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MATHEMATICAL FORMULATION AND ITS ANALYTICAL SYNTHETICS.

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Abstract

What is mathematics is question of pedagogy of learning, in learning processes of mathematics. This article attempt and tries to express its contents to be of simple mathematical is in how in formulation and its nature of analytical synthetics. It viewed that the nature of mathematics in terms more of logical formulation and observed its expressiveness in terms but its logical synthetics. The theory of mathematics could not be constituted with identies but possibilities in definable class, relation in explanation by logical truth is an essential part of modern mathematics. Thus this article gives the ideas of this expression.

Key Words: Mathematics, Logic, Number theory, Science, Induction, Deduction and Limits.

1. Introduction:

It has long been held that without mathematics there is no modern science and moreover a unique character of scientific knowledge depends on the way of mathematics. Prof S.Sarukkai has believed that the difficulty and inaccessibility in learning and knowing mathematics have been important factors in isolating mathematics from even better critics of science. (S.Sarukkai 2003) This means that the process of speculation is strengthened by the contention of that mathematics is a formal, axiomatic, deductive and logical system which is concerned only with a platonic world and whose connection with our real world is only incidental and perhaps even mysterious. (ibid) Thus two cultures of mathematics: axiomatic and algroithematic. Axiomatic explains doing subject from axioms theorems and models.

This pioneered by Greeks but well grounded in the growth of modern mathematics. The other one computational and algroithematic method favored ancient Indian mathematicians and astronomers. (ibid) This article gives some of the ideas which is exemplified the mathematical thoughts and its in formulation which expressed in the literatures and viewed it to represent its analytical nature and synthetics.

2. Approaches of Science by Mathematics:

Mathematics is the studies of two opposite directed passage are familiar and constructive;-integer to fragmentation, real number to complex numbers, addition to multiplication and to differentiation and integration and so on to higher mathematics. The other direction; - less familiarly analyzing, abstractness, logical similarity, deduction, principles found, starting point deduced. (Russell 1919) This opposite characterizes mathematical philosophy. Two sorts of logical process –instruments for the enlargements forwarded higher mathematics to one logical power, other backward to logical foundation are inclined to granted in mathematics. (ibid) Mathematical notion will be the mean of reaching new mathematical subjects. (ibid) Prof Piano showed that entire theory of natural numbers could be derived from three primitive ideas and five primitive propositions to those of pure logic. This hostage of traditional logic of parameters. The three primitive ideas are 0, number, and successor. The five primitive propositions are (1).0 is a number, (2).The success of any number is number (3). No two numbers have same number (4). O is not the successor of any number and (5). Any Property which belongs to 0 and also to the successor of every number which has the property belongs to all number. (ibid)

Mathematics confine simple arithmetic ie. 2+2=4 stands obviously a ridiculously numerous view of mathematics, means that a theory of mathematics could not be constructed with identities for its foundation. (Ramsay 1925) The possibilities of indefinable classes and relations in extensions is an essential part of the extensional attitude of modern mathematics. (ibid) Mathematical through arithmetic, arithmetic is therefore will be a good subject to consider in order discovering, if possible, the most obvious characteristics of science, the leading characteristics of mathematics that it deals with properties and ideas. To see what is general in is what is particular and what is particular in what is transitory is the aim of scientific thought. Mathematical ideas because they are abstract, supply just what is wanted for a scientific description of the course or events. (Whitehead 1909). One great peculiarity of mathematics is the set of allied ideas which have been invented in connection with integral numbers. These ideas called extensions or generalization of numbers.- First ideas of fractions of Greeks thought is a ratio- To divide a field into three equal parts and to take two of the parts, must be a type of the operation which had often occurred. Algebraic notation more often says that one line was two thirds of the other in the length, and would thing of two thirds as a numerical multiplier. (ibid) Greeks found and discovered that in the theory of fraction /ratios has occasion of large amount of philosophical and mathematical thought. They found that the existence of ‘’incommensurable’’ ratios. (ibid) Greek proved that lengths exist which are not any exact fraction of the original length. Eg. Diagonal of a sequence cannot be expressed as any fraction of the side of the same sequence. Modern notation the length of diagonal is $\sqrt{2}$ times the length of the side. But there is no fraction which exactly represents $\sqrt{2}$. Systematic way of approximating to $\sqrt{2}$ series is 1, 14/10,141/100, and 1414/1000 and so on. (ibid)

