The Notation of Mathematics

Bill McKeeman

Dartmouth

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Mathematicians have always invented notation. It was easier when manuscripts were handwritten. Printing introduced a new player; the typesetter. Finally Donald Knuth returned notation to the exclusive hands of authors with $\LaTeX$.

Some examples, like $\sum_{i=1,\infty}(1/n)$ and $\sqrt{2}$

have made all the way into Microsoft Powerpoint.

The dominant motivations are

1. What is frequent should be brief
2. Supporting transformations that maintain correctness

The formula $e^{i\pi} + 1 = 0$ contains single-glyph representations

for the base of natural logarithms,

the ratio the diameter of a circle to its circumference, and

the square root of -1.

(231+4502)+99 = (4502+99)+231

are two different computations (when done by hand)
but we do not need to check equality because
commutivity and associativity rules

x+y=y+x and (x+y)+z=x+(y+z)

Allow us to change one side of the formula into the
other without ever having to do an addition.

And so it goes in mathematics….