**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 = 20% of 𝝁 = 0.20 \* 20000 = 4000

At x = 𝝁

h𝝁 = e[-0.5\*{(𝝁 -𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e0 /4000√(2𝝿)

= (1/4000)\*√(1/2𝝿)

= 0.0001

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] /4000√(2𝝿)

= (e-0.125/4000)√(1/2𝝿)

= 0.000088

At x = 𝝁 + 1.0𝝈

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

= e[-0.5\*(1)^2] /(4000√(2𝝿))

= 1/(4000\*√(2𝝿e))

= 0.00006

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] /(4000√(2𝝿))

= (e-1.125/4000)√(1/(2𝝿))

= 0.000032

At x = 𝝁 + 2.0𝝈

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

= e[-0.5\*(2)^2] /4000√(2𝝿)

= (e-2/4000)√(1/(2𝝿))

= 0.0000135

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] /4000√(2𝝿)

= (e-3.125/4000)√(1/(2𝝿))

= 0.0000044

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

|  |  |
| --- | --- |
| **Jump Frequency** | **Weight** |
| x = 20000 | 0.0001 |
| x = 20000+0.5𝝈 = 20000+ 2000 = 22000 | 0.000088 |
| x = 20000+ 𝝈 = 20000+ 4000 = 24000 | 0.00006 |
| x = 20000+1.5𝝈 = 20000+ 6000 = 26000 | 0.000032 |
| x = 20000+2.0𝝈 = 20000+ 8000 = 28000 | 0.0000135 |
| x = 20000+2.5𝝈 = 20000+10000 = 30000 | 0.0000044 |