(b) Survival Equation

We wish to estimate the numbers that have not made a collision at some later time. Let the number of molecules surviving a collision in traveling a distance x be $N = N(x)$. If N_0 is number of molecule at $x = 0$ then number of molecule $N = N(x)$ which will suffer no collision between distance 0 to x is $N(x) = N_0 \exp\left(-\frac{x}{\lambda}\right)$ with mean path λ as parameter of gas.

The equation $N(x) = N_0 \exp\left(-\frac{x}{\lambda}\right)$ is identified as survival equation. For Maxwellian distribution into account the survival equation can be represented as

$$f(x) = \frac{N}{N_0} = \exp(1.04x/\lambda)$$

The survival equation is shown in figure.

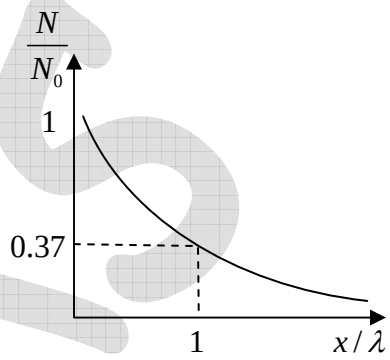

Figure 3