

# Applying the Math (DNA) to Distribute Functions into Series

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**Abstract** The math (DNA) is a new mathematical method which enables us to transform any function into two series, these two series represent the function regarding its mathematical attributes. By extrapolating these two series we can distinguish whether the function is a radical one, a multi-term, fractional or logarithmic ....ext. The characteristic feature of the new method is that we can distribute functions with no need for the function derivative as in Taylor s series method or the differences in the function values as in interpolation. By using the new method we can rewrite the function into two series while the ways mentioned previously cannot give us such results.

**Keywords** Numerical analysis, Math(DNA), Series

## 1. Introduction

In formulating the equations of the math (DNA) I used the logarithms and the limit calculation of functions as the independent variable approximates from infinity or from zero. I have adopted several equations to transform functions into two series, for example:-

$$Y = \left( 3x^{\left(\frac{23}{10}\right)} + x^{\left(\frac{2}{5}\right)} \right)$$

$$YI = 3^{\left(\frac{2}{5}\right)} x^{\left(\frac{23}{25}\right)} + \frac{2}{15} \cdot \frac{3^{\left(\frac{2}{5}\right)}}{x^{\left(\frac{19}{50}\right)}} - \frac{1}{75} \cdot \frac{3^{\left(\frac{2}{5}\right)}}{x^{\left(\frac{42}{25}\right)}} \quad 0.5 < x$$

$$YI = x^{\left(\frac{2}{5}\right)} + \frac{6}{5} \cdot x^{\left(\frac{17}{10}\right)} - \frac{27}{25} \cdot x^3 + \frac{216}{125} \cdot x^{\left(\frac{43}{10}\right)} \quad -0.5 < x < 0.5$$

## 2. The General Structure of the Suggested System

### 2.1. The Math (DNA) Equations

The following equations are considered to be the basic equations of the math(DNA) which would enable us to find series and they are as follow

$$K = \log(Y) / \log(X) = \ln(Y) / \ln(X) \quad (1)$$

$$L = \lim_{x \rightarrow \infty} (K) \quad (2)$$

$$P = K - L. \quad (3)$$

$$R = X^P \quad (4)$$

$$T = \lim_{x \rightarrow \infty} (R). \quad (5)$$

$$Y_{new} = Y_{old} - TX^L \quad (6)$$

$$YI = \sum TX^L \quad (7)$$

The net result of equations 1-6 is equation number (7).

After that we will reuse the seven equations above but when the X approximates from zero so equation number (2) and (5) will be written as follow

$$L = \lim_{x \rightarrow 0} (K) \quad (2)$$

$$T = \lim_{x \rightarrow 0} (R) \quad (5)$$

And the summation of equations from (1) to (6) is in the equation (8) as follows

$$YZ = \sum TX^L \quad (8)$$

### Theory (1)

The two series YI and YZ are the math (DNA) for the function Y, or the mathematical code which contains all the mathematical attributes of the function

### 2.2. Proof

Suppose that

$$a = x^K$$

Since

$$K = \log(y) / \log(x). \quad (1)$$

Then

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$$a = x^{\log(y)/\log(x)}$$

And by taking the logarithm of both sides

$$\log(a) = (\log(y)/\log(x))\log(x)$$

$$\log(a) = \log(y)$$

$$a = y$$

And since

$$a = x^K$$

Then

$$y = x^K$$

Based on equations (2) and (3), the result will be as follow

$$L = \lim_{\substack{x \rightarrow \infty \\ \text{or} \\ x \rightarrow 0}}(K) \quad (2)$$

$$P = K - L \quad (3)$$

$$y = x^{L+P}$$

$$y = x^L x^P$$

And from equation (4) and (5), y will be equal to

$$R = x^P \quad (4)$$

$$T = \lim_{\substack{x \rightarrow \infty \\ \text{or} \\ x \rightarrow 0}}(R) \quad (5)$$

$$y = Tx^L$$

But we cannot consider the equation above always correct because L is the limit of K, and T is the limit of R .where

$$y - Tx^L \neq 0$$

The equation above does not always equal to zero therefore, if the result of subtraction was equal to the following equation

