

Humor: Einstein and Lorentz in the Twin Paradox

Einstein begins, "You know, Hendrik, people say we think so much alike we must be twins, but we are obviously different ages." Lorentz responds, "Yeah, I know, it sort of a twin paradox – I think Siggie started that one. Forget it, let's play marbles."

Lorentz said, "Here's the rules: From a 50/50% mix of red and blue marbles we each have to put the blue marbles in a blue container and the red marbles in a red container." Einstein responded, "I've done something like this before, and I noticed I get worse and worse as the number of items to sort gets larger and larger." Being the mathematicians they are, they decided to give each other a 50/50% chance of winning. That meant doing some preliminary games to develop a handicap – like in golf. First Lorentz tried it. Given 2 marbles to sort, he completed the task in 2 seconds. 4 marbles, 4 seconds; 10 marbles, 10 seconds, etc. Now, for Einstein: 2 marbles, 2 seconds; 4 marbles, 24 seconds; 10 marbles 3628800 seconds, etc. Lorentz said, "Looks like I scale linearly as x , as the number of marbles, increase ... But, wow, Albert, you scale as a factorial, $x!$ ". They both realized the handicap was $x! / x$, with Albert's nonpolynomial rate ($x!$) on top of Hendrik's simple polynomial rate (x).

Einstein said, "I think I know how to normalize for our respective handicap using a new vehicle I just invented that runs on an $E=mc^2$ engine and dilates time (t) to t' based on division of t by that equation you just discovered with $(1 - (v^2 / c^2))^{-0.5}$. We will have to neglect $F = ma$ because it will be crushing and $W = fd$ because of the consequential heat at the launch site." Lorentz agreed and added, "Let's play for the best rate, after normalization, because I don't want to do all the integrals for total velocity and time!"

Einstein fret that he had problems naming the vehicle, "I found that Folks-Wagon is taken, so I called it a You-Van. In fact, I'll ride first because you are so slow." They worked out the math and found the necessary velocity for the handicap to sort 100 marbles:

$$t' = t ((1 - (v^2 / c^2))^{-0.5})$$

solve for v , with $c = 1$:

$$v = (t'^2 - t^2)^{0.5} / t'$$

substitute the scaling factors:

$$v = (((x!)^2 - x^2)^{0.5}) / (x!)$$

enter actual numbers:

$$v = (((100!)^2 - 100^2)^{0.5}) / (100!)$$

Lorentz looked again and said, "Too bad Cook and Levin haven't been born yet!" Einstein added, "Oops, we have to wait for Wolfram, too, as we need a lot of precise digits for this calculation. Another day ..."