

$$\frac{dN_t}{dt} = r \times N_t$$

where:

$N_t$  = the population size at time t

$r$  = the intrinsic rate of growth [1/time step]

$$N_t = e^{rt+c}$$

where:

$c$  = constant which is determined from the initial condition:

$$N_{t=0} = N_0$$

thus:

$$N_t = N_0 e^{rt}$$