Regarding Pi

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Abstract
From the title of the little article, it seems that esteemed readers have already understood, what we are speaking about and whose contributions are trying to speak. Yes, we would like to say something about a beautiful and correct constant Greek letter Pi that gave birth to the ancient, great Scientist, Greek mathematician, physicist, astronomer, and inventor, Archimedes of Syracuse (287 – 212 BC). In addition to this, we think readers should also draw their attention to the unexpected, unnecessary, and inevitable conflict created by Tau with Pi.

Dedication: I have dedicated this paper to Prof. Dr. Gouranga Dev Roy, Prof. Dr. Md. Sirajul Haque Meah, and Prof. Dr. M. Miraz Uddin Mandal Sir, who were my favorite and honorable teachers in University life. All of them were prominent and devoted teachers of the Department of Mathematics. Not only for the Department of Mathematics but also strengthening and sustainability of the new and the first University of Science and Technology in Bangladesh, Shahjalal University of Science and Technology (SUST), Sylhet-3100, Bangladesh, they had played a leading role. Unfortunately, these three strong personalities are no longer with us, which means all three of them are deceased but, they continue to be our source of inspiration, creating deep positive lines in the minds of countless people. I pay my respects to all of them and wish eternal peace to their departed souls.

Keywords: Archimedes, Circle, Diameter, Pi, Area, Radius, Tau

1. Introduction

It is the job of the truth seeker to accept any necessary change in a constantly changing world and have the mentality of not creating the field for an unnecessary change. **π** is a great contribution to science that has carefully and accurately expanded its branches. We have been celebrating Pi Day since 14th March 1988 with the mentality of walking truly and beautifully like **π** see [1]. In 2009, the United States House of Representatives supported the designation of Pi Day. The UNESCO's 40th General Conference designated Pi Day as the International Day of Mathematics in November 2019 see [2]. Since 2001 Pi, was said to be a selection by an incorrect alphabet that does not fit with the structure of various scientific formulas or with a unit multiplier. So it has been proposed to change its name with tau. Tau Day has been observed annually since 2010 on 28th June as **Fun Holiday**, an **anti-Pi Day holiday**, and an **unofficial day**. Conflicts were beginning from the thinking - **pi is wrong**. And it was raised by Adjunct Professor **Dr. Bob Palais** of Mathematics, Department of Mathematics, University of Utah, Salt Lake City, Utah 84112. It demands an analysis of "**π is wrong**" [Please see [3]]. And that is why we have made a small effort to write this article. Needless, to say, those who have demanded a change with the recognition that the value of **π** is correct. They want to multiply **π** by 2 and correct the name of two pies with tau that. To prove the name of the constant **π is wrong**, they have presented some fields to the world of mathematics or science. Our point is clear that if there is a need to correct the name, it should be corrected through an affidavit, and fundamentals proof of correctness has to be present there that the proposed name applied for was the right fundamentally. Otherwise, the proposed name should not be allowed. Presenting evidence must be fundamentals, and it is not right to proceed based on error. However, we try to see whether the proposed amendment is necessary by analyzing the additions of the amendment proponents [Please the cause of amendment find at The Tau Manifesto, updated 2021 or see [4]]? And we try to demonstrate the counter-argument. It is noteworthy here that no article written in favor of Pi or against Tau was added as a reference in this article to avoid allegations of bias. The Pi is a hundred alone.

2. Discussion, Criticism, & Argument-Counterargument

This part of the article will conduct mainly based on the merits, demerits, similarity, dissimilarity, and various logic, which submitted as a proposal in favor of turn to **τ** as a true circle constant in 'The Tau Manifesto, updated in 2021' along with its references.

2.1 Definition of circle constant:

2.1.1 By the great founder Archimedes, circle constant $= \frac{Circumference}{Diameter} = \frac{2\,\pi r}{2r} = \boldsymbol{\pi}$ of the same circle, this result was produced based on primary data, i.e., following by fundamental procedure and hence Archimedes came to the conclusion that the circumference of a circle is proportional to its diameter, i.e., $C \propto 2r \therefore C = 2\pi r$. Here the circumference of the circle is **twice** multiple of circle constant **π**, i.e., $\mathbf{2\pi r}$ concerning diameter. Tau believers say it looks dissimilar to other fields of science (e.g., $v = gt,\ \theta = f\tau,\ F = kx,\ F = ma,\ C = \tau r$…., etc.). Yes, we admit this. (Dear pi believers, please need not whisper and say concerning radius it is also **unit** multiple of circle constant **π**.)

