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Development of Kifilideen's Elimination Matrix Model to Solve Simultaneous Equations of Four Variables $(w, x, y, and\ z)$, Three Variables$(x, y, and\ z)$, and Two Variables $(x\ and\ y)$

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Abstract

The Gaussian elimination method of solving four variables of simultaneous equations involves eliminating some elements of the simultaneous equations in triangular form to zero to determine the values of the variables of the simultaneous equations. This approach does not involve a matrix in generating the values of variables of the simultaneous equations. There is a need to develop a matrix model for solving four variables of simultaneous equations. The pattern of the developed model can be extended by solving three variables and two variables of simultaneous equations. This study develops Kifilideen's Elimination Matrix Model to solve simultaneous equations of four variables w, x, y and z, three variables x, y and z and two variables x and y. The elimination method was gradually used to reduce the number of variables of a given simultaneous equation in matrix form. In contrast, in the process, Kifilideen's Elimination Matrix Model was generated to solve the values of the variables of the simultaneous equations. The Kifilideen's Elimination Matrix Model was implemented in solving four variables w, x, y and z, three variables x, y and z and two variables x and y simultaneous equations. Kifilideen's Elimination Matrix Model has been fully utilised, attractive, accurate, and easy to understand.

INTRODUCTION

Mathematics is a branch of science that studies the pattern of arrangement and formulation of events, systems, objects and structures (Luo et al., 2021). Understanding the pattern of progression of events, systems, objects, and structures has led to many discoveries of models, formulas and equations (Kaiser et al., 2018; Yadav, 2019; Wedin, 2020). The beauty of mathematics is that it is dynamic and progressing but not static (Osanyinpeju, 2019). What mathematics requires is commitment, time, effort and much interaction with figures, shapes or numbers in different ways for new models, formulas, and equations to be generated and established (Çelik et al., 2020; Osanyinpeju, 2020a; Osanyinpeju, 2021).

The understanding and assimilation of new models, formulas and equations can be built into oneself by continuously interacting and implementing the models, formulas and equations (Osanyinpeju, 2022). As it is known, you know more about and have a better understanding of something when you continue to interact with that thing in different ways (Osanyinpeju, 2020b) more so as you have less interaction with something you know less of it (Osaninpeju, 2020c).

Simultaneous equations are two or more equations with the same unknown variables in which the values of the variable satisfy all the equations (Grcar, 2011b). The known methods of solving simultaneous equations are the elimination method, substitution method, graphical method, crammer's rule, inverse matrix method and Gaussian elimination method (Ugboduma, 2013; Woollard, 2015). Gaussian elimination method of solving four variables of simultaneous equations involves eliminating some elements of the simultaneous equation in triangular form to zero to determine the values of the variables of the simultaneous equation (Grcar, 2011a). This approach does not involve a matrix in generating the values of variables of the simultaneous equations (Luo et al., 2021). There is a need to develop a matrix model for solving four variables of simultaneous equations, and the pattern of the developed model can be extended to solving three variables and two variables of simultaneous equations. This study develops Kifilideen's Elimination Matrix Model to solve simultaneous equations of four variables w, x, $y\ and\ z$, three variables x, $y\ and\ z$ and two variables $x\ and\ y$. Implementing Kifilideen's Elimination Matrix Model generates the values of the variables of the simultaneous equations.

Literature Review

1.Kifilideen's Elimination Matrix Model to Solve Simultaneous Equations of Two Variables

The Kifilideen's Elimination Matrix Model to solve simultaneous equations of two variables $x\ and\ y$ is presented as follows:

The simultaneous equation of two variables $x\ and\ y$ is given as:

$$ax + by = k \qquad row\ 1 \qquad (1)$$

$$cx + dy = m \qquad row\ 2 \qquad (2)$$

To establish Kifilideen's Elimination Matrix Model to find x, we first eliminate y, then we have

So, we first eliminate y in (1) and (2):

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} x + \begin{vmatrix} b & b \\ d & d \end{vmatrix} y = \begin{vmatrix} k & b \\ m & d \end{vmatrix}$$

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} x = \begin{vmatrix} k & b \\ m & d \end{vmatrix} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \end{matrix}$$

To establish Kifilideen's Elimination Matrix Model to find y, we first eliminate y, then we have:

So, we first eliminate x in (1) and (2):

$$\begin{vmatrix} a & a \\ c & c \end{vmatrix} x + \begin{vmatrix} b & a \\ d & c \end{vmatrix} y = \begin{vmatrix} k & a \\ m & c \end{vmatrix} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \end{matrix}$$

$$\begin{vmatrix} b & a \\ d & c \end{vmatrix} y = \begin{vmatrix} k & a \\ m & c \end{vmatrix}$$

In general, the Kifilideen's Elimination Matrix Model to solve simultaneous equations of two variables $x\ and\ y$ is given as:

To find x:

$$\begin{array}{cc} C_x & C_y \\ \end{array} \qquad \begin{array}{cc} C_s & C_y \\ \end{array}$$
$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} x = \begin{vmatrix} k & b \\ m & d \end{vmatrix} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \end{matrix} \tag{3}$$

To find y:

$$\begin{array}{cc} C_y & C_x \\ \end{array} \qquad \begin{array}{cc} C_s & C_y \\ \end{array}$$
$$\begin{vmatrix} b & a \\ d & c \end{vmatrix} y = \begin{vmatrix} k & a \\ m & c \end{vmatrix} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \end{matrix} \tag{4}$$

The coefficients of the variable x, C_x in equations (1) and (2) are a and c, while the coefficients of the variable y, C_y in equations (1) and (2) are b and d. The coefficients of the system s, C_s in equations (1) and (2) are k and m. For Kifilideen's Elimination Matrix Models (3) and (4), the number of columns is four (2^2); two columns from the left-hand side and two columns from the right side of the model. Also, for Kifilideen's Elimination Matrix Models (3) and (4), the number of rows is four (22): two rows from the left-hand side and two rows from the right side of the model.

For all the Kifilideen's Elimination Matrix Models (3) and (4) to find the variables $x\ and\ y$, says variable x; the first column at the left (1^{st} column of the Kifilideen's Elimination Matrix model) is the coefficients of the variable x (the variable we are looking for), C_x. In contrast, the first column at the right (3^{rd} column of Kifilideen's Elimination Matrix model) is the coefficient of the system's constant, C_s. The even columns (2^{nd} and 4^{th} column of Kifilideen's Elimination Matrix model) are the coefficients of the variable y (eliminated variable), C_y. 1^{st}, 2^{nd}, 3^{rd} and 4^{th} columns of the Kifilideen's Elimination Matrix Model to find the variables $x\ and\ y$; says variable x; contains the coefficients, C_x, C_y, C_s and C_y respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable y, C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_x - 1$ column, $C_y - 2$ columns and $C_s - 1$ column. Row 1 and row 2 of the models (3) and (4) are the coefficients of Rows 1 and Row 2 in (1) and (2), respectively, in line withthe identities of $x, y\ and\ s$.

2.Kifilideen's Elimination Matrix Model to Solve Simultaneous Equations of Two Variables

The Kifilideen's Elimination Matrix Model to solve simultaneous equations of three variables $x, y\ and\ z$ is presented below:

The simultaneous equation of three variables $x, y\ and\ z$ is given as:

$$ax + by + cz = k \qquad row\ 1 \tag{5}$$
$$dx + ey + fz = m \qquad row\ 2 \tag{6}$$
$$gx + hy + jz = n \qquad row\ 3 \tag{7}$$

To generate Kifilideen's Elimination Matrix Model to find x, we first eliminate any of $y\ or\ z$, and then eliminate the one that was not eliminated in the first elimination.

To establish Kifilideen's Elimination Matrix Model to find x, we first eliminate y, then we have:

So, to generate Kifilideen's Elimination Matrix Model to find x, we first eliminate y in (5) and (6), and (6) and (7).

From (5) and (6), we have:

$$\begin{vmatrix} a & b \\ d & e \end{vmatrix} x + \begin{vmatrix} b & b \\ e & e \end{vmatrix} y + \begin{vmatrix} c & b \\ f & e \end{vmatrix} z = \begin{vmatrix} k & b \\ m & e \end{vmatrix}$$

$$\begin{vmatrix} a & b \\ d & e \end{vmatrix} x + \begin{vmatrix} c & b \\ f & e \end{vmatrix} z = \begin{vmatrix} k & b \\ m & e \end{vmatrix} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \end{matrix} \qquad (8)$$

From (6) and (7), we have:

$$\begin{vmatrix} d & e \\ g & h \end{vmatrix} x + \begin{vmatrix} e & e \\ h & h \end{vmatrix} y + \begin{vmatrix} f & e \\ j & h \end{vmatrix} z = \begin{vmatrix} m & e \\ n & h \end{vmatrix}$$

$$\begin{vmatrix} d & e \\ g & h \end{vmatrix} x + \begin{vmatrix} f & e \\ j & h \end{vmatrix} z = \begin{vmatrix} m & e \\ n & h \end{vmatrix} \qquad \begin{matrix} row\ 2 \rightarrow\ Row\ 1 \\ row\ 3 \rightarrow\ Row\ 2 \end{matrix} \qquad (9)$$

From (8) and (9), we have:

$$\begin{vmatrix} a & b \\ d & e \end{vmatrix} x + \begin{vmatrix} c & b \\ f & e \end{vmatrix} z = \begin{vmatrix} k & b \\ m & e \end{vmatrix} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \end{matrix} \qquad (10)$$

$$\begin{vmatrix} d & e \\ g & h \end{vmatrix} x + \begin{vmatrix} f & e \\ j & h \end{vmatrix} z = \begin{vmatrix} m & e \\ n & h \end{vmatrix} \qquad \begin{matrix} row\ 2 \rightarrow\ Row\ 1 \\ row\ 3 \rightarrow\ Row\ 2 \end{matrix} \qquad (11)$$

To find x, we further eliminate z in (10) and (11), so we have:

$$\begin{array}{c} \begin{matrix} C_x\ C_y & C_z\ C_y \end{matrix} \\ \left\| \begin{matrix} \begin{vmatrix} a & b \\ d & e \end{vmatrix} & \begin{vmatrix} c & b \\ f & e \end{vmatrix} \\ \begin{vmatrix} d & e \\ g & h \end{vmatrix} & \begin{vmatrix} f & e \\ j & h \end{vmatrix} \end{matrix} \right\| \end{array} x = \begin{array}{c} \begin{matrix} C_s\ C_y & C_z\ C_y \end{matrix} \\ \left\| \begin{matrix} \begin{vmatrix} k & b \\ m & e \end{vmatrix} & \begin{vmatrix} c & b \\ f & e \end{vmatrix} \\ \begin{vmatrix} m & e \\ n & h \end{vmatrix} & \begin{vmatrix} f & e \\ j & h \end{vmatrix} \end{matrix} \right\| \end{array} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \\ row\ 2 \rightarrow\ Row\ 3 \\ row\ 3 \rightarrow\ Row\ 4 \end{matrix} \qquad (12)$$

If we eliminate x in (10) and (11) in order to find z, so we have:

$$\begin{array}{c} \begin{matrix} C_z\ C_y & C_x\ C_y \end{matrix} \\ \left\| \begin{matrix} \begin{vmatrix} c & b \\ f & e \end{vmatrix} & \begin{vmatrix} a & b \\ d & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & h \end{vmatrix} & \begin{vmatrix} d & e \\ g & h \end{vmatrix} \end{matrix} \right\| \end{array} z = \begin{array}{c} \begin{matrix} C_s\ C_y & C_x\ C_y \end{matrix} \\ \left\| \begin{matrix} \begin{vmatrix} k & b \\ m & e \end{vmatrix} & \begin{vmatrix} a & b \\ d & e \end{vmatrix} \\ \begin{vmatrix} m & e \\ n & h \end{vmatrix} & \begin{vmatrix} d & e \\ g & h \end{vmatrix} \end{matrix} \right\| \end{array} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \\ row\ 2 \rightarrow\ Row\ 3 \\ row\ 3 \rightarrow\ Row\ 4 \end{matrix} \qquad (13)$$

Following the pattern of arrangement in the Kifilideen's Elimination Matrix Model established in (12) and (13), the Kifilideen's Elimination Matrix Model to solve for y if x is eliminated first and z is then eliminated, we have:

$$\begin{array}{c} \begin{matrix} C_y\ C_x & C_z\ C_x \end{matrix} \\ \left\| \begin{matrix} \begin{vmatrix} b & a \\ e & d \end{vmatrix} & \begin{vmatrix} c & a \\ f & d \end{vmatrix} \\ \begin{vmatrix} e & d \\ h & g \end{vmatrix} & \begin{vmatrix} f & d \\ j & g \end{vmatrix} \end{matrix} \right\| \end{array} y = \begin{array}{c} \begin{matrix} C_s\ C_x & C_z\ C_x \end{matrix} \\ \left\| \begin{matrix} \begin{vmatrix} k & a \\ m & d \end{vmatrix} & \begin{vmatrix} c & a \\ f & d \end{vmatrix} \\ \begin{vmatrix} m & d \\ n & g \end{vmatrix} & \begin{vmatrix} f & d \\ j & g \end{vmatrix} \end{matrix} \right\| \end{array} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \\ row\ 2 \rightarrow\ Row\ 3 \\ row\ 3 \rightarrow\ Row\ 4 \end{matrix} \qquad (14)$$

