Imaginary Numbers (Not)

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Euler's expressions added 9/28/2023

Imaginary Numbers (Not)

Imaginary numbers are complex only for those who think they may or may not be real.

Hypothesis: Imaginary numbers do not exist (i.e., must be real).

Proof

Hypothesis: $\left(-1\right)\left(-1\right)=1^2$

Thesis:

$$-1=n-(n+1)$$
$$\left(-1\right)\left(-1\right)=n^2+(n+1)^2-2n(n+1)$$
$$=n^2+\left[n^2+2n+1\right]-2n^2-2n$$
$$=\left[2n^2-2n^2\right]+\left[2n-2n\right]+1^2$$
$$=2\left[n^2-n^2\right]+2\left[n-n\right]+1^2$$
$$=0+0+1^2$$
$$=1^2$$
$$\therefore\left(-1\right)\left(-1\right)=1^2\quad\text{qed}$$
$$\text{Corrolary: }\sqrt{\left(-1\right)\left(-1\right)}=\sqrt{1^2}=1$$

(This procedure merely displaces the origin by one unit on the number line)

Alternatively

$$\forall n: -1 = n-(n+1) = (n-n)-1 = 0-1$$
$$(-1)(-1) = [0-1]^2 = 0^2 - 2(1)(0) + 1^2 = 1^2$$
$$\sqrt{(-1)(-1)} = 1$$
$$i := \sqrt{(-1)}$$
$$i^2 = \sqrt{(-1)}\sqrt{(-1)} = \sqrt{(-1)(-1)} = \sqrt{1^2} = 1$$
$$i^2 = 1 \neq -1$$

If there are no negative numbers, there is no complex plane, then the question is moot.

Euler's Formula

$$e^{i\phi} = [\cos(0)]\vec{i} + i[\sin(\phi)]\vec{j} = (1)\vec{i} + (i\sin\phi)\vec{j}$$

Therefore, any variation is due to ϕ so any complex area $A_I = \frac{1}{2}xy$ is also imaginary (e.g. a right triangle Ihe first quadrant)

Euler's Identity

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

But negation only indicates a difference between two existing positive group elements so that

$$-1 + 1 = 0 \leftrightarrow -1 = 1$$

That is,

"imaginary " numbers are actually real'. QED

Orthogonal vs Parallel Number Lines

Consider the ordered pair of numbers characterized by $(x, y) \equiv (x, \tau) \equiv (x, (y)i), \ \ i := \sqrt{-1}$

This is usually represented as two orthogonal axes ("SpaceTime Diagram, complex plane) where the two independent number lines meet $(0,0) \equiv (0,0)$

This is wrong conceptually, since the independent lines never meet at a common origin where $(\overline{0}) \neq (0,0)$ that is, the products $(\overline{0}) \neq \vec{0} \cdot \overleftarrow{0}$ and $(\overline{0}) \neq \vec{0} \otimes \overleftarrow{0}$ are not defined (if there is no common origin, then vectors are called "affine", meaning they are unconnected in (e.g.) 2D space). The same is applies to the complex plane.

(Note: Einstein tried to get around this in GTR by defining and "affine connection" in terms of Christoffel symbols (covariant "acceleration" as a local effect at a point on the tangent of a surface) which only addresses the interaction relation (multiplication), but not the existence relation (addition))

The graph is then represented by parallel lines, where the lines "intersect" only if they are congruent (the same number line with multiple number values in a single dimension) where the "vector products" are not defined, and Fermat's Last Theorem for the case $n = 2$ is correct:

$$c = a + b$$
$$c^2 = (a+b)^2 = [a^2 + b^2] + [2ab]$$

Where the term $[a^2 + b^2]$ represents existence (addition) and the term $[2ab]$ represents interaction (multiplication). In particular, note that $c^2 \neq (a+b)^2 = [a^2 + b^2]$ which can only be "derived" from the initial state $c = a + b$ by using complex numbers, where:

$$c := \psi := a + ib$$
$$\psi\psi^* := (a+ib)(a-ib) = a^2 + b^2$$

However, if $i^2 = -1$ then $b^2 = i^2 b^2 = (-1)b^2 = 0$ since the product of a first order function and an nth order function only meet at a common origin which does not exist in n-dimensional space. That is, the plot of $y = x$ and $y = x^2$ only meet at the origin of the dimension (x)