The philosophy of mathematics dominantly influenced by logical and analytical tradition. The other phenomenology affer different perspectives on the philosophical foundations of mathematics. An early critic of mathematics in social sciences was that mathematics could describe physical system only through ideal models, which are simply in comparison to real phenomena. Therefore, the mathematics is inherently unsuitable for modeling complex social phenomena. But the development of new ideas in Physics, particularly of non linear systems and complex behavior, opened up new vistas to model complex phenomena of social sciences. (S.Sarukkai 2003). One of the most important reasons offered mathematicians is the possibility of having objectivity in the description and explanation of economic processes. Pani (2003) who argued that mathematical models in economics narrowly favored because they have not been able to incorporate the notion of subjective judgment in their formulation. This lead non objective judgment. (ibid)

The subject of mathematics is often seen as the most nearly universal of intellectual disciplines. Aryapatta used trigonometric functions as the procedure described for solving equations. (R.Narasimha 2003) He tries to describe algroithemetic –computational astronomy. Indian astronomers used epic circles with time varying parameters or patched eclipses. We must note that remarkable deductionists successes of Euclidean geometry encouraged generations of western scholars to attempt similar methods in wide variety of other fields not only astronomy but even religion and philosophy. (ibid) Universal laws of motion are stated in the form of three axioms, a vast variety of results are deduced (by pure logic) from these axioms and then from an analysis of observational data that had become available by Newton's time the principles of gravity is proposed. (ibid)

There has been considerable discussion about Newton's style in the Principia. The general view is that although be expounded his work by Euclidian methods, he actually delivered his results by a mixtures of calculus and algebra dressing them in geometry because that is what in his views that ''dignify'' of the subject demanded. (ibid) Newton's thinking was greatly influenced by the work of Descartes (1596-1645) in particular his algebreanion of geometry. It expresses the power of new Europeans approach ie., the combination of the methods of geometry and algebra. (ibid)

Putnam (1975) says that mathematics should be interpreted realistically and objectively. But unfortunately belief in the objectivity of mathematics has generally gone along with belief that ''mathematical objects'' hence a un conditional and super –physical reality and with the idea that mathematical knowledge is strictly a prior. But actually the criterion of truth in mathematics is success of its ideas in practice; mathematical knowledge is corrigible and not absolute; thus it resembles empirical knowledge in many respects. He says that method in mathematics seems to consists in deriving conclusions from axioms which have been fixed once and for all. (ibid) Bishop says that most mathematics used in psychological, social and economic research was phony and merely decorative. It may occurred that most mathematical economics was unimportant mathematically and useless economically. Finally Bishop regretted that the approach of ''applications'' is to social science in introductory calculus texts. (Cited ibid)

The validity of philosophy of mathematics as observed in the foundation, epistemology and philosophy of mathematics itself as well as sociology of knowledge and the sociology of science. These refer as Rene Thom's philosophy of mathematics as a combination of a realistic –platonic with an empiriosocialogical view. Imre Lakatos it is quasi empirism, Haq Wang's it is for substantial factualism, Good man's it is for knowing mathematics and Putnam it is for mathematics is in without foundation. (Steniear 1987) Philosophical problems and epistemological theories related mathematics such as logicism, formalism, constructivism, structuralism, empirism, have always had a significant influence on the guiding ideas and leading principles in mathematical education.(ibid)

