Comparison between Optimized and Traditional Combinations of Combinatorics

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Abstract: This paper compares the traditional combination of combinatorics with the optimized combination introduced by Chinnaraji Annamalai, Indian Institute of Technology Kharagpur. This comparison of combinatorial combinations will be useful for the researchers who are involving to solve the problems in science and management.

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I. Introduction

The combinatorics involves with the problems of selection, arrangement, and operation within a discrete system. In this paper, the comparison between optimized [1-7] and traditional combinations defined in the field of combinatorics is discussed for applications in science and management.

II. Comparison between Traditional and Optimized Combinations

The optimized combination [1, 2] of combinatorics is expressed as follows:

$$V_r^n = \frac{(r+1)(r+2)\cdots\cdots(r+n)}{n!} = \prod_{i=1}^{n} \frac{r+i}{n!} \ (n, r \geq 1 \ \& \ n, r \in N).$$

The traditional combination of combinatorics is shown below:

$$nC_r = \frac{n!}{r!\,(n-r)!} = \frac{(r+1)(r+2)\cdots\cdots(r-(n-1)}{(n-r)!} = \prod_{i=1}^{n-1} \frac{r+i}{(n-r)!},$$

where $N = \{1, 2, 3, \cdots\cdots\}$, V_r^n is a binomial coefficient, and $n!$ is the factorial of n.

The comparison between optimized combination and traditional combination are given below:

$V_x^y = V_y^x$ denotes the otimized combination. Let $z = x + y$. Then, $zC_x = zC_y$.

For example,

$$V_3^5 = V_5^3 = (5+3)C_3 = (5+3)C_5 = 56$$

Note that both V_r^n and nC_r are not equal.

III. Conclusion

This paper compares the traditional combination of combinatorics and optimized combination introduced by Chinnaraji Annamalai[1-7]. This comparison of combinatorial results will be useful for the researchers who are involving to solve the scientific problems.

IV. References

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