$$y - Tx^L = y_1$$

then the value of y1 is a new value on which we can apply the equations(1)(2)(3)(4)(5) to find L1 and T1 and then repeating the subtraction process just as we did above. as follow

$$y_1 - T_1 x^{L_1} = y_2$$

From y2 we can find the value of L2 and T2 by applying the equations (1)-(5) and then using them in the following equation

$$y_2 - T_2 x^{L_2} = y_3$$

And so on until we reach the following equation

$$y_i - T_i x^{L_i} = y_{i+1}$$

If the value of yi+1 was equal to zero or approximating from zero (which is a value that can be neglected) then the summation of the following equations will produce the

following results

$$y - Tx^L = y_1$$

$$y_1 - T_1 x^{L_1} = y_2$$

$$y_2 - T_2 x^{L_2} = y_3$$

$$y_i - T_i x^{L_i} = y_{i+1}$$

$$y = \sum T_i x^{L_i}$$

Whereas the summation of the equations above is represented in the final equation which equal to equation (7) of the math (DNA) equations

$$y = \sum Tx^L \quad (7)$$

From the final equation we can get tow series

When X approximates from zero we get the following series

$$YZ = \sum Tx^L$$

When X approximate from infinity we get the following

$$YI = \sum Tx^L$$

The tow series YZ,YI are the math(DNA) for the function Y

### 2.3. The Equations of the Math (DNA) According to the Numerical Analysis

Let the following table represent Y=f(X)

j	Xj	Y1j
1	X1	Y11
2	X2	Y12
3	X3	Y13
.	.	.
.	.	.
.	.	.

we will apply the math (DNA) equations according to the numerical analysis approach as follow

$$1-Kij = \log(Yij) / \log(Xj) = \ln(Yij) / \ln(Xj) \quad (9)$$

$$2-Li = \lim(Kij) \quad X \rightarrow (ij \text{ finite or zero}) \quad (10)$$

$$3-Pij = Kij - Li \quad (11)$$

$$4-Rij = Xj^{Pij} \quad (12)$$

$$5-Ti = \lim(Rij) \quad X \rightarrow (ij \text{ finite or zero}) \quad (13)$$

$$6-Yi + 1j = Yij - Ti * Xj^{Li} \quad (14)$$

$$7-YI = \sum Ti * X^{Li} \quad (15)$$

$$8-YZ = \sum Ti * X^{Li} \quad (16)$$

The equations above are applied twice, once when X approximates from zero and once more when X approximates from infinity. there for, we will need another table where the values of X approximate from zero supposing that in the table above the X values approximate from infinity.

The following example will explain how would we use the math (DNA) equations according to the numerical analysis approach

**Example (1)**

$$F(X) = (X + X^{1/2})^{1/2}$$

$$\text{let } Y1j = F(X)$$

j	Xj	Y1j
1	1e+4	(1e+4+1e+2) <sup>^</sup> .5
2	1e+50	(1e+50+1e+25) <sup>^</sup> .5
3	1e+100	(1e+100+1e+50) <sup>^</sup> .5
4	1e+3000	(1e+3000+1e+500) <sup>^</sup> .5

$$K1j = \log(Y1j) / \log(Xj) = \ln(Y1j) / \ln(Xj) \quad (9)$$

j	Xj	Y1j	K1j
1	1e+4	(1e+4+1e+2) <sup>^</sup> .5	0.500540
2	1e+50	(1e+50+1e+25) <sup>^</sup> .5	.5
3	1e+100	(1e+100+1e+50) <sup>^</sup> .5	.5
4	1e+3000	(1e+3000+1e+500) <sup>^</sup> .5	.5

$$L1 = \text{limit}(K1j) = .5 \quad (10)$$

j	Xj	Y1j	K1j	L1
1	1e+4	(1e+4+1e+2) <sup>^</sup> .5	0.500540	.5
2	1e+50	(1e+50+1e+25) <sup>^</sup> .5	.5	.5
3	1e+100	(1e+100+1e+50) <sup>^</sup> .5	.5	.5
4	1e+3000	(1e+3000+1e+500) <sup>^</sup> .5	.5	.5

