JOURNAL OF BASIC SCIENCE AND ENGINEERING

THEORY OF SPECIAL CURVES

Ramesh Chandra Bagadi[a], D. S. R. Murthy[b]

[a]Ramesh Bagadi Consulting LLC, {R042752}, Madison, Wisconsin 53715, USA.
[b]Professor Emeritus, Department Of Civil Engineering, College Of Engineering, Andhra University, Visakhapatnam, Andhra Pradesh State, India.

Abstract

In this research manuscript, the author has presented two novel notions of Advanced Algorithm To Compute Special Curve Points Between Any Two Real Points Of Concern, and an Easy Approximation For Special Curves Computations

Keywords: One Step Evolution, One Step Devolution, Primes, Higher Order Primes, Askew Primes, Higher Order Askew Primes, Universal Representation Theory, Universal Representation Theory Interaction, Universal Representation Theory Entropy, RCB Special Curve.

1.0 INTRODUCTION

Since, the dawn of civilization, human kind has been leaning on the Sequence of Primes to devise Evolution Schemes akin to the behavior of the Distribution of Primes, in an attempt to mimic natural phenomenon and be able to forecast useful aspects of science of the aforementioned phenomenon. Many western and as well as oriental Mathematicians and Physicsts have understood the importance of Prime Numbers (in the ambit of Quantum Groups, Hopf Algebras, Differentiable Quantum Manifolds, etc.,) in understanding subatomic processes such as Symmetry Breaking, Standard Model Explanation, etc. [1], [2] and [4]

Special Curves are curves that connect any two real positive numbers based on the continuous segments of Sequence of Primes, any Sequence of Higher Order Primes [1], any Sequence of Askew Primes [2].

2.0 METHODOLOGIES USED

The following sub-sections present in detail the methodologies used.

2.1 Theory Of Higher Order Sequences(s) Of Primes

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.2 Askew Primes And Sequences Of Askew Primes

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.3 One Step Evolution Of Any Element Of Sequence Of Prime

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.4 One Step Devolution Of Any Element Of Sequence Of Prime

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.5 One Step Evolution Of Any Element Of Higher Order Sequence Of Prime

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.6 One Step Devolution Of Any Element Of Higher Order Sequence Of Prime

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.7 One Step Evolution Of Any Element Of Higher Order Sequence Of Askew Prime

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.8 One Step Devolution Of Any Element Of Higher Order Sequence Of Askew Prime

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.9 One Step Evolution Of Any Real Number

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.10 One Step Devolution Of Any Real Number

For complete description of the aforesaid, please refer to [5], [6], [7], [8] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.11 Theory Of Special Curves

The following sub-sections present in detail, the Theory of RCB Special Curves

2.11.1 Special Curve Connecting Any Two Positive Real Numbers [1], [2], [4]

For complete description of the aforesaid, please refer to [1], [2], [4] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.11.2 Net Slope or Cadence Change Optimization Along The Special Curve [1], [2], [4]

For complete description of the aforesaid, please refer to [1], [2], [4] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

2.11.3 Generic Representation [1], [2], [4]

For complete description of the aforesaid, please refer to [1], [2], [4] and [9] as the author omits the description of the same due to copyright and plagiarism restrictions.

Vol. 21, No. 1, (2024)
ISSN: 1005-0930

2.11.4 Advanced Notion Of One Step Evolution Of An Askew Prime [5], [6], [7], [8] and [9]

The following sub-sections present the notions of Interaction in Euclidean Inner Product Space, Interaction In Universal Representation Theoretic Format Space, One Step Evolution Of An Askew Prime In The Universal Representation Theoretic Space, and finally an Advanced Algorithm To Compute Special Curve Points Between Any Two Real Points Of Concern.

