

## A special case of the Gamma-distribution

### Parametrisation

We consider this distribution

$$\pi(y) = \frac{1}{\Gamma(a)} y^{a-1} \exp(-y), \quad a > 0, \quad y > 0,$$

where  $E(y) = \mu = a$ .

### Link-function

The linear predictor  $\eta$  is linked to the mean  $\mu$  using a default log-link

$$\mu = \exp(\eta)$$

### Hyperparameter

None.

### Specification

- `family="gammajw"` for regression models and `family="gammajw.surv"` for survival models.
- Required arguments: for `gammajw.surv`,  $y$  (to be given in a format by using `inla.surv()`), and for `gammajw`,  $y$ .

### Hyperparameter spesification and default values

**gammajw:**

**doc** A special case of the Gamma likelihood

**hyper**

**survival** FALSE

**discrete** FALSE

**link** default log neglog

**pdf** gammajw

**gammajwsurv:**

**doc** A special case of the Gamma likelihood (survival)

**hyper**

**thetal**

**hyperid** 58200

**name** beta1

**short.name** beta1

**output.name** beta1 for GammaJW-Cure

**output.name.intern** beta1 for GammaJW-Cure

**initial** -7

```

fixed FALSE
prior normal
param -4 100
to.theta function(x) x
from.theta function(x) x
theta2
  hyperid 58201
  name beta2
  short.name beta2
  output.name beta1 for GammaJW-Cure
  output.name.intern beta1 for GammaJW-Cure
  initial 0
  fixed FALSE
  prior normal
  param 0 100
  to.theta function(x) x
  from.theta function(x) x
theta3
  hyperid 58202
  name beta3
  short.name beta3
  output.name beta3 for GammaJW-Cure
  output.name.intern beta3 for GammaJW-Cure
  initial 0
  fixed FALSE
  prior normal
  param 0 100
  to.theta function(x) x
  from.theta function(x) x
theta4
  hyperid 58203
  name beta4
  short.name beta4
  output.name beta4 for GammaJW-Cure
  output.name.intern beta4 for GammaJW-Cure
  initial 0
  fixed FALSE
  prior normal
  param 0 100
  to.theta function(x) x
  from.theta function(x) x
theta5
  hyperid 58204
  name beta5

```

```

short.name beta5
output.name beta5 for GammaJW-Cure
output.name.intern beta5 for GammaJW-Cure
initial 0
fixed FALSE
prior normal
param 0 100
to.theta function(x) x
from.theta function(x) x
theta6
  hyperid 58205
  name beta6
  short.name beta6
  output.name beta6 for GammaJW-Cure
  output.name.intern beta6 for GammaJW-Cure
  initial 0
  fixed FALSE
  prior normal
  param 0 100
  to.theta function(x) x
  from.theta function(x) x
theta7
  hyperid 58206
  name beta7
  short.name beta7
  output.name beta7 for GammaJW-Cure
  output.name.intern beta7 for GammaJW-Cure
  initial 0
  fixed FALSE
  prior normal
  param 0 100
  to.theta function(x) x
  from.theta function(x) x
theta8
  hyperid 58207
  name beta8
  short.name beta8
  output.name beta8 for GammaJW-Cure
  output.name.intern beta8 for GammaJW-Cure
  initial 0
  fixed FALSE
  prior normal
  param 0 100
  to.theta function(x) x

```

```

    from.theta function(x) x
theta9
  hyperid 58208
  name beta9
  short.name beta9
  output.name beta9 for GammaJW-Cure
  output.name.intern beta9 for GammaJW-Cure
  initial 0
  fixed FALSE
  prior normal
  param 0 100
  to.theta function(x) x
  from.theta function(x) x
theta10
  hyperid 58209
  name beta10
  short.name beta10
  output.name beta10 for GammaJW-Cure
  output.name.intern beta10 for GammaJW-Cure
  initial 0
  fixed FALSE
  prior normal
  param 0 100
  to.theta function(x) x
  from.theta function(x) x

survival TRUE

discrete FALSE

link default log

pdf gammajw

```

## Example

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

```

n <- 300
x <- rnorm(n, sd = 0.3)
eta <- 1 + x
mu <- exp(eta)
y <- rgamma(n, shape = mu, scale = 1)
r <- inla(y ~ 1 + x,
  data = data.frame(y, x),
  family = "gammajw",
  control.compute = list(cpo = TRUE),
  control.fixed = list(prec.intercept = 0.01),
  verbose = TRUE)

```

```
summary(r)

yy <- inla.surv(y, event = 1)
rr <- inla(yy ~ 1 + x,
           data = list(yy = yy, x = x),
           family = "gammajwsurv",
           control.compute = list(cpo = TRUE),
           control.fixed = list(prec.intercept = 0.01),
           verbose = TRUE)
summary(rr)

print(r$summary.fixed - rr$summary.fixed)
```

## Notes

None.