Title –
DEFINING DIVISION BY ZERO (MAKING IT NOT JUST POSSIBLE, BUT ESSENTIAL) AND RELATING ZERO TO INFINITY

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Abstract –
Mathematics books say division by zero is undefined and you should never divide by zero (the special case of 0/0 is termed "indeterminate"). According to "Einstein's Only Mistake: Division by Zero" (http://refully.blogspot.com.au/2012/05/einsteins-only-mistake-division-by-zero.html),
"When Astronomers today say they are following Einsteins theory of relatively" (Einstein's theory of relativity), "they are actually not. Partially because Einstein said the Big Bang theory made no sense. He never in his lifetime accepted the Big Bang as the way our universe came into being or Black Holes. He always looked for another explanation. (And partly because) Einstein made a school boy error in algebra. What Einstein did was divide by zero during his calculations, a no, no, in math."

"Basic Technical Mathematics with Calculus, SI Version Ninth Edition" by Allyn J. Washington (Pearson Education, 2010) states on p.9, "If 0/0 = b, then 0 = 0 x b, which is true for any value of b. Therefore, no specific value of b can be determined." My aim is to show that Einstein was perfectly correct to divide by zero, that doing so enabled him to introduce his Hidden Variables theory into quantum mechanics, that zero is not nothing but actually something, that it redefines the term infinity, and that there really is another explanation for the Big Bang as well as black holes. By the way, we may have to rebuild all those sophisticated calculators that produce an error message when you try to divide by zero.

When forced to summarize the general theory of relativity in one sentence, Einstein said: time and space and gravitation have no separate existence from matter. I'll try to follow his example by attempting to summarize this idea of zero-infinity relation in one sentence: infinity is the total elimination of distance in space-time, and zero is the nothing (total elimination) that is something (a "creator" of space-time).

Content -
What does 0/0 truly mean? It's asking how many times is the origin on the number line of positive and negative numbers contained in zero – the nothing that is something. If we focus on its nothingness, no specific value can be determined and division by zero is undefined. But if we focus on its something-ness, zero could be said to go into zero an infinite number of times i.e. the operation gains substance, is defined, and produces determinism.

Einstein said hidden variables carry extra information about the world of quantum mechanics and complete it, eliminating probabilities and bringing about exact predictions. The variables thus bring determinism (an exact cause) to probabilistic quantum theory. Zero would be something if it's paired with one to form the binary digits which are used in computers and electronics.

I think the Roman philosopher Lucretius was correct 2,000 years ago when he said, "nothing can be created from nothing". The idea of quantum fluctuations - which are proposed by modern science in order to create the universe from nothing - is valid in a sense (quantum fluctuations actually happen because they're temporary changes in the amount of energy at points in space). But this doesn't mean the universe can be created from nothing (from, using traditional knowledge, zero alone). I think the universe, and life, began because brains acquire knowledge from the 4 dimensions of space-time. Then brains interact with a 5th-dimensional hyperspace to purposely switch the binary digits composing the universe from 1 to 0 or vice versa (this switching would be quantum fluctuations).

"DIGITAL" STRING THEORY AND RENORMALIZATION

Let's borrow a few ideas from string theory's ideas of everything being ultimately composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents in a four-dimensional looped superstring - "Workings of the Universe" by Time-Life Books (1991, p.84). We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) forming currents in a two-dimensional program called a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current. Combination of the 2 loops' currents requires connection of the two as a four-dimensional Klein bottle. This connection can be made with the infinitely-long irrational and transcendental numbers. Such an infinite connection* translates - via bosons being ultimately composed of the binary digits of 1 and 0 depicting pi, e, √2 etc.; and fermions being given mass by bosons interacting in matter particles' "wave packets" – into an infinite number of Figure-8 Klein bottles which are, in fact, "subuniverses" (binary digits fill in gaps and adjust edges to fit surrounding subuniverses [similar to manipulation of images by computers]). Slight "imperfections" in the way the Mobius loops fit together determine the precise nature of the binary-digit currents (the producers of space-time-hyperspace, gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force) and thus of exact mass, charge, quantum spin.

