**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 = 15% of 𝝁 = 0.15 \* 70000 = 10500

At x = 𝝁

h𝝁 = e[-0.5\*{(𝝁 -𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e0 /10500√(2𝝿)

= (1/10500)\*√(1/2𝝿)

= 0.000038

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] /10500√(2𝝿)

= (e-0.125/105001/2𝝿)

= 0.000034

At x = 𝝁 + 1.0𝝈

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

= e[-0.5\*(1)^2] /(10500√(2𝝿))

= 1/(10500\*√(2𝝿e))

= 0.000023

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] /(10500√(2𝝿))

= (e-1.125/10500)√(1/(2𝝿))

= 0.000012

At x = 𝝁 + 2.0𝝈

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

= e[-0.5\*(2)^2] /10500√(2𝝿)

= (e-2/10500)√(1/(2𝝿))

= 0.000005

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] /10500√(2𝝿)

= (e-3.125/10500)√(1/(2𝝿))

= 0.0000017

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

|  |  |
| --- | --- |
| **Jump Frequency** | **Weight** |
| x = 70000 | 0.000038 |
| x = 70000+0.5𝝈 = 70000+5250 = 75250 | 0.000034 |
| x = 70000+ 𝝈 = 70000+10500 = 80500 | 0.000023 |
| x = 70000+1.5𝝈 = 70000+15750 = 85750 | 0.000012 |
| x = 70000+2.0𝝈 = 70000+21000 = 91000 | 0.000005 |
| x = 70000+2.5𝝈 = 70000+26250 = 96250 | 0.0000017 |