2.1.2 By The Tau Manifesto, circle constant $= \frac{Circumference}{Radius}$ of the same circle and then, by depending on the Archimedes circumference, i.e., using secondary data and only by putting $\mathbf{2\pi} = \boldsymbol{\tau}$ they are saying that $C \propto r \therefore C = \tau r$ and finally claimed that **τ** is the **true** circle constant. The esteemed Tau believers circle constant is

$$\tau = 2\pi \approx 6.283185307179586476925286766559005768394338798750211\cdots$$

which is nothing but a copy-paste of **2π**. Honorable readers, Does it call fundamental procedure or without using **π** effort [Please see [1, 4]]? Here, of course, the circumference is **unit** multiple of proposed circle constant **τ**, which matches with other fields of science and looks better than **twice** multiple of **π**. Using the true circle constant pi of Archimedes, many Mathematicians have been calculated the area of a circle in different beautiful ways (such as the right-angle triangle, in the integration of calculus, shell integration,...., etc.), and these methods were also able to prove $A = \pi r^2$'s authenticity. Again, many have reached the approximate result of Archimedes in a proper fundamental scientific way, without using pi. Calculating the area of a circle without pi is obviously a beautiful effort - because solving a mathematical problem in the various fundamental alternative methods is part of the beauty of mathematics, see [15]. But do not take precautions before claiming that only I am correct and to deny the truth is not a decent mentality which seems to be the cause of creating confusion in public. I do not know how many of them denied Archimedes, who went closer to the approximate results of the circle. And it would be inappropriate, indecent if they deny Archimedes - because **π** is the symbol of the truth and beauty of mathematics.

2.2 Area of circle:

2.2.1 The Tau Manifesto says, "Indeed, the original proof by Archimedes shows not that the area of a circle is πr^2, but that it is equal to the area of a right triangle with base C and height r." in the bottom of subsection 3.2 [please see 4]. To answering this portion, we would like to request the readers please visit & read at an Area [5] or watch the Video [6] and enjoy the figure below: (Fig: taken from web)

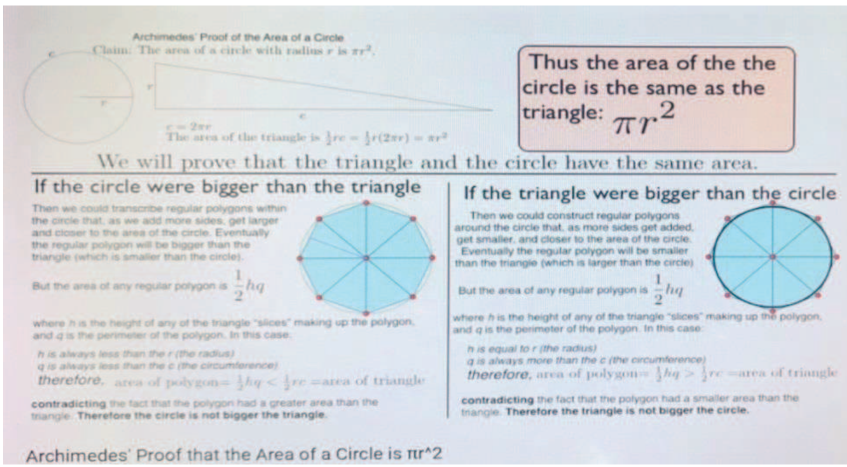

Fig:1(Archimedean Proof of Circular Area)

The area of a circle by Archimedes is $A = \pi r^2$, and the unit circle $=$ **π** sq. unit. Archimedes endeavored in this case followed by regular polygon and concluded the result with a contradiction. What do you say this time? Not for just unit circle, results for any radius is unit multiple of constant **π**. Oh, it does not fit with nature or the environment. Here $\frac{1}{2}$ is not present (e.g., $y = \frac{1}{2}gt^2$, $U = \frac{1}{2}\,kx^2$, $K = \frac{1}{2}\,mv^2$, $A = \frac{1}{2}\,\tau r^2$, …., etc.). Well, we agree, it is not a sub-multiple of **2**, i.e., not multiple of $\frac{1}{2}$.