3. Science and Mathematics:

Scientific methodology comprises observation, measurement, experimentation and theorizing. Scientific discourse and scientific texts are multi semantic, where even English plays an important role. The explicit presence of mathematicians in science is largely restricted to the theoretical domains although quantifications which are based on mathematics is common to measurement and experiments. Even they are not pure mathematics it is combination of different semantic system such as graphs, tables, figures, mathematical terms and verbal language such as English. (S.Sarukkai 2003) The verifications of remarkable prediction by scientific theories using very specific mathematical formulations is evidence of the fact that there is something in mathematics formulations that somehow captures (or help to capture) some truths of the natural world. (ibid)

A large body of mathematics what is usually called ‘’Pure’’ mathematics develops entirely independent of the concerns of that discourse of science. (ibid) World consists an inanimate objects as well as living beings. The world of inanimate objects is best described by Physics and Physics in turn is best described by mathematics is enshrined in the belief , held that by Galileo, Newton, Einstein and Feynman among others, that nature is an open book written in the language of mathematics and the task of sciences is only to read this book. (ibid) Social sciences have attempted by mathematics themselves. While they do not go to the extent of claiming that society is an open book written in the language of mathematics. Einstein wondered how it is ‘’ possible that mathematics is the product of human thought that is independent of experience, fits so excellently the objects of physical reality’’. (Quoted in.S.Saukkai 2003) Mathematics is human creation yet it is intrinsically tied in with the description and explanation of the reality of our world, or reality which is not dependent on us. To scientists it is a source of wonderment as to why this should be the case. (ibid)

In the application of mathematics in the investigation of natural philosophy, science does systematically what ordinary thought does carefully. (Whitehead 1909) Various elements or factors which enter into a set of circumstances as, thus conceived are merely the things., like lengths, of lines, sizes of angles, areas of and volumes, by which the positions of bodies in space can be settled. In addition of these geometrical elements the introduction of the rate of changes of such elements ie., velocities angular, velocities acceleration.

Mathematical physics deals with correlation between variables numbers which are supposed to represent the correlation which exists in nature between the measure of these geometrical elements and of their rate of change. But always the mathematical law deal with variables .Define number are substituted Position and shape are combined together with their changes. The vital points in the application of mathematical formulae are to have clear ideas and correct estimate of their relevance to the phenomena under observation. Ancestors impressed the importance of natural phenomena and the desirability of taking energetic measures to regulate the sequence of events. (ibid) Law of mathematical action between electric current is one of the brilliant achievements in the science. The way in which the idea of variables satisfying a relation occurs in the application of mathematics is worth thought. In the mathematical investigation we are in fact merely concerning the properties of this correlation between a pair of variables number x and y. The Newtonic program of Law of gravity states that any two bodies attracted one another with a force proportional to the product of their masses, and inversely proportional to the square route of the distance between them. Thus mM/d^2 equal to kmM/d^2 where k is the definite number of depending on the absolute magnitude of this attraction and also on the scale by which we choose to measure forces. Now $F=kmM/d^2$ giving correlation between the variables F, m, M, and d. (ibid) An engineer or physicist may want to know the particular pressure corresponding to some definitely assigned volume. Then we have the case of determining the unknown P when V is a known number. In considering generally the properties of the gas and how it will behave, he has to have in his mind the general form of the whole curve ABC and its general properties. In other words the really fundamental ideas is that of the pair of variables satisfying the relation PV =1. This example illustrates how the ideas of the variables is fundamental both in the application as well as in the theory of mathematics. (ibid)

4. Mathematical Logic:

Mathematics and logic have been distinct studies, and in a broad sense so much of modern mathematical work is obviously on the border line of logic; so much modern logic is symbolic and formal. It is the idea of functionality, that is to say the idea of constant relation which gives the secret power of mathematics to deal simultaneously with an infinite of data. Mathematics therefore is wholly composed of propositions which only contain variables and logical constants, that is to say, purely formal propositions – for the logical constants are there which constitute form. Russell defined Mathematical Logic as ‘’ any logical theory whose objects in the analysis and deductions of arithmetic and geometry by means of concepts which belongs evidently logic. (Russell 1919) Mathematical logic emphasized that the greatest degree of certainty.