In general, the Kifilideen's Elimination Matrix Model to solve simultaneous equations of three variables $x, y\ and\ z$ is given as:

To find x, if y is first eliminated and z is eliminated second

$$\begin{array}{c} \begin{matrix} C_x\ C_y & C_z\ C_y \end{matrix} \\ \left\| \begin{matrix} \begin{vmatrix} a & b \\ d & e \end{vmatrix} & \begin{vmatrix} c & b \\ f & e \end{vmatrix} \\ \begin{vmatrix} d & e \\ g & h \end{vmatrix} & \begin{vmatrix} f & e \\ j & h \end{vmatrix} \end{matrix} \right\| \end{array} x = \begin{array}{c} \begin{matrix} C_s\ C_y & C_z\ C_y \end{matrix} \\ \left\| \begin{matrix} \begin{vmatrix} k & b \\ m & e \end{vmatrix} & \begin{vmatrix} a & b \\ f & e \end{vmatrix} \\ \begin{vmatrix} m & e \\ n & h \end{vmatrix} & \begin{vmatrix} f & e \\ j & h \end{vmatrix} \end{matrix} \right\| \end{array} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \\ row\ 2 \rightarrow\ Row\ 3 \\ row\ 3 \rightarrow\ Row\ 4 \end{matrix} \qquad (15)$$

For Kifilideen's Elimination Matrix Model to find the variable x in (15), where y is first eliminated and z is eliminated second, we have 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 6^{th}, 7^{rd} and 8^{th} columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, C_x, C_y, C_z C_y, C_s, C_y, C_z and C_y respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable y (first eliminated variable) C_y appear in four columns, the coefficients of variable z (second eliminated variable), C_z appear in two columns and the coefficients of system s, C_s appear in one column. That is C_x– 1 column, C_y– 4 columns C_z– 2 columns and C_s– 1 column. Row 1, Row 2, Row 3 and Row 4 of Kifilideen's Elimination Matrix Model model (15) are the coefficients of rows 1, row 2, row 2 and Row 3 in (5) to (7), respectively, in line with the identities of $x, y, z\ and\ s$.

OR

To find x, if z is first eliminated and y is eliminated second

$$\begin{array}{c} \begin{array}{cccc} C_x & C_z & C_y & C_z \end{array} \\ \left\| \begin{array}{cc} \begin{vmatrix} a & c \\ d & f \end{vmatrix} & \begin{vmatrix} b & c \\ e & f \end{vmatrix} \\ \begin{vmatrix} d & f \\ g & j \end{vmatrix} & \begin{vmatrix} e & f \\ h & j \end{vmatrix} \end{array} \right\| \end{array} x = \begin{array}{c} \begin{array}{cccc} C_s & C_z & C_y & C_z \end{array} \\ \left\| \begin{array}{cc} \begin{vmatrix} k & c \\ m & f \end{vmatrix} & \begin{vmatrix} b & c \\ e & f \end{vmatrix} \\ \begin{vmatrix} m & f \\ n & j \end{vmatrix} & \begin{vmatrix} e & f \\ h & j \end{vmatrix} \end{array} \right\| \end{array} \qquad \begin{array}{l} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \\ row\ 2 \rightarrow\ Row\ 3 \\ row\ 3 \rightarrow\ Row\ 4 \end{array} \tag{16}$$

For Kifilideen's Elimination Matrix Model to find the variable x in (16), where z is first eliminated, and y is eliminated second, we have 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 6^{th}, 7^{rd} and 8^{th} columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, C_x, C_z, C_y C_z, C_s, C_z, C_y and C_z respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable z (first eliminated variable) C_z appear in four columns, the coefficients of variable y (second eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is C_x– 1 column, C_z– 4 columns C_y– 2 columns and C_s– 1 column. Row 1, Row 2, Row 3 and Row 4 of Kifilideen's Elimination Matrix Model model (16) are the coefficients of rows 1, row 2, row 2 and Row 3 in (5) to (7), respectively, in line with the identities of $x, y, z\ and\ s$.

To find y, if z is first eliminated and x is eliminated second

$$\begin{array}{c} \begin{array}{cccc} C_y & C_z & C_x & C_z \end{array} \\ \left\| \begin{array}{cc} \begin{vmatrix} b & c \\ e & f \end{vmatrix} & \begin{vmatrix} a & b \\ d & e \end{vmatrix} \\ \begin{vmatrix} e & f \\ h & j \end{vmatrix} & \begin{vmatrix} d & e \\ g & h \end{vmatrix} \end{array} \right\| \end{array} y = \begin{array}{c} \begin{array}{cccc} C_s & C_z & C_x & C_z \end{array} \\ \left\| \begin{array}{cc} \begin{vmatrix} k & c \\ m & f \end{vmatrix} & \begin{vmatrix} a & c \\ d & f \end{vmatrix} \\ \begin{vmatrix} m & f \\ n & j \end{vmatrix} & \begin{vmatrix} d & f \\ g & j \end{vmatrix} \end{array} \right\| \end{array} \qquad \begin{array}{l} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \\ row\ 2 \rightarrow\ Row\ 3 \\ row\ 3 \rightarrow\ Row\ 4 \end{array} \tag{17}$$

For Kifilideen's Elimination Matrix Model to find the variable y in (17), where z is first eliminated, and x is eliminated second, we have 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 6^{th}, 7^{rd} and 8^{th} columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, C_y, C_z, C_x C_z, C_s, C_z, C_x and C_z respectively. So, the coefficients of variable y (the variable we are looking for), C_y appear in one column, the coefficients of variable z (first eliminated variable) C_z appear in four columns, the coefficients of variable x

(second eliminated variable), C_x appear in two columns and the coefficients of system s, C_s appear in one column. That is $C_y - 1$ column, $C_z - 4$ columns $C_x - 2$ columns and $C_s - 1$ column. Row 1, Row 2, Row 3 and Row 4 of Kifilideen's Elimination Matrix Model model (17) are the coefficients of rows 1, row 2, row 2 and Row 3 in (5) to (7), respectively, in lines with the identities of $x, y, z \ and \ s$.

OR

To find y, if x is first eliminated and z is eliminated second

$$\begin{array}{c} \begin{array}{cccc} C_y & C_x & C_z & C_x \end{array} \\ \left\| \begin{matrix} \begin{vmatrix} b & a \\ e & d \end{vmatrix} & \begin{vmatrix} c & a \\ f & d \end{vmatrix} \\ \begin{vmatrix} e & d \\ h & g \end{vmatrix} & \begin{vmatrix} f & d \\ j & g \end{vmatrix} \end{matrix} \right\| \end{array} y = \begin{array}{c} \begin{array}{cccc} C_s & C_x & C_z & C_x \end{array} \\ \left\| \begin{matrix} \begin{vmatrix} k & a \\ m & d \end{vmatrix} & \begin{vmatrix} c & a \\ f & d \end{vmatrix} \\ \begin{vmatrix} m & d \\ n & g \end{vmatrix} & \begin{vmatrix} f & d \\ j & g \end{vmatrix} \end{matrix} \right\| \end{array} \qquad \begin{matrix} row\ 1 \rightarrow \ Row\ 1 \\ row\ 2 \rightarrow \ Row\ 2 \\ row\ 2 \rightarrow \ Row\ 3 \\ row\ 3 \rightarrow \ Row\ 4 \end{matrix} \qquad (18)$$

For Kifilideen's Elimination Matrix Model to find the variable y in (18), where x is first eliminated, and z is eliminated second, we have 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 6^{th}, 7^{rd} and 8^{th} columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, C_y, C_x, C_z C_x, C_s, C_x, C_z and C_x respectively. So, the coefficients of variable y (the variable we are looking for), C_y appear in one column, the coefficients of variable x (first eliminated variable) C_x appear in four columns, the coefficients of variable z (second eliminated variable), C_z appear in two columns and the coefficients of system s, C_s appear in one column. That is C_y–1 column, C_x–4 columns C_z–2 columns and C_s–1 column. Row 1, Row 2, Row 3 and Row 4 of Kifilideen's Elimination Matrix Model model (18) are the coefficients of rows 1, row 2, row 2 and Row 3 in (5) to (7), respectively in line with the identities of $x, y, z \ and \ s$.

To find z, if x is first eliminated and y is eliminated second

$$\begin{array}{c} \begin{array}{cccc} C_z & C_x & C_y & C_x \end{array} \\ \left\| \begin{matrix} \begin{vmatrix} c & a \\ f & d \end{vmatrix} & \begin{vmatrix} b & a \\ e & d \end{vmatrix} \\ \begin{vmatrix} f & d \\ j & g \end{vmatrix} & \begin{vmatrix} e & d \\ h & g \end{vmatrix} \end{matrix} \right\| \end{array} z = \begin{array}{c} \begin{array}{cccc} C_s & C_x & C_y & C_x \end{array} \\ \left\| \begin{matrix} \begin{vmatrix} k & a \\ m & d \end{vmatrix} & \begin{vmatrix} b & a \\ e & d \end{vmatrix} \\ \begin{vmatrix} m & d \\ n & g \end{vmatrix} & \begin{vmatrix} e & d \\ h & g \end{vmatrix} \end{matrix} \right\| \end{array} \qquad \begin{matrix} row\ 1 \rightarrow \ Row\ 1 \\ row\ 2 \rightarrow \ Row\ 2 \\ row\ 2 \rightarrow \ Row\ 3 \\ row\ 3 \rightarrow \ Row\ 4 \end{matrix} \qquad (19)$$

For Kifilideen's Elimination Matrix Model to find the variable z in (19), where x is first eliminated, and y is eliminated second, we have 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 6^{th}, 7^{rd} and 8^{th} columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, C_z, C_x, C_y C_x, C_s, C_x, C_y and C_x respectively. So, the coefficients of variable z (the variable we are looking for), C_z appear in one column, the coefficients of variable x (first eliminated variable) C_x appear in four columns, the coefficients of variable y (second eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is $C_z - 1$ column, $C_x - 4$ columns $C_y - 2$ columns and $C_s - 1$ column. Row 1, Row 2, Row 3 and Row 4 of Kifilideen's Elimination Matrix Model model (19) are the coefficients of rows 1, row 2, row 2 and Row 3 in (5) to (7), respectively, in line with the identities of $x, y, z \ and \ s$.

OR

To find z, if y is first eliminated and x is eliminated second

$$\begin{array}{c} C_z \quad C_y \quad\; C_x \quad C_y \\ \left\| \begin{matrix} \begin{vmatrix} c & b \\ f & e \end{vmatrix} & \begin{vmatrix} a & b \\ d & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & h \end{vmatrix} & \begin{vmatrix} d & e \\ g & h \end{vmatrix} \end{matrix} \right\| \end{array} z = \begin{array}{c} C_s \quad C_y \quad\; C_x \quad C_y \\ \left\| \begin{matrix} \begin{vmatrix} k & b \\ m & e \end{vmatrix} & \begin{vmatrix} a & b \\ d & e \end{vmatrix} \\ \begin{vmatrix} m & e \\ n & h \end{vmatrix} & \begin{vmatrix} d & e \\ g & h \end{vmatrix} \end{matrix} \right\| \end{array} \qquad \begin{matrix} row\ 1 \to\ Row\ 1 \\ row\ 2 \to\ Row\ 2 \\ row\ 2 \to\ Row\ 3 \\ row\ 3 \to\ Row\ 4 \end{matrix} \qquad (20)$$

For Kifilideen's Elimination Matrix Model to find the variable z in (20), where y is first eliminated and z is eliminated second, we have 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 6^{th}, 7^{rd} and 8^{th} columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, C_z, C_y, C_x C_y, C_s, C_y, C_x and C_y respectively. So, the coefficients of variable z (the variable we are looking for), C_z appear in one column, the coefficients of variable y (first eliminated variable) C_y appear in four columns, the coefficients of variable x (second eliminated variable), C_x appear in two columns and the coefficients of system s, C_s appear in one column. That is $C_z - 1$ column, $C_y - 4$ columns $C_x - 2$ columns and $C_s - 1$ column. Row 1, Row 2, Row 3 and Row 4 of Kifilideen's Elimination Matrix Model model (20)are the coefficients of rows 1, row 2, row 2 and Row 3 in (5) to (7), respectively in line with the identities of x, y, z and s.

