**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 = 15% of 𝝁 = 0.15 \* 20000 = 3000

At x = 𝝁

h𝝁 = e[-0.5\*{(𝝁 -𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e0 /3000√(2𝝿)

= (1/3000)\*√(1/2𝝿)

= 0.00013

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] /3000√(2𝝿)

= (e-0.125/3000)√(1/2𝝿)

= 0.00012

At x = 𝝁 + 1.0𝝈

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

= e[-0.5\*(1)^2] /(3000√(2𝝿))

= 1/(3000\*√(2𝝿e))

= 0.000081

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] /(3000√(2𝝿))

= (e-1.125/3000)√(1/(2𝝿))

= 0.000043

At x = 𝝁 + 2.0𝝈

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

= e[-0.5\*(2)^2] /3000√(2𝝿)

= (e-2/3000)√(1/(2𝝿))

= 0.000018

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] /3000√(2𝝿)

= (e-3.125/3000)√(1/(2𝝿))

= 0.0000058

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

|  |  |
| --- | --- |
| **Jump Frequency** | **Weight** |
| x = 20000 | 0.00013 |
| x = 20000+0.5𝝈 = 20000+1500 = 21500 | 0.00012 |
| x = 20000+ 𝝈 = 20000+3000 = 23000 | 0.000081 |
| x = 20000+1.5𝝈 = 20000+4500 = 24500 | 0.000043 |
| x = 20000+2.0𝝈 = 20000+6000 = 26000 | 0.000018 |
| x = 20000+2.5𝝈 = 20000+7500 = 27500 | 0.0000058 |