**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 = 70000

StdDev: 𝝈 = 20% of 𝝁 = 0.20 \* 70000 = 14000

At x = 𝝁

h𝝁 = e[-0.5\*{(𝝁 -𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e0 /14000√(2𝝿)

= (1/14000)\*√(1/2𝝿)

= 0.000029

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] /14000√(2𝝿)

= (e-0.125/14000/2𝝿)

= 0.000025

At x = 𝝁 + 1.0𝝈

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

= e[-0.5\*(1)^2] /(14000√(2𝝿))

= 1/(14000\*√(2𝝿e))

= 0.000017

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] /(14000√(2𝝿))

= (e-1.125/14000)√(1/(2𝝿))

= 0.0000093

At x = 𝝁 + 2.0𝝈

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

= e[-0.5\*(2)^2] /14000√(2𝝿)

= (e-2/14000)√(1/(2𝝿))

= 0.0000039

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] /14000√(2𝝿)

= (e-3.125/14000)√(1/(2𝝿))

= 0.0000013

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

|  |  |
| --- | --- |
| **Jump Frequency** | **Weight** |
| x = 70000 | 0. 000029 |
| x = 70000+0.5𝝈 = 70000+7000 = 77000 | 0. 000025 |
| x = 70000+ 𝝈 = 70000+14000 = 84000 | 0. 000017 |
| x = 70000+1.5𝝈 = 70000+21000 = 91000 | 0. 0000093 |
| x = 70000+2.0𝝈 = 70000+28000 = 98000 | 0. 0000039 |
| x = 70000+2.5𝝈 = 70000+35000 = 105000 | 0. 0000013 |