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RESEARCH ARTICLE

INAUGURATION OF NEGATIVE POWER OF – N OF KIFILIDEEN TRINOMIAL THEOREM USING STANDARDIZED AND MATRIX METHODS

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ABSTRACT

The positive power of Kifilideen trinomial theorem based on matrix and standardized approach had been developed and implemented alongside the general power combination formula which helps to determine the terms in the kifilideen expansion of positive power of n of trinomial expression. This study inaugurated negative power of $-$ n of kifilideen trinomial theorem using standardized and matrix methods. Matrix was used in this research work to arrange the terms of the series of the negative power of the Kifilideen trinomial theorem. The general formula of the power combination of any term in the series was invented. The general formula to determine the term of a given power combination was also originated. It has been proving that the theorem and formulas generated are accurate, reliable, easy and interesting. The theorem helps in generating the terms of Kifilideen trinomial theorem of negative power of – n in an orderly form and makes it easy in obtaining the power combination that produce any given term and vice versa.

KEYWORDS

Kifilideen trinomial theorem, power combination formula, Kif terms formula, kif matrix, negative power.

1. INTRODUCTION

Creation of numbers is established in a unique way (Fritz et al., 2013; Hurst and Hurrell, 2014; Posamentier, 2015; Penn, 2021). Permutation and combination of numbers in different ways to generate different sets of numbers which when study critically; the set of numbers produce have marvelous and miraculous in pattern, structure, series and arrangement (Liljedahl, 2004; Itaketo, 2010; Mulligan et al., 2010; Yesildere and Akkoc, 2010; Ernest, 2015; Hessman, 2020). This makes mathematics to stand out from all other subjects such as physics, chemistry, computer science or biology (Peter, 2011; Ziegler and Loss, 2017; Rajah, 2020). Uniqueness of mathematics is not limited to the area of multiplication, calculus, and trigonometry but can also be seen in trinomial theorem which its terms can also be transformed into matrix for both trinomial expression of positive and negative power of n and – n (Osanyinpeju, 2020a).

Although to get numerous facts, latent revelation, trick, great discoveries and invention on mathematics; it required a lot of interactions with it, sacrifices of time, effort and persistence with the subject matter 'mathematics' (Osanyinpeju et al., 2019; Osanyinpeju 2020d). Good things do not come out with easy. Sir Isaac Newton was able to invent theorems and concepts in mathematics as a result of interaction with number and permutation of numbers. Development is occurring in mathematics because of its beauty and pleasure derived from it when required result is obtained and achieved (Cairbre, 2009; Mordukovich, 2011; Zeki et al., 2014; Osanyinpeju, 2019; Reynolds and Lemma, 2021).

The Kifilideen general formula for obtaining the power combination for a given term of negative power of – n of Newton binomial theorem is:

$$C_P = -11t + 10n + 11$$

Where C_P is the power combination to be determined when t^{th} term of series of expansion of the Newton binomial theorem is given. More so, n is the value of negative power of – n of the Newton binomial theorem. The general formula for the power combination for negative power of – n of the Newton binomial theorem was achieved by having full representation of the component parts of the power combination (Osanyinpeju, 2020b). The arrangement of terms of trinomial expression of positive and negative power of n and – n in periodicity and orderly manners as break ways in developing a standardized trinomial theorem which can be formulated into matrix where position of terms and power combination of each terms can be determined with easy (Osanyinpeju, 2020c).

This also lead to discovery of general formulas for terms and power combination of positive and negative power of n and – n of trinomial theorem. Matrix is used in this research work to arrange the terms of the series of the negative power of – n of Kifilideen trinomial theorem. The general formula of the power combination of any term in the series of the negative power of – n of Kifilideen trinomial was invented. The general formula to determine the term of a given power combination was also originated. The theorem helps in generating the terms of Kifilideen trinomial theorem of negative power of – n in an orderly form and makes it easy in obtaining the power combination that produce any given term and vice versa. This study inaugurated negative power of $-$ n of kifilideen trinomial theorem using standardized and matrix method.

2. MATERIALS AND METHODS

2.1 The Kifilideen expansion of negative power of – 2 of a trinomial expression $[x + y + z]$

The kif power combination of the negative power of – 2 of a trinomial

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expression in orderly manner using standardized and matrix methods are – 200, − 310, − 301, −420, – 411, − 402, − 530, −521, – 512, − 503, − 640, −631, – 622, − 613, − 604, −750, – 741, − 732, − 723, −714, – 705, − 860, − 851, −842, − 833, −824, – 815, − 806, − 970, −961, − 952, − 943, −934, – 925, − 916, − 907, −1080, − 1071, − 1062, − 1053, −1044, −1035, − 1026, − 1017, −1008, … .

Arrangement of this power combination in Kif matrix, we have;

g_1	g_2	g_3	g_4	g_5	g_6	g_7	$g_{...}$
−200							
	−310						
	−301	−420					
		−411	−530				
		−402	−521	−640			
			−512	−631	−750		
			−503	−622	−741	−860	
				−613	−732	−851	.
				−604	−723	−842	..
					−714	−833	..
					−705	−824	...
						.	...

For each power combination of any term of the series of kif expansion of trinomial theorem of negative power of – 2; the sum of the three parts of the power combination of that particular term gives a total of − 2. The group of negative power of negative power of -2 of a trinomial expression is infinity. The number of members in groups 1, 2, 3, 4 , 5, 6, 7, 8, 9, … are 1, 2, 3, 4, 5, 6, 7, 8, 9, … respectively. The value of the middle part of the power combination of the first member of the group 1, 2, 3, 4, 5, 6, 7, 8 ,9,… are 1, 2, 3, ,4, 5 , 6, 7, 8, 9, … which can be shown in the kif matrix above. For group that is having more than one member; the members are arithmetically increasing by a value of 9. To migrate from one group (first member of that group) to a successive group (first member of the processing group) a value of – 110 is added up. Across the period, the members are decreasing by a value of 119. The first member of the power combination of the series is – 200 because the negative power of the trinomial expression looking into is – 2. The negative power of – 2 of Kifilideen trinomial theorem generates infinite series.

