**Gaussian Distribution Weights**

The intensity/height of the Gaussian distribution at any point (or, jump frequency) gives the relative fraction of the population of molecules with that jump frequency.

The relative fraction of the population of molecules will give us the weights.

The height of a normal density curve at a given point x is given by:

h = e[-0.5\*{(x-𝝁)/𝝈}^2] /𝝈√(2𝝿)

Link: <http://www.stat.yale.edu/Courses/1997-98/101/normal.htm>

**Calculation of Gaussian Distribution Heights**

Mean: 𝝁 = 20000

StdDev: 𝝈 = 5% of 𝝁 = 20000 / 20 = 1000

At x = 𝝁

h𝝁 = e[-0.5\*{(𝝁 -𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e0 /1000√(2𝝿)

= (1/1000)\*√(1/2𝝿)

= 0.0004

At x = 𝝁 + 0.5𝝈

h𝝁 + 0.5𝝈 = e[-0.5\*{(𝝁+0.5𝝈-𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e[-0.5\*(0.5)^2] /1000√(2𝝿)

= (e-0.125/1000)√(1/2𝝿)

= 0.00035

At x = 𝝁 + 1.0𝝈

h𝝁 + 𝝈 = e[-0.5\*{(𝝁+1.0𝝈-𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e[-0.5\*(1)^2] /(1000√(2𝝿))

= 1/(1000\*√(2𝝿e))

= 0.00024

At x = 𝝁 + 1.5𝝈

h𝝁 + 1.5𝝈 = e[-0.5\*{(𝝁+1.5𝝈-𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e[-0.5\*(1.5)^2] /(1000√(2𝝿))

= (e-1.125/1000)√(1/(2𝝿))

= 0.00013

At x = 𝝁 + 2.0𝝈

h𝝁 + 2.0𝝈 = e[-0.5\*{(𝝁+2.0𝝈-𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e[-0.5\*(2)^2] /1000√(2𝝿)

= (e-2/1000)√(1/(2𝝿))

= 0.000054

At x = 𝝁 + 2.5𝝈

h𝝁 + 2.5𝝈 = e[-0.5\*{(𝝁+2.5𝝈-𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e[-0.5\*(2.5)^2] /1000√(2𝝿)

= (e-3.125/1000)√(1/(2𝝿))

= 0.000018

So, we get the table of Jump Frequencies and Weights as shown below:

|  |  |
| --- | --- |
| **Jump Frequency** | **Weight** |
| x = 20000 | 0.0004 |
| x = 20000+0.5𝝈 = 20000+500 = 20500 | 0.00035 |
| x = 20000+ 𝝈 = 20000+1000 = 21000 | 0.00024 |
| x = 20000+1.5𝝈 = 20000+1500 = 21500 | 0.00013 |
| x = 20000+2.0𝝈 = 20000+2000 = 22000 | 0.000054 |
| x = 20000+2.5𝝈 = 20000+2500 = 22500 | 0.000018 |