One possible Proof of Collatz's Conjecture

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,,...Take any natural number n. If n is even, divide it by 2 to get n / 2. If n is odd, multiply it by 3 and add 1 to obtain 3n + 1. Repeat the process (which has been called "Half Or Triple Plus One", or HOTPO) indefinitely. The conjecture is that no matter what number you start with, you will always eventually reach 1. The property has also been called oneness.

Paul Erdős said, allegedly, about the Collatz conjecture: "Mathematics is not yet ripe for such problems" and also offered $500 for its solution...."

n_1=1 --- 3x1+1 -- **4/2 -- 2/2 = 1**
n_2=2 --- **2/2 = 1**
n_3=3 --- 3x3+1 = **10/2 -- 5x3+1 -- 16/2 -- 8/2 -- 4/2 -- 2/2 = 1**
n_4=4 --- **4/2 -- 2/2 = 1**
n_5=5 --- **5x3+1 -- 16/2 -- 8/2 -- 4/2 -- 2/2 = 1**
n_6=6 --- 6/2 -- 3x3+1 -- **10/2 -- 5x3+1 -- 16/2 -- 8/2 -- 4/2 -- 2/2 = 1**
n_7=7 --- 7x3+1 -- 22/2 -- 11x3+1 -- 34/2 -- 17x3+1 -- 52/2 -- 26/2 -- 13x3+1 -- 40/2 -- 20/2 -- **10/2 -- 5x3+1 -- 16/2 -- 8/2 -- 4/2 -- 2/2 = 1**
n_8=8 --- **8/2 -- 4/2 -- 2/2 = 1**
n_9=9 --- 9x3+1 -- 28/2 -- 14/2 -- 7x3+1 -- 22/2 -- 11x3+1 -- 34/2 -- 17x3+1 -- 52/2 -- 26/2 -- 13x3+1 -- 40/2 -- 20/2 -- **10/2 -- 5x3+1 -- 16/2 -- 8/2 -- 4/2 -- -- 2/2 = 1**

$n_{10}=10$ --- **10/2 -- 5x3+1 -- 16/2 -- 8/2 -- 4/2 -- 2/2 = 1**

……….....

2.

for $n=(n_2)_n$

$(n_2)_n=2n$ --- ... -- **$5n_2/2$ -- $(2n_2 + 1)$x3 + 1 -- $6n_2 + 4$ -- $8n_2/2$ -- $4n_2/2$ -- $2n_2/2$ -- 2/2 = 1**

$(n_2)_{n+1}=2n+1$ --- ... -- **$5n_2/2$ -- $(2n_2 + 1)$x3 + 1 -- $6n_2 + 4$ -- $8n_2/2$ -- $4n_2/2$ -- $2n_2/2$ -- 2/2 = 1**

for n = k suppose that is true

$(n_2)_n=(k_2)_n=2k$ --- ... -- **$5k_2/2$ -- $(2k_2 + 1)$x3 + 1 -- $6k_2 + 4$ -- $8k_2/2$ -- $4k_2/2$ -- $2k_2/2$ -- 2/2 = 1**

$(n_2)_{n+1}=(k_2)_{n+1}=2k+1$ --- ... -- **$5k_2/2$ -- $(2k_2 + 1)$x3 + 1 -- $6k_2 + 2k_2$ -- $8k_2/2$ -- $4k_2/2$ -- $2k_2/2$ -- 2/2 = 1**

for k = k + 1

$k_{2n}=(k_{2n}+1)$ --- … -- $(5(k_2+1))$x3 +1 -- $15k_2+15$ +1 -- $15k_2+16$ -- $15k_2+8k_2$ -- $23k_2/2$ -- $(11k_2+1)$x3 +1 -- $33k_2+2k_2$-- $35k_2/2$ -- $(17k_2+1)$x3 +1 -- $51k_2+ 2k_2$ -- $53k_2/2$ -- $(26k_2+1)$x3 +1-- $78k_2+2k_2$-- $80k_2/2$ -- $40k_2/2$ -- $20k_2/2$ -- $10k_2/2$ -- **$5k_2/2$ -- $(2k_2+1)$x3 +1 -- $6k_2+2k_2$ -- $8k_2/2$ -- $4k_2/2$ -- $2k_2/2$ -- 2/2 = 1**

$k_{2n+1}=(k_{2n+1}+1)$ --- … -- $(5(k_2 +1) +1)$ -- $5k_2 +6$ -- $5k_2 +3k_2$ -- **$8k_2/2$ -- $4k_2/2$ -- $2k_2/2$ -- 2/2 = 1**

q.e.d.