The Kifilideen expansion of negative power of – 2 of a trinomial expression [x+y+z] is

$$[x+y+z]^{-2} = {}_{-2,0,0}^{-2}c[x]^{-2}[y]^{0}[z]^{0} + {}_{-3,1,0}^{-2}c[x]^{-3}[y]^{1}[z]^{0} +$$
$${}_{-3,0,1}^{-2}c[x]^{-3}[y]^{0}[z]^{1} + {}_{-4,2,0}^{-2}c[x]^{-4}[y]^{2}[z]^{0} + {}_{-4,1,1}^{-2}c[x]^{-4}[y]^{1}[z]^{1} +$$
$${}_{-4,0,2}^{-2}c[x]^{-4}[y]^{0}[z]^{2} + {}_{-5,3,0}^{-2}c[x]^{-5}[y]^{3}[z]^{0} + {}_{-5,2,1}^{-2}c[x]^{-5}[y]^{2}[z]^{1}$$
$${}_{-5,1,2}^{-2}c[x]^{-5}[y]^{1}[z]^{2} + {}_{-5,0,3}^{-2}c[x]^{-5}[y]^{0}[z]^{3} + {}_{-6,4,0}^{-2}c[x]^{-6}[y]^{4}[z]^{0} +$$
$${}_{-6,3,1}^{-2}c[x]^{-6}[y]^{3}[z]^{1} + {}_{-6,2,2}^{-2}c[x]^{-6}[y]^{2}[z]^{2} + {}_{-6,1,3}^{-2}c[x]^{-6}[y]^{1}[z]^{3} +$$
$${}_{-6,0,4}^{-2}c[x]^{-6}[y]^{0}[z]^{4} + {}_{-7,5,0}^{-2}c[x]^{-7}[y]^{5}[z]^{0} + {}_{-7,4,1}^{-2}c[x]^{-7}[y]^{4}[z]^{1} +$$
$${}_{-7,3,2}^{-2}c[x]^{-7}[y]^{3}[z]^{2} + {}_{-7,2,3}^{-2}c[x]^{-7}[y]^{2}[z]^{3} + {}_{-7,1,4}^{-2}c[x]^{-7}[y]^{1}[z]^{4} +$$
$${}_{-7,0,5}^{-2}c[x]^{-7}[y]^{0}[z]^{5} + {}_{-8,6,0}^{-2}c[x]^{-8}[y]^{6}[z]^{0} + {}_{-8,5,1}^{-2}c[x]^{-8}[y]^{5}[z]^{1} +$$
$${}_{-8,4,2}^{-2}c[x]^{-8}[y]^{4}[z]^{2} + {}_{-8,3,3}^{-2}c[x]^{-8}[y]^{3}[z]^{3} + {}_{-8,2,4}^{-2}c[x]^{-8}[y]^{2}[z]^{4} +$$
$${}_{-8,1,5}^{-2}c[x]^{-8}[y]^{1}[z]^{5} + {}_{-8,0,6}^{-2}c[x]^{-8}[y]^{0}[z]^{6} + {}_{-9,7,0}^{-2}c[x]^{-9}[y]^{7}[z]^{0} +$$
$${}_{-9,6,1}^{-2}c[x]^{-9}[y]^{6}[z]^{1} + {}_{-9,5,2}^{-2}c[x]^{-9}[y]^{5}[z]^{2} + {}_{-9,4,3}^{-2}c[x]^{-9}[y]^{4}[z]^{3} +$$
$${}_{-9,3,4}^{-2}c[x]^{-9}[y]^{3}[z]^{4} + {}_{-9,2,5}^{-2}c[x]^{-9}[y]^{2}[z]^{5} + {}_{-9,1,6}^{-2}c[x]^{-9}[y]^{1}[z]^{6} + {}_{-9,0,7}^{-2}c[x]^{-9}[y]^{0}[z]^{7} + \cdots \quad (1)$$

$$[x+y+z]^{-2} = \frac{-2!}{-2!0!0!}[x]^{-2}[y]^{0}[z]^{0} + \frac{-2!}{-3!1!0!}[x]^{-3}[y]^{1}[z]^{0} +$$
$$\frac{-2!}{-3!0!1!}[x]^{-3}[y]^{0}[z]^{1} + \frac{-2!}{-4!2!0!}[x]^{-4}[y]^{2}[z]^{0} + \frac{-2!}{-4!1!1!}[x]^{-4}[y]^{1}[z]^{1} +$$
$$\frac{-2!}{-4!0!2!}[x]^{-4}[y]^{0}[z]^{2} + \frac{-2!}{-5!3!0!}[x]^{-5}[y]^{3}[z]^{0} + \frac{-2!}{-5!2!1!}\,{}_{-5,2,1}^{-5}c[x]^{-5}[y]^{2}[z]^{1} +$$
$$\frac{-2!}{-5!1!2!}[x]^{-5}[y]^{1}[z]^{2} + \frac{-2!}{-5!0!3!}[x]^{-5}[y]^{0}[z]^{3} + \frac{-2!}{-6!4!0!}[x]^{-6}[y]^{4}[z]^{0} +$$
$$\frac{-2!}{-6!3!1!}[x]^{-6}[y]^{3}[z]^{1} + \frac{-2!}{-6!2!2!}[x]^{-6}[y]^{2}[z]^{2} + \frac{-2!}{-6!1!3!}[x]^{-6}[y]^{1}[z]^{3} +$$
$$\frac{-2!}{-6!0!4!}[x]^{-6}[y]^{0}[z]^{4} + \frac{-2!}{-7!5!0!}[x]^{-7}[y]^{5}[z]^{0} + \frac{-2!}{-7!4!1!}[x]^{-7}[y]^{4}[z]^{1} +$$
$$\frac{-2!}{-7!3!2!}[x]^{-7}[y]^{3}[z]^{2} + \frac{-2!}{-7!2!3!}[x]^{-7}[y]^{2}[z]^{3} + \frac{-2!}{-7!1!4!}[x]^{-7}[y]^{1}[z]^{4} +$$
$$\frac{-2!}{-7!0!5!}[x]^{-7}[y]^{0}[z]^{5} + \frac{-2!}{-8!6!0!}[x]^{-8}[y]^{6}[z]^{0} + \frac{-2!}{-8!5!1!}[x]^{-8}[y]^{5}[z]^{1} +$$
$$\frac{-2!}{-8!4!2!}[x]^{-8}[y]^{4}[z]^{2} + \frac{-2!}{-8!3!3!}[x]^{-8}[y]^{3}[z]^{3} + \frac{-2!}{-8!2!4!}[x]^{-8}[y]^{2}[z]^{4} +$$
$$\frac{-2!}{-8!1!5!}[x]^{-8}[y]^{1}[z]^{5} + \frac{-2!}{-8!0!6!}[x]^{-8}[y]^{0}[z]^{6} + \frac{-2!}{-9!7!0!}[x]^{-9}[y]^{7}[z]^{0} +$$
$$\frac{-2!}{-9!6!1!}[x]^{-9}[y]^{6}[z]^{1} + \frac{-2!}{-9!5!2!}[x]^{-9}[y]^{5}[z]^{2} + \frac{-2!}{-9!4!3!}[x]^{-9}[y]^{4}[z]^{3} +$$
$$\frac{-2!}{-9!3!4!}[x]^{-9}[y]^{3}[z]^{4} + \frac{-2!}{-9!2!5!}[x]^{-9}[y]^{2}[z]^{5} + \frac{-2!}{-9!1!6!}[x]^{-9}[y]^{1}[z]^{6} +$$
$$\frac{-2!}{-9!0!7!}[x]^{-9}[y]^{0}[z]^{7} + \cdots \quad (2)$$

