

Ankur Tiwari's Great Discovery of the Division By Zero $1/0 = \tan(\pi/2) = 0$ on 2011

Saburou Saitoh and Yoshinori Saitoh
Institute of Reproducing Kernels
Kawauchi-cho, 5-1648-16, Kiryu 376-0041, JAPAN
saburou.saitoh@gmail.com

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Abstract: We got an important information on the Ankur Tiwari's great discovery of the division by zero $1/0 = \tan(\pi/2) = 0$ on 2011. Since the information was not known for us and among many colleagues, we would like to state our opinions on his great discovery.

Key Words: Division by zero, division by zero calculus, $1/0 = 0/0 = z/0 = \tan(\pi/2) = \log 0 = 0$, $[(z^n)/n]_{n=0} = \log z$, $[e^{(1/z)}]_{z=0} = 1$.

AMS Mathematics Subject Classifications: 00A05, 00A09, 42B20, 30E20.

1 Introduction and facts

We found the surprising information on the publications ([30, 31]) of Ankur Tiwari on the division by zero at 2020/02/25 : 9 : 45 as follows:

<http://www.ankurtiwari.in/downloads/bnrf-paper.pdf>

and

<https://www.bookdepository.com/>

[Andhakar-Autobiography-Ankur-Tiwari/9788192373515?](https://www.bookdepository.com/Andhakar-Autobiography-Ankur-Tiwari/9788192373515?)

2 Tiwari's basic ideas

We can understand Tiwari's basic ideas from the 7 pages paper, precisely.

Since the division by zero $z/0$ is not possible in the usual sense that $z/0 = X$ and $z = 0 \times X$ are the same, we have to consider some definition of the division by zero $z/0$.

His first idea: for the fraction

$$B = \frac{A}{Q},$$

we will consider it as follows: it is from the general form

$$A = B \times Q + R.$$

Therefore, for $Q = 0$, we have

$$A = R,$$

and he considers that the division by zero $z/0$ is zero and the remainder is z . This great idea comes from Mahavira (about 800 - about 870).

For his great idea, we have to refer to the same idea and the exact proof that our colleague Hiroshi Michiwaki had, on our early stage discovery of the division by zero (23 Feb. 2014).

His second idea is follows:

For a value of a function $F(z)$, he considers that

$$F(z) = \lim_{\delta \rightarrow 0} \frac{F(z - \delta) + F(z + \delta)}{2};$$

that is, with the mean value. And he obtained the very important results

$$\frac{1}{0} = 0, \quad \tan \frac{\pi}{2} = 0,$$

from the functions $y = 1/x$ and $y = \tan x$, respectively.

Of course, we considered the same way on our initial stage of our discovery of the division by zero.

However, with his idea, we will not be able to derive the important result, for example, for the function

$$f(x) = \frac{1}{x^2},$$

$f(0) = 0$.

Furthermore, in his definition, when do not exist the limits, he will not be able to give the definition.

Of course, anyhow we obtained many and many results on the division by zero as we see from the basic references in the reference.

3 Conclusion

Incidentally, when we find his publications, we are writing the Annoucement 549; an answer for the question whether mathematics is innovation (creation) or discovery. There we stated that mathematics is the real existence and not innovation. Mathematics exists independently of our existence, independently of time and energy. We have to say that mathematics was created by God. – Absolute existences. Indeed, we wrote: What is mathematics?

No.81, May 2012(pdf 432kb)
www.jams.or.jp/kaiho/kaiho-81.pdf

in Japanese, in details with human beings.

In particular, mathematics is over logic, we consider so.

From these ideas, we would like to say that the division by zero was discovered by Ankur Tiwari on 2011 based on his 7 pages article at this moment.

One basic reason is that he got the great ideas on the great history of India on the problem:

Brahmagupta (598 - 670),
Mahavira (about 800 - about 870),
and
Bhaskara II (1114 - 1185).

The second important reason is on his estimation for the results obtained; he admits the importance of the results in a highly way as we see from the document of 7 pages.

Therefore, we had sent the e-mail to him as follows:

Dear Ankur Tiwari:

Indeed, you are great and your discovery is very important. Since my English ability is poor, I first wrote the attached Announcement 550 for its importance in Japanese.

The main points are:

You are the first man of discovery of the division by zero,

Your passion and high estimation to the discovery are important factors.

I would like to send you; Congratulations!!!

You will be extremely happy with the great discovery.

We thought so.

I would like to write a new version as in

viXra:1903.0184 submitted on 2019-03-10 20:57:02,

Who Did Derive First the Division by Zero $1/0$ and the Division by Zero Calculus $\tan(\pi/2) = 0, \log 0 = 0$ as the Outputs of a Computer?

And I would like to add your important discovery in my book in details.