2.11.5 Interaction In Euclidean Inner Product Space [5], [6], [7], [8] and [9]

The Interaction Of two Vectors of same size in Euclidean Inner Product Space is given as follows:
Given

$$\vec{A} = \sum_{i=1}^{n} a_i \hat{e}_i \ \text{ and } \ \hat{A} = \sum_{i=1}^{n} \hat{a}_i \hat{e}_i \ \text{ where } \hat{a}_i = \left\{ \frac{a_i}{\left(\sum_{i=1}^{n} a_i^2 \right)^{0.5}} \right\} \tag{1}$$

$$\vec{B} = \sum_{i=1}^{n} b_i \hat{e}_i \ \text{ and } \ \hat{B} = \sum_{i=1}^{n} \hat{b}_i \hat{e}_i \ \text{ where } \hat{b}_i = \left\{ \frac{b_i}{\left(\sum_{i=1}^{n} b_i^2 \right)^{0.5}} \right\} \tag{2}$$

, we write the Interaction of A and B as

$$\left(\vec{A}\right) \otimes_I \left(\vec{B}\right) = \vec{A} + \left(\hat{A} \cdot \hat{B}\right)\vec{B} - \left(1 - \hat{A} \cdot \hat{B}\right)\vec{B} \tag{3}$$

2.11.6 Interaction In Universal Representation Theoretic Format Space [5], [6], [7], [8] and [9]

The Interaction Of two Universal Representation Theoretic Format 5], [6], [7], [8] and [9] Vector or Matrices **A** and **B** of even different sizes in Universal Representation Theoretic Format Space is given as follows:

First we need to slate both the given Numbers in One Sized Universal Representation Theoretic Format Matrix, i.e., of the Highest Prime Basis Position Number for each Dimension (Row) of each Matrix. Any Non Present element (say of the i^{th} Row and the j^{th} Column) in the corresponding

Vol. 21, No. 1, (2024)
ISSN: 1005-0930

Prime Basis Position Number, say (i, j) is equated to $(p_{ij})^{a_{ij}=0}$ and if it is present, i.e., Non-Absent, it is equated to $(p_{ij})^{a_{ij}=1}$.

One can note that any Natural Number ‘ s ’ can be written as

$s = (p_1)^{a_1} \cdot (p_2)^{a_2} \cdot (p_3)^{a_3} \cdots\cdots\cdots (p_{z-1})^{a_{z-1}} \cdot (p_z)^{a_z}$ where $p_1, p_2, p_3, \ldots\ldots\ldots\ldots,$(4)

p_{z-1}, p_z are some Primes and $a_1,\ a_2, a_3, \ldots\ldots\ldots\ldots, a_{z-1}, a_z$ are some positive integers.

Given

$$\vec{A}_{ij} = (p_{ij})^{a_{ij}} \tag{5}$$

where p_{ij} is the i^{th} Prime and a_{ij} is the power to which the p_{ij} is raised, i.e., is equal to 1 or 0 according to the representation called by the Integer we wish to represent in the Universal Representation Space. That is,

$$a_{ij} = 1 \text{ or } a_{ij} = 0 \tag{6}$$

That is,

$$\vec{A}_i = \underset{all\ j}{C} \left({}^{A}p_{ij}\right)^{a_{ij}} \tag{7}$$

where C denotes the Collection , as in a Vector. And,

$$\vec{B}_k = \underset{all\,k}{C} \left({}^{B}p_{ik}\right)^{a_{ik}} \tag{8}$$

We then, we write the Interaction of A and B as

$$\left(\vec{A}_i\right) \otimes_I \left(\vec{B}_k\right) = \left\{\vec{A}_i + \left(\hat{A}_i \cdot \hat{B}_k\right)\vec{B}_k - \left(1 - \hat{A}_i \cdot \hat{B}_k\right)\vec{B}_k\right\} \tag{9}$$

where,

$$\left(A_i \cdot B_k\right)_j = \left\{\begin{array}{l} 1\ \ if\ A(i, j) = B(k, j) \\ 0\ \ if\ A(i, j) \neq B(k, j) \end{array}\right\} \tag{10}$$