$$[x+y+z]^{-2} = [x]^{-2}[y]^{0}[z]^{0} + \frac{-2}{1!0!}[x]^{-3}[y]^{1}[z]^{0} + \frac{-2}{0!1!}[x]^{-3}[y]^{0}[z]^{1}$$
$$+ \frac{-2\times-3}{2!0!}[x]^{-4}[y]^{2}[z]^{0} + \frac{-2\times-3}{1!1!}[x]^{-4}[y]^{1}[z]^{1} + \frac{-2\times-3}{0!2!}[x]^{-4}[y]^{0}[z]^{2} +$$
$$\frac{-2\times-3\times-4}{3!0!}[x]^{-5}[y]^{3}[z]^{0} + \frac{-2\times-3\times-4}{2!1!}[x]^{-5}[y]^{2}[z]^{1} + \frac{-2\times-3\times-4}{1!2!}[x]^{-5}[y]^{1}[z]^{2}$$
$$+ \frac{-2\times-3\times-4}{0!3!}[x]^{-5}[y]^{0}[z]^{3} + \frac{-2\times-3\times-4\times-5}{4!0!}[x]^{-6}[y]^{4}[z]^{0} +$$
$$\frac{-2\times-3\times-4\times-5}{3!1!}[x]^{-6}[y]^{3}[z]^{1} + \frac{-2\times-3\times-4\times-5}{2!2!}[x]^{-6}[y]^{2}[z]^{2} +$$
$$\frac{-2\times-3\times-4\times-5}{1!3!}[x]^{-6}[y]^{1}[z]^{3} + \frac{-2\times-3\times-4\times-5}{0!4!}[x]^{-6}[y]^{0}[z]^{4} +$$
$$\frac{-2\times-3\times-4\times-5\times-6}{5!0!}[x]^{-7}[y]^{5}[z]^{0} + \frac{-2\times-3\times-4\times-5\times-6}{4!1!}[x]^{-7}[y]^{4}[z]^{1} +$$
$$\frac{-2\times-3\times-4\times-5\times-6}{3!2!}[x]^{-7}[y]^{3}[z]^{2} + \frac{-2\times-3\times-4\times-5\times-6}{2!3!}[x]^{-7}[y]^{2}[z]^{3} +$$
$$\frac{-2\times-3\times-4\times-5\times-6}{1!4!}[x]^{-7}[y]^{1}[z]^{4} +$$
$$\frac{-2\times-3\times-4\times-5\times-6}{0!5!}[x]^{-7}[y]^{0}[z]^{5} + \frac{-2\times-3\times-4\times-5\times-6\times-7}{6!0!}[x]^{-8}[y]^{6}[z]^{0} +$$
$$\frac{-2\times-3\times-4\times-5\times-6\times-7}{5!1!}[x]^{-8}[y]^{5}[z]^{1} + \frac{-2\times-3\times-4\times-5\times-6\times-7}{4!2!}[x]^{-8}[y]^{4}[z]^{2}$$
$$+ \frac{-2\times-3\times-4\times-5\times-6\times-7}{3!3!}[x]^{-8}[y]^{3}[z]^{3} + \frac{-2\times-3\times-4\times-5\times-6\times-7}{2!4!}[x]^{-8}[y]^{2}[z]^{4}$$
$$+ \frac{-2\times-3\times-4\times-5\times-6\times-7}{1!5!}[x]^{-8}[y]^{1}[z]^{5} + \frac{-2\times-3\times-4\times-5\times-6\times-7}{0!6!}[x]^{-8}[y]^{0}[z]^{6}$$
$$+ \frac{-2\times-3\times-4\times-5\times-6\times-7\times-8}{7!0!}[x]^{-9}[y]^{7}[z]^{0} +$$
$$\frac{-2\times-3\times-4\times-5\times-6\times-7\times-8}{6!1!}[x]^{-9}[y]^{6}[z]^{1} +$$
$$\frac{-2\times-3\times-4\times-5\times-6\times-7\times-8}{5!2!}[x]^{-9}[y]^{5}[z]^{2} +$$
$$\frac{-2\times-3\times-4\times-5\times-6\times-7\times-8}{4!3!}[x]^{-9}[y]^{4}[z]^{3} +$$
$$\frac{-2\times-3\times-4\times-5\times-6\times-7\times-8}{3!4!}[x]^{-9}[y]^{3}[z]^{4} +$$
$$\frac{-2\times-3\times-4\times-5\times-6\times-7\times-8}{2!5!}[x]^{-9}[y]^{2}[z]^{5} +$$
$$\frac{-2\times-3\times-4\times-5\times-6\times-7\times-8}{1!6!}[x]^{-9}[y]^{1}[z]^{6} +$$
$$\frac{-2\times-3\times-4\times-5\times-6\times-7\times-8}{0!7!}[x]^{-9}[y]^{0}[z]^{7} + \cdots \quad (3)$$

2.2 The Kifilideen expansion of negative power of – n of a trinomial expression

The kif power combination of the negative power of – n of a trinomial expression in orderly manner using standardized and matrix methods are – n00, (− n−1)10, $(-n-1)01$, $(-n-2)20$, $(-n-2)11$, $(-n-2)02$, $(-n-3)30$, $(-n-3)21$, $(-n-3)12$, $(-n-3)03$, $(-n-4)40$, $(-n-4)31$, $(-n-4)22$, $(-n-4)13$, $(-n-4)04$, $(-n-5)50$, $(-n-5)41$, $(-n-5)32$, $(-n-5)23$, $(-n-5)14$, $(-n-5)05$, $(-n-6)60$,

$(-n-6)51$, $(-n-6)42$, $(-n-6)33$, $(-n-6)24$, $(-n-6)15$, $(-n-6)06$, $(-n-7)70$, $(-n-7)61$, $(-n-7)52$, $(-n-7)43$, $(-n-7)34$, $(-n-7)25$, $(-n-7)16$, $(-n-7)07$, $(-n-8)80$, $(-n-8)71$,

$(-n-8)62$, $(-n-8)53$, $(-n-8)44$, $(-n-8)35$, $(-n-8)26$, $(-n-8)17$, $(-n-8)08$, … .

