The Yang-Mills Hypothesis, Faster Than Light Travel and The Collatz Conjecture

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1. *The Yang Mills Hypothesis and the Existence of a Mass Gap*

Yang-Mills theories are special examples of gauge theories with a non-abelian group given by the Lagrangian [2]. As this is the case, we can solve any example of these equations to prove the finite-mass gap.

$$L_{gt} = -\frac{1}{2}Tr(F^2) \tag{1.1}$$

Taking the Lagrangian as 0.

Proof.
$0 = -\frac{1}{2}Tr(F^2)$
$\sqrt{0} = \sqrt{-\frac{1}{2}Tr(F^2)}$
□

Therefore the masses of the yang mills hypothesis or the mass solutions to the Yang-Mills theories are the non-trivial zeros of the Riemann Hypothesis. Showing that there is a finite mass gap with regards to the vacuum energy state and some of the expected lower energy states are not accounted for. See "Proof of the Riemann Hypothesis" [1] for further details. I shall also predict the existence of a single particle with an arbitrarily small negative mass that should move faster than light.

2. *Faster Than Light Travel*

Once the fundamentals of mathematics are understood, it is quite obvious that faster than light travel is a possibility. Although an exact method can not be summarised in this text nor can a proof be established yet, I shall lay out the fundamentals as to why and what exactly to expect.

The Jamell Conjecture

Firstly the problem with current mathematics is that nobody was trying to count zero. Although zero conventionally cannot be counted it is something that should at least be "attempted" to be counted. To count zero, one must count backwards and to count zero you must count negatives. Therefore the counting of zero is the counting of negatives and the counting of negatives is the counting of zero. Finally this extends to all numbers that can not be conventionally counted and the "first" of these is a half. Therefore counting a half is the same as counting zero as you are counting something that can not be counted. I shall call this

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the Jamell Conjecture and name the subsequent equation the Jamell Equation.

$$\frac{1}{2} = 0 \tag{2.1}$$

We can therefore state that whatever an engine or spacecraft must do to move faster than the speed of light would be to "count zero". Most likely by measuring and adjusting a spacecraft's energy to the vacuum energy state. This can be done by either mass or velocity manipulation. Although mass manipulation is a possibility, engineering has not come that far yet so I am suggesting some sort of velocity manipulation.

2.0.1. *Probability Drive* The only other possibility would be some sort of probability drive, requiring you to move on only one plane. If you recall from the "Proof P $\neq$ NP" [3] paper I worked on previously, there are 2 measurable planes when counting any object. Time on these planes can move either forwards or backwards, but they both have to be moving in the same direction to resolve as time moving forwards. There should be an experiment to determine if these plans move forwards or backwards and whether backwards time travel (and FTL Travel by result) is possible. I am leaning towards them moving backwards as physics plays out the same way whether we move forwards or backwards which means that probability has to act the same as well. Thus a backwards probability drive could be an alternative to a vacuum state drive.

2.0.2. *Thoughts on Backwards Time Travel and Probability* In regards to any "issues" that could arise from backwards time travel, probability most likely takes the route that brings it back to the predetermined route and it probably only works for travel as there is enough "space" between where you were at the time and your new location for you to feasibly exist there without causing any problems.

3. *The Collatz Conjecture*

The Collatz Conjecture can be stated as.

Theorem 3.1. $f(n) = \begin{cases} \frac{n}{2}, \textit{if } n \textit{ is even} \\ 3n{+}1, \textit{if } n \textit{ is odd} \end{cases}$

The Collatz Conjecture has 4 permutations.
(1) $\frac{n}{2} \to 1$.
(2) $3n + 1 \to \infty$.
(3) $\frac{3n+1}{2} \to ?$.
(4) $\frac{3n}{2} + 1 \to ?$.

Permutations 3 and 4 were created by applying one transformation to the other in the two possible sequences. We must now prove that for the two possible alternations that the end result will be 1. We shall do this using two separate proofs.

Proof.
(i) $\frac{3n+1}{2} = \frac{3n}{2} + 1$.

(ii) $\frac{1}{2} = 0$ or $-\frac{1}{2} = 0$.

$\frac{\sqrt{2}}{2} \pm i\frac{\sqrt{2}}{2} = \sqrt{0}$.
The equations meet at the Square Root of Zero [1] and are exactly on the half-line. Therefore all permutations will reach all primes and therefore will eventually reach 1. $\square$

References

1. Jamell Ivan Samuels. *A Proof of the Riemann Hypothesis*. ResearchGate, 2020.
2. Wikipedia. *Yang Mills theory*. https://en.wikipedia.org/wiki/Yang
3. Jamell Ivan Samuels. *Proof* $P \neq NP$. ResearchGate, 2020.