# *Theory Of 'Complementable Bounds' And 'Universe(s) In Parallel' Of Any Sequence Of Primes Of $R^{th}$ Order Space*

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**Abstract**

In this research monograph, the author enlightens a fact regarding the existence of '*Complementable Bounds*' in any *Sequence Of Primes Of* $R^{th}$ *Order Space*. Also, the author enlightens another aspect of finding the '*Universe In Parallel*' of any *Sequence Of Primes Of* $R^{th}$ *Order Space* in the *Sequence Of Primes Of* $(R+1)^{th}$ *Order Space* or for that matter any $(R+v)^{th}$ *Order Space* for '*v*' being a positive integer. The author also presents some insights regarding how these aspects can be used as constraints on '*Quantization Based Evolution*' are presented.

**Theory**

By *'Complementable Bound'*, the author means those bounds in a Sequence of Primes (of any order of space considered) from say, 1 to R such that with respect to this bound value, the values of a set generated by consideration of the values of $(R-i)$ where R goes from 1 through i, (where i is some intermediate Prime Number between 1 and R) is also a set of Prime Numbers of some order of space. Especially, when one computes such differences, one should note that given any Sequence of Primes, there exist such aforementioned bounds in it along its sequence such that the above condition is satisfied.

For a set with many bounds, the above condition can be slated as follows:
Let the Prime Sequence (of any Order Space) Set starting from 1 to $R_b$ have $r_b$ number of elements. And let such aforementioned bounds in this Sequence be represented by $[R_c, R_{c+1}]$ where c goes from 1 to g. Now, in the given set, we have for every $R_i \in [R_c, R_{c+1}]$, $\{(R_{c+1}-R_i) \in$ Sequence Of Primes Of Some Order Space$\}$.

By '*Universe In Parallel*', we mean a sub-set belonging to a Sequence Of Primes of Order less than (N) that of a set belonging to a Sequence Of Primes Of Order, say , N such that the set is gotten by considering magnification of the sub-set by some integral number. Simply put, it is $\{p_i\}$ for the given set $\{p_{i+1}\}$ or rather in a generic form, it is any $\{p_s\}$ for the given set $\{p_r\}$ where $s<r$. For example one can do so using the following equation:

*Formula For Sequence Of Primes Of any $R^{th}$ Order Sequence Of Primes*

One can also note that the Sequence Of Primes Of any $R^{th}$ Order Sequence Of Primes can be gotten using the following formula which was constructed using observation.

$$\{p_{i+1}\} = \sum_{k=j+1}^{\infty} \left\{ \{p_i(k)\} \{p_i\} - \sum_{j}^{\infty} p_i(j) \right\} \quad (1)$$

where $p_i(j)$ represents the $j^{th}$ element of the $i^{th}$ Order Dimension (Space) Sequence Of Primes.

*Applications*

One can use such notions of '*Complementable Bounds*' and '*Universe In Parallel*' in '*Primality Engineering*' based applications such that when '*Sequence Of Primes Of Any Specific Order Of Space*' of concern are considered to construct '*Primality Engineering*' based applications, one can note that one can implement such applications from both directions of the quanta of Set of '*Sequence(s) Of Primes Of Any Specific Order(s) Of Space*' by considering *Prime Metric(s)* in both (forward and reverse) directions wherein the *Prime Metric* in reverse direction can be constructed using the constraint ordered by the afore-stated author's '*Complementable Bounds*' concept. Such implementations can be rendered as a '*Quantum Canonical States*' pair along the concerned two opposite directions. Furthermore, the whole of the '*Primality Engineering*' based application of concern can span through the entire density (holistically) of the '*Complete Recursive Subsets {Universe(s) In Parallel} Of Set Of Concern And/ Or Orthogonal Universes In Parallel Of Set Of Concern In Completeness*'.

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