A function of a proposition which has property is called truth function. The whole meaning of the truth function has exhausted by the statement of the circumstances under which it is true or false.(ibid) Logical frame is establishing ‘’p implies q’’ the subtantative premises is p schema. The logical processes then implies three proposition basically ie.,P1= p implies q ,P2= q implies r then P3=p implies r then we have to prove that p1 implies p2 implies p3. If q implies r then p implies q implies p implies r ie p2 implies that p1 implies p2 call this perspective A. If p2 implies that p1 implies p3 then p1 implies that p2 implies p3 call this B. Accordingly A truth function content five functions these are negation –not P not q that is ‘’p/q’’, disjunction-‘’p or q ‘’ –(p/q)/(p/q), conjunction when p and q both are true (p/q)/(p/q), incompatibility –p&q are not both are true p/(q/q) and implication – when q implies p , p implies q, joint falsehood –not p and not q.

Mathematical demonstration then called Induction. The definition of logical constants is not easy. A constant in logical is if the proposition in which it is found still contain it when we try to replace it by a variable. The constants are here - : is, a , all, and if- then pure mathematics concern itself exclusively with the deductive element. Mathematics thus not discussed about the facts, not known about real world but concerned exclusively with the variables –that is subject problems both involved in the importance of deduction. The proposition from ‘’p’’ we deduce ‘’q’’ and from’’ q’’ we deduce ‘’r’’ is a hypothesis. This proposition is a rule of deductions and the rule of deduction have a twofold are in mathematics. Both as premises and as a method of obtaining consequences of premises. This two fold deduction differentiate the formation of mathematics from the later parts. Mathematics wholly compared of proposition –contain variables and logical constant.

4.1. Order, Relation and Series:

Fraction is the order of magnitude, between any two fractions there are others eg arithmetic mean. (Russell 1919) In all such cases the order must be defined by means of a transitive relation, since only such relation is able to lead over an infinite number of intermediate terms. (ibid) Given any three points on a straight line in ordinary space, there must be one of them which is between the other two. This will not be the case the points on a circle or other closed corner because given three points on a circle we can travel from any one to any other without passing through the third. The notion of between may be chosen as the fundamental notion of ordering geometry. (ibid) The great part of the philosophy of mathematics is concerned with relation and may different kinds of relations have different kinds of uses. It is often happens that a property which belongs to all relations is only important as regards relations of certain sorts. The three important relations are –asymmetry, transitive, and connectivity. (ibid) If x precedes y, y must not also precedes x. This is the kind of relation leads to series. The field of a relation consists of its domain and converse domain together.(ibid) Order in mathematics is essential to most of their properties. The order of the points in a line is essential to geometry. There is a complicated order of lines through the points in a plane or plane through a line. Dimensions, in geometry are a development of order. The natural number –or inductive number – occurs to us most readily in order of magnitude. What is true of number is equally true of points on a line or of moments of time. In a line all the points have integral co-ordinates then all those that non –integral rational co-ordinates then all those that have algebraic non-rational co ordinates and so on. The order lies not in the class of terms but in a relation among the members of the class in respect of which some appear as earlier and some as later. (ibid) Class may have many orders. Any two terms in the class which is to be ordered that one ''precedes'' and the other 'follows''. (ibid)

4.2. Relation and Its Similarity:

Relation between relations plays similarity of classes for classes or likeness. Similar two classes have the same number of terms. The domain of the one relation can be correlated with the domain of the other and the converse domain with the converse domain. In defining likeness to such relations as have ''fields'' ie the formation of single class out of the domain and the converse domain. (ibid) A relation only has a field when it is what we called ''homogeneous'' when its domain and converse domain are of the same logical type. We may define two relations p and q as similar or as having likeness when S whose domain is the field of P and where converse domain is the field of Q. It is clear that for every instance in which the relation P holds there is a corresponding incidence in which the relation Q holds and vice versa. And this we discuss to secure by our definition. (ibid) Many of the most important notions in the logic of relations are descriptive functions for eg –converse, domain, converse domain, and field. Among one many relations, one- one relations are a specially important class. Given two terms x and x' x have the relation x' have no member in common.