For all the Kifilideen's Elimination Matrix models (15) to (20) to find the variables x, y and z; the first column at the left (1^{st} column of the Kifilideen's Elimination Matrix Model) is the coefficients of the variable we are looking for while the first column at the right (5^{th} column of the Kifilideen's Elimination Matrix model) is the coefficients of the constant of the system, C_s. The coefficients of the first eliminated variable are the even columns ($2nd$ $4th$ $6th$ and $8th$ columns of the Kifilideen's Elimination Matrix model). The remaining columns (3^{rd} and 7^{th} columns of Kifilideen's Elimination Matrix model) are the coefficients of the second eliminated variable.

3.Kifilideen's Elimination Matrix Model to Solve Simultaneous Equations of Four Variables $\boldsymbol{w, x, y}$ $\boldsymbol{and}$ $\boldsymbol{z}$

The Kifilideen's Elimination Matrix Model to proffer solutions to simultaneous equations of four variables $w, x, nd\ z$ is illustrated below:

The simultaneous equation of four variables $w, x, nd\ z$ is given as:

$$aw + bx + cy + dz = r \qquad row\ 1 \qquad (21)$$

$$ew + fx + gy + hz = s \qquad row\ 2 \qquad (22)$$

$$iw + jx + ky + lz = t \qquad row\ 3 \qquad (23)$$

$$mw + nx + py + qz = v \qquad row\ 4 \qquad (24)$$

To generate Kifilideen's Elimination Matrix Model to find x, we first eliminate any of w, y or z; say w;then eliminate any of y or z; say y; then eliminate z.

To establish Kifilideen's Elimination Matrix Model to find x, we first eliminate w, then we have:

So, to generate Kifilideen's Elimination Matrix Model to find x, we first eliminate w in (21) and (22), (22) and (23), and (23) and (24).

From (21) and (22), we have:

$$\begin{vmatrix} b & a \\ f & e \end{vmatrix} x + \begin{vmatrix} c & a \\ g & e \end{vmatrix} y + \begin{vmatrix} d & a \\ h & e \end{vmatrix} z = \begin{vmatrix} r & a \\ s & e \end{vmatrix} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \end{matrix} \qquad (25)$$

From (22) and (23), we have:

$$\begin{vmatrix} f & e \\ j & i \end{vmatrix} x + \begin{vmatrix} g & e \\ k & i \end{vmatrix} y + \begin{vmatrix} h & e \\ l & i \end{vmatrix} z = \begin{vmatrix} s & e \\ t & i \end{vmatrix} \qquad \begin{matrix} row\ 2 \rightarrow\ Row\ 1 \\ row\ 3 \rightarrow\ Row\ 2 \end{matrix} \qquad (26)$$

From (23) and (24), we have:

$$\begin{vmatrix} j & i \\ n & m \end{vmatrix} x + \begin{vmatrix} k & i \\ p & m \end{vmatrix} y + \begin{vmatrix} l & i \\ q & m \end{vmatrix} z = \begin{vmatrix} t & i \\ v & m \end{vmatrix} \qquad \begin{matrix} row\ 3 \rightarrow\ Row\ 1 \\ row\ 4 \rightarrow\ Row\ 2 \end{matrix} \qquad (27)$$

To find x, we eliminate y second in (25) and (26) and (26) and (27), so we have: From (25) and (26), we have:

$$\begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} x + \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} z = \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} t & e \\ v & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \qquad \begin{matrix} row\ 1 \rightarrow\ Row\ 1 \\ row\ 2 \rightarrow\ Row\ 2 \\ row\ 2 \rightarrow\ Row\ 3 \\ row\ 3 \rightarrow\ Row\ 4 \end{matrix} \qquad (28)$$

From (26) and (27), we have:

$$\begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} x + \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} z = \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} \qquad \begin{matrix} row\ 2 \rightarrow\ Row\ 1 \\ row\ 3 \rightarrow\ Row\ 2 \\ row\ 3 \rightarrow\ Row\ 3 \\ row\ 4 \rightarrow\ Row\ 4 \end{matrix} \qquad (29)$$

To find x, we eliminate z third in (28) and (29), so we have:

$$\begin{array}{cc} C_x\ C_w\ C_y\ C_w & C_z\ C_w\ C_y\ C_w \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \end{vmatrix}} \end{array} x = \begin{array}{cc} C_s\ C_w\ C_y\ C_w & C_z\ C_w\ C_y\ C_w \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} t & e \\ v & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} \end{vmatrix}} \end{array} \qquad (30)$$

To find z, we eliminate x in (28) and (29), so we have:

$$\begin{array}{cc} C_Z\ C_w\ C_y\ C_w & C_x\ C_w\ C_y\ C_w \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} \end{vmatrix}} \end{array} z = \begin{array}{cc} C_s\ C_w\ C_y\ C_w & C_x\ C_w\ C_y\ C_w \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} \end{vmatrix}} \end{array} \qquad (31)$$

Following the pattern of arrangement in the Kifilideen's Elimination Matrix Model established in (30) and (31), the Kifilideen's Elimination Matrix Model to solve for y if x is eliminated first is eliminated second and w is eliminated third, we have:

$$\begin{array}{c} C_y \quad C_x \quad C_z \quad C_x \qquad C_w \quad C_x \quad C_z \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} c & b \\ g & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & b \\ e & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} k & j \\ p & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} i & j \\ m & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} y = \begin{array}{c} C_s \quad C_x \quad C_z \quad C_x \qquad C_w \quad C_x \quad C_z \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & b \\ s & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & b \\ e & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} t & j \\ v & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} i & j \\ m & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \qquad (32)$$

In general, the Kifilideen's Elimination Matrix Model to solve simultaneous equations of four variables $w, x, y \text{ and } z$ is given as:

To find w, if x is first eliminated, y is eliminated second, and z is eliminated third, we have:

$$\begin{array}{c} C_w \quad C_x \quad C_y \quad C_x \qquad C_z \quad C_x \quad C_y \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} a & b \\ e & f \end{vmatrix} & \begin{vmatrix} c & b \\ g & f \end{vmatrix} \\ \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & b \\ h & f \end{vmatrix} & \begin{vmatrix} c & b \\ g & f \end{vmatrix} \\ \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \\ \begin{vmatrix} i & j \\ m & n \end{vmatrix} & \begin{vmatrix} k & j \\ p & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \\ \begin{vmatrix} l & j \\ q & n \end{vmatrix} & \begin{vmatrix} k & j \\ p & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} w = \begin{array}{c} C_s \quad C_x \quad C_y \quad C_x \qquad C_z \quad C_x \quad C_y \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & b \\ s & f \end{vmatrix} & \begin{vmatrix} c & b \\ g & f \end{vmatrix} \\ \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & b \\ h & f \end{vmatrix} & \begin{vmatrix} c & b \\ g & f \end{vmatrix} \\ \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \\ \begin{vmatrix} t & j \\ v & n \end{vmatrix} & \begin{vmatrix} k & j \\ p & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \\ \begin{vmatrix} l & j \\ q & n \end{vmatrix} & \begin{vmatrix} k & j \\ p & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \qquad (33)$$

For Kifilideen's Elimination Matrix Model to find the variable w in (33), where x is first eliminated and y is eliminated second, and z is eliminated third, we have $(1^{st}, 2^{nd}, 3^{rd}, 4^{th})$, $(5^{th}, 6^{th}, 7^{th}, 8^{th})$, $(9^{th}, 10^{th}, 11^{th}, 12^{th})$, $(13^{th}, 14^{th}, 15^{th}$, and $16^{th})$ columns of the Kifilideen's Elimination Matrix Model, which contains the coefficients (C_w, C_x, C_yC_x), (C_z, C_x, C_y, C_x), (C_s, C_x, C_y, C_x), (C_z, C_x, C_y, C_x) respectively. So, the coefficients of the variable w The variable we are looking for), C_w appear in one column, the coefficients of the variable x (first eliminated variable) C_x appear in eight columns, the coefficients of the variable y (second eliminated variable), C_y appear in four columns, the coefficients of the variable z (third eliminated variable), C_z appear in two columns, and the coefficients of the system s, C_s appear in one column. That is, $C_w - 1$ column, $C_x - 8$ columns, $C_y - 4$ columns, $C_z - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (33) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z \text{ and } s$.

OR

To find w, if x is first eliminated, z is eliminated second, and y is eliminated third, we have:

$$\begin{array}{c} C_w \quad C_x \quad C_z \quad C_x \qquad C_y \quad C_x \quad C_z \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} a & b \\ e & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & b \\ g & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} i & j \\ m & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} k & j \\ p & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} w = \begin{array}{c} C_s \quad C_x \quad C_z \quad C_x \qquad C_y \quad C_x \quad C_z \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & b \\ s & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & b \\ g & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} t & j \\ v & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} k & j \\ p & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \qquad (34)$$

For Kifilideen's Elimination Matrix Model to find the variable w in (34), where x is first eliminated and z is eliminated second and y is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_w, C_x, C_z, C_x), (C_y, C_x, C_z, C_x), (C_s, C_x, C_z, C_x), (C_y, C_x, C_z, C_x) respectively. So, the coefficients of variable w (the variable we are looking for), C_w appear in one column, the coefficients of variable x (first eliminated variable) C_x appear in eight columns, the coefficients of variable z (second eliminated variable), C_z appear in four columns, the coefficients of variable y (third eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_w - 1$ column, $C_x - 8$ columns, $C_z - 4$ columns, $C_y - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (34) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.
OR
To find w, if y is first eliminated, z is eliminated second and x is eliminated third, we have:

$$\begin{array}{c} C_w\ \ C_y\ \ C_z\ \ C_y\ \ \ C_x\ \ C_y\ \ C_z\ \ C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} a & c \\ e & g \end{vmatrix} & \begin{vmatrix} d & c \\ h & g \end{vmatrix} \\ \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & c \\ f & g \end{vmatrix} & \begin{vmatrix} d & c \\ h & g \end{vmatrix} \\ \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \\ \begin{vmatrix} i & k \\ m & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \\ \begin{vmatrix} j & k \\ n & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} w = \begin{array}{c} C_s\ \ C_y\ \ C_z\ \ C_y\ \ \ C_x\ \ C_y\ \ C_z\ \ C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & c \\ s & g \end{vmatrix} & \begin{vmatrix} d & c \\ h & g \end{vmatrix} \\ \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & c \\ f & g \end{vmatrix} & \begin{vmatrix} d & c \\ h & g \end{vmatrix} \\ \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \\ \begin{vmatrix} t & k \\ v & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \\ \begin{vmatrix} j & k \\ n & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{35}$$

For Kifilideen's Elimination Matrix Model to find the variable w in (35), where y is first eliminated and z is eliminated second and x is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}, 14^{th}, 15^{th}$ and 16^{th}) columns of the Kifili-deen's Elimination Matrix Model which contains the coefficients, (C_w, C_y, C_z, C_y), (C_x, C_y, C_z, C_y), (C_s, C_y, C_z, C_y), (C_x, C_y, C_z, C_y) respectively. So, the coefficients of variable w (the variable we are looking for), C_w appear in one column, the coefficients of variable y (first eliminated variable) C_y appear in eight columns, the coefficients of variable z (second eliminated variable), C_z appear in four columns, the coefficients of variable x (third eliminated varia-ble), C_x appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_w - 1$ column, $C_y - 8$ columns, $C_z - 4$ columns, $C_x - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (35) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.
OR

To find w, if y is first eliminated, x is eliminated second and z is eliminated third, we have:

$$\begin{array}{c} C_w \;\; C_y \;\; C_x \;\; C_y \qquad C_z \;\; C_y \;\; C_x \;\; C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} a & c \\ e & g \end{vmatrix} & \begin{vmatrix} b & c \\ f & g \end{vmatrix} \\ \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & c \\ h & g \end{vmatrix} & \begin{vmatrix} b & c \\ f & g \end{vmatrix} \\ \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \\ \begin{vmatrix} i & k \\ m & p \end{vmatrix} & \begin{vmatrix} j & k \\ n & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \\ \begin{vmatrix} l & k \\ q & p \end{vmatrix} & \begin{vmatrix} j & k \\ n & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} w = \begin{array}{c} C_s \;\; C_y \;\; C_x \;\; C_y \qquad C_z \;\; C_y \;\; C_x \;\; C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & c \\ s & g \end{vmatrix} & \begin{vmatrix} b & c \\ f & g \end{vmatrix} \\ \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & c \\ h & g \end{vmatrix} & \begin{vmatrix} b & c \\ f & g \end{vmatrix} \\ \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \\ \begin{vmatrix} t & k \\ v & p \end{vmatrix} & \begin{vmatrix} j & k \\ n & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \\ \begin{vmatrix} l & k \\ q & p \end{vmatrix} & \begin{vmatrix} j & k \\ n & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{36}$$

For Kifilideen's Elimination Matrix Model to find the variable w in (36), where y is first eliminated and x is eliminated second and z is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}, 4^{th}$), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}, 14^{th}, 15^{th}$ and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_w, C_y, C_x, C_y), (C_z, C_y, C_x, C_y), (C_s, C_y, C_x, C_y), (C_z, C_y, C_x, C_y) respectively. So, the coefficients of variable w (the variable we are looking for), C_w appear in one column, the coefficients of variable y (first eliminated variable) C_y appear in eight columns, the coefficients of variable x (second eliminated variable), C_x appear in four columns, the coefficients of variable z (third eliminated variable), C_z appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_w - 1$ column, $C_y - 8$ columns, $C_x - 4$ columns, $C_z - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (36) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of w, x, y, z and s.

