The Fine-structure Constant as a Function of the Number PI and Powers of 2

This paper presents a numeric formula for the fine-structure constant as a function of the number π and nine powers of 2.

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June 2015

Numeric Formula for the Fine-structure Constant

The numeric formula for the fine-structure constant is:

$$\alpha = \frac{1}{\left(2^4 + 2^{-6} + 2^{-8} + 2^{-10} + 2^{-14} + 2^{-16} + 2^{-17} + 2^{-18} + 2^{-22}\right) \pi^{\frac{15}{8}}} \tag{1}$$

Where α is the fine-structure constant (also known as the electromagnetic coupling constant) and

$\pi \approx 3.141\ 592\ 654$

The value this formula produces is

$\alpha \approx 0.007\ 297\ 352\ 5$

The value of the fine-structure constant given by NIST 2010 is

$\alpha_{NIST\ 2010} \approx 0.007\ 297\ 352\ 569\ 8(24)$

Therefore Formula (1) is accurate to 10 decimal places.