Relative product one of them or its converse implies identity. Relative product of two relations R & S is the relation hold between x and z when there is an intermediate term y.

Another class of correlation is important is the permutation whose domain and converse domain are identical. Eg abc relations abc and cba combination of two permutations is again a permutation ie., the permutation of a given class form what is called a group. The notion of one- one correlation has boundless importance in the philosophy of mathematics. A great part of the philosophy of mathematics is concerned with relations and many different kinds of relations have different kinds of uses. Property belong to all relations is only important. Property like asymmetry, transitiveness and convexity has its own importance. Asymmetrical relations imply diversity but not the converse the case. Unequal imply diversity but is symmetrical diversity regarded as incompatible predicates. All mathematical function result from one –many relations eg logarithm of x the cosine of x ie relation. Regarding the R of x as a function in the mathematical source we say that x in the argument of the function if is R of x then y is the ‘’value’’ of the function for the argument x. If the R is one –many relation, the range of possible arguments to the functions is the converse domain of R and the range value B the domain. (Russell 1919)

4.3. Limits and continuity of Function:

It has been thought ever since the time of Leibniz that the differential and integral calculus reprised that infinitesimal quantity. Mathematics (especially Weierstrass) proved that this is an error. Philosophers have tended to ignore the work of such men as Weierstrass**.** A function is called ‘’continuous ‘’ when it is continuous for every argument. A function is ultimately converse into a class α we say that function R is ultimately Q convergent into α. There is nothing in the notion of the limit of the function or the continuity of a function that essentially involves number. Both can be defined generally and many propositions about them can be proved for any two series (one being the argument series and the other the value series). Definitions not involve infinitesimals but involve infinite classes of intervals. (Russell 1919) The boundary of a class itself limits or maximum. The boundary is the limit from the case where it is a maximum. The segment defines the progress. Segment of P defined by a class α if p a series, the segment defined by α consists of all the terms that precede some term or other of α. If α has a maximum, the segment will be all the predecessors of the maximum. In some cases segment defined finite integers. The limiting part of the set are called first derivative and the limiting part of the first derivative are called the second derivative and so on. With regards to limits we may distinguish various grades of what we called continuity in a series.

A series is said to be cloused when every progress on or regression contained in the series has a limit in the series. The conception of a limit is one of which the importance in mathematics. The whole of the differential and integral calculus indeed practically everything in higher mathematics depends upon limits. Limit was an essentially quantitative notion. Notion of quantity to which others approached near to near. But notion of limit is purely ordinal notion. The cardinal number 8^{o} in the limit because of series which is an ordinal fact not quantity fact. The ''minima'' of a class α with respect to a relation P one those number of α and the field of P (if any) to which no member of α has relation P. The ''maxima'' with respect ''P'' are the minima with respect to the converse of ''P''. The segments of a class α with respect to a relation P are the minima of the successor of α and the successor of α are the members of the field of P. The precedents with respect to P are the segments with respect to converse of P. The upper limit of α to P are the segments provided α has no maximum but if α has maximum, it has no upper limit. The lower limit to P are the upper limit with respect to the converse of P. Whereas P has connexity it has , one maximum, one minimum, one sequent, so the limit. (Russell 1919)