And

$$\left(A_i \cdot B_k\right) = \sum_j \left(A_i \cdot B_k\right)_j \tag{11}$$

Furthermore,

$$\hat{A}_i(j) = \left\{\begin{array}{l} 1\ \ if\ the\ PBPN\ \ is\ Vacant, i.e.,\ \ p_{ij} = 0 \\ 0\ \ if\ the\ PBPN\ \ is\ \ Non-Vacant,\ i.e.,\ \ p_{ij} \neq 0 \end{array}\right\} \tag{12}$$

And also,

$$\left(\hat{A}_i\right)=\left\{\frac{\hat{A}_i(j)}{\sum_j\left(A_i\cdot B_k\right)_j}\right\} \tag{13}$$

and

$$\left(\hat{B}_i\right)=\left\{\frac{\hat{B}_k(j)}{\sum_j\left(A_i\cdot B_k\right)_j}\right\} \tag{14}$$

Therefore, we can write,

$$\left(\hat{A}_i\cdot\hat{B}_k\right)=\sum_j\left(\hat{A}_i\cdot\hat{B}_k\right)_j \tag{15}$$

2.11.7 One Step Evolution Of An Askew Prime In The Universal Representation Theoretic Space [5], [6], [7], [8] and [9]

This can be simply written as the Integer Value carried by the following Operation:

$$\underbrace{\sum_{m=1}^{j_B}\sum_{l=1}^{j_A}\sum_{all\ k}\sum_{all\ i}\left\{\left(\vec{A}_i\right)\otimes_I\left(\vec{B}_k\right)\right\}}_{for\ all\ possible\ j_A,\ j_B}=\sum_{m=1}^{j_B}\underbrace{\sum_{l=1}^{j_A}\sum_{all\ k}\sum_{all\ i}\left\{\vec{A}_i+\left(\hat{A}_i\cdot\hat{B}_k\right)\vec{B}_k-\left(1-\hat{A}_i\cdot\hat{B}_k\right)\vec{B}_k\right\}}_{for\ all\ possible\ j_A\ j_B} \tag{16}$$

where, $j_A=1\ to\ j^{th}\ Column\ of\ the\ Vector\ A_i$ and
$j_B=1\ to\ j^{th}\ Column\ of\ the\ Vector\ B_k$

In better explicable notation, the above can be written as

$$\underbrace{\sum_{m=1}^{j_B}\sum_{l=1}^{j_A}\sum_{all\ k}\sum_{all\ i}\left\{\left(\vec{A}_i\right)\otimes_I\left(\vec{B}_k\right)\right\}}_{for\ all\ possible\ j_A,\ j_B}=$$

$$\sum_{m=1}^{j_B}\underbrace{\sum_{l=1}^{j_A}\sum_{all\ k}\sum_{all\ i}\left\{\left(\vec{A}_i\right)_{j_A}+\left(\left(\hat{A}_i\right)_{j_A}\cdot\left(\hat{B}_k\right)_{j_B}\right)\left(\vec{B}_k\right)_{j_B}-\left(1-\left(\hat{A}_i\right)_{j_A}\cdot\left(\hat{B}_k\right)_{j_B}\right)\left(\vec{B}_k\right)_{j_B}\right\}}_{for\ all\ possible\ j_A\ j_B}$$

where, $j_A = 1\ to\ j^{th}\ Column\ of\ the\ Vector\ A_i$ and

$j_B = 1\ to\ j^{th}\ Column\ of\ the\ Vector\ B_k$ (17)

3.0 METHODOLOGIES PROPOSED

The following sub-sections detail the Methodologies proposed.

3.1 Advanced Algorithm To Compute Special Curve Points Between Any Two Real Points Of Concern

Algorithm

Step 1: Given any two Real Numbers a, b, we first convert a into $\left(\frac{p_a}{q_a}\right)$, i.e., a Rational to the nearest possible approximation as stipulated by the need level of the accuracy.

