**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 = 5% of 𝝁 = 70000 / 20 = 3500

At x = 𝝁

h𝝁 = e[-0.5\*{(𝝁 -𝝁)/𝝈}^2] /𝝈√(2𝝿)

= e0 /3500√(2𝝿)

= (1/3500)\*√(1/2𝝿)

= 0.000114

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] /3500√(2𝝿)

= (e-0.125/3500)√(1/2𝝿)

= 0.0001

At x = 𝝁 + 1.0𝝈

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

= e[-0.5\*(1)^2] /(3500√(2𝝿))

= 1/(3500\*√(2𝝿e))

= 0.000069

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] /(3500√(2𝝿))

= (e-1.125/3500)√(1/(2𝝿))

= 0.000037

At x = 𝝁 + 2.0𝝈

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

= e[-0.5\*(2)^2] /3500√(2𝝿)

= (e-2/3500)√(1/(2𝝿))

= 0.000015

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] /3500√(2𝝿)

= (e-3.125/3500)√(1/(2𝝿))

= 0.000005

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

|  |  |
| --- | --- |
| **Jump Frequency** | **Weight** |
| x = 70000 | 0. 000114 |
| x = 70000+0.5𝝈 = 70000+1750 = 71750 | 0. 0001 |
| x = 70000+ 𝝈 = 70000+3500 = 73500 | 0. 000069 |
| x = 70000+1.5𝝈 = 70000+5250 = 75250 | 0. 000037 |
| x = 70000+2.0𝝈 = 70000+7000 = 77000 | 0. 000015 |
| x = 70000+2.5𝝈 = 70000+8750 = 78750 | 0. 000005 |