Weibull With Cure Fraction

Background

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

Parametrisation

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

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

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.