Step 2: We then write $(p_a q_b)$ considering it as some element of Sequence Of Primes (I) or some element of Sequence Of Higher Order Sequence(s) of Primes (II) or some element of Sequence of Askew Primes (III) or some element of Sequence(s) of Higher Order Askew Primes (IV) or some element of the Sequences(s) generated by the Field of Algebraic Operations on I, II, III and IV, and write the next terms of its generic form, i.e., $(p_a q_b)_t$ representing the t^{th} Prime Basis Position Number of the Sequence that p_a belongs to, we write $(p_a q_b)_t$, $(p_a q_b)_{t+1}$, $(p_a q_b)_{t+2}$,……., $(p_a q_b)_{t+k}$ such that

$$(p_a q_b)_{t+k} < (p_b q_a) \tag{18}$$

and

$$(p_a q_b)_{t+k+1} > E^1(p_b q_a) \tag{19}$$

Step 3: We then consider the difference

$$\{(p_b q_a) - (p_a q_b)_{t+k}\} = \delta_1 \tag{20}$$

Step 4: We now assign $(p_a q_b)_{t+k} \to 0$, so now, the domain of investigation being $(0, \delta_1)$.

Step 5: We now check which (element of Sequence Of Primes (I) or some element of Sequence Of Higher Order Sequence(s) of Primes (II) or some element of Sequence of Askew Primes (III) or some element of Sequence(s) of Higher Order Askew Primes (IV) or some element of the Sequences(s) generated by the Field of Algebraic Operations on I, II, III and IV), best suits such that

$$\{\delta_1 - ({}^{N_2} p_{jN_2})\} = \delta_2 \tag{21}$$

is a Minimum. Here, N_2 is the Order of the

(element of Sequence Of Primes (I) or some element of Sequence Of Higher Order Sequence(s) of Primes (II) or some element of Sequence of Askew Primes (III) or some element of Sequence(s) of Higher Order Askew Primes (IV) or some element of the Sequences(s) generated by the Field of Algebraic Operations on I, II, III and IV) and j_{N_2} is the Prime Basis Position Number of that Order Sequence.

Step 6: Again, we set $(0, \delta_2)$ as the domain of investigation and repeat the procedure (Step 1 to Step 6) again and again until, say up to g^{th} iteration, $\delta_g = 0$.

Step 7: Then, the extrapolated intermediary stage Special Curve co-ordinates are given as:

$$\left\{\begin{array}{l} {}^{N_1}(p_a q_b)_t, \ldots\ldots\ldots, {}^{N_1}(p_a q_b)_{t+k}, \\ 0, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots, {}^{N_2}(p)_{j_{N_2}}, \\ 0, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots, {}^{N_3}(p)_{j_{N_3}}, \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ 0, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots, {}^{N_g}(p)_{j_{N_g}} \end{array}\right\}$$

segment wise, which are actually,

Vol. 21, No. 1, (2024)
ISSN: 1005-0930

$$\left\{\begin{array}{l} {}^{N_1}(p_a q_b)_t, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots, {}^{N_1}(p_a q_b)_{t+k}, \\ \left({}^{N_1}(p_a q_b)_{t+k} + 0\right), \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots, \left({}^{N_1}(p_a q_b)_{t+k} + {}^{N_2}(p)_{j_{N_2}}\right), \\ \left(\left({}^{N_1}(p_a q_b)_{t+k} + {}^{N_2}(p)_{j_{N_2}}\right) + 0\right), \ldots\ldots\ldots\ldots\ldots, \left(\left({}^{N_1}(p_a q_b)_{t+k} + {}^{N_2}(p)_{j_{N_2}}\right) + {}^{N_3}(p)_{j_{N_3}}\right), \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ \left(\left(\left({}^{N_1}(p_a q_b)_{t+k} + {}^{N_2}(p)_{j_{N_2}}\right) + {}^{N_3}(p)_{j_{N_3}}\right) + 0\right), \ldots, \left(\left(\left({}^{N_1}(p_a q_b)_{t+k} + {}^{N_2}(p)_{j_{N_2}}\right) + {}^{N_3}(p)_{j_{N_3}}\right) + {}^{N_g}(p)_{j_{N_g}}\right) \end{array}\right\}$$

$$= SC_{ab} \tag{22}$$

Step 8: All these co-ordinates can then again be (element of Sequence Of Primes (I) or some element of Sequence Of Higher Order Sequence(s) of Primes (II) or some element of Sequence of Askew Primes (III) or some element of Sequence(s) of Higher Order Askew Primes (IV) or some element of the Sequences(s) generated by the Field of Algebraic Operations on I, II, III and IV) Metrized using their

