# Gaussian model for Stochastic volatility

#### Parametrization

The Gaussian likelihood for stochastic volatility models is defined as:

$$y|\ldots = \sigma\epsilon$$

where

$$\epsilon \sim \mathcal{N}(0,1)$$

### **Link-function**

The squared of the scale parameter  $\sigma$  is linked to the linear predictor  $\eta$  as:

$$\sigma^2 = \exp(\eta) + 1/\tau$$

where  $1/\tau$  is an possible offset in the variance.

# Hyperparameters

This likelihood has one hyperparmeter

$$\theta = \log(\tau)$$

and the prior is defined on  $\theta$ .

See Notes for more info about the possible offset in the variance, as default  $1/\tau = 0$  and fixed.

## **Specification**

- family = stochvol
- Required argument: y.

### Hyperparameter spesification and default values

doc The Gaussian stochvol likelihood

hyper

#### theta

hyperid 82001
name log precision
short.name prec
initial 500
fixed TRUE
prior loggamma
param 1 0.005
to.theta function(x) log(x)
from.theta function(x) exp(x)

survival FALSE

discrete FALSE

link default log

pdf stochvolgaussian

## Example

In the following example we specify the likelihood for the stochastic volatility model to be Gaussian

### Notes

The default setting treat  $\theta$  as fixed and with an initial value so that  $1/\tau = 0$ . If  $\theta$  is random, then you must also give it a reasonable initial value.