

# Independent random noise model

## Parametrization

This model simply defines  $\mathbf{z}$  to be a vector of independent and Gaussian distributed random variable with precision  $\tau$ :

$$\pi(\mathbf{x}|\tau) \propto \tau^{n/2} \exp \left\{ -\frac{\tau}{2} \mathbf{x}^T \mathbf{I} \mathbf{x} \right\}$$

where  $\mathbf{I}$  is the identity matrix.

## Hyperparameters

The precision parameter  $\tau$  is represented as

$$\theta = \log \tau$$

and the prior is defined on  $\theta$ .

## Specification

The independent model is specified inside the `f()` function as

```
f(<whatever>, model="iid", hyper = <hyper>)
```

## Hyperparameter specification and default values

**hyper**

**theta**

```
name    log precision
short.name  prec
prior    loggamma
param    1 5e-05
initial  4
fixed    FALSE
to.theta function(x) log(x)
from.theta function(x) exp(x)
```

**constr** FALSE

**nrow.ncol** FALSE

**augmented** FALSE

**aug.factor** 1

**aug.constr**

**n.div.by**

**n.required** FALSE

**set.default.values** FALSE

**pdf** indep

## Example

```
n=12
Ntrials = sample(c(80:100), size=n, replace=TRUE)
eta = rnorm(n,0,0.5)
prob = exp(eta)/(1 + exp(eta))
y = rbinom(n, size=Ntrials, prob = prob)

data=data.frame(y=y,z=1:n)

formula=y~f(z,model="iid",
            hyper=list(theta=list(prior="loggamma",param=c(1,0.01))))
result=inla(formula,data=data,family="binomial",Ntrials=Ntrials)
```

## Notes

None