Global Journal of Science Frontier Research: F
Mathematics & Decision Science
Volume 20 Issue 3 Version 1.0 Year 2020
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

On the Theory of the Varieties Cantor's Many

By E. A. Tsarev & F. F. Mende

Abstract- Theory of sets (varieties) this one of the divisions of mathematics. In it they are studied the general properties sets are determined properties and characteristics, that possess what that general by property. Georg Cantor is considered the father of theory rightfully, which helped Richard Dedikind. The author of theory proposed the new concept of understanding nature of infinity, but the substantiation of theory itself is not entirely correct, which gave birth to logical contradictions both in theory itself and in those following, on its osnove. Iznachalnaya form of theory was called subsequently name *naive set theory*. In the indicated in the bibliography monograph daN the thorough analysis of set theory. In its time set theory it underwent rigid criticism from the side the well-known mathematicians: Henri Poincare, Luitzen Weyl and Herman Weyl and even associate of Cantor Richard Dedikind. They asserted that to Cantor all put outting themselves of mathematics, considered urgent infinity not scientific concept and this was error. Scientific disputes apropos of naive set theory it does not cease up to now. In the article possible inaccuracies and even errors in the theory of Cantor's varieties are examined.

Keywords: *set, power, interval, length.*

GJSFR-F Classification: *MSC 2010: 00A69*

ONTHETHEORYOFTHEVARIETIESCANTORSMANY

Strictly as per the compliance and regulations of:

Notes

On the Theory of the Varieties Cantor's Many

E. A. Tsarev [α] & F. F. Mende [σ]

Abstract- Theory of sets (varieties) this one of the divisions of mathematics. In it they are studied the general properties sets are determined properties and characteristics, that possess what that general by property. Georg Cantor is considered the father of theory rightfully, which helped Richard Dedikind. The author of theory proposed the new concept of understanding nature of infinity, but the substantiation of theory itself is not entirely correct, which gave birth to logical contradictions both in theory itself and in those following, on its osnove. Iznachalnaya form of theory was called subsequently name *naive set theory*. In the indicated in the bibliography monograph daN the thorough analysis of set theory. In its time set theory it underwent rigid criticism from the side the well-known mathematicians: Henri Poincare, Luitzen Weyl and Herman Weyl and even associate of Cantor Richard Dedikind. They asserted that to Cantor all put outting themselves of mathematics, considered urgent infinity not scientific concept and this was error. Scientific disputes apropos of naive set theory it does not cease up to now. In the article possible inaccuracies and even errors in the theory of Cantor's varieties are examined.

Keywords: *set, power, interval, length.*

I. Introduction

Cantor, after continuing the transactions of Riemann in the works on the theory of trigonometric series, understood, that one should be determined with points and many afore-mentioned, with sizes and quantity. After interesting in power and their comparisons, in 1873 the year Cantor reveals the denumerability of the sets of rational numbers, but cannot solve a question about the equal power of integers. The first results, obtained by Cantor, were accepted favorably by Dedikind and Weierstrass and in the period 1879-1884 of year were published six articles in Mathematische Annalen.

Foggily formulated concept set in the naive theory, that was being rested only on the sign of the collection of all objects according to any properties, it provoked to the detection of a series of contradictions, namely paradox To Burali-Forti, the discrepancy of universe, Russell's paradox, the paradox of Richard, Berry's paradox, the Grellinga-Nelson paradox. The attempts to solve privately these paradoxes led to the creation of new direction in mathematics-of intuitionism and formalization of set theory by means of the selection of axioms. On this worked as Zermelo, Gilbert, Bernays, Hausdorff, Brouwer, Poincare, Lebesgue, Borel, by Weyl. Nevertheless, the general principle of permission contradictions (fundamental errors in the basis of theory) so they did not find.

II. General Concepts

This is set mathematical object , most being been collection, totality, meeting of any objects, which are called elements of this set and possess general for all their characteristic property.

Author: *e-mail: fedormende@gmail.com*

Global Journal of Science Frontier Research (F) Volume XX Issue III Version I Year 2020

Point- this is the abstract object, which does not have the measuring characteristics: neither height nor length nor radius.

Line is area and volume are divided to the points, but they do not individually have the identical properties (characteristics).

Therefore the determination of set relates only to the inverse sets.

Reversed set is - this set, the sum of elements of which is equal to the base of set.

Not reversed (associated) set is - this set, the sum of elements of which is not equal to the base of set.

For example, section (base of set), divided in the infinitely small sections (elements of set). All sections have one property- length. Set is reversed. The points are located between the sections, they in this case are the boundaries between the sections. And it is possible to define the set of these points as the sum of end-points, but this sum does not have a property of length, i.e., set is not reversed relative to section.

That is the base of set, which can be divided to the elements of set.

Base can be finite and infinite, fixed and not fixed.