4.4. Symbolism and its issues:

The symbolism of mathematics is in truth outcome of the general ideas which dominates science. (Whitehead 1909). We have now two such general ideas before us, that of the variable and that of algebraic form. Thus x+y -1=0 represents one definite correlation and 3x+2y-5=0 represents another definite correlation between the variables x and y. Both correlations are linear correlations and x symbolizes any number. We explain ax+by-c =0 hence a,b, c, stand for variable number. Just as do x and y. but there is a difference between these two set of variables. (ibid) We studied the general properties of the relationship between x and y whiles a, b, and c has unchanged values. Successive layers of parameters are that the amount of arithmetic performed by mathematicians is extremely small. The territory of arithmetic ends where the two ideas of variables and of ''algebraic'' form commences their sway. (ibid) Numerical system affords of the enormous importance of a good notation. Divisions called into play the highest mathematical faculties. Mathematics is often considered a difficult and mysterious science because of the numerous symbols which it employs. (ibid) Nothing more than is incomprehensible other than symbolism. Symbolism is invariably an immense simplification. It represents the analysis of the ideas of the subject and an element pictorial representation of their relation to each other. (ibid) Aid of symbolism can make transitions in reasoning almost mechanically by eye otherwise play higher faculties of the brain. It is performable erroneous truism. Cultivate habit of thinking of what we are doing. Properties of symbolism are concise. In a good symbolism therefore, the juxtaposition of important symbols should have important meaning. (ibid) Modest looking symbols, subtle ideas, and easy to exhibit the relation of this idea to all the complex trains of ideas in which it occurs. Modest of all symbols 0 which stands for number zero. Numbers are reckoning right to left-coordination become possible. The ideas of zero probably took shape gradually from a desire to assimilate the meaning of this mark to that marks 1,2,…9 which do represents cardinal number. $x + y - 1 = 0$. This important way to stating and $x=1$ is $x-1=0$ it representing the equation $3x-2=2x^2$ is $2x^2-3x+2=0$. The whole left hand side is equated to the number zero. The fist man does this is said have been Thomas Harriet born at oxford in 1560 and died in 1621. This made possible the growth of the modern conception of algebraic form. Equation like quadric, cubic, like that to have x^2 and x^3 that x is unknown variables. Quadric equation has general form of equation as $x^2-3x+2=0$.

5. Mathematical Induction:

Mathematical induction is a definition not principles. (Russell 1919) The number of intermediate terms is finite. It is essential that number of intermediaterier should be finite. Finite is to be defined in terms, means of mathematical induction and in simpler to define the ancestral relation generally at once than to define it first only for the core of the relation of n to n+1 and then extend it to other cases. (ibid) For natural numbers as to those to which proofs by mathematical induction can be applied. i.e., as those that powers all inductive properties. Inductive numbers means ‘’natural numbers’’. (ibid) The mathematical induction affords more than anything else the essential characteristics by which the finite is distinguished from the infinite. (ibid) The principle of induction might be stated purposefully in some such form as ‘’ what can be inferred from next to next can be inferred first to last. This is true when the number of intermediate steps between first and last is finite, not otherwise’’. (ibid)

6. The Theory of Deduction:

The three topics concern basically the theory of classes namely (1). The theory of deductions, (2). Propositional functions and (3). Description. Mathematics is the deductive science. Starting from certain premises, it arrives, by a strict process of deduction at the various theorems which constitute it. Rigor lacking in a mathematical proof called the proof is defective. No appeal of in common scence or ‘’intuition’’ or anything except strict deductive logic, ought to be needed in mathematics after the premises have been laided. (Russell 1919) Kantian theory for proof depends ‘’intuition’’ but modern mathematics depends deductive and proceed to involve to inquiries as what is called /involved in deduction. In deduction we involved more proposition called premises from which we infer a proposition called the conclusion. There is a two a relation called ‘’implication’’ implies conclusion. Other proposition is false between the two called ‘’disposition’’ expanded by ‘’p or q’’. The one is falls allow us to infer the other is true ie., we wish to infer false hood of some proposition , not its truth, that is another status called ‘’incompatible’’ ie., if one is true the other is false. Inferred from false hood. From the false hood of p we may infer the false hood of q when q implies p. All implies inferences it is to take implication as the primitive fundamental relation –There is not ‘p’-truth value of the true proposition ie opposite truth value ‘’p’’.