Arrangement of this power combination in Kif matrix, we have;

g_1	g_2	g_3	g_4	$g_{.....}$
– n00				
	(− n − 1)10			
	(−n − 1)01	(−n − 2)20		
		(−n − 2)11	(−n−3)30	
		(−n − 2)02	(−n−3)21	.
			(−n−3)12	..
			(−n−3)03	...
				...
				....

For each power combination of any term of the series of kif expansion of trinomial theorem of negative power of – n; the sum of the three parts of the power combination of that particular term gives a total of − n. The group of negative power of negative power of – n of a trinomial expression is infinity. The number of members in groups 1, 2, 3, 4 , 5, 6, 7, 8, 9, … are 1, 2, 3, 4, 5, 6, 7, 8, 9, … respectively. The value of the middle part of the power combination of the first member of the group 1, 2, 3, 4, 5, 6, 7, 8 ,9,… are 1, 2, 3, ,4, 5 , 6, 7, 8, 9, … which can be shown in the kif matrix above. For group that is having more than one member; the members are arithmetically increasing by a value of 9. To migrate from one group (first member of that group) to a successive group (first member of the processing group) a value of – 110 is added up. Across the period, the members are decreasing by a value of 119. The first member of the power combination of the series is – n00 because the negative power of the trinomial expression looking into is – n. Furthermore, down the group the middle part of the power combination is decreasing by 1 until it get to zero while the end part of the power combination is increasing by 1. The negative power of – n of Kifilideen trinomial theorem generates infinite series.

The Kifilideen expansion of negative power of – n of a trinomial expression [x+y+z] is

$$[x+y+z]^{-n} = {}_{-n,0,0}^{-n}c[x]^{-n}[y]^0[z]^0 + {}_{-n-1,1,0}^{-n}c[x]^{-n-1}[y]^1[z]^0 +$$
$${}_{-n-1,0,1}^{-n}c[x]^{-n-1}[y]^0[z]^1 + {}_{-n-2,2,0}^{-n}c[x]^{-n-2}[y]^2[z]^0 +$$
$${}_{-n-2,1,1}^{-n}c[x]^{-n-2}[y]^1[z]^1 + {}_{-n-2,0,2}^{-n}c[x]^{-n-2}[y]^0[z]^2 +$$
$${}_{-n-3,3,0}^{-n}c[x]^{-n-3}[y]^3[z]^0 + {}_{-n-3,2,1}^{-n}c[x]^{-n-3}[y]^2[z]^1 +$$
$${}_{-n-3,1,2}^{-n}c[x]^{-n-3}[y]^1[z]^2 + {}_{-n-3,0,3}^{-n}c[x]^{-n-3}[y]^0[z]^3 +$$
$${}_{-n-4,4,0}^{-n}c[x]^{-n-4}[y]^4[z]^0 + {}_{-n-4,3,1}^{-n}c[x]^{-n-4}[y]^3[z]^1 +$$
$${}_{-n-4,2,2}^{-n}c[x]^{-n-4}[y]^2[z]^2 + {}_{-n-4,1,3}^{-n}c[x]^{-n-4}[y]^1[z]^3 +$$
$${}_{-n-4,0,4}^{-n}c[x]^{-n-4}[y]^0[z]^4 + {}_{-n-5,5,0}^{-n}c[x]^{-n-5}[y]^5[z]^0 +$$
$${}_{-n-5,4,1}^{-n}c[x]^{-n-5}[y]^4[z]^1 + {}_{-n-5,3,2}^{-n}c[x]^{-n-5}[y]^3[z]^2 +$$
$${}_{-n-5,2,3}^{-n}c[x]^{-n-5}[y]^2[z]^3 + {}_{-n-5,1,4}^{-n}c[x]^{-n-5}[y]^1[z]^4 +$$
$${}_{-n-5,0,5}^{-n}c[x]^{-n-5}[y]^0[z]^5 + {}_{-n-6,6,0}^{-n}c[x]^{-n-6}[y]^6[z]^0 +$$
$${}_{-n-6,5,1}^{-n}c[x]^{-n-6}[y]^5[z]^1 + {}_{-n-6,4,2}^{-n}c[x]^{-n-6}[y]^4[z]^2 +$$
$${}_{-n-6,3,3}^{-n}c[x]^{-n-6}[y]^3[z]^3 + {}_{-n-6,2,4}^{-n}c[x]^{-n-6}[y]^2[z]^4 +$$
$${}_{-n-6,1,5}^{-n}c[x]^{-n-6}[y]^1[z]^5 + {}_{-n-6,0,6}^{-n}c[x]^{-n-6}[y]^0[z]^6 +$$
$${}_{-n-7,7,0}^{-n}c[x]^{-n-7}[y]^7[z]^0 + {}_{-n-7,6,1}^{-n}c[x]^{-n-7}[y]^6[z]^1 +$$
$${}_{-n-7,5,2}^{-n}c[x]^{-n-7}[y]^5[z]^2 + {}_{-n-7,4,3}^{-n}c[x]^{-n-7}[y]^4[z]^3 +$$
$${}_{-n-7,3,4}^{-n}c[x]^{-n-7}[y]^3[z]^4 + {}_{-n-7,2,5}^{-n}c[x]^{-n-7}[y]^2[z]^5 + {}_{-n-7,1,6}^{-n}c[x]^{-n-7}[y]^1[z]^6 + {}_{-n-7,0,7}^{-n}c[x]^{-n-7}[y]^0[z]^7 + \cdots \quad (4)$$