For example, the set of integers infinite value, many infinitely small sections in the sum of those giving the section of finite quantity, certainly (length of base it is final).

Simple set is this set, which they consist of the uniform elements (elements with the identical characteristics).

Complex set consists of certain quantity of simple.

It does not change during division and multiplication of infinite set (set with an infinite quantity of elements) by the finite number, the cardinal number of set, and also it does not change, if we add a final quantity of elements or to take away.

Variety (Cantor) synonym is set (conventional).

The cardinal number of set this is value (order) of infinity.

Finite sets, i.e., calculating possess the zero power (value of infinity).

Many one order (power) these are those sets, which are more either less into a final quantity of times or less or more to the finite quantity and with the division for each other result will be the finite number.

Identical power, these are those power, with division of which into each other, result one on the module.

Those sets, which less or more into an infinite quantity of times are the sets of different value.

But if power are more or less to the infinite value, then for determining the relationship of the amounts of power additional mathematical operations require.

Addition, what or finite numbers as both subtraction and multiplication by the finite numbers do not change the order of finite sets, with exception of multiplication by zero.

Division on any the finite number except zero does not change the order of finite set.

The same is correct for the sets of other power.

The indeterminate sets these are those sets, in which it cannot be determined power, in particular because of the absence of properties, according to which it is possible to determine power.

Without the comparison of the elements of a set and their quantity it cannot be compared and power.

Infinitesimal quanitiies are positive and are negative - this of value, the value (module) of one of the parameters which the aim is zero.

Notes

Simple sets this of the sets, in which all elements are characterized by the identical properties (identical property).

Complex sets this of set, that consist of their several simple sets.

III. Procedures of Determination and Comparison of the Cardinal Numbers (Quantity of Elements) of the Sets

Notes

For the fact that to determine and to compare a quantity of elements of different sets, is required to determine the order of tendency toward infinity through the formulas, expressed algebraically.

Interval widely adapts, i.e., the fixed value of anything and can be used both the basis and as element of set.

For example, it is necessary to compare the set of integers and fractional. Both and other set can be represented as the sum of intervals. We take the interval between zero and one (0,1) - in that case interval and the base of subset, and element of set. A quantity of integers is equal to two, a quantity of fractional of infinity. Hence it follows that the cardinal number of the set of the fractions is more than of integers.

Interval it is possible to use and as an element. For example, how are compared two sections? Lengthwise measure (standard) and to a quantity of measures in the section. The simplest version this when the length of measure one for both compared sections and then it is compared with respect to a quantity and if a quantity is equal, then the lengths of sections are identical. However, in the cases when standard different are compared the works of the lengths of standards to a quantity.

This procedure is applicable for those cases, when the lengths of sections by means of the comparison of the cardinal numbers of the set of points of those belonging to the specific sections compare. It is taken the interval (linear interval) (a,b) of infinitely small length (standard) and sections are divided into this interval.

$$M(L) = L/(a,b),$$

where $M(L)$ a quantity of points in the section L , length of which (a,b) interval.

Then a quantity of sections is compared and the conclusion about equality or inequality is done from this.

Sizes are compared with respect to two parameters - lengthwise of interval and quantity of intervals themselves, mentally applied to the measured objects, correspondingly, size this to the work of interval to the quantity

$$L = (a,b) \times M(L),$$

where L the length of section, $M(L)$ a quantity of points on section (a,b) interval.

With the comparison of identical sections, are obtained the identical sets of points (associating of set). With the comparison of the sections, whose length is more or less into a final quantity of times of the cardinal number of the sets of points of one order.

IV. Comparison of the Cardinal Number of the Sets of the Elements of the Components the Space

Let us take the elements of the space: point, line, plane, volume.

It follows from that state aboved that a quantity of points on the line is infinite, nevertheless, there is a formula, making it possible to determine the relativity of power in the cases not of arbitrary taking for the basis of a quantity of points. So it follows that the cardinal number of the sets in the section of one order for the sections of finite length.

Plane can be represented as the set of infinitely small areas, which are divided by lines. In that case the set of the lines, which divide plane into the set of elements of set, it will also be irreversible (associating). Each line consists of the infinite set accordingly, plane consists so of an infinite quantity of points, but the cardinal number of this irreversible set is more than the cardinal number of the set on the line.

Volume is divided by planes to an infinite quantity infinite small volumes, respectively in such cases:

1. Many planes are not reversed (associating).
2. The point set in the final volume possesses larger power than the point set on the final plane and in the final section.
3. The cardinal number of the set of lines in the final volume is more than on the final plane.

V. Cantor's Errors

Main error of Cantor, which involved certain quantity of insoluble paradoxes - this taking for the basis of an arbitrary quantity of points. Because an arbitrary quantity is this uncertainty.