OR

To find w, if z is first eliminated, x is eliminated second and y is eliminated third, we have:

$$\begin{array}{c} C_w \;\; C_z \;\; C_x \;\; C_z \qquad C_y \;\; C_z \;\; C_x \;\; C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} a & d \\ e & h \end{vmatrix} & \begin{vmatrix} b & d \\ f & h \end{vmatrix} \\ \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & d \\ g & h \end{vmatrix} & \begin{vmatrix} b & d \\ f & h \end{vmatrix} \\ \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \\ \begin{vmatrix} i & l \\ m & q \end{vmatrix} & \begin{vmatrix} j & l \\ n & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \\ \begin{vmatrix} k & l \\ p & q \end{vmatrix} & \begin{vmatrix} j & l \\ n & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} w = \begin{array}{c} C_s \;\; C_z \;\; C_x \;\; C_z \qquad C_y \;\; C_z \;\; C_x \;\; C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & d \\ s & h \end{vmatrix} & \begin{vmatrix} b & d \\ f & h \end{vmatrix} \\ \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & d \\ g & h \end{vmatrix} & \begin{vmatrix} b & d \\ f & h \end{vmatrix} \\ \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \\ \begin{vmatrix} t & l \\ v & q \end{vmatrix} & \begin{vmatrix} j & l \\ n & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \\ \begin{vmatrix} k & l \\ p & q \end{vmatrix} & \begin{vmatrix} j & l \\ n & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{37}$$

For Kifilideen's Elimination Matrix Model to find the variable w in (37), where z is first eliminated and x is eliminated second and y is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}, 4^{th}$), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}, 14^{th}, 15^{th}$ and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_w, C_z, C_x, C_z), (C_y, C_z, C_x, C_z), (C_s, C_z, C_x, C_z), (C_y, C_z, C_x, C_z) respectively. So, the coefficients of variable w (the variable we are looking for), C_w appear in one column, the coefficients of variable z (first eliminated variable) C_z appear in eight columns, the coefficients of variable x (second eliminated variable), C_x appear in four columns, the coefficients of variable y (third eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_w - 1$ column, $C_z - 8$

columns, $C_x\ - 4$ columns, $C_y\ - 2$ columns and $C_s\ - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (37) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find w, if z is first eliminated, y is eliminated second and x is eliminated third, we have:

$$\begin{array}{c} C_w\quad C_z\quad C_y\quad C_z\qquad C_x\quad C_z\quad C_y\quad C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} a & d \\ e & h \end{vmatrix} & \begin{vmatrix} c & d \\ g & h \end{vmatrix} \\ \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & d \\ f & h \end{vmatrix} & \begin{vmatrix} c & d \\ g & h \end{vmatrix} \\ \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \\ \begin{vmatrix} i & l \\ m & q \end{vmatrix} & \begin{vmatrix} k & l \\ p & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \\ \begin{vmatrix} j & l \\ n & q \end{vmatrix} & \begin{vmatrix} k & l \\ p & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} w = \begin{array}{c} C_s\quad C_z\quad C_y\quad C_z\qquad C_x\quad C_z\quad C_y\quad C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & d \\ s & h \end{vmatrix} & \begin{vmatrix} c & d \\ g & h \end{vmatrix} \\ \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & d \\ f & h \end{vmatrix} & \begin{vmatrix} c & d \\ g & h \end{vmatrix} \\ \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \\ \begin{vmatrix} t & l \\ v & q \end{vmatrix} & \begin{vmatrix} k & l \\ p & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \\ \begin{vmatrix} j & l \\ n & q \end{vmatrix} & \begin{vmatrix} k & l \\ p & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{38}$$

For Kifilideen's Elimination Matrix Model to find the variable w in (38), where z is first eliminated and y is eliminated second and x is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, $(C_w, C_z, C_y, C_z), (C_x, C_z, C_y, C_z), (C_s, C_z, C_y, C_z), (C_x, C_z, C_y, C_z)$ respectively. So, the coefficients of variable w (the variable we are looking for), C_w appear in one column, the coefficients of variable z (first eliminated variable) C_z appear in eight columns, the coefficients of variable y (second eliminated variable), C_y appear in four columns, the coefficients of variable x (third eliminated variable), C_x appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_w - 1$ column, $C_z - 8$ columns, $C_y - 4$ columns, $C_x - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (38) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

To find x, if y is first eliminated, z is eliminated second and w is eliminated third, we have:

$$\begin{array}{c} C_x\quad C_y\quad C_z\quad C_y\qquad C_w\quad C_y\quad C_z\quad C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} b & c \\ f & g \end{vmatrix} & \begin{vmatrix} d & c \\ h & g \end{vmatrix} \\ \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & c \\ e & g \end{vmatrix} & \begin{vmatrix} d & c \\ h & g \end{vmatrix} \\ \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \\ \begin{vmatrix} j & k \\ n & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \\ \begin{vmatrix} i & k \\ m & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} x = \begin{array}{c} C_s\quad C_y\quad C_z\quad C_y\qquad C_w\quad C_y\quad C_z\quad C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & c \\ s & g \end{vmatrix} & \begin{vmatrix} d & c \\ h & g \end{vmatrix} \\ \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & c \\ e & g \end{vmatrix} & \begin{vmatrix} d & c \\ h & g \end{vmatrix} \\ \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \\ \begin{vmatrix} t & k \\ v & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} h & g \\ l & k \end{vmatrix} \\ \begin{vmatrix} i & k \\ m & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{39}$$

For Kifilideen's Elimination Matrix Model to find the variable x in (39), where y is first eliminated and z is eliminated second and w is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, $(C_x, C_y, C_z, C_y), (C_w, C_y, C_z, C_y), (C_s, C_y, C_z, C_y), (C_w, C_y, C_z, C_y)$ respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable y (first eliminated variable) C_y appear in eight columns, the coefficients of variable z (second eliminated variable), C_z appear in four columns, the coefficients of variable w (third eliminated variable), C_w appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_x - 1$ column, $C_y - 8$ columns, $C_z - 4$ columns, $C_w - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (39) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find x, if y is first eliminated, w is eliminated second and z is eliminated third, we have:

$$\begin{array}{c} C_x \quad C_y \quad C_w \quad C_y \qquad C_z \quad C_y \quad C_w \quad C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} b & c \\ f & g \end{vmatrix} & \begin{vmatrix} a & c \\ e & g \end{vmatrix} \\ \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & c \\ h & g \end{vmatrix} & \begin{vmatrix} a & c \\ e & g \end{vmatrix} \\ \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \\ \begin{vmatrix} j & k \\ n & p \end{vmatrix} & \begin{vmatrix} i & k \\ m & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \\ \begin{vmatrix} l & k \\ q & p \end{vmatrix} & \begin{vmatrix} i & k \\ m & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} x = \begin{array}{c} C_s \quad C_y \quad C_w \quad C_y \qquad C_z \quad C_y \quad C_w \quad C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & c \\ s & g \end{vmatrix} & \begin{vmatrix} a & c \\ e & g \end{vmatrix} \\ \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & c \\ h & g \end{vmatrix} & \begin{vmatrix} a & c \\ e & g \end{vmatrix} \\ \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \\ \begin{vmatrix} t & k \\ v & p \end{vmatrix} & \begin{vmatrix} i & k \\ m & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \\ \begin{vmatrix} l & k \\ q & p \end{vmatrix} & \begin{vmatrix} i & k \\ m & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{40}$$

For Kifilideen's Elimination Matrix Model to find the variable x in (40), where y is first eliminated and w is eliminated second and z is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}, 4^{th}$), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}, 14^{th}, 15^{th}$ and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_x, C_y, C_w, C_y), (C_z, C_y, C_w, C_y), (C_s, C_y, C_w, C_y), (C_z, C_y, C_w, C_y) respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable y (first eliminated variable) C_y appear in eight columns, the coefficients of variable w (second eliminated variable), C_w appear in four columns, the coefficients of variable z (third eliminated variable), C_z appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_x - 1$ column, $C_y - 8$ columns, $C_w - 4$ columns, $C_z - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (40) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find x, if z is first eliminated, w is eliminated second and y is eliminated third, we have:

$$\begin{array}{c} C_x \quad C_z \quad C_w \quad C_z \qquad C_y \quad C_z \quad C_w \quad C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} b & d \\ f & h \end{vmatrix} & \begin{vmatrix} a & d \\ e & h \end{vmatrix} \\ \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & d \\ g & h \end{vmatrix} & \begin{vmatrix} a & d \\ e & h \end{vmatrix} \\ \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \\ \begin{vmatrix} j & l \\ n & q \end{vmatrix} & \begin{vmatrix} i & l \\ m & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \\ \begin{vmatrix} k & l \\ p & q \end{vmatrix} & \begin{vmatrix} i & l \\ m & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} x = \begin{array}{c} C_s \quad C_z \quad C_w \quad C_z \qquad C_y \quad C_z \quad C_w \quad C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & d \\ s & h \end{vmatrix} & \begin{vmatrix} a & d \\ e & h \end{vmatrix} \\ \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & d \\ g & h \end{vmatrix} & \begin{vmatrix} a & d \\ e & h \end{vmatrix} \\ \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \\ \begin{vmatrix} t & l \\ v & q \end{vmatrix} & \begin{vmatrix} i & l \\ m & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \\ \begin{vmatrix} k & l \\ p & q \end{vmatrix} & \begin{vmatrix} i & l \\ m & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{41}$$

For Kifilideen's Elimination Matrix Model to find the variable x in (41), where z is first eliminated and w is eliminated second and y is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}$, 8^{th}), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, $14^{th}, 15^{th}$ and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_x, C_z, C_w, C_z), (C_y , C_z , C_w, C_z), (C_s, C_z,C_w, C_z), (C_y , C_z, C_w, C_z) respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable z (first eliminated variable) C_z appear in eight columns, the coefficients of variable w (second eliminated variable), C_w appear in four columns, the coefficients of variable y (third eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_x - 1$ column, $C_z - 8$ columns, $C_w - 4$ columns, $C_y - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (41) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find x, if z is first eliminated, y is eliminated second and w is eliminated third, we have:

$$\begin{array}{c} C_x \quad C_z \quad C_y \quad C_z \qquad C_w \quad C_z \quad C_y \quad C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} b & d \\ f & h \end{vmatrix} & \begin{vmatrix} c & d \\ g & h \end{vmatrix} \\ \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & d \\ e & h \end{vmatrix} & \begin{vmatrix} c & d \\ g & h \end{vmatrix} \\ \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \\ \begin{vmatrix} j & l \\ n & q \end{vmatrix} & \begin{vmatrix} k & l \\ p & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \\ \begin{vmatrix} i & l \\ m & q \end{vmatrix} & \begin{vmatrix} k & l \\ p & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} x = \begin{array}{c} C_s \quad C_z \quad C_y \quad C_z \qquad C_w \quad C_z \quad C_y \quad C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & d \\ s & h \end{vmatrix} & \begin{vmatrix} c & d \\ g & h \end{vmatrix} \\ \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & d \\ e & h \end{vmatrix} & \begin{vmatrix} c & d \\ g & h \end{vmatrix} \\ \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \\ \begin{vmatrix} t & l \\ v & q \end{vmatrix} & \begin{vmatrix} k & l \\ p & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} g & h \\ k & l \end{vmatrix} \\ \begin{vmatrix} i & l \\ m & q \end{vmatrix} & \begin{vmatrix} k & l \\ p & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{42}$$

For Kifilideen's Elimination Matrix Model to find the variable x in (42), where z is first eliminated and y is eliminated second and w is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}$, 8^{th}), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, $14^{th}, 15^{th}$ and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_x, C_z, C_y, C_z), (C_w , C_z , C_y, C_z), (C_s, C_z,C_y, C_z), (C_w , C_z, C_y, C_z) respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable z (first eliminated variable) C_z appear in eight columns, the coefficients of variable w (second eliminated variable), C_w appear in four columns, the coefficients of variable y (third eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_x - 1$ column, $C_z - 8$

columns, $C_y - 4$ columns, $C_w - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (42) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find x, if w is first eliminated, y is eliminated second and z is eliminated third, we have:

$$\begin{array}{c} C_x \quad C_w \quad C_y \quad C_w \qquad C_z \quad C_w \quad C_y \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} x = \begin{array}{c} C_s \quad C_w \quad C_y \quad C_w \qquad C_z \quad C_w \quad C_y \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{43}$$