2.2.2 The area of circle by Tau Manifesto is $A = \pi r^2 = \frac{1}{2}2\pi r^2 = \frac{1}{2}\tau r^2$ or $A = \frac{1}{2}Cr = \frac{1}{2}\tau r^2$ and unit circle $= \frac{1}{2}\tau$ sq. unit. Dear readers, Does area $\frac{1}{2}\tau r^2$ look better than a **unit** multiple of **π**? Honorable pi supporters, please don't whisper because you can't create $\frac{1}{2}$ multiple of **π** but, you can say that, since the area is directly proportional to the square of the radius, then, **unit** multiple of **π** with r^2 seem here relatively natural.

In The Tau Manifesto, updated in 2021, some conjectures were included, in such a way that:

a) The unnecessary factors of **2** arising from the use of ***π*** are annoying enough by themselves [see at the bottom of the subsection 2.1 of The Tau Manifesto named ramifications].

b) There is a missing factor of **2** [see subsection 3.2]. So, the area is $A = \frac{1}{2}bh = \frac{\mathbf{1}}{\mathbf{2}}\tau r^2$

c) The relationship $\boldsymbol{\tau} = 2\boldsymbol{\pi}$ is perfectly natural. [see at subsection 4.1]

d) The factor of $\frac{\mathbf{1}}{\mathbf{2}}$ arises naturally in the context of the circular area. Indeed, the formula for the area of a circular sector subtended by angle θ is $\frac{1}{2}r^2\theta$. So there's no way to avoid the factor of $\frac{\mathbf{1}}{\mathbf{2}}$ in general. We thus see that $A = \frac{1}{2}\tau r^2$ is simply the special case $\theta = \boldsymbol{\tau}$ [see at subsection at 4.2].

In response to the above conjectures a) & b), we want to say these may create anomaly or delude someone and, as a result, I could make a mistake. Please see an article or see [7]. On page no.2 of this article author mentioned that, 1) Area of a circle $A = r\,C$, where C is the circumference, r is the radius. 2) For r = 1, newly defined as a unit circular block $\boldsymbol{A = C = \tau}$, where $\boldsymbol{\tau = 6.28\ldots.}$ is the fundamental circle constant. If I don't mistake, want to say, this article creates serious complications for find out the plane area of various polygons and circles. I can claim this mistake happened following the manifesto's observations:

a) '**The unnecessary factors of 2**' or the sentence

b) **'In fact, there is a missing factor of 2'** because **2** of **Archimedes** is not unnecessary. It concerns diameter.

And in response to c) & d), we think for the emergency case of nature, apart from the Rhombus, the parallel group will also be arrested on this charge.

2.3 Now, we turn our attention out to The Tau Manifesto.

2.3.1 At first, Dr. Bob Palais said that I believe that **pi is wrong**, see [3]. He raised a question-In a clock there 15 minutes is called a quarter of an hour or a circle, but in mathematics, it is called half of the **π**. We can't blame them for the fact that - **pi is wrong**. We say perhaps that is not a problem, sir, because Pi is one straight angle. 15-minutes is half of (half of an hour), and we know the ratio between an hour and half an hour is 2:1. Therefore, 15-minutes is a quarter of an hour which is quite okay. Honorable Dr. Chandler Davis said, I agree with Bob Palais' pi-ous article, but it may be 2-pi-ous. So, why then, pi is wrong, sir?

2.3.2 An another article in favor of tau as a circle constant see [8], author Randyn Charles mentioned mathematicians think that Pi ($\boldsymbol{\pi}$) still equals the same infinite string of never-repeating digits. Rather, according to *The Tau Manifesto,* "pi is a confusing and unnatural choice for the circle constant." Far more relevant, according to the algebraic apostates, is 2π, aka tau. He also mentioned in his article that, Last year the University of Oxford hosted a daylong conference titled "Tau versus Pi: Fixing a 250-Year-Old Mistake." In 2012 the Massachusetts Institute of Technology modified its practice of letting applicants know admissions decisions on Pi Day by further specifying that it will happen at tau time - that is, at 6:28 P.M. In fact, almost every mathematical equation about circles is written in terms of *r* for radius. Tau is precisely the number that connects a circumference to that quantity.

