analysis of building physics experiments.

License GPL (>= 2)

LazyLoad yes

Encoding UTF-8

Suggests testthat, plyr

RoxygenNote 5.0.1

NeedsCompilation no

Repository CRAN

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R topics documented:

bhm *Bayesian Heating Model*

Description

Estimates the parameters of a building's heating model.

Usage

```
bhm(formula, data, baseLoad = NULL)
```

Arguments

formula	an object of class "formula": a description of which variable holds the energy readouts and which variable holds the daily temperatures.
data	a data frame in which the energy and daily temperatures are to be found.
baseLoad	a optional constant base load, e.g. for domestic hot water preparation.

Details

bhm assumes that the heating energy for a building has been measured over several time periods (not necessarily of equal length). The data data frame should have one row per measurement period. The energy vector (whose name is given on the left-hand side of the formula) will have the total energy measured during each period. The daily temperature vector (whose name is given on the right-hand side of the formula) will have either a vector of average daily temperatures (when each measurement period is just one day) or a list of vectors (when each measurement period can be an arbitrary number of days).

Value

bhm returns an object of class "bhm". The generic accessor functions coefficients, vcov and residuals extract the usual information from the fitted model, while logposterior will return a function that evaluates the log-posterior as a function of the parameters.

Examples

```
set.seed(1111)

# Simple, but unrealistic parameters
K <- 1
tb <- 1
DHW <- 1
sigma <- 1e-2
temps <- tb + c(-2, -1, 0, 1)

# With daily measurements
E <- K * pmax(tb - temps, 0) + DHW + rnorm(length(temps), 0, sigma)
fourDayData <- data.frame(E = E, T = temps)
```

```
fourDayData
## Not run:
fit <- bhm(E ~ T, fourDayData)
coef(fit)
resid(fit)

## End(Not run)

# With two-day measurements
fourTimesTwoDayData <- with(fourDayData,
                            data.frame(E = 2 * E,
                            T = I(lapply(T, function(x) c(x, x)))))
fit2 <- bhm(E ~ T, fourTimesTwoDayData)
coef(fit2)
resid(fit2)
```

`logposterior` *Log-posterior of a Bayesian Heating Model*

Description

Provides the log-posterior of a heating model given the data, as a function of the model's parameters.

Usage

```
logposterior(bhm)
```

Arguments

`bhm`	a fitted model returned by a call to `bhm()`

Value

a function of the model's parameters (currently K, tb, DHW and sigma)

`pmv` *Predicted Mean Vote*

Description

Computes Fanger's predicted mean vote

Usage

```
pmv(clo, met, air.temp, saturation)
```

Arguments

clo	Thermal insulation of clothing in [clo] (underwear, blouse/shirt, slacks/trousers, jacket, socks and shoes are approximately 1 clo)
met	Physical activity in [met] (one person seated at rest is approximately 1 met)
air.temp	Indoor air temperature (assumed equal to mean radiant temperature) in [C]
saturation	Ratio of moisture content to moisture content of saturated air at the same temperature, in [%] (approximately the same thing as relative humidity)

Details

Compute the predicted mean vote for one or more combinations of clo, met, air temperature and moisture saturation. The inputs arguments can be scalars or vectors.

Value

The predicted mean vote, a value between -3 (cold) to +3 (hot)

References

CIBSE Guide A, section 1.4 and 1.A1.2 (from which this implementation is derived)

Examples

```
# With scalars
pmv(clo=1.0,
    met=1.2,
    air.temp=19,
    saturation=40)
# With vectors
pmv(clo=c(1.0, 1.5),
    met=c(1.2, 0.6),
    air.temp=c(19, 30),
    sat=c(35, 40))
```

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