$$[x+y+z]^{-n} = \frac{-n!}{-n!0!0!}[x]^{-n}[y]^0[z]^0 + \frac{-n}{-n-1!1!0!}[x]^{-n-1}[y]^1[z]^0 +$$
$$\frac{-n!}{-n-1!0!1!}[x]^{-n-1}[y]^0[z]^1 + \frac{-n!}{-n-2!2!0!}[x]^{-n-2}[y]^2[z]^0 +$$
$$\frac{-n!}{-n-2!1!1!}[x]^{-n-2}[y]^1[z]^1 + \frac{-n!}{-n-2!0!2!}[x]^{-n-2}[y]^0[z]^2 +$$
$$\frac{-n!}{-n-3!3!0!}[x]^{-n-3}[y]^3[z]^0 + \frac{-n!}{-n-3!2!1!}[x]^{-n-3}[y]^2[z]^1 +$$
$$\frac{-n!}{-n-3!1!2!}[x]^{-n-3}[y]^1[z]^2 + \frac{-n!}{-n-3!0!3!}[x]^{-n-3}[y]^0[z]^3 +$$
$$\frac{-n!}{-n-4!4!0!}[x]^{-n-4}[y]^4[z]^0 + \frac{-n!}{-n-4!3!1!}[x]^{-n-4}[y]^3[z]^1 +$$
$$\frac{-n!}{-n-4!2!2!}[x]^{-n-4}[y]^2[z]^2 + \frac{-n!}{-n-4!1!3!}[x]^{-n-4}[y]^1[z]^3 +$$
$$\frac{-n!}{-n-4!0!4!}[x]^{-n-4}[y]^0[z]^4 + \frac{-n!}{-n-5!5!0!}[x]^{-n-5}[y]^5[z]^0 +$$
$$\frac{-n!}{-n-5!4!1!}[x]^{-n-5}[y]^4[z]^1 + \frac{-n!}{-n-5!3!2!}[x]^{-n-5}[y]^3[z]^2 +$$
$$\frac{-n!}{-n-5!2!3!}[x]^{-n-5}[y]^2[z]^3 + \frac{-n!}{-n-5!1!4!}[x]^{-n-5}[y]^1[z]^4 +$$
$$\frac{-n!}{-n-5!0!5!}[x]^{-n-5}[y]^0[z]^5 + \frac{-n!}{-n-6!6!0!}[x]^{-n-6}[y]^6[z]^0 +$$
$$\frac{-n!}{-n-6!5!1!}[x]^{-n-6}[y]^5[z]^1 + \frac{-n!}{-n-6!4!2!}[x]^{-n-6}[y]^4[z]^2 +$$
$$\frac{-n!}{-n-6!3!3!}[x]^{-n-6}[y]^3[z]^3 + \frac{-n!}{-n-6!2!4!}[x]^{-n-6}[y]^2[z]^4 +$$
$$\frac{-n!}{-n-6!1!5!}[x]^{-n-6}[y]^1[z]^5 + \frac{-n!}{-n-6!0!6!}[x]^{-n-6}[y]^0[z]^6 +$$
$$\frac{-n!}{-n-7!7!0!}[x]^{-13}[y]^7[z]^0 + \frac{-n!}{-n-7!6!1!}[x]^{-13}[y]^6[z]^1 +$$
$$\frac{-n!}{-n-7!5!2!}[x]^{-n-7}[y]^5[z]^2 + \frac{-n!}{-n-7!4!3!}[x]^{-n-7}[y]^4[z]^3 +$$
$$\frac{-n!}{-n-7!3!4!}[x]^{-n-7}[y]^3[z]^4 + \frac{-n!}{n-7!2!5!}[x]^{-n-7}[y]^2[z]^5 +$$
$$\frac{-n!}{-n-7!1!6!}[x]^{-n-7}[y]^1[z]^6 + \frac{-n!}{-n-7!0!7!}[x]^{-n-7}[y]^0[z]^7 + \cdots \quad (5)$$

$$[x+y+z]^{-n} = [x]^{-n}[y]^0[z]^0 + \frac{-n}{1!0!}[x]^{-n-1}[y]^1[z]^0 +$$
$$\frac{-n}{0!1!}[x]^{-n-1}[y]^0[z]^1 + \frac{-n\times-n-1}{2!0!}[x]^{-n-2}[y]^2[z]^0 +$$
$$\frac{-n\times-n-1}{1!1!}[x]^{-n-2}[y]^1[z]^1 + \frac{-n\times-n-1}{0!2!}[x]^{-n-2}[y]^0[z]^2 +$$
$$\frac{-n\times-n-1\times-n-2}{3!0!}[x]^{-n-3}[y]^3[z]^0 + \frac{-n\times-n-1\times-n-2}{2!1!}[x]^{-n-3}[y]^2[z]^1 +$$
$$\frac{-n\times-n-1\times-n-2}{1!2!}[x]^{-n-3}[y]^1[z]^2 + \frac{-n\times-n-1\times-n-2}{0!3!}[x]^{-n-3}[y]^0[z]^3 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3}{4!0!}[x]^{-n-4}[y]^4[z]^0 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3}{3!1!}[x]^{-n-4}[y]^3[z]^1 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3}{2!2!}[x]^{-n-4}[y]^2[z]^2 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3}{1!3!}[x]^{-n-4}[y]^1[z]^3 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3}{0!4!}[x]^{-n-4}[y]^0[z]^4 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4}{5!0!}[x]^{-n-5}[y]^5[z]^0 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4}{4!1!}[x]^{-n-5}[y]^4[z]^1 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4}{3!2!}[x]^{-n-5}[y]^3[z]^2 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4}{2!3!}[x]^{-n-5}[y]^2[z]^3 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4}{1!4!}[x]^{-n-5}[y]^1[z]^4 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4}{0!5!}[x]^{-n-5}[y]^0[z]^5 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4\times n-5}{6!0!}[x]^{-n-6}[y]^6[z]^0 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4\times n-5}{5!1!}[x]^{-n-6}[y]^5[z]^1 +$$
$$\frac{-n\times-n-1\times-n-2\times-n-3\times n-4\times n-5}{4!2!}[x]^{-n-6}[y]^4[z]^2 +$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5}{3!3!}[x]^{-n-6}[y]^{3}[z]^{3}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5}{2!4!}[x]^{-n-6}[y]^{2}[z]^{4}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5}{1!5!}[x]^{-n-6}[y]^{1}[z]^{5}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5}{0!6!}[x]^{-n-6}[y]^{0}[z]^{6}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5\times n-6}{7!0!}[x]^{-n-7}[y]^{7}[z]^{0}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5\times n-6}{6!1!}[x]^{-n-7}[y]^{6}[z]^{1}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5\times n-6}{5!2!}[x]^{-n-7}[y]^{5}[z]^{2}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5\times n-6}{4!3!}[x]^{-n-7}[y]^{4}[z]^{3}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5\times n-6}{3!4!}[x]^{-n-7}[y]^{3}[z]^{4}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5\times n-6}{2!5!}[x]^{-n-7}[y]^{2}[z]^{5}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5\times n-6}{1!6!}[x]^{-n-7}[y]^{1}[z]^{6}+$$

$$\frac{-n\times -n-1\times -n-2\times -n-3\times n-4\times n-5\times n-6}{0!7!}[x]^{-n-7}[y]^{0}[z]^{7}+\cdots \quad (6)$$

Table 1 presents the Kiilideen Power combination table off the terms of the series of Kifilideen expansion of negative power of $-n$ of trinomial expression (x+y+z) in a standardized order.

