# Types of relation between a variable and its probabilities

By Benoît Bruneau

**Package :** 'bmisc'

**Version :** 0.2-12

**Depends :** car, lattice, zoo, robustbase, and methods

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**Description :** These functions can be used to estimate probabilities `[0,1]` by specifying the inflection points of a relation. Described relations are of type 'full', 'ramp' and 'logistic'.



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# Table des matières

# 1 Types ‘full’ and ‘plat.full’

These relations have ”all-or-nothing” types of probabilities. One or two threshold (inflection points) need to be defined. The main difference between ‘full’(Figure 1) and ‘plat.full’ (Figure 2) types are the number of thresholds. For all types, ‘plat’ stands for ”plateau”.

**full.sel** `(infl1, x, ptv=TRUE)`

**plat.full.sel** `(infl1, infl2, x, ptv=TRUE)`

where `infl1` and `infl2` are the inflection points, `x` is a numeric vector for which probabilities are estimated and `ptv` indicates if the trend is positive (`TRUE`) or negative (`FALSE`).

Here are examples for these types :

```
> full.sel(infl1 = 1500, x = data, ptv = TRUE)
> full.sel(infl1 = 1500, x = data, ptv = FALSE)
```

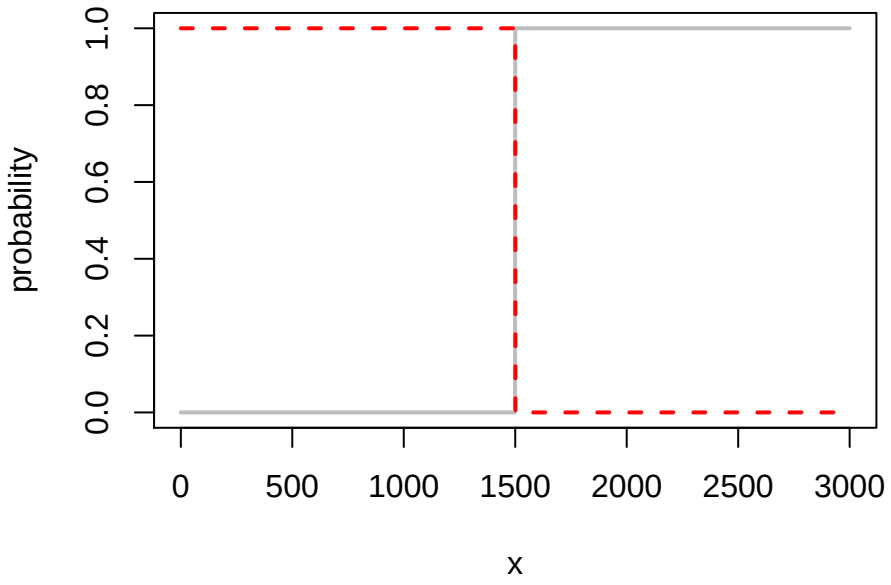


FIGURE 1 – Type ’full’ with pvt=TRUE in gray and pvt=FALSE in red.

```
> data = 0:3000
> plat.full.sel(infl1 = 1000, infl2 = 2000, x = data, ptv = TRUE)
> plat.full.sel(infl1 = 1000, infl2 = 2000, x = data, ptv = FALSE)
```

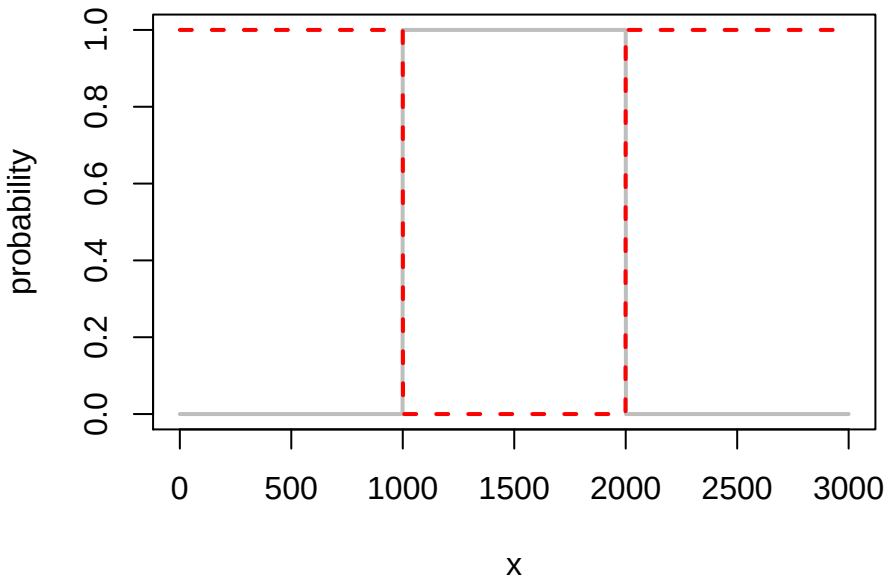


FIGURE 2 – Type 'plat.full' with pvt=TRUE in gray and pvt=FALSE in red.

