

## Prior for the intercept in the skew-normal link

### Parametrisation

The skew-normal link parameterise the intercept implicitly through the quantile level  $q$  as a function of the skewness, which for zero skewness equals the normal intercept in the probit link,

$$\mu = \Phi^{-1}(q). \quad (1)$$

Further the quantile level  $q$  is represented by

$$q = \frac{\exp(\theta)}{1 + \exp(\theta)} \quad (2)$$

for the (internal) hyperparameter  $\theta$ . The `linksnintercept` prior is the implied prior for  $\theta$  when  $\mu$  is Normal with a given mean and precision.

Note that zero precision is interpreted that the Normal density is uniform with unit density.

### Specification

```
..., prior="linksnintercept", param=c(<mean>, <precision>),...
```

### Example

This example just shows that the implied prior for the intercept is the same for probit and snlink.

```
n = 200
Ntrials = 200
x = rnorm(n, sd = 0.5)
eta = x
skew <- 0.0
prob = inla.link.invsn(eta, skew = skew, intercept = 0.75)
y = rbinom(n, size = Ntrials, prob = prob)

r = inla(y ~ 1 + x,
  family = "binomial",
  data = data.frame(y, x),
  Ntrials = Ntrials,
  control.fixed = list(remove.names = "(Intercept)",
    prec = 1),
  control.family = list(
    control.link = list(
      model = "sn",
      hyper = list(
        skew = list(initial = 0,
          fixed = TRUE),
        intercept = list(param = c(0, 1))))))

rr = inla(y ~ 1 + x,
  family = "binomial",
  data = data.frame(y, x),
  Ntrials = Ntrials,
  control.fixed = list(prec = 1, prec.intercept = 1),
  control.family = list(
```



```
      control.link = list(  
        model = "probit")),  
verbose = TRUE)
```

```
r$mlik - rr$mlik
```

## Notes

This is the default prior for the intercept in the skew-normal link.