Table 1: The Kifilideen general power combination table of the terms of the series of kifilideen expansion of negative power of – n of trinomial expression $(x+y+z)$ in a standardized order.

Terms	n = −1	n = −2	n = −3	n = −4	n = −5	n = −6	n = −7	n = −8	n = −9	n = −10	n = −11	n = −12	n = −13
1	-100	-200	-300	-400	-500	-600	-700	-800	-900	-1000	-1100	-1200	-1300
2	-210	-310	-410	-510	-610	-710	-810	-910	-1010	-1110	-1210	-1310	-1410
3	-201	-301	-401	-501	-601	-701	-801	-901	-1001	-1101	-1201	-1301	-1401
4	-320	-420	-520	-620	-720	-820	-920	-1020	-1120	-1220	-1320	-1420	-1520
5	-311	-411	-511	-611	-711	-811	-911	-1011	-1111	-1211	-1311	-1411	-1511
6	-302	-402	-502	-602	-702	-802	-902	-1002	-1102	-1202	-1302	-1402	-1502
7	-430	-530	-630	-730	-830	-930	-1030	-1130	-1230	-1330	-1430	-1530	-1630
8	-421	-521	-621	-721	-821	-921	-1021	-1121	-1221	-1321	-1421	-1521	-1621
9	-412	-512	-612	-712	-812	-912	-1012	-1112	-1212	-1312	-1412	-1512	-1612
10	-403	-503	-603	-703	-803	-903	-1003	-1103	-1203	-1303	-1403	-1503	-1603
11	-540	-640	-740	-840	-940	-1040	-1140	-1240	-1340	-1440	-1540	-1640	-1740
12	-531	-631	-731	-831	-931	-1031	-1131	-1231	-1331	-1431	-1531	-1631	-1731
13	-522	-622	-722	-822	-922	-1022	-1122	-1222	-1322	-1422	-1522	-1622	-1722
14	-513	-613	-713	-813	-913	-1013	-1113	-1213	-1313	-1413	-1513	-1613	-1713
15	-504	-604	-704	-804	-904	-1004	-1104	-1204	-1304	-1404	-1504	-1604	-1704
16	-650	-750	-850	-950	-1050	-1150	-1250	-1350	-1450	-1550	-1650	-1750	-1850
17	-641	-741	-841	-941	-1041	-1141	-1241	-1341	-1441	-1541	-1641	-1741	-1841
18	-632	-732	-832	-932	-1032	-1132	-1232	-1332	-1432	-1532	-1632	-1732	-1832
19	-623	-723	-823	-923	-1023	-1123	-1223	-1323	-1423	-1523	-1623	-1723	-1823
20	-614	-714	-814	-914	-1014	-1114	-1214	-1314	-1414	-1514	-1614	-1714	-1814
21	-605	-705	-805	-905	-1005	-1105	-1205	-1305	-1405	-1505	-1605	-1705	-1805
22	-760	-860	-960	-1060	-1160	-1260	-1360	-1460	-1560	-1660	-1760	-1860	-1960
23	-751	-851	-951	-1051	-1151	-1251	-1351	-1451	-1551	-1651	-1751	-1851	-1951
24	-742	-842	-942	-1042	-1142	-1242	-1342	-1442	-1542	-1642	-1742	-1842	-1942
25	-733	-833	-933	-1033	-1133	-1233	-1333	-1433	-1533	-1633	-1733	-1833	-1933
26	-724	-824	-924	-1024	-1124	-1224	-1324	-1424	-1524	-1624	-1724	-1824	-1924
27	-715	-815	-915	-1015	-1115	-1215	-1315	-1415	-1515	-1615	-1715	-1815	-1915
28	-706	-806	-906	-1006	-1106	-1206	-1306	-1406	-1506	-1606	-1706	-1806	-1906
29	-870	-970	-1070	-1170	-1270	-1370	-1470	-1570	-1670	-1770	-1870	-1970	-2070
30	-861	-961	-1061	-1161	-1261	-1361	-1461	-1561	-1661	-1761	-1861	-1961	-2061
31	-852	-952	-1052	-1152	-1252	-1352	-1452	-1552	-1652	-1752	-1852	-1952	-2052
32	-843	-943	-1043	-1143	-1243	-1343	-1443	-1543	-1643	-1743	-1843	-1943	-2043
33	-834	-934	-1034	-1134	-1234	-1334	-1434	-1534	-1634	-1734	-1834	-1934	-2034
34	-825	-925	-1025	-1125	-1225	-1325	-1425	-1525	-1625	-1725	-1825	-1925	-2025
35	-816	-916	-1016	-1116	-1216	-1316	-1416	-1516	-1616	-1716	-1816	-1916	-2016
36	-807	-907	-1007	-1107	-1207	-1307	-1407	-1507	-1607	-1707	-1807	-1907	-2007
37	-980	-1080	-1180	-1280	-1380	-1480	-1580	-1680	-1780	-1880	-1980	-2080	-2180
38	-971	-1071	-1171	-1271	-1371	-1471	-1571	-1671	-1771	-1871	-1971	-2071	-2171
39	-962	-1062	-1162	-1262	-1362	-1462	-1562	-1662	-1762	-1862	-1962	-2062	-2162
40	-953	-1053	-1153	-1253	-1353	-1453	-1553	-1653	-1753	-1853	-1953	-2053	-2153
41	-944	-1044	-1144	-1244	-1344	-1444	-1544	-1644	-1744	-1844	-1944	-2044	-2144
42	-935	-1035	-1135	-1235	-1335	-1435	-1535	-1635	-1735	-1835	-1935	-2035	-2135
43	-926	-1026	-1126	-1226	-1326	-1426	-1526	-1626	-1726	-1826	-1926	-2026	-2126
44	-917	-1017	-1117	-1217	-1317	-1417	-1517	-1617	-1717	-1817	-1917	-2017	-2117
45	-908	-1008	-1108	-1208	-1308	-1408	-1508	-1608	-1708	-1808	-1908	-2008	-2108
46	-1090	-1190	-1290	-1390	-1490	-1590	-1690	-1790	-1890	-1990	-2090	-2190	-2290
47	-1081	-1181	-1281	-1381	-1481	-1581	-1681	-1781	-1881	-1981	-2081	-2181	-2281
48	-1072	-1172	-1272	-1372	-1472	-1572	-1672	-1772	-1872	-1972	-2072	-2172	-2272
49	-1063	-1163	-1263	-1363	-1463	-1563	-1663	-1763	-1863	-1963	-2063	-2163	-2263
50	-1054	-1154	-1254	-1354	-1454	-1554	-1654	-1754	-1854	-1954	-2054	-2154	-2254
51	-1045	-1145	-1245	-1345	-1445	-1545	-1645	-1745	-1845	-1945	-2045	-2145	-2245
52	-1036	-1136	-1236	-1336	-1436	-1536	-1636	-1736	-1836	-1936	-2036	-2136	-2236
53	-1027	-1127	-1227	-1327	-1427	-1527	-1627	-1727	-1827	-1927	-2027	-2127	-2227
54	-1018	-1118	-1218	-1318	-1418	-1518	-1618	-1718	-1818	-1918	-2018	-2118	-2218
55	-1009	-1109	-1209	-1309	-1409	-1509	-1609	-1709	-1809	-1909	-2009	-2109	-2209
56	-11100	-12100	-13100	-14100	-15100	-16100	-17100	-18100	-19100	-20100	-21100	-22100	-23100
57	-1191	-1291	-1391	-1491	-1591	-1691	-1791	-1891	-1991	-2091	-2191	-2291	-2391
58	-1182	-1282	-1382	-1482	-1582	-1682	-1782	-1882	-1982	-2082	-2182	-2282	-2382
59	-1173	-1273	-1373	-1473	-1573	-1673	-1773	-1873	-1973	-2073	-2173	-2273	-2373
60	-1164	-1264	-1364	-1464	-1564	-1664	-1764	-1864	-1964	-2064	-2164	-2264	-2364
61	-1155	-1255	-1355	-1455	-1555	-1655	-1755	-1855	-1955	-2055	-2155	-2255	-2355
62	-1146	-1246	-1346	-1446	-1546	-1646	-1746	-1846	-1946	-2046	-2146	-2246	-2346
63	-1137	-1237	-1337	-1437	-1537	-1637	-1737	-1837	-1937	-2037	-2137	-2237	-2337
64	-1128	-1228	-1328	-1428	-1528	-1628	-1728	-1828	-1928	-2028	-2128	-2228	-2328
65	-1119	-1219	-1319	-1419	-1519	-1619	-1719	-1819	-1919	-2019	-2119	-2219	-2319
66	-11010	-12010	-13010	-14010	-15010	-16010	-17010	-18010	-19010	-20010	-21010	-22010	-23010

