Weibull With Cure Fraction

Background

$$
\begin{aligned}
Z_i &\sim \text{Bernoulli}(\rho)\\
[Y_i|Z_i = 0] &\sim \text{Weibull}(\lambda_i, \alpha)\\
[Y_i|Z_i = 1] &= \infty
\end{aligned}
$$

Parametrisation

The Weibull is parametrized as `variant=0` of the `weibull` family.

$$
f(y) = (1-\rho)\alpha y^{\alpha-1}\lambda \exp(-\lambda y^{\alpha}), \qquad 0 \le y < \infty, \qquad \alpha > 0, \qquad \lambda > 0
$$

α: shape parameter.

ρ: the cure fraction parameter

Link-function

The parameter λ is linked to the linear predictor as:

$$
\lambda = \exp(\eta)
$$

Hyperparameters

The α parameter is represented as

$$
\theta_1 = \log \alpha
$$

and ρ is transformed to

$$
\theta_2 = \log[\rho/(1-\rho)].
$$

The priors are defined on θ.

Specification

Response variable y must be given using `inla.surv()`

Hyperparameter spesification and default values

Example

In the following example we estimate the parameters in a simulated case

Notes

- Weibull model can be used for right censored, left censored, interval censored data. If the observed times y are large/huge, then this can cause numerical overflow in the likelihood routine. If you encounter this problem, try to scale the observatios, `time = time / max(time)` or similar.