25th Oct 2017

log logistic model.

variant = 0

$$f(t) = \frac{1}{1+\lambda t^{-\alpha}} \qquad \begin{matrix} \alpha > 0 \\ t > 0 \end{matrix}$$

variant = 1

$$f(t) = \frac{1}{1+(\lambda t)^{-\alpha}}$$

$$\log \lambda = \gamma$$

the quantile model.

$$f(k(q)) = q$$

↑ quantile function.

then. for variant = 1

$$\lambda = \frac{1}{k}\left(\frac{q}{1-q}\right)^{1/\alpha}$$

$$\log(k) = \gamma$$

```
> simplify(diff(1/(1+lambda * time^(-alpha)), time));
                                (-alpha - 1)
                        lambda time              alpha
                        ----------------------------
                                          (-alpha) 2
                         (1 + lambda time          )

> simplify(diff(1/(1+(lambda * time)^(-alpha)), time));
                                   (-alpha)
                          (lambda time)          alpha
                     ---------------------------------
                                          (-alpha) 2
                     (1 + (lambda time)          )  time

>
```