Case a:

Using their Least Common Multiple (LCM)

$$UMSC_{ab} = \{A_i\}_{i=1\ to\,\omega,\ say} \tag{23}$$

Then, we have

$$\{B_i\}_{i=1\ to\,\omega,\ say} = \underset{i=1\ to\ \omega}{C}\left\{\frac{A_i\left\{\dfrac{LCM\left(\{A_i\}_{i=1\ to\,\omega,\ say}\right)}{A_i}\right\}}{LCM\left(\{A_i\}_{i=1\ to\,\omega,\ say}\right)}\right\} \tag{24}$$

where the C stands for Collection, as in a Set’s elements.

Finally, we write

$$\{R_i\} = \left\{\frac{\{B_i\}_{i=1\ to\,\omega,\ say}}{q_a q_b}\right\} \tag{25}$$

Case b:

Using Prime Metrization detailed in {[8], [10], [11], [9], [23]}.

3.2 An Easy Approximation For Special Curves Computations

In the following lines, the authors present an easy approximation for Special Curves Computation between any two Real Numbers (Points) of concern.

Step 1: Given any 2 Real Points a and b, we first write

$$a = \left(\frac{p_a}{q_a} \right)$$

and

$$b = \left(\frac{p_b}{q_b} \right)$$

where p_a, p_b, q_a and q_b are all Positive Integers.

Step 2: We then note if p_a is equal to any element of Sequence Of Primes (I) or some element of Sequence Of Higher Order Sequence(s) of Primes (II) or some element of Sequence of Askew Primes (III) or some element of Sequence(s) of Higher Order Askew Primes (IV) or some element of the Sequences(s) generated by the Field of Algebraic Operations on I, II, III and IV).

Step 3: We then use the One Step Evolution Scheme of this number $\left({}^{N_a} p_a\right)_l$ And write its next terms along its successive Prime* Basis Position Numbers, say till $\left({}^{N_a} p_a\right)_{l+k}$, where l is the Prime Basis Position Number of p_a, and k is an integer such that $\left({}^{N_a} p_a\right)_{l+k+1} > p_b$ and $\left({}^{N_a} p_a\right)_{l+k} < p_b$. Also, N_a is the Order of element of Sequence Of Primes (I) or some element of Sequence Of Higher Order Sequence(s) of Primes (II) or some element of Sequence of Askew Primes (III) or some element of Sequence(s) of Higher Order Askew Primes (IV) or some element of the Sequences(s) generated by the Field of Algebraic Operations on I, II, III and IV, of p_a.

Step 4: We now consider, p_b and apply Step 2 on it.

Step 5: Here, we apply Step 3, on p_b, but with an only change that, instead of One Step Evolution, we use One Step Devolution. Therefore, we now find $\left({}^{N_a} p_b\right)_{m-r}$ where m is the Prime Basis Position Number of p_b and r is an Integer such that $\left({}^{N_b} p_b\right)_{m-r-1} < p_a$ and $\left({}^{N_b} p_b\right)_{m-r} > p_a$.

Step 6: We now set the Reference Framewherein, we use the Whole Numbers, 0, 1, 2, 3,….. on the x-axis and Standard Primes on the y-axis, and place it in accordance to the values taken by $\left({}^{N_a} p_a\right)_{l+k}$ and $\left({}^{N_b} p_b\right)_{m-r}$ relative to the Reference Frame of Primes Vs Whole Numbers.

Step 7: We now drop Vertical Ordinates from p_a, p_b onto the x-axis.

