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Quadratic convergence of a multivalued series (S_+)

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Abstract

We use the Infinity Theorem to find two possible values for S+.

keywords: multivalued series, infinity theorem

Introduction

1. In this paper, we use the **Infinity Theorem** [1].

The S_+ series

2. $S_+ = 1 + 1 + 1 + 1 + 1 + ...$

3. $S_+ = -\frac{(2n-1)}{2} = -n + \frac{1}{2}$ for $n \in \mathbb{N} = \{1, 2, 3, ...\} \cup \{0\}$.

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4. Summing over (2) and (3),

$$\sum_{n=1}^{+\infty} S_+ = \sum_{n=1}^{+\infty} \left(-n + \frac{1}{2} \right).$$

5.

$$S_+ \sum_{n=1}^{+\infty} 1 = -\sum_{n=1}^{+\infty} n + \frac{1}{2} \sum_{n=1}^{+\infty} 1$$

6. From the reference [2],

$$S = \sum_{n=1}^{+\infty} n = \{-1/12, \infty\}$$

7. Using (2), and the finite result of (6),

$$S_+^2 = \frac{1}{12} + \frac{1}{2} S_+.$$

8.

$$S_+^2 - \frac{1}{2} S_+ - \frac{1}{12} = 0$$

9.

$$S_+ = \frac{1}{4} \pm \frac{\sqrt{\frac{7}{3}}}{4}$$

Final Remarks

10.

$$S_+ = \left\{ -\frac{(2n-1)}{2}, \frac{1}{4} \pm \frac{\sqrt{\frac{7}{3}}}{4}, \pm\infty : n \in \mathbb{N} \cup \{0\} \right\}$$

Open Invitation

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Ethical conduct of research

This original work was pre-registered under the OSF Preprints [5], please cite it accordingly [6]. This will ensure that researches are conducted with integrity and intellectual honesty at all times and by all means.

References

[1] Lobo, Matheus P. "The Infinity Theorem." *OSF Preprints*, 4 Feb. 2020. https://doi.org/10.31219/osf.io/9zm6b

[2] Lobo, Matheus P. "Sum of All Natural Numbers." *OSF Preprints*, 17 Feb. 2020. https://doi.org/10.31219/osf.io/yx28b

[3] Lobo, Matheus P. "Microarticles." *OSF Preprints*, 28 Oct. 2019. https://doi.org/10.31219/osf.io/ejrct

[4] Lobo, Matheus P. "Simple Guidelines for Authors: Open Journal of Mathematics and Physics." *OSF Preprints*, 15 Nov. 2019. https://doi.org/10.31219/osf.io/fk836

[5] COS. *Open Science Framework*. https://osf.io

[6] Lobo, Matheus P. "Quadratic Convergence of a Multivalued Series (S+)." *OSF Preprints*, 18 Feb. 2020. https://doi.org/10.31219/osf.io/rx79h

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