2.3 Inauguration of the Kifilideen general power combination equation or formula of any Term of Negative Power of – n of Trinomial Expression $[x + y + z]$

The Kifilideen general power combination formula of the negative power of – n of trinomial expression $[x + y + z]$ when the tth term of the series is given is stated as:

$$c_p = kif = -110x + 9(t - y) + n00 \quad (7)$$

Where,

n – the negative power of the trinomial expression

c_p –the power combination of the term

kif – the power combination of the term

t –the tth term

y – the tth term of the first term in the group the t term belong to

The value of y is determined from:

$$y = \frac{x^2+x+2}{2} \quad (8)$$

$$x = \frac{-1+\sqrt{8t-7}}{2} \quad (9)$$

Where,

x – is a constant value for the group the tth term belongs to. (the whole number value of x = [group number of the required term in the kif matrix of the negative power of –n] – 1.

2.4 Demonstration on how to utilize the Kifilideen general power combination formula of negative power of – n of Kifilideen Trinomial Theorem

[i] Determine the power combination, kif of the 20th term of Kifilideen expansion of the negative power of – 2 of trinomial expression of $[x + y + z]$

2.4.1 Solution

$$c_p = kif = -110x + 9(t - y) + n00 \quad (10)$$

From the question $n = -2$ and $t = 20$

$$x = \frac{-1+\sqrt{8t-7}}{2} \quad (11)$$

$$x = \frac{-1+\sqrt{8\times 20-7}}{2} \quad (12)$$

$$x = 5.68 \quad (13)$$

Note the whole number part of the decimal value of x is recorded as its value always. So,

$$x = 5 \quad (14)$$

$$y = \frac{x^2+x+2}{2} \quad (15)$$

$$y = \frac{5^2+5+2}{2} \quad (16)$$

$$y = 16 \quad (17)$$

$$c_p = kif = -110x + 9(t - y) + n00 \quad (18)$$

$$c_p = kif = -110 \times 5 + 9(20 - 16) - 200 \quad (19)$$

$$c_p = kif = -714 \quad (20)$$

So, $k = -7, i = 1$ and $f = 4$ which are the component of the power combination of the 20th term and the power of the 20th term of the kifilideen expansion of negative power of – 2 the trinomial expression $[x + y + z]$ is – 714.

[ii] Give the power combination, c_p of the 100th term of the Kifilideen expansion of the negative power of – 3 of the trinomial expression $[x + y + z]$

2.4.2 Solution

$$c_p = kif = -110x + 9(t - y) + n00 \quad (21)$$

From the question $n = -3$ and $t = 100$

$$x = \frac{-1+\sqrt{8t-7}}{2} \quad (22)$$

$$x = \frac{-1+\sqrt{8\times 100-7}}{2} \quad (23)$$

$$x = 13.58 \quad (24)$$

Note the whole number part of the decimal value of x is recorded as its value always. So,

$$x = 13 \quad (25)$$

$$y = \frac{x^2 + x + 2}{2}$$

$$y = \frac{13^2 + 13 + 2}{2}$$

$$y = 92 \quad (26)$$

$$c_p = kif = -110x + 9(t - y) + n00 \quad (27)$$

$$c_p = kif = -110 \times 13 + 9(100 - 92) - 300 \quad (28)$$

$$c_p = kif = -1658 \quad (29)$$

So, $k = -16, i = 5$ and $f = 8$ which are the component of the power combination of the 100th term and the power of the 100th term of the kifilideen expansion of negative power of – 3 of the trinomial expression $[x + y + z]$ is – 1658.

2.5 The Kifilideen general term formula to determine the term when the power combination of the series of negative power of $-n$ of trinomial Expression $[x + y + z]$

The Kifilideen general term formula to determine the term when the power combination of the series of negative power of $-n$ of trinomial Expression $[x + y + z]$ is given is originated as:

$$t = y + f \quad (30)$$

$x = n - k$ and $n = k + i + f$ (31) and (32)

$$y = \frac{x^2+x+2}{2} \quad (33)$$

n – the negative power of the trinomial expression

$c_p = kif$ –the power combination of the term

k, i and$f$ – the first, second and third component of power combination of the term respectively

t –the tth term

y – the tth term of the first term in the group the t term belong to

2.6 The illustration of the implementation of the Kifilideen general term formula to determine the term when the power combination of the series of negative power of $-n$ of trinomial Expression $[x + y + z]$ is given

[iii] Deduce the term of Kifilideen expansion of negative power of – 7 of trinomial expression of $[x + y + z]$ of the power combination $-20, 9, 4$.