$$P1j = K1j - L1 \quad (11)$$

j	Xj	Y1j	K1j	L1	P1j
1	1e+4	(1e+4+1e+2) <sup>^</sup> .5	0.500540	.5	.00054
2	1e+50	(1e+50+1e+25) <sup>^</sup> .5	.5	.5	0
3	1e+100	(1e+100+1e+50) <sup>^</sup> .5	.5	.5	0
4	1e+3000	(1e+3000+1e+500) <sup>^</sup> .5	.5	.5	0

$$R1j = Xj^{P1j} \quad (12)$$

j	Xj	Y1j	K1j	L1	P1j	R1j
1	1e+4	(1e+4+1e+2) <sup>^</sup> .5	0.500540	.5	.00054	1.0049
2	1e+50	(1e+50+1e+25) <sup>^</sup> .5	.5	.5	0	1
3	1e+100	(1e+100+1e+50) <sup>^</sup> .5	.5	.5	0	1
4	1e+3000	(1e+3000+1e+500) <sup>^</sup> .5	.5	.5	0	1

$$T1 = \text{limit}(R1j) = 1 \quad (13)$$

j	Xj	Y1j	K1j	L1	P1j	R1j	T1
1	1e+4	(1e+4+1e+2) <sup>^</sup> .5	0.500540	.5	.00054	1.0049	1
2	1e+50	(1e+50+1e+25) <sup>^</sup> .5	.5	.5	0	1	1
3	1e+100	(1e+100+1e+50) <sup>^</sup> .5	.5	.5	0	1	1
4	1e+3000	(1e+3000+1e+500) <sup>^</sup> .5	.5	.5	0	1	1

By applying equations (9-15) on the last table repeatedly

$$Y2j = Y1j - T1 * Xj^{L1} \quad (14)$$

j	Xj	Y2j
1	1e+4	(1e+4+1e+2) <sup>^</sup> .5 - 1e+2
2	1e+50	(1e+50+1e+25) <sup>^</sup> .5 - 1e+25
3	1e+100	(1e+100+1e+50) <sup>^</sup> .5 - 1e+50
4	1e+3000	(1e+3000+1e+500) <sup>^</sup> .5 - 1e+1500

time after another just as we do previously we will get the following series

$$YI = \sum_{i=1}^n (T_i * X^{L_i}) = X^{-.5} + 0.5 - (1/8)X^{-.5} + \dots \quad (15)$$

Then apply the new method when X approximates from zero as follow

j	Xj	Y1j
1	1e-4	(1e-4+1e-2)^.5
2	1e-50	(1e-50+1e-25)^.5
3	1e-100	(1e-100+1e-50)^.5
4	1e-3000	(1e-3000+1e-1500)^.5

$$K1j = \log(Y1j) / \log(Xj) = \ln(Y1j) / \ln(Xj) \quad (9)$$

j	Xj	Y1j	K1j
1	1e-4	(1e-4+1e-2)^.5	0.2494
2	1e-50	(1e-50+1e-25)^.5	0.25
3	1e-100	(1e-100+1e-50)^.5	0.25
4	1e-3000	(1e-3000+1e-1500)^.5	0.25

$$L1 = \lim_{j \rightarrow \infty} (K1j) = .25 \quad (10)$$

j	Xj	Y1j	K1j	L1
1	1e-4	(1e-4+1e-2)^.5	0.2494	.25
2	1e-50	(1e-50+1e-25)^.5	0.25	.25
3	1e-100	(1e-100+1e-50)^.5	0.25	.25
4	1e-3000	(1e-3000+1e-1500)^.5	0.25	.25

$$P1j = K1j - L1 \quad (11)$$

j	Xj	Y1j	K1j	L1	P1j
1	1e-4	(1e-4+1e-2)^.5	0.2494	.25	.0006
2	1e-50	(1e-50+1e-25)^.5	0.25	.25	0
3	1e-100	(1e-100+1e-50)^.5	0.25	.25	0
4	1e-3000	(1e-3000+1e-1500)^.5	0.25	.25	0

