

## Fancy likelihood: “fl” (EXPERIMENTAL)

### Parametrisation

This not a likelihood in the usual sense, but a artificial one to more easily be able add missing terms into the likelihood contribution due to various rewrites/reformulations. Obviously, it is only ment for special occations and to be used only for those who have spesific needs.

The “loglikelihood” is

$$\log f(y) = c_1 + c_2\eta - \frac{1}{2}c_3(c_4 - \eta)^2 - c_5 \exp(c_6 + c_7\eta) - c_8 \log \left( \frac{\exp(c_9\eta) - 1}{\text{sign}(c_9)\eta} \right)$$

for constants  $c_1, \dots, c_9$ . In most cases, only a few of the  $c_i$ ’s will be non-zero. Note that there is no dependence on the reponse  $y$ , as  $y$  itself is not part of the spesification.

### Link-function

The identity link is used.

### Hyperparameters

None.

### Specification

- `family="fl"`
- This family require the response to be a `inla.mdata`-object, where each row defines the vector  $(c_1, \dots, c_9)$  for each likelihood contribution. Any NA’s in the  $c_i$ ’s will be converted to 0.

### Hyperparameter spesification and default values

`family="fl"`

`doc` The fl likelihood

`hyper`

`survival` FALSE

`discrete` TRUE

`link` default identity

`status` experimental

`pdf` fl

### Example

```
## example with Poisson likelihood in two ways
n <- 100
x <- rnorm(n)
eta <- 1 + 0.3 * x
y <- rpois(n, exp(eta))
```

## log-likelihood is in the fl-parameterisation:

```
## log(y!) + y * eta - 0.5 * 0 * (0 - eta)^2 - 1 * exp(0 + 1 * eta)
C <- cbind(-lfactorial(y), y, 0, 0, 1, 0, 1, 0, 0)

r <- inla(inla.mdata(C) ~ 1 + x, family = "fl", data = list(C = C, x = x))
rr <- inla(y ~ 1 + x, family = "poisson", data = data.frame(y, x))

summary(rr)
summary(r)
r$mlik - rr$mlik
```

## Notes

Since this is not a likelihood in the usual sense, it will not be used for CPO/PO calculations and not be influenced by the `control.inla=list(cmin=...)`-argument.

This likelihood is EXPERIMENTAL and only supported in using the (default) `compact-mode` for the moment.