Step 8: We then shift (Translate) the Curve $\left({}^{N_b} p_b\right)_{m-r} \leftrightarrow \left({}^{N_b} p_b\right)_m$ vertically such that the point $\left({}^{N_b} p_b\right)_{m-r}$ is exactly on the point $\left({}^{N_a} p_a\right)_l$ of the Curve $\left({}^{N_a} p_a\right)_l \leftrightarrow \left({}^{N_a} p_a\right)_{l+k}$ and that, it is also on the y-axis.

Vol. 21, No. 1, (2024)
ISSN: 1005-0930

Step 9: We then find the Vertical Deviations of the Curve $\left({}^{N_a}p_a\right)_l \leftrightarrow \left({}^{N_a}p_a\right)_{l+k}$ w.r.t the Curve $\left({}^{N_b}p_b\right)_{m-r} \leftrightarrow \left({}^{N_b}p_b\right)_m$, from the point where the Curve $\left({}^{N_b}p_b\right)_{m-r} \leftrightarrow \left({}^{N_b}p_b\right)_m$ Intersects the y-axis and to the point where the Curve $\left({}^{N_b}p_b\right)_{m-r} \leftrightarrow \left({}^{N_b}p_b\right)_m$ meets the Vertical Line drawn onto the x-axis from $\left({}^{N_b}p_b\right)_m$.

Step 10: We now check if the aforementioned two Curves - Curve $\left({}^{N_b}p_b\right)_{m-r} \leftrightarrow \left({}^{N_b}p_b\right)_m$ and Curve $\left({}^{N_a}p_a\right)_l \leftrightarrow \left({}^{N_a}p_a\right)_{l+k}$ intersect or not.

Case I : They do not intersect. Then, we note that either of these curves is on one above the other. Then, all the Deviations shall be of the same sign.

Case II: They do intersect. In this case, we find the intersections point (w.r.t the x and y axes) and find the signs of the Left Hand Side Deviations and the Right Hand Side Deviations, w. r. t. the aforementioned Intersection Point.

Step 11: Now, considering the Curves

$$C_1 : \left({}^{N_a}p_a\right)_l \leftrightarrow \left({}^{N_a}p_a\right)_{l+k}$$

and

$$C_2 : \left({}^{N_b}p_b\right)_{m-r} \leftrightarrow \left({}^{N_b}p_b\right)_m$$

we write

$$\frac{\left\{\dfrac{dC_1}{d\left(PBPN_1\right)}\right\}}{\left\{\dfrac{dC_2}{d\left(PBPN_2\right)}\right\}} = \left\{\frac{dC_1}{dC_2}\right\} \cdot \left\{\frac{d\left(PBPN_2\right)}{d\left(PBPN_1\right)}\right\} = f\left(C_1, C_2\right) \tag{26}$$

giving us

$$\int\limits_{\substack{along\\URT\\Metric}} dC_1 = \int\limits_{\substack{along\\URT\\Metric}} f\left(C_1, C_2\right)\left\{\frac{d\left(PBPN_1\right)}{d\left(PBPN_2\right)}\right\} \cdot dC_2 \tag{27}$$

Similarly, we can write

$$\int\limits_{\substack{along\\URT\\Metric}} dC_2 = \int\limits_{\substack{along\\URT\\Metric}} g\left(C_1, C_2\right)\left\{\frac{d\left(PBPN_1\right)}{d\left(PBPN_2\right)}\right\} \cdot dC_1 \tag{28}$$

Step 12: We now find, where dC_1 and dC_2 intersect.

Now, as we know the Integer values of N_a and N_b, we can also find functions $\xi\left(dC_i, dC_j\right)$ for the Curves of Integral Orders between N_a and N_b, i.e., for Order $N_{a \le k \le b}$. The number of such Curves being

$$n_c = \left(N_a - N_b + 1\right) \; if \;\; N_a > N_b \tag{29}$$

or

$$n_c = \left(N_b - N_a + 1\right) \; if \;\; N_b > N_a \tag{30}$$

As we have to select only the Optimal two out of the n_c number of Curves, there are $C\left(n_c, 2\right)$ number of cases.