$$R1j = Xj^{P1j} \quad (12)$$

j	Xj	Y1j	K1j	L1	P1j	R1j
1	1e-4	(1e-4+1e-2)^.5	0.2494	.25	.0006	1.005
2	1e-50	(1e-50+1e-25)^.5	0.25	.25	0	1
3	1e-100	(1e-100+1e-50)^.5	0.25	.25	0	1
4	1e-3000	(1e-3000+1e-1500)^.5	0.25	.25	0	1

$$T1 = \lim_{j \rightarrow \infty} (R1j) = 1 \quad (13)$$

j	Xj	Y1j	K1j	L1	P1j	R1j	T1
1	1e-4	(1e-4+1e-2)^.5	0.2494	.25	.0006	1.005	1
2	1e-50	(1e-50+1e-25)^.5	0.25	.25	0	1	1
3	1e-100	(1e-100+1e-50)^.5	0.25	.25	0	1	1
4	1e-3000	(1e-3000+1e-1500)^.5	0.25	.25	0	1	1

$$Y_{2j} = Y_{1j} - (T1)X_j^{L1} \quad (14)$$

$$Y_{2j} = Y_{1j} - X_j^{.25}$$

j	Xj	Y2j
1	1e-4	(1e-4+1e-2) <sup>.5</sup> -0.1
2	1e-50	(1e-50+1e-25) <sup>.5</sup> -1e-12.5
3	1e-100	(1e-100+1e-50) <sup>.5</sup> -1e-25
4	1e-3000	(1e-3000+1e-1500) <sup>.5</sup> -1e-750

By applying equations (9-16) on the last table repeatedly time after another just as we do previously we will get the following series

$$YZ = \sum_{i=1}^n (T_i * X^{L_i}) = X^{.25} + .5X^{.75} - (X^{1.25})/8 + \dots \quad (16)$$

So the math (DNA) for the function  $(x^{.5}+x)^{.5}$  is represented in the following tow series

$$YI = \sum_{i=1}^n (T_i * X^{L_i}) = X^{.5} + 0.5 - (1/8)X^{-.5} + \dots \quad \text{all } x \in [-.5, .5]$$

$$YZ = \sum_{i=1}^n (T_i * X^{L_i}) = X^{.25} + .5X^{.75} - (X^{1.25})/8 + \dots \quad -.5 < x < .5$$

## 2.4. A MATLAB Program to Calculate the Math (DNA) of the Function

We can notice the complex calculations of tables in the previous example when X approximates from zero and from infinity to find the series which represent the math(DNA) for the function, therefore the following MATLAB program will save us the time and effort that we need for more accuracy to find the math(DNA) of functions

```
X=sym('x')
YI=0
Y=formula of function
For i=1:8,
K=log(Y)/log(x)
L=limit(K,x,inf,'left')
R=x^(K-L)
T=limit(R,x,inf,'left')
Y=Y-T*x^L
YI=YI+T*x^L
End
```

The program above calculates the series YI which represent the function Y when X approximates from infinity.

The following program is calculating the series YZ which represent the function Y when X approximates from zero

```
X=sym('x')
YZ=0
Y=formula of function
For i=1:8,
K=log(Y)/log(x)
L=limit(K,x,0,'left')
R=x^(K-L)
T=limit(R,x,0,'left')
Y=Y-T*x^L
YZ=YZ+T*x^L
End
```

## 2.5. Exploration of the Math(DNA) of Functions

In this part of the research we are going to extract the mathematical attributes of function by using the tow series which represent the math(DNA) of that function.

### 2.5.1. The Math(DNA) for Multi-term Functions

In multi-term function the two series that represent the math(DNA) of the function will be equal to each other and also equal to the original formula of that function .

