Using the `pareto` package

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1 Introduction

The `pareto` package includes three primary functions: `dpareto`, `ppareto`, and `qpareto`, with corresponding functions `p.dpareto`, `p.ppareto`, and `p.qpareto` to allow for parallel processing. These three compute the Pareto density, distribution, and quantile function, respectively, defined as follows:

Table 1: `pareto` functions

Density	Distribution	Quantile
$f(x;\alpha,\beta) = \frac{\beta\alpha^\beta}{x^{\beta+1}}$	$F(x;\alpha,\beta) = 1 - \left(\frac{\alpha}{x}\right)^\beta$	$Q(p;\alpha,\beta) = \alpha(1-p)^{-\frac{1}{\beta}}$

2 Usage

The following are simple examples of their usages:

```
>   dpareto(3, 1, 2)

[1] 0.07407407

>   ppareto(1:3, 1, 2)

[1] 0.0000000 0.7500000 0.8888889

>   qpareto(0.5, 1:3, 2)

[1] 1.414214 2.828427 4.242641
```

	q	p = ppareto(q)	qpareto(p)
1	3.00	-0.41	3.00
2	4.00	-0.69	4.00
3	5.00	-0.92	5.00
4	6.00	-1.10	6.00
5	7.00	-1.25	7.00

Table 2: Results for `ppareto` and `qpareto`.

The quantile function is the inverse of the distribution function. Table 2 displays this fact by using the upper tail and log specification of the `ppareto` and `qpareto` functions with scale and shape parameters $\alpha = 2$ and $\beta = 1$, applying first the distribution function and then the quantile function to get the original input.

Figure 1 shows the Pareto density for fixed scale and varying shape parameters and Figure 2 shows the corresponding distribution:

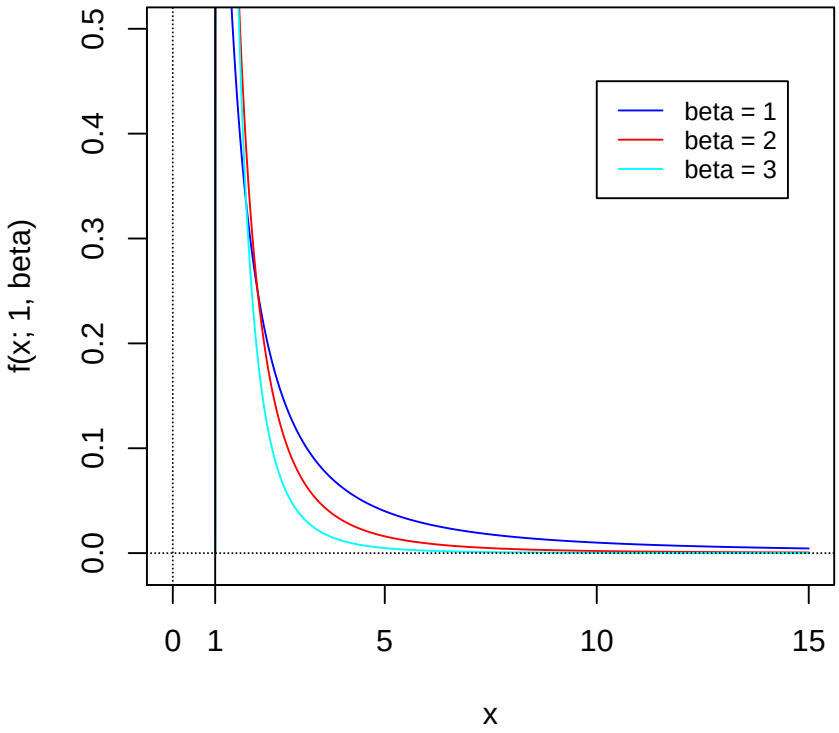

Figure 1: Pareto density, $\alpha = 1$.

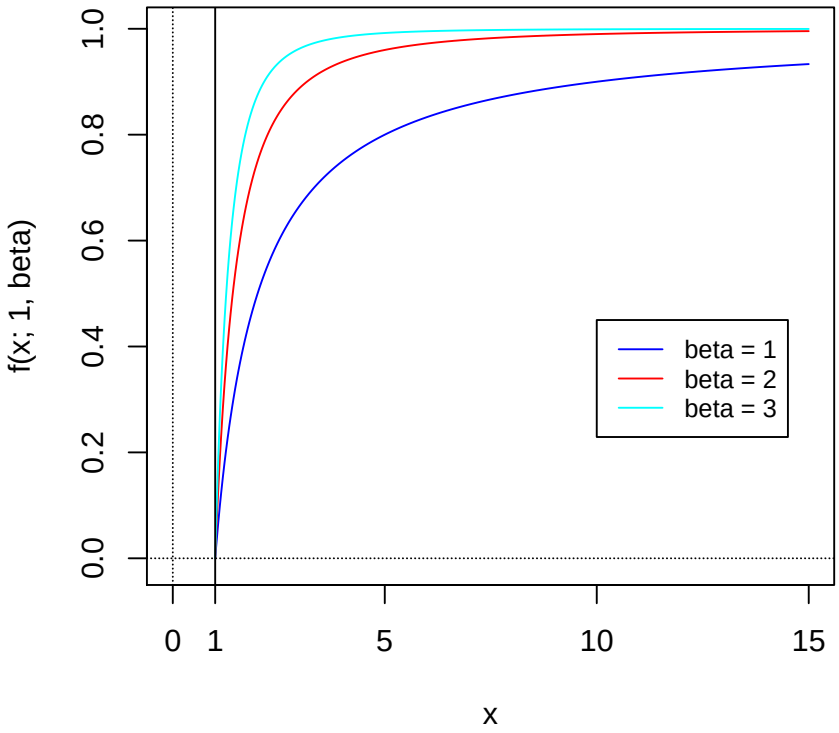

Figure 2: Pareto CDF, $\alpha = 1$.