With best regards,

Sincerely yours,

Saburo Saitoh

2020.2.28.05:00

Now we think that any estimation ability is important; based on this idea, for the facts that CSEB and Chhattisgarh Academia gave the high estimation on his discovery we would like to express our great respects to them.

Meanwhile, for example, the division by zero is the generalized inverse - in the sense of **Moore-Penrose generalized inverse** - for the fundamental equation $aX = b$ and the inverse is fundamental and popular for the equation. Therefore, since our initial stage of the division by zero study, we stated repeatedly that the division by zero is trivial and clear all. However, over those 6 years, our world may not be accepted our opinion on its importance. Therefore, we are looking for its importance with many evidences over 1100 items.

In addition, we would like to refer to our paper ([2]) that will contain the division by zero as a very special case.

4 Book manuscript

In our book manuscript of 307 pages at this moment, we are stating as follows:

Preface:

The division by zero has a long and mysterious history all over the world (see, for example, [1, 19] and the Google site with the division by zero) with its physical viewpoint since the document of zero in India in AD 628. In particular, note that Brahmagupta (598 -668 ?) established four arithmetic operations by introducing 0 and at the same time he defined as $0/0 = 0$ in Brāhmasphuṭasiddhānta. We have been, however, considering that his definition $0/0 = 0$ is wrong for over 1300 years, but, we will see that his definition is right and suitable.

The division by zero $1/0 = 0/0 = z/0$ itself will be quite clear and trivial with several natural extensions of fractions against the mysteriously long history, as we can see from the concept of the Moore-Penrose generalized inverse to the fundamental equation $az = b$, whose solution leads to the definition of $z = b/a$.

However, the result (definition) will show that for the elementary mapping

$$W = \frac{1}{z},$$

the image of $z = 0$ is $W = 0$ (**should be defined from the form**). This fact seems to be a curious one in connection with our well-established popular image for the point at infinity on the Riemann sphere. As the representation of the point at infinity of the Riemann sphere by the zero $z = 0$, we will see some delicate relations between 0 and ∞ which show a strong discontinuity at the point of infinity on the Riemann sphere. We did not consider any value of the elementary function $W = 1/z$ at the origin $z = 0$, because we did not consider the division by zero $1/0$ in a good way. Many and many people consider its value by limiting like $+\infty$ and $-\infty$ or the point at infinity as ∞ . However, their basic idea comes from **continuity** with the common sense or based on the basic idea of Aristotele. – However, as the division by zero we will consider the value of the function $W = 1/z$ as zero at $z = 0$. We will see that this new definition is valid widely in mathematics and mathematical sciences, see ([10, 13]) for example. Therefore, the division by zero will give great impacts to calculus, Euclidean geometry, analytic geometry, differential equations, complex analysis at the undergraduate level and to our basic idea for the space and universe.

We have to arrange globally our modern mathematics at our undergraduate level. Our common sense on the division by zero will be wrong, with our basic idea on the space and universe since Aristotele and Euclid. We would like to show clearly these facts in this book. The content is at an undergraduate level.

Close the mysterious and long history of division by zero that may be considered as a symbol of the stupidity of the human race and open the new world since Aristotele - Euclid.

Key Words:

Division by zero, division by zero calculus, singularity, derivative, differential equation, $0/0 = 1/0 = z/0 = 0$, $\tan(\pi/2) = 0$, $\log 0 = 0$, infinity, discontinuous, point at infinity, Puha's horn torus model, Däumler's horn torus model, gradient, Laurent expansion, extension of solutions of differential equations, reduction problems of differential equations, analytic geometry, singular integral, conformal mapping, Euclidean geometry, Wasan, absolute function theory, Isabelle/HOL, Riemann zeta function, axiom.

5 Misha Gromov defined that $\frac{0}{0} = 0$

At 2020.2.29.08 : 00, we obtained the e-mail from José Manuel Rodríguez Caballero:

Dear Saitoh,

Look at page 5 of the following paper ($0 / 0 = 0$)

<https://www.ihes.fr/~gromov/wp-content/uploads/2018/08/structre-serch-entropy-july5-2012.pdf>

José M.

Surprisingly enough, in the article ([4]) Misha Gromov **defined** that

$$\frac{0}{0} = 0$$

on June 25, 2013.

6 Could Brahmagupta derive the result $1/0 = 0$ from his result $0/0 = 0$?

Tiwari considers that the result $1/0 = 0$ is derived from the result $0/0 = 0$ as in

$$\frac{1}{0} = \frac{1}{\frac{0}{0}} = \frac{1 \times 0}{0} = \frac{0}{0} = 0.$$

This curious logic may not be accepted and contrary, we think that Brahmagupta was not, in general, able to consider the division by zero $1/0 = 0$. Look ([12]) for this opinion.

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