2.6.1 Solution

n =negative power of the trinomial expression = -7

$$c_p = power\ combination = kif = -20, 9, 4 \quad (34)$$

$$So, k = -20,\ i = 9\ and\ f = 4 \quad (35)$$

Note,

$$x = n - k \quad (36)$$

$t = y + f$ and $n = k + i + f$ (37)

So,

$$x = -7 - -20 = 13 \quad (38)$$

$y = \frac{13^2+13+2}{2}$ (39)

$y = 92$ (40)

$t = y + f = 92 + 4 = 96^{th}$ term (41)

The use of the Kifilideen general term formula to determine the term of any given power combination of any negative power of $-n$ of trinomial theorem is found to be easy to work with and interest but is not direct enough. This lead to the inauguration of Kifilideen alternate general term formula to determine the term of any given power combination of any negative power of $-n$ of trinomial expression $[x + y + z]$

2.7 Development of Kifilideen alternate general term formula of a given power combination of negative power of – n of Kifilideen expansion of trinomial expression of $[x + y + z]$

The Kifilideen alternate general term formula or equation that generate a particular power combination $[c_p], kif$ of negative power of – n of Kifildeen expansion of trinomial expression of $[\boldsymbol{x} + \boldsymbol{y} + \boldsymbol{z}]$ is given as:

If the power combination of the term of the Kifilideen expansion of negative power of – n of the trinomial expression $[\boldsymbol{x} + \boldsymbol{y} + \boldsymbol{z}]$ **is** kif

Where,

kif – the power combination, c_p
k – the first component part of the power combination
i – the second component part of the power combination
f – the third component part of the power combination
n –the negative power of – n of the trinomial expression

So we have,

$t = \frac{[n-k]^2+[n-k]+2f+2}{2}$ (42)

Where,

t – the required t^{th} term
k – the first component part of the power combination
i – the second component part of the power combination
f – the third component part of the power combination
n –the negative power of – n of the trinomial expression

2.8 Illustration on the implementation of the Kifilideen alternate general term formula that generate a Particular Power Combination $[c_p], kif$

[i] Determine the negative power of – n of Kifilideen trinomial theorem that generate the power combination – 1642 and the t^{th} term of the power combination.

2.8.1 Solution

[ai] n = the negative power of $-$ n = $k + i + f$ (43)

Where,

k – the first component part of the power combination
i – the second component part of the power combination
f – the third component part of the power combination
n –the negative power of – n of the trinomial expression

From the question,

$c_p = kif = -16, 4, 2$ (44)

$k = -16, i = 4 \; and \; f = 2$ (45)

$n = -16 + 4 + 2 = -10$ (46)

[aii]

$t = \frac{[n-k]^2+[n-k]+2f+2}{2}$ (47)

$t = \frac{[-10--16]^2+[-10--16]+2\times2+2}{2}$ (48)

$t = 24^{th}$ term (49)

2.9 Kifilideen general position formula to determine the position of member in a particular group of Kif matrix of negative power of – n of Kifilideen expansion of trinomial expression $[x + y + z]$

The Kifilideen general position formula to determine the position of member in a particular group of kif matrix of negative power of – n of kifilideen expansion of trinomial expression $[x + y + z]$ is given as:

$R_{member} = F_{member} + 9[p - 1]$ (50)

$g = 1 + n - k$ (51)

Where,

R_{member} – the required power combination in which its position in the group it belongs to in the kif matrix is to be known
F_{member} – the power combination of the first member of the group in which the required power combination belong to
p – the position of the required power combination
g – the group the required power combination belong to in the kif matrix
n – the negative power of – n of the kifilideen expansion of trinomial expression $[x + y + z]^{-n}$
k – the first component part of the required power combination

2.10 Utilization of the Kifilideen general position Formula to determine the position of member in a particular group of Kif matrix of negative power of – n of Kifilideen expansion of trinomial expression $[x + y + z]$

[i] Determine the group and the position of the power combination −1635 in the group they belong to in the kif matrix

2.10.1 Solution

$C_P = kif = -1635$ (52)

So, $k = -16, \; i = 3$ and $f = 5$ (53)

$n = k + i + f = -16 + 3 + 5 = -8$ (54)

group $= g = 1 + n - k = 1 - 8 - -16 = 9$ (55)

So, power combination – 1635 belong to group 9 of the kif matrix of negative power of – 8

F_{member} =The first member of the group 4 of the kif matrix of negative power of – 8 = – 1680

$R_{member} = F_{member} + 9[p - 1]$ (56)

$-1635 = -1680 + 9[p - 1]$ (57)

$p = 6^{th}$ position (58)

2.11 Kifilideen general row column formula for negative power of – n of Kifilideen expansion of trinomial expression $[x + y + z]$

The Kifilideen general row column formula for negative power of – n of Kifilideen expansion of trinomial expression $[x + y + z]$ is given as:

$PC_{rc} = n00 - 110[r - 1] + 9[r - c]$ (59)

Where,

PC_{rc} –the power combination of row r and column c in the kif matrix
r –the row of the required power combination
c–the column of the required power combination
n – the negative power of – n of the kifilideen expansion of trinomial expression $[x + y + z]^{-n}$

2.12 Demonstration on the usage of the Kiflideen general row column formula for Negative Power of – n of Kifilideen expansion of trinomial expression $[x + y + z]$

[i] Determine the power combination of the Kifilideen expansion of negative power of – 1in the row (period) 8 and column (group) 5 of the kif matrix of the expansion of $[x + y + z]^{-1}$

2.12.1 Solution

From the question, $n = -1, r = 8$ and $c = 5$ (60)

$PC_{rc} = n00 - 110[r - 1] + 9[r - c]$ (61)

$$PC_{rc} = -100 - 110[8-1] + 9[8-5] \quad (62)$$

$$PC_{rc} = -843 \quad (63)$$

3. Conclusions

This study inaugurated negative power of − n of kifilideen trinomial theorem using standardized and matrix method. The general formula of the power combination of any term in the series was developed. The general formula to determine the term of a given power combination was also generated. Preliminary evaluation has been done on the developed theorem and formulas originated to ascertain their accuracy and workability. It has been proved that the theorem and formulas generated are accurate, reliable, easy and interesting. The theorem helps in generating the terms of Kifilideen trinomial theorem of negative power of − n in an orderly form and makes it easy in obtaining the power combination that produce any given term and vice versa.

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