* If the material and immaterial universe consists of an infinite connection of transcendentals and irrationals, renormalization might be unnecessary in certain circumstances. This mathematical procedure is regarded as prerequisite for a useful theory and is used in attempts to unite general relativity with quantum mechanics to produce Quantum Gravity and the Theory of Everything. Renormalization seeks to cancel infinities – but in a literally infinite universe, retaining the infinite values might point the way to deeper understanding of the cosmos.
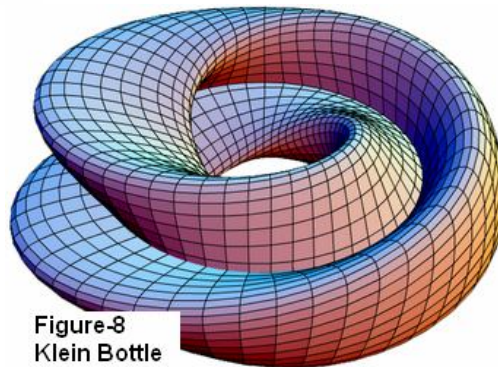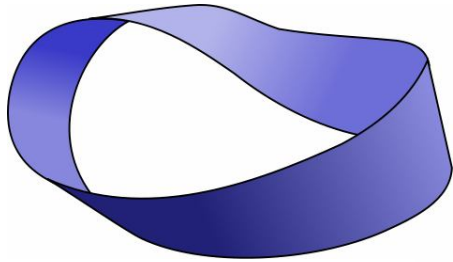
Mobius Loop

Figure-8
Klein Bottle

INFINITY

The inverse-square law states that the force between two particles becomes infinite if the distance of separation between them goes to zero. Remembering that gravitation partly depends on the distance between the centres of objects, the distance of separation between objects only goes to zero when those centres occupy the same space-time coordinates (not merely when the objects' sides are touching). That is, infinity equals the total elimination of distance – the infinite cosmos could possess this absence of distance in space and time via the electronic mechanism of binary digits, which would make the universe as malleable and flexible as any image on a computer screen. If infinity is the total elimination of distance in space-time, there would be nothing to prevent instant intergalactic travel or time travel to the past and future. Infinity does not equal nothing - total elimination of distance, or space-time, produces nothing in a physical sense and reverts to theoretical physicist Lee Smolin's imagining of strings as "not made of anything at all" - "What String Theory Tells Us About the Universe" by Dr. Odenwald : Astronomy – (April 2013, p.35). It also reverts the universe to the mathematical blueprint from which physical being is constructed (this agrees with cosmologist Tegmark's hypothesis that mathematical formulas create reality – "Is the universe actually made of math?" by Adam Frank - http://discovermagazine.com/2008/jul/16-is-the-universe-actually-made-of-math#.UZsHDaIwebs, and "The Mathematical Universe" by Max Tegmark - http://arxiv.org/abs/0704.0646. So, infinity = something (mathematics, just like zero).

STEADY STATE UNIVERSE, BIG BANG SUBUNIVERSES AND BLACK HOLES

As for the new perspective on the Big Bang, don't think of space's expansion as the universe

starting with a big bang and the galaxies forever flying apart. Think of it as the production of "new" space by binary digits which is added to existing space and pushes that existing space farther and farther away. The Law of Conservation says new space isn't created from nothing but is converted from something else. It may be speculated that new space is converted from the BITS (BInary digiTS) of 1 and 0. (Does ultra-advanced human computer technology of the far future have a role in the universe's origin and destiny?)

Also, recall that each "subuniverse" (bubble or pocket universe) is one of a series of figure-8 Klein bottles (extending infinitely in every direction) composing the physically infinite and eternal space-time of the universe. The infinite numbers make the cosmos physically infinite, the union of space and time makes it eternal, and it's in a static or steady state because it's already infinite and has no room for expansion. Our own subuniverse has a limited size (and age of 13.8 billion years), is expanding from a big bang, and has warped space-time because it's modelled on the Mobius loop, which can be fashioned by giving a strip of paper a 180-degree twist before joining the ends. (It may have DOUBLE STRANDED, spiralling DNA because the universe is modelled on TWO twisted Mobius loops.)

And the new perspective on black holes would be – in the case of the sun, our star would become a black hole if it was compressed to 2.95 kms ("From the Big Bang to Dark Energy" – a lecture on coursera.org by Hitoshi Murayama from the University of Tokyo), in which case the pressure increase "shreds" the sun into its binary digits. In other words, its mass is relativistically converted into the energy of binary digits i.e. the bosons stop interacting in wave packets to produce the forces we identify as mass, and the bosons – which are ultimately composed of the binary digits depicting pi, e, $\sqrt{2}$ etc. (see "Digital String Theory") – register as 1's and 0's.