For Kifilideen's Elimination Matrix Model to find the variable x in (43), where w is first eliminated and y is eliminated second and z is eliminated third, we have $(1^{st}, 2^{nd}, 3^{rd}$, $4^{th})$, $(5^{th}, 6^{th}, 7^{th}, 8^{th})$, $(9^{th}, 10^{th}, 11^{th}, 12^{th})$, $(13^{th}, 14^{th}, 15^{th}$ and $16^{th})$ columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_x, C_w, C_y, C_w), (C_z, C_w, C_y, C_w), (C_s, C_w, C_y, C_w), (C_z, C_w, C_y, C_w) respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable w (first eliminated variable) C_w appear in eight columns, the coefficients of variable y (second eliminated variable), C_y appear in four columns, the coefficients of variable z (third eliminated variable), C_z appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_x - 1$ column, $C_w - 8$ columns, $C_y - 4$ columns, $C_z - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (43) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find x, if w is first eliminated, z is eliminated second and y is eliminated third, we have:

$$\begin{array}{c} C_x \quad C_w \quad C_z \quad C_w \qquad C_y \quad C_w \quad C_z \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} d & a \\ h & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & a \\ g & e \end{vmatrix} & \begin{vmatrix} d & a \\ h & e \end{vmatrix} \\ \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} l & i \\ q & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \\ \begin{vmatrix} k & i \\ p & m \end{vmatrix} & \begin{vmatrix} l & i \\ q & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} x = \begin{array}{c} C_s \quad C_w \quad C_z \quad C_w \qquad C_y \quad C_w \quad C_z \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} d & a \\ h & e \end{vmatrix} \\ \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & a \\ g & e \end{vmatrix} & \begin{vmatrix} d & a \\ h & e \end{vmatrix} \\ \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} l & i \\ q & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \\ \begin{vmatrix} k & i \\ p & m \end{vmatrix} & \begin{vmatrix} l & i \\ q & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{44}$$

For Kifilideen's Elimination Matrix Model to find the variable x in (43), where w is first eliminated and z is eliminated second and y is eliminated third, we have $(1^{st}, 2^{nd}, 3^{rd}$, $4^{th})$, $(5^{th}, 6^{th}, 7^{th}, 8^{th})$, $(9^{th}, 10^{th}, 11^{th}, 12^{th})$, $(13^{th}, 14^{th}, 15^{th}$ and $16^{th})$ columns of the Kifilideen's Elimination Matrix Model which contains the coefficients,

(C_x, C_w, C_y, C_w), (C_z, C_w, C_y, C_w), (C_s, C_w, C_y, C_w), (C_z, C_w, C_y, C_w) respectively. So, the coefficients of variable x (the variable we are looking for), C_x appear in one column, the coefficients of variable w (first eliminated variable) C_w appear in eight columns, the coefficients of variable z (second eliminated variable), C_z appear in four columns, the coefficients of variable y (third eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_x - 1$ column, $C_w - 8$ columns, $C_z - 4$ columns, $C_y - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (44) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

To find y, if z is first eliminated, w is eliminated second and x is eliminated third, we have:

$$\begin{array}{cccccccc} C_y & C_z & C_w & C_z & C_x & C_z & C_w & C_z \end{array} \qquad \begin{array}{cccccccc} C_s & C_z & C_w & C_z & C_x & C_z & C_w & C_z \end{array}$$

$$\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} c & d \\ g & h \end{vmatrix} & \begin{vmatrix} a & d \\ e & h \end{vmatrix} \\ \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & d \\ f & h \end{vmatrix} & \begin{vmatrix} a & d \\ e & h \end{vmatrix} \\ \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \\ \begin{vmatrix} k & l \\ p & q \end{vmatrix} & \begin{vmatrix} i & l \\ m & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \\ \begin{vmatrix} j & l \\ n & q \end{vmatrix} & \begin{vmatrix} i & l \\ m & q \end{vmatrix} \end{vmatrix} \end{vmatrix} y = \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & d \\ s & h \end{vmatrix} & \begin{vmatrix} a & d \\ e & h \end{vmatrix} \\ \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & d \\ f & h \end{vmatrix} & \begin{vmatrix} a & d \\ e & h \end{vmatrix} \\ \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \\ \begin{vmatrix} t & l \\ v & q \end{vmatrix} & \begin{vmatrix} i & l \\ m & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & h \\ j & l \end{vmatrix} & \begin{vmatrix} e & h \\ i & l \end{vmatrix} \\ \begin{vmatrix} j & l \\ n & q \end{vmatrix} & \begin{vmatrix} i & l \\ m & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \tag{45}$$

For Kifilideen's Elimination Matrix Model to find the variable x in (45), where z is first eliminated and w is eliminated second and x is eliminated third, we have (1^{st}, 2^{nd}, 3^{rd}, 4^{th}), (5^{th}, 6^{th}, 7^{th}, 8^{th}), (9^{th}, 10^{th}, 11^{th}, 12^{th}), (13^{th}, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_y, C_z, C_w, C_z), (C_x, C_z, C_w, C_z), (C_s, C_z, C_w, C_z), (C_x, C_z, C_w, C_z) respectively. So, the coefficients of variable y The variable we are looking for), C_y appear in one column, the coefficients of the variable z (first eliminated variable) C_z appear in eight columns, the coefficients of the variable w (second eliminated variable), C_w appear in four columns, the coefficients of the variable x (third eliminated variable), C_x appear in two columns, and the coefficients of the system s, C_s appear in one column. That is, $C_y - 1$ column, $C_z - 8$ columns, $C_w - 4$ columns, $C_x - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (45) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find y, if z is first eliminated, x is eliminated second, and w is eliminated third, we have:

$$\begin{array}{cccccccc} C_y & C_z & C_x & C_z & C_w & C_z & C_x & C_z \end{array} \qquad\qquad \begin{array}{cccccccc} C_s & C_z & C_x & C_z & C_w & C_z & C_x & C_z \end{array}$$

$$\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} c & d \\ g & h \end{vmatrix} & \begin{vmatrix} b & d \\ f & h \end{vmatrix} \\ \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & d \\ e & h \end{vmatrix} & \begin{vmatrix} b & d \\ f & h \end{vmatrix} \\ \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} g & h \\ k & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \\ \begin{vmatrix} k & l \\ p & q \end{vmatrix} & \begin{vmatrix} j & l \\ n & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \\ \begin{vmatrix} i & l \\ m & q \end{vmatrix} & \begin{vmatrix} j & l \\ n & q \end{vmatrix} \end{vmatrix} \end{vmatrix} y = \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & d \\ s & h \end{vmatrix} & \begin{vmatrix} b & d \\ f & h \end{vmatrix} \\ \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & d \\ e & h \end{vmatrix} & \begin{vmatrix} b & d \\ f & h \end{vmatrix} \\ \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & h \\ t & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \\ \begin{vmatrix} t & l \\ v & q \end{vmatrix} & \begin{vmatrix} j & l \\ n & q \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & h \\ i & l \end{vmatrix} & \begin{vmatrix} f & h \\ j & l \end{vmatrix} \\ \begin{vmatrix} i & l \\ m & q \end{vmatrix} & \begin{vmatrix} j & l \\ n & q \end{vmatrix} \end{vmatrix} \end{vmatrix} \qquad (46)$$

For Kifilideen's Elimination Matrix Model to find the variable y in (45), where z is first eliminated and x is eliminated second and w is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}$, 8^{th}), (9^{th}, 10^{th}, 11^{th}, 12^{th}), (13^{th}, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_y, C_z, C_x, C_z), (C_w , C_z , C_x, C_z), (C_s, C_z,C_x, C_z), (C_w, C_z, C_x, C_z) respectively. So, the coefficients of variable y (the variable we are looking for), C_y appear in one column, the coefficients of variable z (first eliminated variable) C_z appear in eight columns, the coefficients of variable x (second eliminated variable), C_x appear in four columns, the coefficients of variable w (third eliminated variable), C_w appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_y - 1$ column, $C_z - 8$ columns, $C_x - 4$ columns, $C_w - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (46) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of w, x, y, z *and* s.

OR

To find y, if w is first eliminated, x is eliminated second and z is eliminated third, we have:

$$\begin{array}{cccccccc} C_y & C_w & C_x & C_w & C_z & C_w & C_x & C_w \end{array} \qquad\qquad \begin{array}{cccccccc} C_s & C_w & C_x & C_w & C_z & C_w & C_x & C_w \end{array}$$

$$\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} c & a \\ g & e \end{vmatrix} & \begin{vmatrix} b & a \\ f & e \end{vmatrix} \\ \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} b & a \\ f & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \\ \begin{vmatrix} k & i \\ p & m \end{vmatrix} & \begin{vmatrix} j & i \\ n & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} j & i \\ n & m \end{vmatrix} \end{vmatrix} \end{vmatrix} y = \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} b & a \\ f & e \end{vmatrix} \\ \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} b & a \\ f & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} j & i \\ n & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} j & i \\ n & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \qquad (47)$$

For Kifilideen's Elimination Matrix Model to find the variable y in (47), where w is first eliminated and x is eliminated second and z is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}$, 8^{th}), (9^{th}, 10^{th}, 11^{th}, 12^{th}), (13^{th}, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_y, C_w, C_x, C_w), (C_z , C_w, C_x, C_w), (C_s, C_w,C_x, C_w), (C_z , C_w, C_x, C_w) respectively. So, the coefficients of variable y (the variable we are looking for), C_y appear in one column, the coefficients of variable w (first eliminated variable) C_w appear in eight columns, the coefficients of variable x (second eliminated variable), C_x appear in four columns, the coefficients of variable z (third eliminated variable), C_z appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_y - 1$ column, $C_w - 8$

columns, $C_x - 4$ columns, $C_z - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (47) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of w, x, y, z and s.

OR

To find y, if w is first eliminated, z is eliminated second and x is eliminated third, we have:

$$\begin{array}{c} C_y \quad C_w \quad C_z \quad C_w \qquad C_x \quad C_w \quad C_z \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} c & a \\ g & e \end{vmatrix} & \begin{vmatrix} d & a \\ h & e \end{vmatrix} \\ \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} d & a \\ h & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \\ \begin{vmatrix} k & i \\ p & m \end{vmatrix} & \begin{vmatrix} l & i \\ q & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} l & i \\ q & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} y = \begin{array}{c} C_s \quad C_w \quad C_z \quad C_w \qquad C_x \quad C_w \quad C_z \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} d & a \\ h & e \end{vmatrix} \\ \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} d & a \\ h & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} l & i \\ q & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} h & e \\ l & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} l & i \\ q & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{48}$$

For Kifilideen's Elimination Matrix Model to find the variable y in (48), where w is first eliminated and z is eliminated second and x is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_y, C_w, C_z, C_w), (C_x, C_w, C_z, C_w), (C_s, C_w, C_z, C_w), (C_x, C_w, C_z, C_w) respectively. So, the coefficients of variable y (the variable we are looking for), C_y appear in one column, the coefficients of variable w (first eliminated variable) C_w appear in eight columns, the coefficients of variable z (second eliminated variable), C_z appear in four columns, the coefficients of variable x (third eliminated variable), C_x appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_y - 1$ column, $C_w - 8$ columns, $C_z - 4$ columns, $C_x - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (48) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of w, x, y, z and s.

OR

To find y, if x is first eliminated, z is eliminated second and w is eliminated third, we have:

$$\begin{array}{c} C_y \quad C_x \quad C_z \quad C_x \qquad C_w \quad C_x \quad C_z \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} c & b \\ g & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & b \\ e & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} k & j \\ p & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} i & j \\ m & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} y = \begin{array}{c} C_s \quad C_x \quad C_z \quad C_x \qquad C_w \quad C_x \quad C_z \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & b \\ s & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & b \\ e & f \end{vmatrix} & \begin{vmatrix} d & b \\ h & f \end{vmatrix} \\ \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} t & j \\ v & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} h & f \\ l & j \end{vmatrix} \\ \begin{vmatrix} i & j \\ m & n \end{vmatrix} & \begin{vmatrix} l & j \\ q & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{49}$$

For Kifilideen's Elimination Matrix Model to find the variable y in (49), where x is first eliminated and z is eliminated second and w is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients,

(C_y, C_x, C_z, C_x), (C_w, C_x, C_z, C_x), (C_s, C_x, C_z, C_x), (C_w, C_x, C_z, C_x) respectively. So, the coefficients of variable y (the variable we are looking for), C_y appear in one column, the coefficients of variable x (first eliminated variable) C_x appear in eight columns, the coefficients of variable z (second eliminated variable), C_z appear in four columns, the coefficients of variable w (third eliminated variable), C_w appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_y - 1$ column, $C_x - 8$ columns, $C_z - 4$ columns, $C_w - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (49) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z \; and \; s$.