#### Proof

Suppose the function is equal to

$$Y = b_1 X^{a_1} + b_2 X^{a_2} + \dots + b_n X^{a_n}$$

Whereas  $a_1 > a_2 > \dots > a_n$

Apply the equations of the math(DNA) on the function Y according to equation (1)

$$K = \log(Y) / \log(X) = \ln(Y) / \ln(X) \quad (1)$$

And to calculate L according to equation(2)

$$L = \lim_{x \rightarrow \infty} (K) \quad (2)$$

To calculate the limit for the above equation we will apply the hospital rule (3) for limits

$$\lim_{x \rightarrow \infty} (K) = \frac{Y' / Y}{1 / X}$$

Whereas  $Y'$  is the first derivative of the function Y

$$Y' = dY/dX = b_1 a_1 X^{a_1-1} + b_2 a_2 X^{a_2-1} + \dots + b_n a_n X^{a_n-1}$$

And by substituting the derivative of the function Y in the equation which calculate the limit for K we get

$$\lim_{x \rightarrow \infty} (K) = \frac{X(b_1 a_1 X^{a_1-1} + b_2 a_2 X^{a_2-1} + \dots + b_n a_n X^{a_n-1})}{b_1 X^{a_1} + b_2 X^{a_2} + \dots + b_n X^{a_n}}$$

And by simplifying the fraction above we get

$$\lim_{x \rightarrow \infty}(K) = \frac{b_1 a_1 X^{a_1} + b_2 a_2 X^{a_2} + \dots + b_n a_n X^{a_n}}{b_1 X^{a_1} + b_2 X^{a_2} + \dots + b_n X^{a_n}}$$

Suppose that

$$m_i = (b_i a_i) / b_1 \quad i = 1, 2, \dots, n$$

$$C_i = b_i / b_1 \quad i = 1, 2, \dots, n$$

$$\lim_{x \rightarrow \infty}(K) = \frac{b_1 X^{a_1} (a_1 + m_2 X^{a_2-a_1} + \dots + m_n X^{a_n-a_1})}{b_1 X^{a_1} (1 + C_2 X^{a_2-a_1} + \dots + C_n X^{a_n-a_1})}$$

$$\lim_{x \rightarrow \infty}(K) = \frac{a_1 + m_2 X^{a_2-a_1} + \dots + m_n X^{a_n-a_1}}{1 + C_2 X^{a_2-a_1} + \dots + C_n X^{a_n-a_1}}$$

And since

$$a_1 > a_2 > \dots > a_n$$

According to the assumption

So, that will lead to

$$0 > a_2 - a_1 > \dots > a_n - a_1$$

And from the last result we get

$$a_j - a_1 < 0 \quad j = 2, 3, \dots, n$$

$$\lim_{x \rightarrow \infty}(K) = \frac{a_1 + m_2 X^{a_2-a_1} + \dots + m_n X^{a_n-a_1}}{1 + C_2 X^{a_2-a_1} + \dots + C_n X^{a_n-a_1}}$$

In the fraction above we can notice that X approximates from infinity and that it is raised to a negative exponent which make the final result nearly equal to zero according to the mathematical fact (the inverse of infinity is a value approximating from zero) so we can ignore any X raised to  $a_j - a_1$  whereas  $j = 2, 3, \dots, n$ .

By simplifying the fracture above we get

$$\lim_{x \rightarrow \infty}(K) = a_1$$

And according to equation (10)

$$L_i = \lim(K_{ij}) \quad X \rightarrow (\text{infinite or zero}) \quad (10)$$

We can notice that

$$L_1 = a_1$$

According to equation (11) we get

$$\begin{aligned} P_{ij} &= K_{ij} - L_i \\ K_{ij} &= L_i + P_{ij} \end{aligned} \quad (11)$$

And since

$$\begin{aligned} Y &= X^K \\ Y &= X^{(L+P)} \\ Y &= (X^L)(X^P) \end{aligned}$$

According to equations (12) and (13) we get

$$R_{ij} = X_j \wedge P_{ij} \quad (12)$$

$$T_i = \lim(R_{ij}) \quad x \rightarrow (\text{infinite or zero})$$

$$Y = T_1 X^{L_1}$$

And from the proof  $L_1 = a_1$

$$Y = T_1 X^{a_1}$$

Since

$$Y = b_1 X^{a_1} + b_2 X^{a_2} + \dots + b_n X^{a_n}$$

By substituting Y and making several abbreviations

$$T_1 = b_1 + b_2 X^{a_2-a_1} + \dots + b_n X^{a_n-a_1}$$

And according to the following (from the proof)