Vol. 21, No. 1, (2024)
ISSN: 1005-0930

Step 13: We denote the number of Prime Basis Position Numbers between p_a and p_b of Order N_k ne denoted by ${}^nN_k$

Therefore, the number of $\left\{\frac{dC_i}{dC_j}\right\}$ cases are

$C(n_c,\,2)\cdot\left\{{}^nN_i\cdot{}^nN_j\right\}$, where $i,j=1\ to\ C(n_c,\,2)$ and $i\neq j$

Step 14: We now have a total Number of $\left\{{}^nN_a\cdot.......{}^nN_k........{}^nN_b\right\}$ cases that have to be linearly combined to give Optimal Ascent of Descent from p_a to p_b. And the Optimal selections of Prime Basis Position Bases from each of the $\left\{{}^nN_a\cdot.......{}^nN_k........{}^nN_b\right\}$ Orders have to be chosen and linearly combined for the Special Curve under investigation to converge to p_b that started from p_a.

Step 15: Therefore, for all these cases

$$s=1\ to\ \left\{{}^nN_a\cdot.......{}^nN_k........{}^nN_b\right\} \tag{31}$$

we find the sum $\left\{\frac{dC_i}{dC_j}\right\}_s$ and for the Optimal Case, this Sum is Optimal, i.e., it corresponds to a Trough, when plotted, i.e., a Minimum in this case. As this sum is Minimum, the deviations, i.e., $\left\{\lceil FractionalOrder\ PBPN\rceil - FractionalOrder\ PBPN\right\}$ are Maximum, and this is what is left out or that which is omitted, and hence fits as Entropy, [5], [6], [7], [8], [9] notion, and this also leads to the case of Maximum Entropy situation.

Step 16: That is, we consider the sum

$$S=Minimum\left\{\sum_{s_i\,or\,s_j}\sum_{\substack{all\ i,j\\ i\neq j}}\left\{\frac{dC_i}{dC_j}\right\}_s\right\} \tag{32}$$

And we find the *i*, *j* and the *s* Indexes of each Curve, that gives this sum a Minimum value. It is to be noted that the $s_i\neq s_j$.

References

1. Bagadi, R. C., Theory Of Higher Order Sequence Of Primes, Askew Primes And Special Curves Connecting Any Two Real Numbers, Journal of Army Engineering, University of PLA ISSN: 2097-0730 71 Vol. 24, No. 1, (2024) 2.
   www.jaeupla.org
2. Bagadi, R. C., Theory Of Higher Order Sequence Of Primes, Askew Primes, One Step Evolution Of Any Element Of Any Higher Order Sequence Of Primes Or Any element of Any Askew Primes Sequence – The Notion Of Special Curves Connecting Any Two Real Numbers As An Example Of Application, Journal of Army Engineering, University of PLA ISSN: 2097-0730 71 Vol. 24, No. 1, (2024) 2.

www.jaeupla.org
3. Bagadi, R. C., Natural Representation Theory - Volume 1 {Fourth Edition}, September 22, 2019, Independently Published by Amazon – Kindle Direct Publishing, USA. ISBN-10: 1701201739, ISBN-13: 978-1701201736
4. Bagadi, R. C., Higher Order Sequence Of Primes, February 2019, International Journal Of Innovative Research In Technology, Volume 5 Issue 9 | ISSN:2349-6002
5. Bagadi, R. C., Universal Representation Theory – The Rigour I, Advances in Information Communication Technology and Computing, Springer Verlag, 04/29/2024
6. Bagadi, R. C., Universal Representation Theory – The Rigour II, Advances in Information Communication Technology and Computing, Springer Verlag, 04/29/2024
7. Bagadi, R. C., Universal Representation Theory – The Rigour III, Advances in Information Communication Technology and Computing, Springer Verlag, 04/29/2024
8. Bagadi, R. C., Universal Representation Theory – Applications I, Advances in Information Communication Technology and Computing, Springer Verlag, 04/29/2024
9. Bagadi, R. C., Universal Representation Theory – Applications II, Advances in Information Communication Technology and Computing, Springer Verlag, 04/29/2024