

## Random noise model

### Parametrization

This model simply defines  $\mathbf{y}$  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", prior=c(<prior.model.theta>),  
  param=c(<param.prior.theta>))
```

### 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",prior="loggamma",param=c(1,0.01))  
result=inla(formula,data=data,family="binomial",Ntrials=Ntrials)
```

### Notes

None