Euler's Identity

How to combine 5 important math constants to a short formula

Max Muster[1], Lisa Master[2]

[1]Hochschule Gartenstadt
[2]Universität Übersee

May 2021

Keywords: markdown+math, VSCode, static page, publication, LaTeX, math

Abstract

Euler's identity makes a valid formula out of five mathematical constants.

1. Introduction

Euler's identity is often cited as an example of deep mathematical beauty. Three basic arithmetic operations occur exactly once and combine five fundamental mathematical constants [1].

2. The Identity

Starting from Euler's formula $e^{ix} = \cos x + i \sin x$ for any real number x, we get to Euler's identity with the special case of $x = \pi$

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

The arithmetic operations *addition*, *multiplication* and *exponentiation* combine the fundamental constants

- the additive identity 0.
- the multiplicative identity 1.
- the circle constant π.
- Euler's number e.
- the imaginary constant i.

3. Conclusion

It has been shown, how Euler's identity makes a valid formula from five mathematical constants.

References

[1] Euler's identity