Infinite sum of a fractal set of numbers

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Abstract

The infinite sum of a "fractal" set of numbers is found. The result is intended as an example of recreational mathematics, so we don't worry about mathematical rigor.

The sum or product of an infinite divergent series sometimes results in a finite number [1].

Cantor ternary set is an example of a fractal set [2].

By analogy it can be defined a "fractal" set F of natural numbers,
F = {1, 3, 7, 9, 19, 21, 25, 27, 55, 57, 61, 63, 73, 75, 79, 81, 163, ...}

Let S = 1+3+7+9+19+21+25+27+55+57+61+63+73+75+79+81+163+...

Let T and N be the sums over F of the numbers divisible and not divisible by three, i.e.
T = 3+9+21+27+57+63+75+81+...
N = 1+7+19+25+55+61+73+79+...

Obviously T + N = S

N can be rewritten in this way: N = (3-2) + (9-2) + (21-2) + (27-2) + ... =
T – (2+2+2+2+…)

Because [3] 1+1+1+ ... = -1/2,

N = T + 1 => S = 2T + 1

It can also be observed that 3S = 3+9+21+27+... = T

Replacing 3S = T in S = 2T +1 one obtains S = 6S + 1 => S = -1/5

References

[1] F. Aghili, S. Tafazoli Analytical Solution to Improper Integral of Divergent Power Functions Using The Riemann Zeta Function 2018

E. Munoz Garcia, R. Perez-Marco The product over all primes is $4\pi^2$ 2003

A. R. Kitson The regularized product of the Fibonacci numbers 2006

[2] https://en.wikipedia.org/wiki/Cantor_set

[3] https://en.wikipedia.org/wiki/1_%2B_1_%2B_1_%2B_1_%2B_%E2%8B%AF