

# Constrained Linear

## Parametrization

This model is like a “fixed” effect where you can constrained the coefficient of a covariate to be in an interval:

$$\eta_i = \beta x_i$$

where  $\beta$  is in the interval `[low, high]` and  $x$  are the covariates.

## Hyperparameters

The  $\beta$  parameter, since its is constrained in general, is a hyperparamter. The internal transformation depends on the values of `low` and `high`. If `low` is `-Inf` and `high` is `Inf`, then

$$\beta = \theta$$

and the prior is put on  $\theta$ . If `low` is finite and `high` is `Inf`, then

$$\beta = \text{low} + \exp(\theta)$$

and the prior is put on  $\theta$ . If `low` is finite and `high` is finite, then

$$\beta = \text{low} + (\text{high} - \text{low}) \frac{\exp(\theta)}{1 + \exp(\theta)}$$

and the prior is put on  $\theta$ .

## Specification

```
f(x, model="clinear", range = c(low, high), precision = <precision>)
```

where `precision` is the precision for the tiny noise used to implement this as a latent model.

## Hyperparameter spesification and default values

```
doc Constrained linear effect
```

```
hyper
```

```
  theta
```

```
    hyperid 37001
```

```
    name beta
```

```
    short.name b
```

```
    initial 1
```

```
    fixed FALSE
```

```
    prior normal
```

```
    param 1 10
```

```
    to.theta function(x, REPLACE.ME.low, REPLACE.ME.high) {
```

```
      from.theta function(x, REPLACE.ME.low, REPLACE.ME.high) {
```

```
constr FALSE
```

```
nrow.ncol FALSE
```



`augmented` FALSE

`aug.factor` 1

`aug.constr`

`n.div.by`

`n.required` FALSE

`set.default.values` FALSE

`pdf` clinear

### Example

```
n = 100
x = runif(n)
y = 1 + x + rnorm(n)
r = inla(y ~ f(x, model = "clinear", range = c(0, Inf)),
        data = data.frame(y,x))
summary(r)
```

### Notes

None