OR

To find y, if x is first eliminated, w is eliminated second and z is eliminated third, we have:

$$\begin{array}{c} C_y \quad C_x \quad C_w \quad C_x \quad\quad C_z \quad C_x \quad C_w \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} c & b \\ g & f \end{vmatrix} & \begin{vmatrix} a & b \\ e & f \end{vmatrix} \\ \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & b \\ h & f \end{vmatrix} & \begin{vmatrix} a & b \\ e & f \end{vmatrix} \\ \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \\ \begin{vmatrix} k & j \\ p & n \end{vmatrix} & \begin{vmatrix} i & j \\ m & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \\ \begin{vmatrix} l & j \\ q & n \end{vmatrix} & \begin{vmatrix} i & j \\ m & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} y = \begin{array}{c} C_s \quad C_x \quad C_w \quad C_x \quad\quad C_z \quad C_x \quad C_w \quad C_x \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & b \\ s & f \end{vmatrix} & \begin{vmatrix} a & b \\ e & f \end{vmatrix} \\ \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} d & b \\ h & f \end{vmatrix} & \begin{vmatrix} a & b \\ e & f \end{vmatrix} \\ \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \\ \begin{vmatrix} t & j \\ v & n \end{vmatrix} & \begin{vmatrix} i & j \\ m & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \\ \begin{vmatrix} l & j \\ q & n \end{vmatrix} & \begin{vmatrix} i & j \\ m & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{50}$$

For Kifilideen's Elimination Matrix Model to find the variable y in (50), where x is first eliminated and w is eliminated second and z is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}, 4^{th}$), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}, 14^{th}, 15^{th}$ and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_y, C_x, C_w, C_x), (C_z, C_x, C_w, C_x), (C_s, C_x, C_w, C_x), (C_z, C_x, C_w, C_x) respectively. So, the coefficients of variable y (the variable we are looking for), C_y appear in one column, the coefficients of variable x (first eliminated variable) C_x appear in eight columns, the coefficients of variable w (second eliminated variable), C_w appear in four columns, the coefficients of variable z (third eliminated variable), C_z appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_y - 1$ column, $C_x - 8$ columns, $C_w - 4$ columns, $C_z - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (50) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z \; and \; s$.

To find z, if w is first eliminated, x is eliminated second and y is eliminated third, we have:

$$\begin{array}{c} C_z \quad C_w \quad C_x \quad C_w \qquad C_y \quad C_w \quad C_x \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} b & a \\ f & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & a \\ g & e \end{vmatrix} & \begin{vmatrix} b & a \\ f & e \end{vmatrix} \\ \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} j & i \\ n & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \\ \begin{vmatrix} k & i \\ p & m \end{vmatrix} & \begin{vmatrix} j & i \\ n & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} z = \begin{array}{c} C_s \quad C_w \quad C_x \quad C_w \qquad C_y \quad C_w \quad C_x \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} b & a \\ f & e \end{vmatrix} \\ \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & a \\ g & e \end{vmatrix} & \begin{vmatrix} b & a \\ f & e \end{vmatrix} \\ \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} j & i \\ n & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & e \\ k & i \end{vmatrix} & \begin{vmatrix} f & e \\ j & i \end{vmatrix} \\ \begin{vmatrix} k & i \\ p & m \end{vmatrix} & \begin{vmatrix} j & i \\ n & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{51}$$

For Kifilideen's Elimination Matrix Model to find the variable z in (51), where w is first eliminated and x is eliminated second and y is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}$, 8^{th}), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_z, C_w, C_x, C_w), (C_y , C_w, C_x, C_w), (C_s, C_w,C_x, C_w), (C_y, C_w, C_x, C_w) respectively. So, the coefficients of variable z (the variable we are looking for), C_z appear in one column, the coefficients of variable w (first eliminated variable) C_w appear in eight columns, the coefficients of variable x (second eliminated variable), C_x appear in four columns, the coefficients of variable y (third eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_z - 1$ column, $C_w - 8$ columns, $C_x - 4$ columns, $C_y - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (51) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z \; and \; s$.

OR

To find z, if w is first eliminated, y is eliminated second and x is eliminated third, we have:

$$\begin{array}{c} C_z \quad C_w \quad C_y \quad C_w \qquad C_x \quad C_w \quad C_y \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} d & a \\ h & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} h & e \\ l & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} l & i \\ q & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} z = \begin{array}{c} C_s \quad C_w \quad C_y \quad C_w \qquad C_x \quad C_w \quad C_y \quad C_w \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & a \\ s & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & a \\ f & e \end{vmatrix} & \begin{vmatrix} c & a \\ g & e \end{vmatrix} \\ \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & e \\ t & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} t & i \\ v & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & e \\ j & i \end{vmatrix} & \begin{vmatrix} g & e \\ k & i \end{vmatrix} \\ \begin{vmatrix} j & i \\ n & m \end{vmatrix} & \begin{vmatrix} k & i \\ p & m \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{52}$$

For Kifilideen's Elimination Matrix Model to find the variable z in (52), where w is first eliminated and y is eliminated second and x is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}$, 8^{th}), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, (C_z, C_w, C_y, C_w), (C_x, C_w, C_y, C_w), (C_s, C_w,C_y, C_w), (C_x , C_w, C_y, C_w) respectively. So, the coefficients of variable z (the variable we are looking for), C_z appear in one column, the coefficients of variable w (first eliminated variable) C_w appear in eight columns, the coefficients of variable y (second eliminated variable), C_y appear in four columns, the coefficients of variable x (third eliminated variable), C_x appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_z - 1$ column, $C_w - 8$ columns, $C_y - 4$ columns, $C_x - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row

3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (52) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find z, if x is first eliminated, y is eliminated second and w is eliminated third, we have:

$$\begin{array}{cccccccc} C_z & C_x & C_y & C_x & C_w & C_x & C_y & C_x \end{array} \qquad \begin{array}{cccccccc} C_s & C_x & C_y & C_x & C_w & C_x & C_y & C_x \end{array}$$

$$\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} d & b \\ h & f \end{vmatrix} & \begin{vmatrix} c & b \\ g & f \end{vmatrix} \\ \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & b \\ e & f \end{vmatrix} & \begin{vmatrix} c & b \\ g & f \end{vmatrix} \\ \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \\ \begin{vmatrix} l & j \\ q & n \end{vmatrix} & \begin{vmatrix} k & j \\ p & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \\ \begin{vmatrix} i & j \\ m & n \end{vmatrix} & \begin{vmatrix} k & j \\ p & n \end{vmatrix} \end{vmatrix} \end{vmatrix} z = \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & b \\ s & f \end{vmatrix} & \begin{vmatrix} c & b \\ g & f \end{vmatrix} \\ \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & b \\ e & f \end{vmatrix} & \begin{vmatrix} c & b \\ g & f \end{vmatrix} \\ \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \\ \begin{vmatrix} t & j \\ v & n \end{vmatrix} & \begin{vmatrix} k & j \\ p & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & f \\ i & j \end{vmatrix} & \begin{vmatrix} g & f \\ k & j \end{vmatrix} \\ \begin{vmatrix} i & j \\ m & n \end{vmatrix} & \begin{vmatrix} k & j \\ p & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \tag{53}$$

For Kifilideen's Elimination Matrix Model to find the variable z in (53), where x is first eliminated and y is eliminated second and w is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}$, 8^{th}), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, $(C_z, C_x, C_y C_x), (C_w , C_x , C_y, C_x), (C_s, C_x,C_y, C_x), (C_w, C_x , C_y, C_x)$ respectively. So, the coefficients of variable z (the variable we are looking for), C_z appear in one column, the coefficients of variable x (first eliminated variable) C_x appear in eight columns, the coefficients of variable y (second eliminated variable), C_y appear in four columns, the coefficients of variable w (third eliminated variable), C_w appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_z - 1$ column, $C_x - 8$ columns, $C_y - 4$ columns, $C_w - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (53) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z\ and\ s$.

OR

To find z, if x is first eliminated, w is eliminated second and y is eliminated third, we have:

$$\begin{array}{cccccccc} C_z & C_x & C_w & C_x & C_y & C_x & C_w & C_x \end{array} \qquad \begin{array}{cccccccc} C_s & C_x & C_w & C_x & C_y & C_x & C_w & C_x \end{array}$$

$$\begin{vmatrix} \begin{vmatrix} \begin{vmatrix} d & b \\ h & f \end{vmatrix} & \begin{vmatrix} a & b \\ e & f \end{vmatrix} \\ \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & b \\ g & f \end{vmatrix} & \begin{vmatrix} a & b \\ e & f \end{vmatrix} \\ \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} h & f \\ l & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \\ \begin{vmatrix} l & j \\ q & n \end{vmatrix} & \begin{vmatrix} i & j \\ m & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \\ \begin{vmatrix} k & j \\ p & n \end{vmatrix} & \begin{vmatrix} i & j \\ m & n \end{vmatrix} \end{vmatrix} \end{vmatrix} z = \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & b \\ s & f \end{vmatrix} & \begin{vmatrix} a & b \\ e & f \end{vmatrix} \\ \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} c & b \\ g & f \end{vmatrix} & \begin{vmatrix} a & b \\ e & f \end{vmatrix} \\ \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & f \\ t & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \\ \begin{vmatrix} t & j \\ v & n \end{vmatrix} & \begin{vmatrix} i & j \\ m & n \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} g & f \\ k & j \end{vmatrix} & \begin{vmatrix} e & f \\ i & j \end{vmatrix} \\ \begin{vmatrix} k & j \\ p & n \end{vmatrix} & \begin{vmatrix} i & j \\ m & n \end{vmatrix} \end{vmatrix} \end{vmatrix} \tag{54}$$

For Kifilideen's Elimination Matrix Model to find the variable z in (54), where x is first eliminated and w is eliminated second and y is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}$, 8^{th}), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}$, 14^{th}, 15^{th} and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, $(C_z, C_x, C_w, C_x), (C_y , C_x , C_w, C_x), (C_s, C_x,C_w, C_x), (C_y, C_x, C_w, C_x)$ respectively. So, the coefficients of variable z (the variable we are looking for), C_z appear in one column, the coefficients of variable x (first eliminated variable) C_x appear in eight columns, the coefficients of variable w (second eliminated variable), C_w appear in four columns, the coefficients of variable y (third eliminated variable), C_y appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_z - 1$ column, $C_x - 8$ columns, $C_w - 4$ columns, $C_y - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (54) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z \; and \; s$.

OR

To find z, if y is first eliminated, w is eliminated second and x is eliminated third, we have:

$$\begin{array}{c} C_z \quad C_y \quad C_w \quad C_y \qquad C_x \quad C_y \quad C_w \quad C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} d & c \\ h & g \end{vmatrix} & \begin{vmatrix} a & c \\ e & g \end{vmatrix} \\ \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & c \\ f & g \end{vmatrix} & \begin{vmatrix} a & c \\ e & g \end{vmatrix} \\ \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \\ \begin{vmatrix} l & k \\ q & p \end{vmatrix} & \begin{vmatrix} i & k \\ m & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \\ \begin{vmatrix} j & k \\ n & p \end{vmatrix} & \begin{vmatrix} i & k \\ m & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} z = \begin{array}{c} C_s \quad C_y \quad C_w \quad C_y \qquad C_x \quad C_y \quad C_w \quad C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & c \\ s & g \end{vmatrix} & \begin{vmatrix} a & c \\ e & g \end{vmatrix} \\ \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} b & c \\ f & g \end{vmatrix} & \begin{vmatrix} a & c \\ e & g \end{vmatrix} \\ \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \\ \begin{vmatrix} t & k \\ v & p \end{vmatrix} & \begin{vmatrix} i & k \\ m & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} f & g \\ j & k \end{vmatrix} & \begin{vmatrix} e & g \\ i & k \end{vmatrix} \\ \begin{vmatrix} j & k \\ n & p \end{vmatrix} & \begin{vmatrix} i & k \\ m & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{55}$$

For Kifilideen's Elimination Matrix Model to find the variable z in (55), where y is first eliminated and w is eliminated second and x is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}, 14^{th}, 15^{th}$ and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, $(C_z, C_y, C_w, C_y), (C_x, C_y, C_w, C_y), (C_s, C_y, C_w, C_y), (C_x, C_y, C_w, C_y)$ respectively. So, the coefficients of variable z (the variable we are looking for), C_z appear in one column, the coefficients of variable y (first eliminated variable) C_y appear in eight columns, the coefficients of variable w (second eliminated variable), C_w appear in four columns, the coefficients of variable x (third eliminated variable), C_x appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_z - 1$ column, $C_y - 8$ columns, $C_w - 4$ columns, $C_x - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (55) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of $w, x, y, z \; and \; s$.