$$a_j - a_1 < 0 \quad j = 2, 3, 4, \dots, n$$

Considering X is approximating from infinity and that it is raised to a negative exponent so the result of this process will be equal to zero resulting in the following

$$T_1 = b_1$$

And according to equation (14)

$$Y_{i+1,j} = Y_{ij} - T_i * X \wedge L_i \quad (14)$$

By substitution in the equation above the following will result

$$Y_{2j} = Y_{1j} - T_1 * X \wedge L_1 \quad (14)$$

And by substitution in the equation (14) considering  $Y = Y_{1j}$  give us  $Y_{2j}$  equal to

$$Y_2 = b_2 X^{a_2} + \dots + b_n X^{a_n}$$

And by using the same steps of the proof we will find that  $L_i = a_i, T_i = b_i, \quad i = 1, 2, 3, \dots, n$  and according to equation (15)

$$YI = \sum T_i * X \wedge L_i \quad (15)$$

The following result

$$YI = b_1 X^{a_1} + b_2 X^{a_2} + \dots + b_n X^{a_n}$$

And regarding the second part of the proof, it will be when X approximates from zero

$$K = \log(Y) / \log(X) = \ln(Y) / \ln(X) \quad (1)$$

And to calculate the value of L according to equation (2)

$$L = \lim_{x \rightarrow 0}(K) \quad (2)$$

Then we apply the hospital rule (3) to calculate the limit of K when X is approximating from zero

$$\lim_{x \rightarrow 0}(K) = \frac{Y' / Y}{1 / X}$$

And since  $Y'$  is the first derivative of the function Y

$$Y' = dY / dX = b_1 a_1 X^{a_1-1} + b_2 a_2 X^{a_2-1} + \dots + b_n a_n X^{a_n-1}$$

And by substitution the following will result

$$\lim_{x \rightarrow 0} (K) = \frac{b_1 a_1 X^{a_1} + b_2 a_2 X^{a_2} + \dots + b_n a_n X^{a_n}}{b_1 X^{a_1} + b_2 X^{a_2} + \dots + b_n X^{a_n}}$$

Suppose that

$$m_i = (b_i a_i) / b_n \quad i = 1, 2, \dots, n$$

$$C_i = b_i / b_n \quad i = 1, 2, \dots, n$$

$$\lim_{x \rightarrow 0} (K) = \frac{b_n X^{a_n} (m_1 X^{a_1 - a_n} + m_2 X^{a_2 - a_n} + \dots + a_n)}{b_n X^{a_n} (C_1 X^{a_1 - a_n} + C_2 X^{a_2 - a_n} + \dots + 1)}$$

$$\lim_{x \rightarrow 0} (K) = \frac{m_1 X^{a_1 - a_n} + m_2 X^{a_2 - a_n} + \dots + a_n}{C_1 X^{a_1 - a_n} + C_2 X^{a_2 - a_n} + \dots + 1}$$

According to the assumption  $a_1 > a_2 > \dots > a_n$

This will lead to

$$a_j - a_n > 0 \quad j = 1, 2, \dots, n-1.$$

In the fraction which calculate the limit of K (mentioned above) we notice that X approximates from zero and that it is raised to positive exponent which make the final result equal to zero and this will lead to the possibility of ignoring any X raised to  $a_j - a_n$  whereas  $j = 1, 2, \dots, n-1$  and by simplifying the fraction above we get

$$\lim_{x \rightarrow 0} (K) = a_n$$

And according to equation (10)