In response to sub-sub sections 2.3.1 & 2.3.2, we can leave a question 'Did pi create problems anywhere in science except in the field of name use?' The uses of $\boldsymbol{\tau}$ is common in various branches of science (e.g., torsion, torque, tauon, time constant,….., etc.). So, students may fall into confusion for using **τ** as a constant of a circle with other fields, and as a result, may they find out the wrong value, which will be fatally conflicting. Pi has become known as a specific constant, and everyone is used to it. Concerned people know where to use **π** as an area, circumference, and as an angle with same value. So it would be difficult for the general students to adapt with **τ** without **π**. Moreover, there is no need to change the pi based on quality because Pi is not only the circle constant but also one of the ancient and most important mathematical constants which, have been described naturally in Euclidean Geometry.

2.4 Now, we come back to The Tau Manifesto:

The Manifesto said that "pi is a confusing and unnatural choice for the circle constant." Again, says "*The Tau Manifesto* is dedicated to the proposition that the proper response to "π is wrong" is "No, *really*."And the true circle constant deserves a proper name. As you may have guessed by now, *The Tau Manifesto* proposes that this name should be the Greek letter τ (tau).

We think these are ambiguous proposals. If tau believers think that Archimedes was not wrong, then they should not break down the tradition. We have some questions and arguments for the Tau supporters (In some cases, I like fitness of Tau) regarding their logic described in The Tau Manifesto by Michael Hartl, updated Tau Day, 2021. And the questions are as follows:

i) Why has the value of **τ** been taken from **π**? If you think π is **wrong**, then why its double, i.e., $\tau = 2\pi$ will not be **more wrong**?

ii) Your suggested true circle constant $\tau \equiv Cr = 6.283185307179586\ldots$, is a copy-paste of twice of Archimedes constant. Now, if the name of the previous tries to replace with another, then it will not be wise. We think, first of all, you will have to fundamentally prove the approximate value of **τ = 6.28** (not multiplying **π**, by 2 because **Can you take the twice of a wrong constant?**) After finding out the value of **τ** fundamentally, if you see that **π** mismatch with tau and tau is right enough, then and only then say that **<u>π is wrong</u>** and propose to make an amendment. Otherwise, the underlined sentence is not the right one. But if you get your **τ** is twice the value of **π**, you can propose that the new name of the circle constant is **τ**, whose old name was twice **π**. i.e., $\tau = 2\pi$. Seem that the amendment here is not necessary and sufficient.

iii) We don't think it makes sense for anyone to multiply the wrong **π**, by 2 and say the result is correct. Circumference, $C = 2\pi r = \tau\, r$ and area $A = \pi r^2 = \frac{1}{2} 2\pi r^2 = \frac{1}{2}\tau r^2$. So, your secondary circumference and area belong to **π** unless or until τ, C, and A are calculated fundamentally, i.e., without using **π.** In that case, **π** supporters (I am a supporter of **π** constant) can say that **τ** is dependent on us (pi). So, **who are you want to change my name too?** If there is any necessity of amendment, you can do it but, the name should remain unchanged with a new name (e.g., Laplace correction to Newton's Formula) that is the civilizing process. Unfortunately, we are going to make a conflict by celebrating **Tau day**. It is not a decent way, we think. If something that depends on the error is correct, it will be deception if it does not have the positive mentality to correct more sharply.

iv) In section 2 of The Tau Manifesto, the author mentioned Gaussian normal distribution, Fourier transformation, Cauchy's integral formula every formula there is seen the use of 2π and there are many more examples, and the conclusion is clear: there is something special about 2π. We are going to observe figures in the below: (Figures collected from The Tau Manifesto 2021)

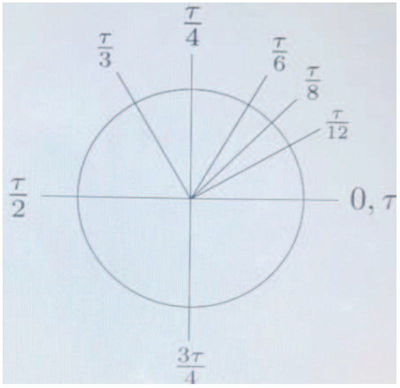

Fig:2(Single Rotation = 1τ)

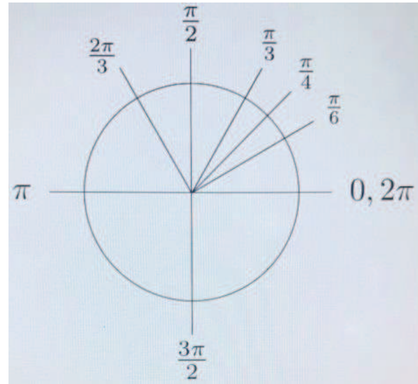

Fig:3(Single Rotation = 2π)

The Tau Manifesto says one turn of a circle is 1τ, but in the conventional system, it is 2π. Numerically they are equal, but conceptually they are quite distinct. Let's see what happens?