## 2 Types ‘ramp’ and ‘plat.ramp’

These relations involve adding a gradual increase (or decrease) of probabitily between two inflection points. They are an ’upgraded’ version of ‘full’ and ‘plat.full’. Two or four inflection points are needed. The main difference between ‘ramp’(Figure 3) and ‘plat.ramp’ (Figure 4) types are the number inflection points.

**ramp.sel** `(infl1, infl2, x, ptv=TRUE)`

**plat.ramp.sel** `(infl1, infl2, infl3, infl4, x, ptv=TRUE)`

where `infl1` to `infl4` are the inflection points, `x` is a numeric vector for which probabilities are estimated and `ptv` indicates if the trend is positive (`TRUE`) or negative (`FALSE`).

Here are examples for these types :

```
> ramp.sel(infl1 = 1000, infl2 = 1500, x = data, ptv = TRUE)
> ramp.sel(infl1 = 1000, infl2 = 1500, x = data, ptv = FALSE)
```

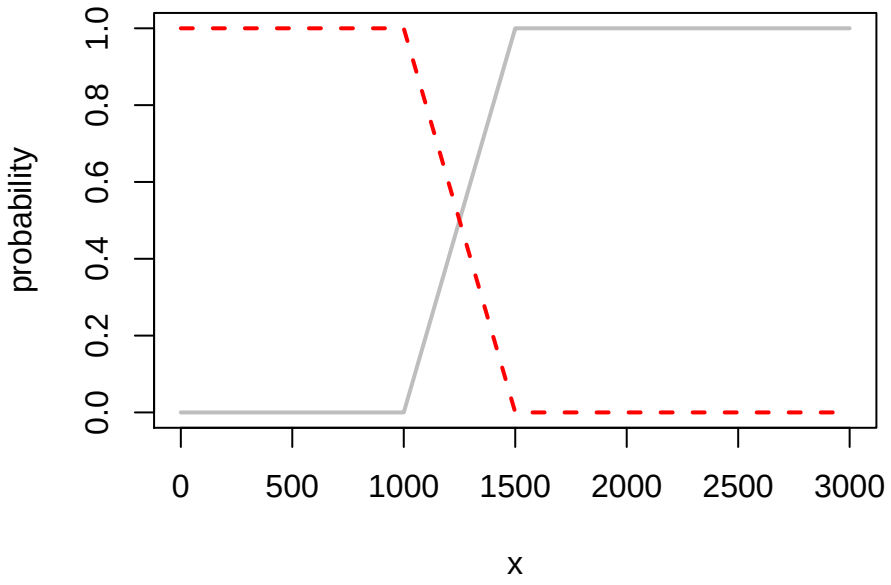


FIGURE 3 – Type ’ramp’ with pvt=TRUE in gray and pvt=FALSE in red.

```
> data = 0:3000
> plat.ramp.sel(infl1 = 1000, infl2 = 1500, infl3 = 2000, infl4 = 2500,
+     x = data, ptv = TRUE)
> plat.ramp.sel(infl1 = 1000, infl2 = 1500, infl3 = 2000, infl4 = 2500,
+     x = data, ptv = FALSE)
```

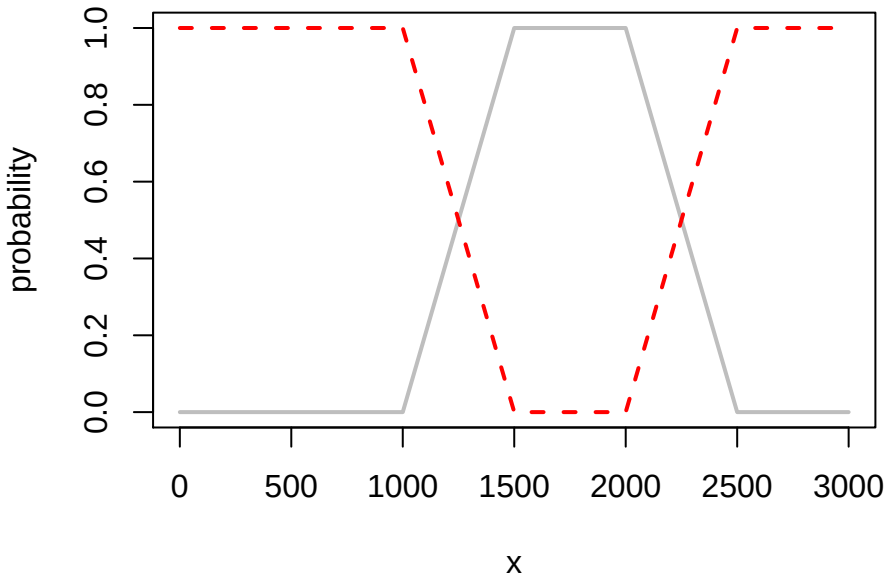


FIGURE 4 – Type 'plat.ramp' with pvt=TRUE in gray and pvt=FALSE in red.