The other proposition primarily a form of words which expresses what is either the true or false. Proposition limited in some sense called symbols’ ‘further to such symbols as gives expression to truth and falsehood. Whatever number a and b may be but (a+b)2 =a2+2ab+b2 is a proposition. A propositional function in fact is an expression containing one or more undetermined constituents, such that when values are assighened to these constituents, the expression becomes a proposition. In other wards it is a function whose values are propositions. A descriptive function eg the hardest proposition in A ‘s mathematical treaties will not a propositional function although its values are propositions. Any mathematical equation is a propositional function. So long as the variables have no definite values, the equation merely an expression awaiting determination in order to become true or false proposition. Traditional logic of all ‘’A is B’’ are propositional function A and B is to have to be determined as definite classes before such an expression becomes true or false. Russell asserting that a certain propositional function is always true.

The process of deduction from certain primitive propositions which falls into two groups. Those expressed in symbols and those expressed in words. Those expressed in words are nearly all non-sense by the theory of types and should be replaced by symbolic convention. The real primitive propositions, there expressed by symbols are with one exceptions, tautologies in Wittingestein ‘s sense. So, as the process of deduction in such that from tautologies and tautology follow s were it not for one blemish the whole structure would consists of tautology. The blemish of course ‘’The axiom of reducibility, which is , as will be shown , a genuine proposition whose truth or falsity is a matter of brute fact not of logic. Russell in his Principle of Mathematics defined pure mathematics as ‘’the class of all propositions of the form P implies q where p and q are proposition containing one or more variables in the same in the two propositions and neither p nor q consist any constants except logical constants. (Ramsay 1925)

7. The number theory:

The most fundamental concept of mathematics is number. (K.Subramanium 2003) The tools and symbolism that we use the structure of mathematical knowledge for other purpose may therefore be inappropriate in understanding mathematical cognation. Formally, the concept of number can be defined axiomatically, starting with Piano’s axioms for natural numbers in terms of natural numbers, negative numbers as additive inverse of natural numbers, rational numbers as equivalence classes of ordered pairs of integers, real numbers as seeking cuts and so on. (ibid) Counting include one to one correspondence, stable ordering, item differences, order irrelevance and conditionality.

For Piaget and for Bryant, both conditionality and ordinarily are essential to the concept of number. Conditionality is the basis of for judging two sets to be equally numerous. Ordinality allows children to conclude that a set of conditionality four is bigger than a set of conditionality three and that a set of conditionality two. Thus 2,3,4 are not just number words which appear in a fixed order but indicate relative sizes. (ibid) Many of the basic properties of fractions –order relations equivalent, addition, or subtraction –are much clear when we thing of there fraction as a number with definite position on the number line. (ibid)

Frege in 1884 in his ‘Grundlagen der Arithmetic’ defined number as in terms of ‘’collection ‘’or as ‘’class’’ or sometime a ‘’set’’ in mathematics the same thing are ‘’aggregate ‘’ and ‘’ manifold’’ (Russell 1919). The definition which enumerates is called a definition by ‘’extension’’ and the one which mention a defining property is called a d definition by ‘’intention’’- intention is logically more fundamental. Numbers themselves form an infinite collection class and defining characteristics of it are practically interchangeable. Classes may be regarded as logical fiction manufactured out of defining characteristics.

Number is used many one and one in many. Notion of one –one, one –many and many –one relation which play a great part on the principles of mathematics not only in definition of numbers but in many other connection. There is domain relation in this and this will be in converse of relation. Then converse domain of a relation is the domain of its converse. It is easy to prove (1). $\alpha=\alpha$ –reflective. (2). $(\alpha=\beta) = (\beta=r)$-symmetrical, (3). $\alpha=\beta$, $\beta=r$, $\alpha=r$-transitive all will be called reflexive domain. It is obvious that we can correlate 2 with ½, 3 with 1/3 and so on thus proving that classes are similar. (Russell 1919)