OR

To find z, if y is first eliminated, x is eliminated second and w is eliminated third, we have:

$$\begin{array}{c} C_z \quad C_y \quad C_x \quad C_y \qquad C_w \quad C_y \quad C_x \quad C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} d & c \\ h & g \end{vmatrix} & \begin{vmatrix} b & c \\ f & g \end{vmatrix} \\ \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & c \\ e & g \end{vmatrix} & \begin{vmatrix} b & c \\ f & g \end{vmatrix} \\ \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} h & g \\ l & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \\ \begin{vmatrix} l & k \\ q & p \end{vmatrix} & \begin{vmatrix} j & k \\ n & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \\ \begin{vmatrix} i & k \\ m & p \end{vmatrix} & \begin{vmatrix} j & k \\ n & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} x = \begin{array}{c} C_s \quad C_y \quad C_x \quad C_y \qquad C_w \quad C_y \quad C_x \quad C_y \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} r & c \\ s & g \end{vmatrix} & \begin{vmatrix} b & c \\ f & g \end{vmatrix} \\ \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} a & c \\ e & g \end{vmatrix} & \begin{vmatrix} b & c \\ f & g \end{vmatrix} \\ \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} s & g \\ t & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \\ \begin{vmatrix} t & k \\ v & p \end{vmatrix} & \begin{vmatrix} l & k \\ q & p \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} e & g \\ i & k \end{vmatrix} & \begin{vmatrix} f & g \\ j & k \end{vmatrix} \\ \begin{vmatrix} i & k \\ m & p \end{vmatrix} & \begin{vmatrix} j & k \\ n & p \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \tag{56}$$

For Kifilideen's Elimination Matrix Model to find the variable z in (56), where y is first eliminated and x is eliminated second and w is eliminated third, we have ($1^{st}, 2^{nd}, 3^{rd}$, 4^{th}), ($5^{th}, 6^{th}, 7^{th}, 8^{th}$), ($9^{th}, 10^{th}, 11^{th}, 12^{th}$), ($13^{th}, 14^{th}, 15^{th}$ and 16^{th}) columns of the Kifilideen's Elimination Matrix Model which contains the coefficients, $(C_z, C_y, C_x, C_y), (C_w, C_y, C_x, C_y), (C_s, C_y, C_x, C_y), (C_w, C_y, C_x, C_y)$ respectively. So, the coefficients of variable z (the variable we are looking for), C_z appear in one column, the coefficients of variable y (first eliminated variable) C_y appear in eight columns, the coefficients of variable x (second eliminated variable), C_x appear in four columns, the coefficients of variable w (third eliminated variable), C_w appear in two columns and the coefficients of system s, C_s appear in one column. That is, $C_w - 1$ column, $C_y - 8$ columns, $C_x - 4$ columns, $C_w - 2$ columns and $C_s - 1$ column. The Row 1, Row 2, Row 3, Row 4, Row 5, Row 6, Row 7 and Row 8 of the Kifilideen's Elimination Matrix Model (56) are the coefficients of the rows 1 row 2, row 2 rows 3, row 2, row 3, row 3 and row 4 in (21) to (24) respectively in line with the identities of w, x, y, z and s.

For all the models (33) to (56) to find the variables w, x, y and z; the first column at the left (1^{st} column of the Kifilideen's Elimination Matrix Model) is the coefficients of the variable we are looking for while the first column at the right (9^{th} column of the model) is the coefficients of the constant of the system, C_s. The even columns (2^{nd}, $4^{th}, 6^{th}, 8^{th}, 10^{th}, 12^{th}, 14^{th}$, and 16^{th} columns of the Kifilideen's Elimination Matrix model) are the coefficients of the first eliminated variable, the odd columns 3^{rd}, $7^{th}, 11^{th}$and 15^{th} columns of the Kifilideen's Elimination Matrix model) are the coefficients of the second eliminated variable and the remaining odd columns 5^{th} and 13^{th} columns of the Kifilideen's Elimination Matrix model are the coefficients of the third eliminated variable

METHOD

The Kifilideen's Elimination Matrix Model to solve simultaneous equations of four variables w, x, y and z, three variables x, y and z and two variables x and y was established using elimination and matrix ideology. Elimination method was gradually used to reduce the numbers of variables of a given simultaneous equation in matrix form where in the process Kifilideen's Elimination Matrix Model was generated to solve the values of the variables of the simultaneous equations. Kifilideen's Elimination Matrix Model of solving simultaneous equations of four variables w, x, y and z, three variables x, y and z and two variables x and y is a model of elements of simultaneous equations into series of 2×2 matrix where within each model there exist a variable to be determined. This is one type of writing where it functions as a theory surgery. Explaining in detail the theory that applies to all n applied to some of the simpler n so that it is easier to understand by people who are still in the "weighty" stage of advanced mathematics

RESULTS AND DISCUSSION

The Kifilideen's Elimination Matrix Model was implemented in solving four variables $w, x, y\ and\ z,$ three variables $x, y\ and\ z$ and two variables $x\ and\ y$ simultaneous equations.

1. Utilization of Kifilideen's Elimination Matrix Model to Solve Simultaneous Equations of Two Variables x and y

(1) Find variables x and y using Kifilideen's Elimination Matrix Model:

$3x + 5y = 11$ (57)

$2x - 3y = 1$ (58)

Solution

Using Kifilideen's Elimination Matrix Model to solve for x, assuming y is first eliminated, we have:

$$\begin{array}{cc} C_x & C_y \end{array} \qquad \begin{array}{cc} C_s & C_y \end{array}$$
$$\begin{vmatrix} 3 & 5 \\ 2 & -3 \end{vmatrix} x = \begin{vmatrix} 11 & 5 \\ 1 & -3 \end{vmatrix} \tag{59}$$

$$-19x = -38 \tag{60}$$

$$x = \frac{-38}{-19} = 2 \tag{61}$$

Using Kifilideen's Elimination Matrix Model to solve for y, assuming x is first eliminated, we have:

$$\begin{array}{cc} C_y & C_x \end{array} \qquad \begin{array}{cc} C_s & C_x \end{array}$$
$$\begin{vmatrix} 5 & 3 \\ -3 & 2 \end{vmatrix} y = \begin{vmatrix} 11 & 3 \\ 1 & 2 \end{vmatrix} \tag{62}$$

$$19x = 19 \tag{63}$$

$$x = \frac{19}{19} = 1 \tag{64}$$

$x = 2$, and $y = 1$ (65)

2. *Implementation* of *Kifilideen's Elimination Matrix Model to Solve Simultaneous Equations of Three Variables $x, y\ and\ z$*

(1) Solve the simultaneous equation using Kifilideen's Elimination Matrix Model

$4x - y + 2z = 5$ (66)

$2x + y - 3z = -1$ (67)

$x - 2y + 6z = 7$ (68)

Solution

Using Kifilideen's Elimination Matrix Model to solve for x, assuming y is first eliminated then z is eliminated second, we have:

To find x, if y is first eliminated and z is eliminated second, we have:

$$\begin{array}{cc} C_x \quad C_y & C_z \quad C_y \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix}4 & -1\\ 2 & 1\end{vmatrix} & \begin{vmatrix}2 & -1\\ -3 & 1\end{vmatrix} \\ \begin{vmatrix}2 & 1\\ 1 & -2\end{vmatrix} & \begin{vmatrix}-3 & 1\\ 6 & -2\end{vmatrix}\end{vmatrix}} \end{array} x = \begin{array}{cc} C_s \quad C_y & C_z \quad C_y \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix}5 & -1\\ -1 & 1\end{vmatrix} & \begin{vmatrix}2 & -1\\ -3 & 1\end{vmatrix} \\ \begin{vmatrix}-1 & 1\\ 7 & -2\end{vmatrix} & \begin{vmatrix}-3 & 1\\ 6 & -2\end{vmatrix}\end{vmatrix}} \end{array} \quad (69)$$

$$\begin{vmatrix}6 & -1\\ -5 & 0\end{vmatrix} x = \begin{vmatrix}4 & -1\\ -5 & 0\end{vmatrix} \quad (70)$$

$$-5z = -5 \quad (71)$$

$$x = \frac{-5}{-5} = 1 \quad (72)$$

To find z, if y is first eliminated and x is eliminated second, we have:

$$\begin{array}{cc} C_z \quad C_y & C_x \quad C_y \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix}2 & -1\\ -3 & 1\end{vmatrix} & \begin{vmatrix}4 & -1\\ 2 & 1\end{vmatrix} \\ \begin{vmatrix}-3 & 1\\ 6 & -2\end{vmatrix} & \begin{vmatrix}2 & 1\\ 1 & -2\end{vmatrix}\end{vmatrix}} \end{array} z = \begin{array}{cc} C_s \quad C_y & C_x \quad C_y \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix}5 & -1\\ -1 & 1\end{vmatrix} & \begin{vmatrix}4 & -1\\ 2 & 1\end{vmatrix} \\ \begin{vmatrix}-1 & 1\\ 7 & -2\end{vmatrix} & \begin{vmatrix}2 & 1\\ 1 & -2\end{vmatrix}\end{vmatrix}} \end{array} \quad (73)$$

$$\begin{vmatrix}-1 & 6\\ 0 & -5\end{vmatrix} z = \begin{vmatrix}4 & 6\\ -5 & -5\end{vmatrix} \quad (74)$$

$$5z = 10 \quad (75)$$

$$z = \frac{10}{5} = 2 \quad (76)$$

To find y, if z is first eliminated and x is eliminated second, we have:

$$\begin{array}{cc} C_y \quad C_z & C_x \quad C_z \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix}-1 & 2\\ 1 & -3\end{vmatrix} & \begin{vmatrix}4 & 2\\ 2 & -3\end{vmatrix} \\ \begin{vmatrix}1 & -3\\ -2 & 6\end{vmatrix} & \begin{vmatrix}2 & -3\\ 1 & 6\end{vmatrix}\end{vmatrix}} \end{array} y = \begin{array}{cc} C_s \quad C_z & C_x \quad C_z \\ \multicolumn{2}{c}{\begin{vmatrix} \begin{vmatrix}5 & 2\\ -1 & -3\end{vmatrix} & \begin{vmatrix}4 & 2\\ 2 & -3\end{vmatrix} \\ \begin{vmatrix}-1 & -3\\ 7 & 6\end{vmatrix} & \begin{vmatrix}4 & -3\\ 2 & 6\end{vmatrix}\end{vmatrix}} \end{array} \quad (77)$$

$$\begin{vmatrix}1 & -16\\ 0 & 15\end{vmatrix} y = \begin{vmatrix}-13 & -16\\ 15 & 15\end{vmatrix} \quad (78)$$

$$15y = 45 \quad (79)$$

$$y = \frac{45}{15} = 3 \quad (80)$$

$x = 1,\ y = 3$ and $z = 2$ (81)

3. Utilization of Kifilideen's Elimination Matrix Model to Solve Simultaneous Equations of Four Variables w, x, y and z

(1) Solve the simultaneous equation using Kifilideen's Elimination Matrix Model

$$3w - 5x + y - 2z = 0 \quad (82)$$

$$7w - 2x + 4y - 3z = 18 \quad (83)$$

$$w - x + y + 3z = 10 \quad (84)$$

$$-5w + 2x - 3y + z = -15 \quad (85)$$

Solution

To find x, assuming w is first eliminated, y is eliminated second and z is eliminated third, we have:

$$\begin{vmatrix} \overset{C_x \quad C_w \quad C_y \quad C_w}{\begin{vmatrix} \begin{vmatrix} -5 & 3 \\ -2 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} \\ \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \end{vmatrix}} & \overset{C_z \quad C_w \quad C_y \quad C_w}{\begin{vmatrix} \begin{vmatrix} -2 & 3 \\ -3 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} \\ \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \end{vmatrix}} \\ \begin{vmatrix} \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \\ \begin{vmatrix} -1 & 1 \\ 2 & -5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \\ \begin{vmatrix} 3 & 1 \\ 1 & -5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} \end{vmatrix} \end{vmatrix} x = \begin{vmatrix} \overset{C_s \quad C_w \quad C_y \quad C_w}{\begin{vmatrix} \begin{vmatrix} 0 & 3 \\ 18 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} \\ \begin{vmatrix} 18 & 7 \\ 10 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \end{vmatrix}} & \overset{C_z \quad C_w \quad C_y \quad C_w}{\begin{vmatrix} \begin{vmatrix} -2 & 3 \\ -3 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} \\ \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \end{vmatrix}} \\ \begin{vmatrix} \begin{vmatrix} 18 & 7 \\ 10 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \\ \begin{vmatrix} 10 & 1 \\ -15 & -5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \\ \begin{vmatrix} 3 & 1 \\ 1 & -5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} \end{vmatrix} \end{vmatrix} \tag{86}$$