We see that 1 radian $= \frac{\tau r}{\tau r} = \frac{2\pi r}{2\pi r} = \frac{r}{r}$. **Is there any violation of radian angle**? So, **how has the conception been interrupted**? Yes, the concept of a single rotation of the radius r in Fig:2 indicates the rotation is a **unit**(single) multiple of **τ**, but Fig:3 indicates this rotation is **twice** multiple of **π**, so Fig:2 looks better.

But in the sense of 1 straight angle $= \pi = \frac{\tau}{2}$, which looks better between Fig:2 & Fig:3, my dear **τ** lovers? Since the value does not differ, then this debate is not so highlighted perhaps.

v) In subsection 2.2 of The Tau Manifesto, treat that period of $y = \sin\theta$ is odd looking at $\theta = 2\pi$ but good looking at $\theta = \tau$. Yes, the looking is good at $\theta = \tau$ but, dear **τ** lovers for $y = \sin 2\theta$, which looks beautiful at $\theta = \pi$ or $\theta = \frac{\tau}{2}$ because θ is arbitrary?

We all two-eyed people are looking the same thing, 1 radian $= \frac{2\pi r}{2\pi r}$, 1 straight angle $= \pi$, period of the sine function $y = \sin 2\theta$ is at $\theta = \pi$ ugly. And 1 radian $= \frac{\tau r}{\tau r}$, 1 straight angle $= \frac{\tau}{2}$, period of the sine function $y = \sin 2\theta$ is at $\theta = \frac{\tau}{2}$ lovely, divided into two groups!! We don't know one-eyed people, look in which way them?

vi) Table 1:

In response to table 1 of the manifesto in subsection 2.3, we construct the following Table:

Ration angle (**θ of 2π rad**)	Ration angle (**θ of τ rad**)	Eulerian identity
0	**0**	1
$\frac{\pi}{2}$	$\frac{\tau}{4}$	i
π	$\frac{\tau}{2}$	- 1
$\frac{3\pi}{2}$	$\frac{3\tau}{4}$	- i
2π	**τ**	1

Since values in the third column are the same, **What is the incorrect choice in the first column**? We are unable to understand. Only for the whole one, we will have to use the same it is biasedness, perhaps. In the first column, we use (0, **π**, 2, 3), whereas, in the second column, we use (0, **τ**, 4, 2, 3). Oh, pi lovers are small in numbers, or tau lovers need more things to do to complete the task, Lol!

We like to say, to the respectable readers, please, without closing your eyes and without using the first column, try to find out the values for the third column, and then describe the complexities that you have faced in that case. Unnecessarily tradition-breaking is not so easy!

vii) In subsections 3.1, 3.2, and 5.1 of Tau manifesto, mismatching of 2π and matching of τ with various formulae and nature interpreted in the following way and dimension:

a) For linear constant: $F \propto x$ (for an external force to spring), $F \propto a$ (for the energy of motion). Therefore, the final equations are $F = kx$, (k is spring constant), and $F = ma$, (m is mass constant). Here the nature of constants k and m are not comparable with circle constant **π** because k and m are dependent on other variables F, x, and a. Also, k and m are arbitrary constants whereas Pi is not an arbitrary constant. Therefore, from $C \propto 2r$, we get $C = 2\pi r$, where **π** is the ancient proportional constant, and it is a true constant that has already been satisfied by you Tau believers. So we don't understand, why you guys are uttering π is wrong, and it can't be a true circle constant?

b) For quadratic form: The rearrangement, of the formula, of the area of a circle has been completed in such a way that:

$A = \pi r^2 = \frac{1}{4} \times \pi \times D^2 = \frac{1}{8} 2\pi \times 4r^2 = \frac{1}{2}\, \tau r^2$, $A = \pi r^2 = \frac{1}{2} \times b \times h = \frac{1}{2} Cr = \frac{1}{2}\, \tau r^2$

Table 2: In response to table 3 of subsection 3.2, we construct the following Table:

Quantity	Symbol	Expression
Distance fallen	y	$\frac{1}{2} gt^2$
Spring energy	U	$\frac{1}{2} kx^2$
Kinetic energy	K	$\frac{1}{2} mv^2$
Circular area	A	$\frac{1}{2}\, \tau r^2$
Archimedes' area	A	πr^2

Just for similarity with, Table 2 The Manifesto suggests writing the area as $A = \frac{1}{2}\, \tau r^2$ instead of $A = \pi r^2$. We want to say y is one dimensional, k and m associated with U and K are arbitrary constants, whereas pi is not an arbitrary constant. So, y, k, and m are not comparable with pi. So the question of dissimilarity is confusing, and the formula $A = \pi r^2$ you have already admitted is correct.

In all cases, we are not able to maintain the structure of the proposed Tau constant. Some of these mentions below:

Case - 1: For the second power of the final velocity (initial velocity $\mathbf{u = 0}$), $\mathbf{v^2 = 2gh}$, $\mathbf{v^2 = 2fs}$; for acceleration due to gravity, maximum height $\mathbf{H} = \frac{\mathbf{u^2}}{\mathbf{2g}}$; for projectile motion, maximum height $\mathbf{H} = \frac{\mathbf{u^2 \sin^2 \alpha}}{\mathbf{2g}}$. Now, here can we propose to replace $2g$ and $2f$ with other letters?

Case - 2: For the period of oscillation of a simple pendulum $\mathbf{T = 2\pi\sqrt{\frac{l}{g}}}$, if we derive this formula using the magnitude $\boldsymbol{\tau} = \mathbf{mg \times \sin\theta \times l}$ of the torque vector $\vec{\boldsymbol{\tau}}$ and follow your proposal, $\boldsymbol{\tau} = \mathbf{2\pi}$, then the derivation will become $\mathbf{T} = \boldsymbol{\tau}\sqrt{\frac{\mathbf{l}}{\mathbf{g}}}$, and hence, there is a scope to create an anomaly between the conception of this tau. [Please visit at oscillation time [9]]

Case - 3: For the total surface area of the unit sphere, the required area $= 4\pi = 2\tau$ sq. unit, here the multipliers neither follow the unity nor the structure $\frac{1}{2}$ of π or $\frac{1}{2}$ of τ for both formulae. So, there is no gain of benefit for using $\boldsymbol{\tau}$. A similar analysis is applicable for the total surface area of the unit cylinder.
It is important to note that the entire surface area of the unit sphere and cylinder are the same, and it is the best and most impeccable contribution of Archimedes.

Case - 4: For the volume of a Sphere $V \propto r^3$. So the result concerning τ is $V = \frac{2}{3}\tau r^3$, and concerning 2π is $V = \frac{2}{3}2\pi r^3$. Here the multipliers do not follow the structure $\frac{1}{3}$ of π or $\frac{1}{3}$ of τ. For the unit sphere, the unit multiplier is absent for both τ and π. For a Cylinder volume $V = \pi r^2 h = \frac{1}{2}2\pi r^2 h = \frac{1}{2}\tau r^2 h$, and for the unit Cylinder volume $V = \pi = \frac{1}{2}\tau$. Here, the unit multiplier is seen in $\boldsymbol{\pi}$, not in $\boldsymbol{\tau}$. If the cylinder goes with nature, Pi looks better than Tau. So, what is the reality for choosing $\boldsymbol{\tau}$ instead of $\boldsymbol{\pi}$?

Case - 5: For Gaussian integral or Normal distribution [Please see at Gaussian Integral [10] or Bangabandhu functions (pages 219-220) [11]],
We know that The Gaussian Integral which, is also proved by The anti-derivative Bangabandhu functions, $\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$, is unit multiple of constant $\boldsymbol{\pi}$ but, the proposed $\boldsymbol{\tau}$ constant says that as if it will be the $\frac{1}{2}$ multiple of τ, i.e., $\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\frac{\tau}{2}}$. Which looks better dear readers, concerning unity? For Gaussian integral, τ lovers say that the factor of 2π, i.e., π in the Gaussian (normal) distribution is a coincidence.