The theory of natural numbers results from these ideas and five propositions. By mathematical induction every number belongs to the series. Frege succeeding ‘’logic’’ in mathematics is in to reducing the logic to the arithmetical notions. Every term can be reached from the start in a finite number of steps is called ‘’progression’’. Progression of great importance in the principles of mathematics –every progression verify Piano’s axiom. These five axioms used to define the class of progression. Progression need not compare of number it may be compared of points in space or moments of time or any other terms of which there is infinite supply. Each different progression will give rise to a different interpretation of all the proposition of traditional pure mathematics. Numbers have definite meaning, not merely they should have certain formal properties. This definite meaning is defined by the logical theory of arithmetic. A real number is a segment of the series of ratios in order of magnitude. An irrational number is a segment of the series of the ratios which has no boundary. A rational number is a segment of the series of ratios which has a boundary. Thus rational real number consists of all ratios less than a certain ratio.ie. The real number 1 for instance is the class of proper fractions. The truth is that it is the limit of the corresponding set of rational real numbers in the series of segment ordered by whole and part. A complex number means a number involving the square root of a negative number whether integral, fractional or real. Any number involving the square root of a negative number can be expressed in the form of x+yi. The part yi is called the imaginary part of this number x being the real part. A complex number may be regarded and defined as simply an ordered couple of real number. Complex number of order n as a one many relation where domain consist of certain real numbers and where converse domain consists of integers from 1 to n. This ordering indicated as (x1,x2,x3,…xn) xr and xs are equal when r and s not equal. (Russell 1919). Cardinal and ordinal number not capable of extensions of negative, fractional, irrational and complex numbers. Rational and irrational numbers taken together as one class called 'real numbers''. Complex numbers defined as number involved the square root of -1. The obvious and sufficient definition is that +1is the relation of n+1 to n and -1 is the relation of n to n+1. If m is the inductive number the +m is to n+m, -m is n+m to n. According this +m is a relation which is one to one. (Russell 1919). As long as n is a cardinal number (finite or infinite) m is an inductive cardinal number m, +m,-m mutually different. We shall define m/n as being that the relation which holds between the inductive numbers x,y when xn =ym. (ibid)

8. Problems in Mathematics:

Problems of mathematics such as those of class, continuity, infinity, in order to perceive the bearing of the definitions and discussion that follow on the work of traditional philosophy. The concepts of function, of continuity of limit and of infinity have been shown to stand in need of sharper definition. Negative and irrational numbers which had long been admitted into science have had to summit to closer scrutiny of their credentials. (Frege 1953) Nature of arithmetic truths -are they are priories or a posteriori? Synthetic or analytic? Not content of the judgment but the justification for making the judgment. Finding the proof of the propositions –logical laws, and on definitions, then the truth is analytic one, how the definitions depends the propositions. Truth is priori when it is derived by proof exclusively from general laws. (ibid) We hardly succeed in finally clearing up negative number or fractional or complex numbers so long as our insight into the foundation of the whole structure of arithmetic is still defective. (ibid) The question Frege asked that ''can the great tree of the science of number as we know it towering, spreading and still continually growing have its roots in bare identities?. (ibid) Mill note that '' the doctrine that we can discover facts , detect the hidden processes of nature by an artful manipulation of language is so contrary to common sense , that a person must have made some advances in philosophy to believe it''. (Frege 1953) All we need to know is how to handle logically the content as made sensible in the symbol. It cannot be denied that the laws established by induction are not enough. (ibid) Condition for facts throughout the whole of a train of reasoning, we shall finally reduce it to a form in which a certain result is made dependent on a certain series of condition. Leibnizh remarks that ''… the connection and natural order of truths, which is always is the same''. (ibid)

9. Conclusion:

Thus, the discussion of mathematics regarding, its formulation and nature of its analytical synthetics expressed in contents more elaborately. The ideas of mathematics is said to be the formulation as being presents of its logical views of expression. This making mathematics is to understand more in terms of varied with its nature of meaning and to be enumerative in terms but with logical forms. This article has presents this views.

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