

Some scribbles on the Pareto distribution

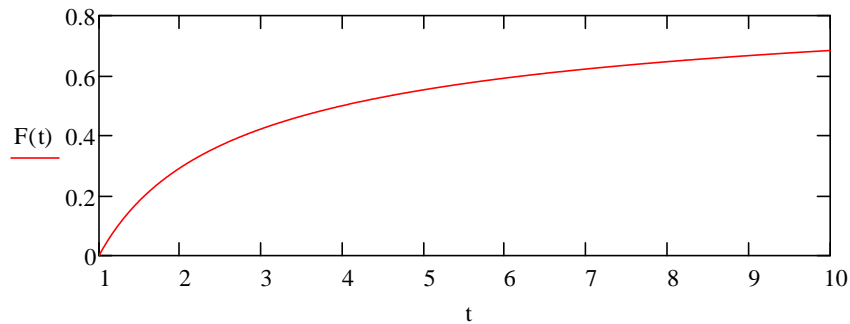
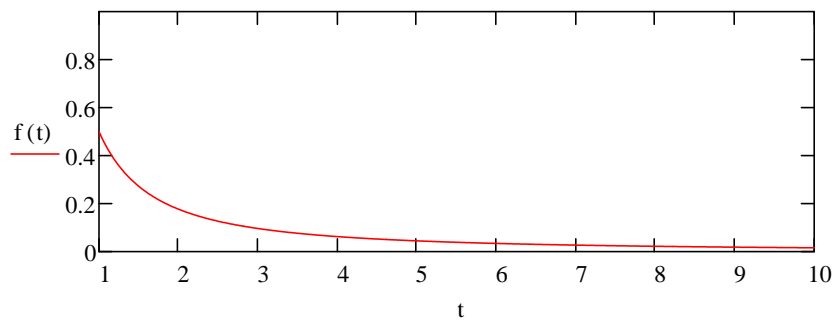
KJC (pareto.mcd - May 28, 2013)

$\alpha := 0.5$ The shape parameter

$k := 1$ The minimum value

$f(t) := \frac{\alpha \cdot k^\alpha}{t^{\alpha+1}}$ pdf

$F(t) := 1 - \left(\frac{k}{t}\right)^\alpha$ CDF $\int_1^{10000000} x \cdot f(x) dx = 3.162 \times 10^3$



What is the probability that an arrival occurs before 5, 50, 500, 5000, and 50000 seconds?

$$\int_1^5 f(t) dt = 0.553 \quad F(5) = 0.553 \quad F(50) = 0.859 \quad F(500) = 0.955 \quad F(5000) = 0.986$$

$$F(50000) = 0.996 \quad \text{Converges to 1.0 very slowly}$$

Infinite mean shown here numerically...

$$\int_1^5 x \cdot f(x) dx = 1.236 \quad \int_1^{50} x \cdot f(x) dx = 6.071 \quad \int_1^{500} x \cdot f(x) dx = 21.361$$

$$\int_1^{5000} x \cdot f(x) dx = 69.711 \quad \text{And bigger and bigger...}$$

See also: http://en.wikipedia.org/wiki/Pareto_distribution