The Irrationality of Infinite Series of a Special Kind

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The contribution provides several criteria for certain infinite series of rational numbers to be irrational, transcendental or Liouville. They are based on the following Erdős Theorem [1]:

Theorem. *Let* $\{a_n\}_{n=1}^{\infty}$ *be a strictly increasing sequence of positive integers. Suppose that*

$$\lim_{n\to\infty} \frac{a_{n+1}}{a_1 a_2 \dots a_n} = \infty.$$

Then the sum of the series

$$\sum_{n=1}^{\infty} \frac{1}{a_n}$$

is an irrational number.

Terms of the series will be constrained by specific reccurence relations. Several examples are included.

References

[1] Erdős, P.: *Problem 4321*, Amer. Math. Mothly, no **64**, (1957), p. 47.