"As it will be shown in our study, the elements of n- multiple of that extended continuous variety it will be possible to unambiguously and fully determine even with the aid of the one- only real continuous coordinate t". (end of quotation, p. 24) [1].

The main thing was be defined, what to compare as to compare and for which this to make.

For guaranteeing the continuity to not logically use the arbitrary sizes of elements of set this leads to the uncertainties and because of this to the insoluble paradoxes.

We will use the procedure of checking results in mathematics. i.e., let us conduct operations with the reverse actions. That to obtain, for example the infinite set from the line it is necessary to divide line from some parameter after obtaining the element of set, which they will be the infinitesimal quanitiy (there are no different versions). For the checking should be multiplied or added the elements of set, in addition from the specific parameter. In our case the infinite sum of the elements of infinitesimal quanitiy. If the orders of infinity of sum and elements are not determined, then as a result is obtained uncertainty, which contradicts the finite quantity of the length of section.

In the dry residue it is it turns out that necessary two parameters - the specific values of infinity of sum and elements, and not one, as the author asserts.

"Hence then it follows that if we about the nature of correspondence make no assumptions, then the number of independent continuous real coordinates, which require for the single-valued and total determination of the elements of the n- multiply extensive continuous variety, can be taken by arbitrary, but it means, it cannot be considered as the constant sign of the assigned variety." (end of quotation, p. 24) [1]. It is not possible to take the number of independent continuous coordinates by arbitrary, because contradiction is obtained.

"It turned out that to the presented by me question about that, is it possible continuous variety I measurements to unambiguously and fully reflect to the continuous variety only one measurement, so that to each element of one of them corresponds one

Ref

1. Георг Кантор. Труды по теории множеств. Москва, Наука, 1985.

and *only* one element of another, it is necessary to answer affirmatively." (end of quotation, p. 24) [1]. It is incorrect assumption.

"Therefore, using the expression introduced above, we can say that the power of any continuous n- multiply extensive means *is equal* to the thickness of the once extensive continuous variety of the, for example, limited continuous section of straight line." (end of quotation, p. 25) [1].

This assertion is not correct, since. power are not equal.

The author so was not dismantled with the following questions.

What such is point? What dimensions of point in the different regularities? Procedure of the determination of a quantity of points?Cardinal number of sets?

"If two well-defined varieties M N can be unambiguously and fully elementwise compared with each other (which is always possible and by many other methods, if this is made any), then it is further convenient to indicate that these varieties have equal power or that they are equivalent". (end of quotation, p. 22) [1].

For this exactly is suitable the procedure, described by me above, however, the author allows procedure with one coordinate (parameter).

"Thus, continuous surface can be unambiguously and fully reflected to the continuous line; it is also correct for continuous bodies and continuous means of any number of measurements." (end of quotation, p. 24)[1].

So cannot be acted, since the cardinal numbers of sets are different.

"Therefore, using the expression introduced above, we can say that the power of any n- multiply of that extended means *it is equal* to the power of the once extensive continuous variety, for example the limited section of straight line." (end of quotation, p. 24-25) [1].

Here also power are not equal.

"When the varieties in question are final, i.e. they consist of the finite number of elements, as can easily be seen, the concept of power corresponds to the concept of number, and, therefore, to the concept positive integer number, since in two such varieties power are equal then only then, when the number of their elements it is identical." (end of quotation, p. 22) [1].

Power in finite sets zero, in the infinitely large sets their power are determined by approach speed to infinity, not by number, i.e., if two sets are compared, then not the infinite difference in the number has values.

"If M it is the variety of the power of the sequence positive integer numbers, that each infinitely component M has the same power as M.¸ (end of quotation, p. 23) [1].

Assertion is incorrect, since. power in the infinitely small part M it will be less than u M.

"If, M‘, M'', M''' ... - the finite or simply infinite sequence of the varieties, each of which has a power of the sequence positive integer numbers, then the varietyM, obtained from the association M‘, M'', M''' has the same power." (end of quotation, p. 23) [1].

In this assertion also there is an error. During the addition of the finite number of varieties (sets) the obtained set there will be the same power, during the addition of the infinite number of varieties (sets) the obtained set there will be larger power. Here

Ref

1. Георг Кантор. Труды по теории множеств. Москва, Наука, 1985.

the author contradicts himself, earlier it asserted that the infinite large set has the large power, than final.

VI. Conclusion

From the aforesaid it is possible to make the conclusion that some conclusions, conducted by Cantor, are erroneous because of the incorrect systematic approach. In the article is carried out the analysis on the basis of the existing knowledge and the existing contradictions in the very theory of Cantor and subsequent theories on this basis. The approach regarding the elements of sets examined makes it possible to solve the significant number of contradictions both in the very theory of Cantor and the subsequent theories on this basis.

Notes

References Références Referencias

1. Георг Кантор. Труды по теории множеств. Москва, Наука, 1985.