The Exponential distribution

The Exponential distribution is a distribution concentrated on the set of positive numbers. The distribution is particularly well suited to model uncertainty of quantities being a minimum of many “underlying” variables. The Exponential distribution is often used to model uncertainty about variables representing duration. Especially it is popular as a lifetime distribution in reliability applications.

In the Exponential distribution the key numbers, “a”, “b” and “c” are interpreted as follows:

“a”
=
The 10%-fractile.

“b”
=
The 50%-fractile.

“c”
=
The 90%-fractile.

To get a sensible distribution, the specified values must satisfy:

0 < “a” < “b” < “c”

DynRisk will adjust the numbers further to make the fractiles fit the fractiles of an exponential distribution.

In many applications it is more usual to specify Exponential distribution by specifying the “transition rate” of the distribution. (In reliability applications the transition rate is usually called the “failure rate”.) To specify an Exponential distribution with transition rate say L, you can calculate the corresponding key numbers using the following:

“a” = -ln(0.9)/L

“b” = -ln(0.5)/L

“c” = -ln(0.1)/L