$$\begin{vmatrix} \begin{vmatrix} -29 & -5 \\ 5 & -3 \end{vmatrix} & \begin{vmatrix} -5 & -5 \\ -24 & -3 \end{vmatrix} \\ \begin{vmatrix} 5 & -3 \\ 3 & -2 \end{vmatrix} & \begin{vmatrix} -24 & -3 \\ -16 & -2 \end{vmatrix} \end{vmatrix} x = \begin{vmatrix} \begin{vmatrix} -54 & -5 \\ -52 & -3 \end{vmatrix} & \begin{vmatrix} -5 & -5 \\ -24 & -3 \end{vmatrix} \\ \begin{vmatrix} -52 & -3 \\ -35 & -2 \end{vmatrix} & \begin{vmatrix} -24 & -3 \\ -16 & -2 \end{vmatrix} \end{vmatrix} \tag{87}$$

$$\begin{vmatrix} 112 & -105 \\ -1 & 0 \end{vmatrix} x = \begin{vmatrix} -98 & -105 \\ -1 & 0 \end{vmatrix} \tag{88}$$

$$-105x = -105 \tag{89}$$

$$x = \frac{-105}{-105} = 1 \tag{90}$$

To find z, assuming w is first eliminated, y is eliminated second and x is eliminated third, we have:

$$\begin{vmatrix} \overset{C_z \quad C_w \quad C_y \quad C_w}{\begin{vmatrix} \begin{vmatrix} -2 & 3 \\ -3 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} \\ \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \end{vmatrix}} & \overset{C_x \quad C_w \quad C_y \quad C_w}{\begin{vmatrix} \begin{vmatrix} -5 & 3 \\ -2 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} \\ \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \end{vmatrix}} \\ \begin{vmatrix} \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \\ \begin{vmatrix} 3 & 1 \\ 1 & -5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \\ \begin{vmatrix} -1 & 1 \\ 2 & -5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} \end{vmatrix} \end{vmatrix} z = \begin{vmatrix} \overset{C_s \quad C_w \quad C_y \quad C_w}{\begin{vmatrix} \begin{vmatrix} 0 & 3 \\ 18 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} \\ \begin{vmatrix} 18 & 7 \\ 10 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \end{vmatrix}} & \overset{C_x \quad C_w \quad C_y \quad C_w}{\begin{vmatrix} \begin{vmatrix} -5 & 3 \\ -2 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} \\ \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \end{vmatrix}} \\ \begin{vmatrix} \begin{vmatrix} 18 & 7 \\ 10 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \\ \begin{vmatrix} 10 & 1 \\ -15 & -5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} & \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} \\ \begin{vmatrix} -1 & 1 \\ 2 & -5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} \end{vmatrix} \end{vmatrix} \tag{91}$$

$$\begin{vmatrix} \begin{vmatrix} -5 & -5 \\ -24 & -3 \end{vmatrix} & \begin{vmatrix} -29 & -5 \\ 5 & -3 \end{vmatrix} \\ \begin{vmatrix} -24 & -3 \\ -16 & -2 \end{vmatrix} & \begin{vmatrix} 5 & -3 \\ 3 & -2 \end{vmatrix} \end{vmatrix} z = \begin{vmatrix} \begin{vmatrix} -54 & -5 \\ -52 & -3 \end{vmatrix} & \begin{vmatrix} -29 & -5 \\ 5 & -3 \end{vmatrix} \\ \begin{vmatrix} -52 & -3 \\ -35 & -2 \end{vmatrix} & \begin{vmatrix} 5 & -3 \\ 3 & -2 \end{vmatrix} \end{vmatrix} \tag{92}$$

$$\begin{vmatrix} -105 & 112 \\ 0 & -1 \end{vmatrix} z = \begin{vmatrix} -98 & 112 \\ -1 & -1 \end{vmatrix} \tag{93}$$

$$105z = 210 \tag{94}$$

$$z = \frac{210}{105} = 2 \tag{95}$$

To find y, assuming w is first eliminated, x is eliminated second and z is eliminated third, we have:

$$\begin{vmatrix} \overset{C_y \quad C_w \quad C_x \quad C_w}{\begin{vmatrix} \begin{vmatrix} 1 & 3 \\ 4 & 7 \end{vmatrix} & \begin{vmatrix} -5 & 3 \\ -2 & 7 \end{vmatrix} \\ \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} & \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} \end{vmatrix}} & \overset{C_z \quad C_w \quad C_x \quad C_w}{\begin{vmatrix} \begin{vmatrix} -2 & 3 \\ -3 & 7 \end{vmatrix} & \begin{vmatrix} -5 & 3 \\ -2 & 7 \end{vmatrix} \\ \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} \end{vmatrix}} \\ \begin{vmatrix} \begin{vmatrix} 4 & 7 \\ 1 & 1 \end{vmatrix} & \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} \\ \begin{vmatrix} 1 & 1 \\ -3 & -5 \end{vmatrix} & \begin{vmatrix} -1 & 1 \\ 2 & -5 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} \\ \begin{vmatrix} 3 & 1 \\ 1 & -5 \end{vmatrix} & \begin{vmatrix} -1 & 1 \\ 2 & -5 \end{vmatrix} \end{vmatrix} \end{vmatrix} y = \begin{vmatrix} \overset{C_s \quad C_w \quad C_x \quad C_w}{\begin{vmatrix} \begin{vmatrix} 0 & 3 \\ 18 & 7 \end{vmatrix} & \begin{vmatrix} -5 & 3 \\ -2 & 7 \end{vmatrix} \\ \begin{vmatrix} 18 & 7 \\ 10 & 1 \end{vmatrix} & \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} \end{vmatrix}} & \overset{C_z \quad C_w \quad C_x \quad C_w}{\begin{vmatrix} \begin{vmatrix} -2 & 3 \\ -3 & 7 \end{vmatrix} & \begin{vmatrix} -5 & 3 \\ -2 & 7 \end{vmatrix} \\ \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} \end{vmatrix}} \\ \begin{vmatrix} \begin{vmatrix} 18 & 7 \\ 10 & 1 \end{vmatrix} & \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} \\ \begin{vmatrix} 10 & 1 \\ -15 & -5 \end{vmatrix} & \begin{vmatrix} -1 & 1 \\ 2 & -5 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -3 & 7 \\ 3 & 1 \end{vmatrix} & \begin{vmatrix} -2 & 7 \\ -1 & 1 \end{vmatrix} \\ \begin{vmatrix} 3 & 1 \\ 1 & -5 \end{vmatrix} & \begin{vmatrix} -1 & 1 \\ 2 & -5 \end{vmatrix} \end{vmatrix} \end{vmatrix} \tag{96}$$

$$\begin{vmatrix} \begin{vmatrix} -5 & -29 \\ -3 & 5 \end{vmatrix} & \begin{vmatrix} -5 & -29 \\ -24 & 5 \end{vmatrix} \\ \begin{vmatrix} -3 & 5 \\ -2 & 3 \end{vmatrix} & \begin{vmatrix} -24 & 5 \\ -16 & 3 \end{vmatrix} \end{vmatrix} y = \begin{vmatrix} \begin{vmatrix} -54 & -29 \\ -52 & 5 \end{vmatrix} & \begin{vmatrix} -5 & -29 \\ -24 & 5 \end{vmatrix} \\ \begin{vmatrix} -52 & 5 \\ -35 & 3 \end{vmatrix} & \begin{vmatrix} -24 & 5 \\ -16 & 3 \end{vmatrix} \end{vmatrix} \quad (97)$$

$$\begin{vmatrix} -112 & -721 \\ 1 & 8 \end{vmatrix} y = \begin{vmatrix} -1778 & -721 \\ 19 & 8 \end{vmatrix} \quad (98)$$

$$-175y = -525 \quad (99)$$

$$y = \frac{-525}{-175} = 3 \quad (100)$$

To find w, assuming z is first eliminated, y is eliminated second and x is eliminated third, we have:

$$\begin{array}{c} C_w \ C_z \quad C_y \ C_z \qquad C_x \ C_z \quad C_y \ C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} 3 & -2 \\ 7 & -3 \end{vmatrix} & \begin{vmatrix} 1 & -2 \\ 4 & -3 \end{vmatrix} \\ \begin{vmatrix} 7 & -3 \\ 1 & 3 \end{vmatrix} & \begin{vmatrix} 4 & -3 \\ 1 & 3 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -5 & -2 \\ -2 & -3 \end{vmatrix} & \begin{vmatrix} 1 & -2 \\ 4 & -3 \end{vmatrix} \\ \begin{vmatrix} -2 & -3 \\ -1 & 3 \end{vmatrix} & \begin{vmatrix} 4 & -3 \\ 1 & 3 \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} 7 & -3 \\ 1 & 3 \end{vmatrix} & \begin{vmatrix} 4 & -3 \\ 1 & 3 \end{vmatrix} \\ \begin{vmatrix} 1 & 3 \\ -5 & 1 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ -3 & 1 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -2 & -3 \\ -1 & 3 \end{vmatrix} & \begin{vmatrix} 4 & -3 \\ 1 & 3 \end{vmatrix} \\ \begin{vmatrix} -1 & 3 \\ 2 & 1 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ -3 & 1 \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} w = \begin{array}{c} C_s \ C_z \quad C_y \ C_z \qquad C_x \ C_z \quad C_y \ C_z \\ \begin{vmatrix} \begin{vmatrix} \begin{vmatrix} 0 & -2 \\ 18 & -3 \end{vmatrix} & \begin{vmatrix} 1 & -2 \\ 4 & -3 \end{vmatrix} \\ \begin{vmatrix} 18 & -3 \\ 10 & 3 \end{vmatrix} & \begin{vmatrix} 4 & -3 \\ 1 & 3 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -5 & -2 \\ -2 & -3 \end{vmatrix} & \begin{vmatrix} 1 & -2 \\ 4 & -3 \end{vmatrix} \\ \begin{vmatrix} -2 & -3 \\ -1 & 3 \end{vmatrix} & \begin{vmatrix} 4 & -3 \\ 1 & 3 \end{vmatrix} \end{vmatrix} \\ \begin{vmatrix} \begin{vmatrix} 18 & -3 \\ 10 & 3 \end{vmatrix} & \begin{vmatrix} 4 & -3 \\ 1 & 3 \end{vmatrix} \\ \begin{vmatrix} 10 & 3 \\ -15 & 1 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ -3 & 1 \end{vmatrix} \end{vmatrix} & \begin{vmatrix} \begin{vmatrix} -2 & -3 \\ -1 & 3 \end{vmatrix} & \begin{vmatrix} 4 & -3 \\ 1 & 3 \end{vmatrix} \\ \begin{vmatrix} -1 & 3 \\ 2 & 1 \end{vmatrix} & \begin{vmatrix} 1 & 3 \\ -3 & 1 \end{vmatrix} \end{vmatrix} \end{vmatrix} \end{array} \quad (101)$$

$$\begin{vmatrix} \begin{vmatrix} 5 & 5 \\ 24 & 15 \end{vmatrix} & \begin{vmatrix} 11 & 5 \\ -9 & 15 \end{vmatrix} \\ \begin{vmatrix} 24 & 15 \\ 16 & 10 \end{vmatrix} & \begin{vmatrix} -9 & 15 \\ -7 & 10 \end{vmatrix} \end{vmatrix} w = \begin{vmatrix} \begin{vmatrix} 36 & 5 \\ 84 & 15 \end{vmatrix} & \begin{vmatrix} 11 & 5 \\ -9 & 15 \end{vmatrix} \\ \begin{vmatrix} 84 & 15 \\ 55 & 10 \end{vmatrix} & \begin{vmatrix} -9 & 15 \\ -7 & 10 \end{vmatrix} \end{vmatrix} \quad (102)$$

$$\begin{vmatrix} -45 & 210 \\ 0 & 15 \end{vmatrix} w = \begin{vmatrix} 120 & 210 \\ 15 & 15 \end{vmatrix} \quad (103)$$

$$-675y = -1350 \quad (104)$$

$$w = \frac{-1350}{-675} = 2 \quad (105)$$

$$w = 2, \ x = 1, \ y = 3 \text{ and } z = 2 \quad (106)$$

CONCLUSION

This study develops Kifilideen's Elimination Matrix Model to solve simultaneous equations of four variables $w, x, y \ and \ z,$ three variables $x, y \ and \ z$ and two variables $x \ and \ y$. The elimination method was gradually used to reduce the number of variables of a given simultaneous equation in matrix form, whereas, in the process, Kifilideen's Elimination Matrix Model was generated to solve the variables of the simultaneous equation. The Kifilideen's Elimination Matrix Model was implemented to solve four variables $w, x, y \ and \ z,$ three variables $x, y \ and \ z$ and two variables $x \ and \ y$ simultaneous equations. The Kifilideen's Elimination Matrix Model has been fully utilized and found effective, interesting, accurate, easy to understand and utilize

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