Expressions from another alternate Rational Number Series

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Abstract

The author had submitted a paper on 'Rational Number Series'[1]. After this, papers on 'A few expressions from Rational Number Series'[2] and 'Some more expressions from Rational Number Series'[3] were submitted. Later, the Rational Number Series was looked at, in an alternate way. A paper 'Some expressions from alternate Rational Number Series'[4] was written. In this paper another alternate Rational Number Series is used to generate expressions.

Keywords

Expressions, rational number series, alternate rational number series;

Introduction

The expression $\frac{(mn+m-1)}{(mn+m)} - \frac{(mn-1)}{mn}$ was used to generate many expressions which are interesting. The papers 'A few expressions from Rational Number Series'[2] and 'Some more expressions from Rational Number Series'[3] have expressions based on $\frac{(mn+m-1)}{(mn+m)} - \frac{(mn-1)}{mn}$. Later $\frac{mn}{(mn+1)} - \frac{(mn-m)}{(mn-m+1)}$ (an alternate Rational Number Series) was tried. The expressions based on $\frac{mn}{(mn+1)} - \frac{(mn-m)}{(mn-m+1)}$ were presented in 'Some expressions from alternate Rational Number Series'[4]. In this paper the expression used is $\frac{n}{(n+1)} - \frac{(n-2)}{(n-1)}$. In total five expressions are listed below from expression $\frac{n}{(n+1)} - \frac{(n-2)}{(n-1)}$.

Expression 1

$$\frac{n}{(n+1)} - \frac{(n-2)}{(n-1)} = \frac{1}{(n-1)} - \frac{1}{(n+1)}$$

Expression 2

$$\frac{n}{(n+1)} - \frac{(n-2)}{(n-1)} = \frac{(n-2)!}{(n-1)!} - \frac{n!}{(n+1)!}$$

Expression 3

$$\sum_{n=2}^{\infty} \frac{n}{(n+1)} - \frac{(n-2)}{(n-1)} = \frac{3}{2}$$

Expression 4

$$\sum_{n=2}^{m} \frac{n}{(n+1)} - \frac{(n-2)}{(n-1)} = \frac{3m^2 - m - 2}{2m^2 + 2m}$$

Expression 5

$$\sum_{n=2}^{\infty} \frac{n^k}{(n+1)^k} - \frac{(n-2)^k}{(n-1)^k} = \frac{2^{k+1} - 1}{2^k}$$

Conclusion

In total five expressions have been submitted in this paper. The concept of another Alternate Rational Number Series can be more widely used.

References

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