**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 = 800

StdDev: 𝝈 = 5% of 𝝁 = 𝝁 / 20 = 40

At x = 𝝁

h𝝁 = e[-0.5\*{(𝝁 -𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e0 /40√(2𝝿)

= 1/40√(1/2𝝿)

= 0.01

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] /40√(2𝝿)

= (e-0.125/40)√(1/2𝝿)

= 0.0088

At x = 𝝁 + 1.0𝝈

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

= e[-0.5\*(1)^2] /(40√(2𝝿))

= 1/(40\*√(2𝝿e))

= 0.006

At x = 𝝁 + 1.5

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

= e[-0.5\*(1.5)^2] /(40√(2𝝿))

= (e-1.125/40)√(1/(2𝝿))

= 0.0032

At x = 𝝁 + 2.0

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

= e[-0.5\*(2)^2] /40√(2𝝿)

= (e-2/40)√(1/(2𝝿))

= 0.00135

At x = 𝝁 + 2.5

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

= e[-0.5\*(2.5)^2] /40√(2𝝿)

= (e-3.125/40)√(1/(2𝝿))

= 0.00044

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

|  |  |
| --- | --- |
| **Jump Frequency** | **Weight** |
| x = 800 | 0.01 |
| x = 800+0.5𝝈 = 800+ 20 = 820 | 0.0088 |
| x = 800 + 𝝈 = 800+ 40 = 840 | 0.006 |
| x = 800+1.5𝝈 = 800+ 60 = 860 | 0.0032 |
| x = 800+2.0𝝈 = 800+ 80 = 880 | 0.00135 |
| x = 800+2.5𝝈 = 800+100 = 900 | 0.00044 |