$$L_i = \lim(K_{ij}) \quad X \rightarrow (\text{infinite or zero}) \quad (10)$$

We can notice that

$$L_i = a_n$$

And from equation (11) we get

$$P_{ij} = K_{ij} - L_i \quad (11)$$

$$K_{ij} = L_i + P_{ij}$$

And since

$$Y = X^K$$

$$Y = X^{(L+P)}$$

$$Y = (X^L)(X^P)$$

From equation (12) and (13) we get

$$R_{ij} = X_j \wedge P_{ij} \quad (12)$$

$$T_i = \lim(R) \quad X \rightarrow (\text{infinite or zero}) \quad (13)$$

$$Y = T_1 X^{L_1}$$

And from the proof  $L_1 = a_n$

$$Y = T_1 X^{a_n}$$

Since

$$Y = b_1 X^{a_1} + b_2 X^{a_2} + \dots + b_n X^{a_n}$$

By substitution for Y and making some abbreviations

$$T_1 = b_n + b_1 X^{a_1 - a_n} + \dots + b_{n-1} X^{a_{n-1} - a_n}$$

And since X approximates from zero and it is raised to a positive exponent according to the following

$$a_j - a_n > 0 \quad j = 1, 2, \dots, n-1 \text{ this lead to}$$

$$T_1 = b_n$$

According to equation (14)

$$Y_{i+1,j} = Y_{ij} - T_i * X_j \wedge L_i \quad (14)$$

By substitution in the equation above the following result

$$Y_{2j} = Y_{1j} - T_1 * X_j \wedge L_1 \quad (15)$$

And by substitution in the equation (14) considering  $Y = Y_{1j}$  so  $Y_{2j}$  will be equal to

$$Y_2 = b_1 X^{a_1} + b_2 X^{a_2} + \dots + b_{n-1} X^{a_{n-1}}$$

And by the same steps of the proof we can prove that

$$L_i = a_i, T_i = b_i \quad i = n, n-1, n-2, \dots, 1$$

And according to equation (16)

$$YZ = \sum T_i * X_j \wedge L_i \quad (16)$$

The following result

$$YZ = b_n X^{a_n} + b_{n-1} X^{a_{n-1}} + \dots + b_2 X^{a_2} + b_1 X^{a_1}$$

So we can notice the following

$$YI = YZ = Y$$

Q.D.

### 3. The Efficiency of the Suggested System

The math(DNA) system is a process of transforming function into tow series.

It characterize by the following:-

1- the result of applying the math(DNA) is two series while the result of the ordinary ways is one series as in interpolation, example :-

$$YI = \sum_{i=1}^n (T_i * X^{L_i}) = X^{-5} + 0.5 - (1/8)X^{-5} + \dots \quad \text{all } x \in [-0.5, 0.5]$$

$$YZ = \sum_{i=1}^n (T_i * X^{L_i}) = X^{-25} + .5X^{-75} - (X^{1.25})/8 + \dots \quad -0.5 < x < .5$$

2- the capability of finding the original formula of function by extrapolating the two series which represent that function.

3- the incapability of the subordinated ways of finding series for some of the function for example Taylors series while the math (DNA) can find two series whatever the function is complicated.

In example(1) at the beginning of research notice that the function Y is equal to the following tow series

Whereas

$$Y = (X + X^{1/2})^{1/2}$$

We cannot apply Taylor's series or Maclawrins series on the function mentioned above because we will get no result Notice:

We cannot apply the math(DNA) if there is no limit for K in equation (2) of the math(DNA) equations

## 4. Conclusions

Each function has two series representing the mathematical attributes of it, therefore it resembles the biological DNA of living cell.

I expect that more elaboration will be done on the math (DNA) to deal with functions which contain more than one independent variable as in the following functions

$$z = \sqrt{y^2 + x^2}$$

$$w = (zy = x)^{3/2}$$

$$t = (x^2 + yx + z^3)^{5/2}$$

By returning to the subject of extrapolating the math(DNA) we can notice that it is possible to reach the mathematical

formula of the function Y if both sides of the math(DNA) were equal, I mean  $YI=YZ$ .

Therefore I suggest the following equation to represent the general solution for the math (DNA).

Let  $\Phi$  be a function so if  $\Phi(Y)$  and the tow series which represent the math (DNA) for the function  $\Phi(Y)$  were  $\Phi I$ ,  $\Phi Z$  and whereas the tow series were equal  $\Phi I=\Phi Z$  so the original law of the function would be

$$Y = \Phi^{-1}(\Phi I) = \Phi^{-1}(\Phi Z)$$

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