# nzPoisson

## Parametrisation

The non-zero Poisson distribution is

$$\text{Prob}(y) = \frac{1}{1-\exp(-\lambda)} \frac{\lambda^y}{y!} \exp(-\lambda)$$

for responses $y = 1, 2, \ldots$, where

$\lambda$**:** the expected value parameter (as if 0's were allowed).

## Link-function

The mean-parameter is is linked to the linear predictor by

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

where $E > 0$ is a known constant (or $\log(E)$ is the offset of $\eta$).

## Hyperparameters

None.

## Specification

- `family="nzpoisson"`
- Required arguments: (integer-valued) $y$ and $E$

## Example

In the following example we estimate the parameters in a simulated example with Poisson responses.

```
n <- 100
a <- 1
b <- 0.2
z <- rnorm(n)
eta <- a + b*z
E <- runif(n)
lambda <- E * exp(eta)
y <- numeric(n)
for(i in 1:n) {
    while((y[i] <- rpois(1, lambda[i])) == 0) TRUE
}

result <- inla(y ~ 1 + z, family = "nzpoisson",
               data = data.frame(y, z), E=E)
summary(result)
```