Logarithms, Counting, and Physics

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Goldbach's Conjecture (and other thoughts)

An element in a set is a collection of unique (reified, indivisible) elements, which can then be defined in turn as sets of elements.

The base of a logarithm is the **count** χ of unique (single valued) elements $\sum_n 1_{x_i}$ in the set to which it refers.

For example, a set might consist of elements

$$\left\{\Omega_{x_i}\right\}=\left\{x_1=c^n, x_2=f(x), x_3=f^n\left(x\right), x_4=g(f(x)\right\}=\left\{x_1,x_2,x_3,x_4\right\}$$

$$\chi(\Omega)=\chi\left\{c^n, f(x), f^n\left(x\right), g(f(x)\right\}=\left\{1_{c^n}+1_{f(x)}+1_{f^n(x)}+1_{g(f(x))}\right\}=4,$$

so that $1_4=\log_4(4)=log_{\chi(\Omega)}\left(\chi(\Omega)\right)^1$

$$\begin{aligned}&1_4=\log_4(4)\\&4=\chi\left\{c^n, f(x), f^n\left(x\right), g(f(x)\right\}=\chi\left\{c^n, f(x), f^n\left(x\right), g(f(x)\right\}\\&\chi\left\{c^n, f(x), f^n\left(x\right), g(f(x)\right\}\triangleq\left\{1_{c^n}+1_{f(x)}+1_{f^n(x)}+1_{g(f(x))}\right\}\end{aligned}$$

The set of integers $\left\{Z\right\}$ then express the counts of the sets to which they refer. In the case the elements of the set are integers, e.g. $\Omega=\left\{4,678,(78)^5,1\right\}$, $\chi=1_4+1_{678}+1_{(78)^5}+1_1=4$ is also an integer, and by the Fundamental Theorem of Arithmetic, can be expressed as a product of primes. In this case, each element of the set can be expressed as a sum of unit integers $1_1=\log_1(1)^1$

For a set of elements consisting of a rational fraction, we have

$1_{\frac{1}{n}}=1_{n^{-1}}=\log_{n^{-1}}(1)^{n^{-1}}$ so that $1_{n\left\{\frac{1}{n}\right\}}=1_{\sum_n\left\{\frac{1}{n}\right\}}=1_1=\log_1(1)^1$

For an element equal to $\sqrt{2}$,

$1_{\sqrt{2}} = \log_{\sqrt{2}}(1)^{\sqrt{2}}$ so that for $\varphi = \sqrt{1+1}$

$$\varphi^2 = \left(\sqrt{1+1}\right)^2 = \left(\sqrt{2}\right)^2 = 2$$
$$1_{\left(\sqrt{2}\right)^2} = 1_2 = \log_2(\varphi)^2 = \log_2(\sqrt{1+1})^2 = 2$$

So that $\chi(\varphi^2) = 2$

Note that for $\varphi = 1+1$,

$\varphi^2 = (1+1)^2 = 1^2 + 1^2 + 2(1)^2 = 4(1)^2$ so that $\chi\left(\varphi^2\right) = 4$

If p is a prime number, then

$$\varphi = \sqrt{p_1 + p_2}$$
$$\varphi^2 = p_1 + p_2 = L$$
$$\chi(\varphi^2) = 2$$
$$\varphi = \sqrt{2 p_1 p_2}$$
$$\varphi^2 = 2 p_1 p_2 = 2N = N + N$$
$$\chi(\varphi^2) = 2$$
$$p_1 + p_2 = 2N$$
$$\chi(\varphi^2) = \chi(\varphi^2) = 2$$

Goldbach's conjecture is proved. For physics, the count of bosons is represented by non-interacting prime numbers as sets with counts of unit elements.