Realization of The Instantaneous System State By Observation of A Quantum Pair Using The Single Unified Law

Mayukh Maitra

Abstract- *The The paper is on the realization of the observation of a quantum state relative to the point of entanglement on the time co-ordinate and computation of the instantaneous system state.*

Keywords- Certainty, Uncertainty, Entropy, Reliability, Quantum Information

I. DEFINITIONS

The certainty is given as: [c = exp(x. ln(x))], which is known as the power function, with the base and exponent as (x), as a variable. The uncertainty is a complement of the certainty.

The root function, in the logarithmic transformation, gives the entropy function, written as: [s = exp.((1/x). ln(x))]. The other entropy function is given by the complementary part of the variable (x) and the respective complements resulting in two pairs that so form the upper and lower bound, appropriately.

II. INTRODUCTION

a) When an observer sights an event happening in a pre-defined space in a stipulated interval of time, then that is marked by the incident light or photons, which is of a certain frequency and intensity, as both wave and particle that is known as quanta.
b) The information content by the quantum, as a group or set of quantum states, is a finitely large number.
c) Among many quantum states possible there is not more than one state, which is considered as a pair, that is meant to stay as a point when viewed on a two-dimensional focal plane.
d) And the observation, as sighted by an observer at any instant of time, is only one view generated from the many quantum pairs for the system in transition.
e) Thus, there is some extent of deviation present in the values of the observation and the underlying function, which is akin to the deviation of an observation data and empirical data ; as for instance, the actual cumulative failures observed and the instantaneous reliability for a given system.
f) The deviation proves a superposition to exist ; and there is the exception at the singularity, where there is no deviation, as an interference exists.

III. THE LAWS

(i) The review of the six laws [Ref.1], that have emerged from the Axioms [Ref.2], which are generalized for a system and the surrounding environment, with the average as a measure, given in a bounded region with the point of entanglement, (q) on the domain, where (dx) is taken as the distance from the origin at zero. All the difference measures are taken in terms of values on the co-domain. These difference measures, which are partial measures, are given by: average uncertainty | du |, average certainty | dc | and entropy difference (ds). The appropriate upper and lower bounds of entropy are given by: (S1) and (S2). The average entropy (Sav), which is a total measure, is inferred therefrom.
(ii) The entropy bounds are given as: [S1 = 3 (S2)], which is from the initial boundary upto (q) ; and [S1 = (S2 + 2) / 3], which is from (q) upto the final boundary. And there is the law that gives the formula to find the average uncertainty from the entropy difference.
(iii) There is a limiting value set by the singularity that is at the point of entanglement, which curtails the difference measure to 0.50 only.
(iv) The difference between the average entropy and the underlying function, taken in modulus form that is in magnitude, is found by the average uncertainty, where the maximum value is: 0.15, which is placed at the mid-segment on the domain scale between the intersection and the boundary, appropriately. And that is generated by virtue of the inherent symmetry, as in a logarithmic transformation.
(v) The single unified law formulated [Ref.1], is given as: starting with a single information of a point located on either bound of entropy, the other bound is obtained and the entropy difference is known; the average uncertainty is calculated from the entropy difference; and modulus of

the difference between the average entropy and the originating function is found by the average uncertainty.

IV. THE APPROXIMATION

The approximation that follows is the maximum value of the average uncertainty as: 0.30; and the laws relating the partial and the total measures are amended accordingly.

V. ANALYSIS

(i) The first step is the observation as sighted by an observer, that ought to be an information among a group, as is induced by a quantum pair, at which the attention of the observer stays focussed. The observation as viewed is supposed to conform to the quantum information process.

(ii) Here, it is to be noted that, only the bounds of entropy are considered as the possibility, as the relevant pair of quantum information, thereby leading to the underlying function, appropriately.

(iii) The second step is computation of average entropy by the bounds of entropy, by simple algebraic operations given as: [S1 = (3 / 2).(Sav)]; and [S2 = (1 / 2).(Sav)].

(iv) The third step is computation of the average uncertainty and the average certainty and the difference given as: [| dc – du | = 2 | du |].

(v) The fourth step is computation of the average uncertainty by the entropy difference, with the approximation is as amended, by the formula: [| du | = 0.6 (ds)].

(vi) And the fifth step is computation of the deviation: | del(Sav) |, for the average entropy and the underlying function.

VI. DISCUSSION

a) The observation, as sighted by an observer, is given by the average entropy ; where the quantum pair, (S1) and (S2), are the appropriate upper and lower bounds of entropy ; and there is a deviation from the underlying value by a magnitude: | del(Sav) |.

b) The maximum deviation is half of the maximum of the average uncertainty, indicating a superposition, which is located at the mid-segment from the point of entanglement and the boundaries. And there is zero deviation at the point of entanglement, indicating an interference to exist.

c) The point of entanglement for the deviation is also a point of inflection, where there is a change in sign, appropriately. As for instance, the deviation changes sign from positive to negative, for an observed cumulative failure in relation to the underlying function given by the instantaneous system reliability.

VII. CONCLUSION

The solution to the simultaneous linear equations, for the quantum information process using the single unified law, with the approximation so introduced, gives the instantaneous state for real time systems. The deviation, in magnitude, so induced by superposition of the half linear function of average uncertainty and the average entropy, is found. And the interference, as given by the point of inflection where the deviation changes in sign with the underlying function over time, is realized.

REFERENCES

[1] Maitra M. [2022], “Formulation Of A Single Unified Law – In The Scientific Theory For A Change – As A Measure For Variations Of Observation Data In Empirical Data”, International Journal for Science and Advance Research in Technology (IJSART), Vol.8, Issue 1, Jan. 22, pp. 258-261.

[2] Maitra M. [2021], “Explanation of A Scientific Theory For A Change- In General And Special Form- By Using Metaphysics.”, International Journal for Science and Advance Research in Technology (IJSART), Vol.7, Issue 12, Dec.21, pp. 48-60.

* The author is M.Tech. (Aerospace Engg.) IIT Bombay. The author also has experience as a research scholar for Ph.D. (Reliability Engg,) IIT-Delhi and has over twenty five years experience in investigation of aircraft events and failure mode and effect analysis of systems. The author has published several books in the area of probability in information and reliability analysis and the quantum theory.