# 3 Types ‘logit’ and ‘plat.logit’

These relations use logistic curves. Inflection points are defined as points where the intantenuous splope is a proportion (`prop`) of the intantenuous slope at $x_{50}$. These types make use of the function `find.beta()` of `package::bmisc`. Default value of `prop` is `0.1`. The end result is a logistic curve with $x_{50}$ being the midpoint between the inflection points. Two or four inflection points are needed. The main difference between ‘logit’(Figure 5) and ‘plat.logit’ (Figure 6) types are the number inflection points.

**logit.sel** `(infl1, infl2, x, ptv=TRUE)`

**plat.logit.sel** `(infl1, infl2, infl3, infl4, x, ptv=TRUE)`

where `infl1` to `infl4` are the inflection points, `x` is a numeric vector for which probabilities are estimated and `ptv` indicates if the trend is positive (`TRUE`) or negative (`FALSE`).

Here are examples for these types :

```
> logit.sel(infl1 = 1000, infl2 = 1500, x = data, ptv = TRUE)
> logit.sel(infl1 = 1000, infl2 = 1500, x = data, ptv = FALSE)
```

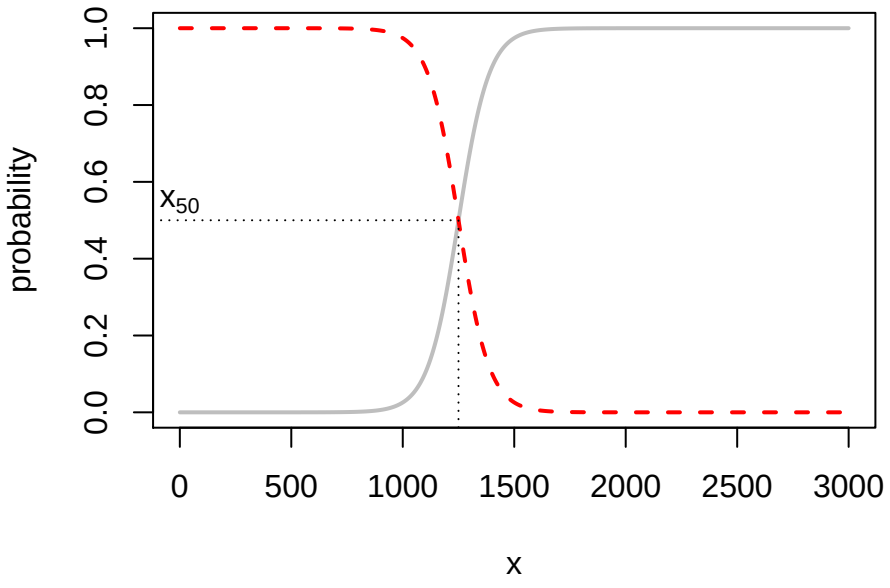


FIGURE 5 – Type ’logit’ with pvt=TRUE in gray and pvt=FALSE in red.

```
> data = 0:3000
> plat.logit.sel(infl1 = 1000, infl2 = 1500, infl3 = 2000, infl4 = 2500,
+     x = data, ptv = TRUE)
> plat.logit.sel(infl1 = 1000, infl2 = 1500, infl3 = 2000, infl4 = 2500,
+     x = data, ptv = FALSE)
```

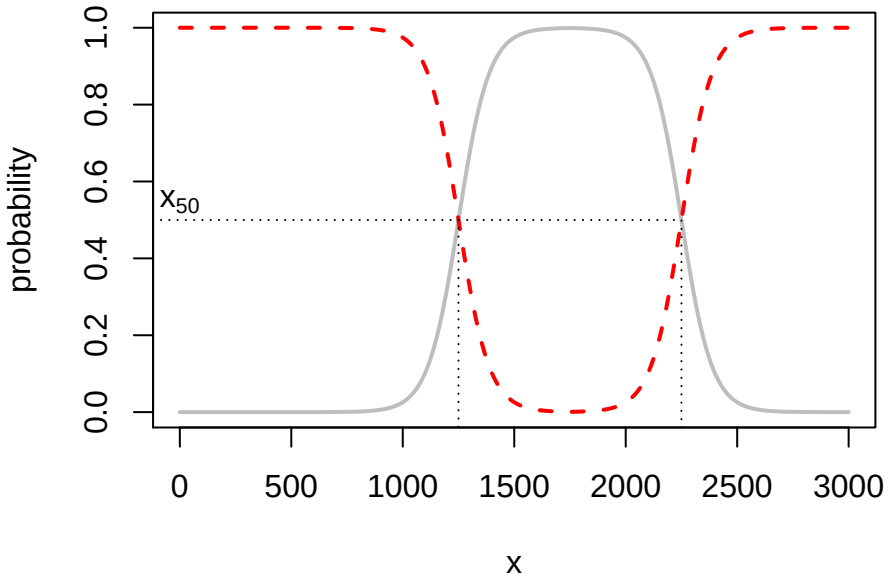


FIGURE 6 – Type 'plat.logit' with pvt=TRUE in gray and pvt=FALSE in red.