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Is Euler’s identity right?

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$$e^{i\pi} + 1 = 0$$

The equation $e^{i\pi} + 1 = 0$ is known as Euler's identity, and it relates the five most important mathematical constants: $0, 1, e, i$, and π.

Here's how it works:

e is the mathematical constant e (approximately 2.71828), which is the base of the natural logarithm. i is the imaginary unit (sometimes denoted by j), which is defined as the square root of -1.

π is the mathematical constant pi (approximately 3.14159), which represents the ratio of a circle's circumference to its diameter.

When we raise e to the power of i times π, we get:

$$e^{i\pi} = cos(\pi) + i.sin(\pi)$$

where $cos(\pi) = -1$ and $sin(\pi) = 0$.

So,

$$e^{i\pi} = -1 + 0.i = -1$$

And then, adding 1 to both sides gives us:

$$e^{i\pi} + 1 = 0$$

which is the famous Euler's identity (Ustinov, 2006).

The equation "e to the power of i times pi plus 1 equals 0" is one of the most famous and elegant equations in mathematics, known as Euler's identity. It relates the five most important constants in mathematics: e (the base of natural logarithms), i (the imaginary unit), pi (the ratio of a circle's circumference to its diameter), 0 (the additive identity), and 1 (the multiplicative identity).

Euler's identity shows the deep connection between the trigonometric functions (sine and cosine) and the exponential function, which are usually studied separately in mathematics. It has many applications in various fields of science and engineering, including signal processing, quantum mechanics, and electrical engineering.

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