Case - 6: For solid angle $\Omega = \frac{A}{r^2}$, where $\Omega =$ Solid angle, $A =$ Area of an object covered by a considered sphere, $r =$ Radius of the considered sphere.
If the object is a circle with the same radius r of sphere then, $\Omega = \boldsymbol{\pi}$ Steradian $= \frac{\boldsymbol{\tau}}{\mathbf{2}}$ Steradian. Look honorable readers, which is unit multiple, $\boldsymbol{\pi}$ or $\boldsymbol{\tau}$?
If $A = r^2$ and the object is the unit circle, then the area $A = \pi = \frac{1}{2}\tau = r^2$. So, the solid angle will be $\Omega = 1$ Steradian. Therefore, against 1 Steradian, the unit multiplier is found in the unit circle, $A = \pi$, not in the unit circle $A = \frac{1}{2}\tau$. Besides this the area of the unit circle is π in a

conventional system but, for the proposed turning to τ constant, it will be $\frac{1}{2}\tau$. So, there nature exists in beautiful constant **π**.

We know that the total solid angle at apex is 4π Steradian for the total surface area of the sphere, i.e., for $A = 4\pi r^2 = 4 \times \frac{1}{2}\tau r^2 = 2\tau r^2$, that is 4-multiple of a circular area with the same radius r of the sphere. Also, we know various solid angles against various plane angles are:

i) Against plane angle $\varphi = 0° = 0$ rad, $\Omega = 0$ Steradian.

ii) Against plane angle $\varphi = 90° = \frac{\pi}{2}$ rad $= \frac{\tau}{4}$ rad, $\Omega = 2\pi$ Steradian $= \tau$ Steradian.

iii) Against plane angle $\varphi = 180° = \pi$ rad $= \frac{\tau}{2}$ rad, $\Omega = 4\pi$ Steradian $= 2\tau$ Steradian.
In the above three steps, there is no absolutely unit multiplier of both π and τ but, **for τ radian, there is no existence of total solid angle.**

Case - 7: For relation among Degree unit, supplementary unit-Radian and Steradian:
For circle, Total Circumference $= 2\pi r = \tau r$. $\therefore$ 2π rad $= 2\pi r$ or τ rad $= \tau r$. So, for both letters, there the radius r = 1 rad remains constant.

For sphere, the total Surface area $= 4\pi r^2 = 2\tau r^2$.
$\therefore 4\pi \text{ Sr.} = 4\pi(1 \text{ rad})^2 = 4\pi(\frac{180}{\pi} \text{ deg})^2$ or $2\tau \text{ Sr.} = 2\tau(1 \text{ rad})^2 = 2\tau(\frac{360}{\tau} \text{ deg})^2$.
Therefore, the relation $1 \text{ Sr.} = (1 \text{ rad})^2 = (\frac{180}{\pi} \text{ deg})^2 = (\frac{360}{\tau} \text{ deg})^2 \approx 3283 \text{ deg}^2$ remains unchanged for both π, τ. The fitness of **π and τ are same** here but don't follow unit multiplier.

So, regarding solid angle Ω or ω, the multiplier fitness is observed only on **π naturally**. Therefore, the comment in the Tau Manifesto '**π is a pedagogical disaster**.' Perhaps is not true at all.

Case - 8: Now, we observe The Tau Manifesto's answer to some frequently asked questions. The question & answering section was such types:
1) How can we switch from π to τ? Answer: we set "τ = 2π"

2) Won't using τ confuse people, especially students? Answer: "Let τ = 2π"

3) Why does this subject interest you? One part of the answer was: What else might be staring us in the face, just waiting for us to discover it?

4) What is the reason for naming τ? Answer: Indeed, the horizontal line in each letter suggests that we interpret the "legs" as *denominators*, so that **π** has two legs in its denominator, while **τ** has only one. Seen this way, the relationship τ = 2π is perfectly natural.

In response to the above section here, it can say, if we consider a function $y = 2x$ as input and output, then $\tau = 2\pi$ is a linear function of π, where π is the independent variable and τ is the dependent variable on the π. Its domain = {**π**} = input and range = {**τ**} = output. So, there is no output unless we supply input that is a great natural phenomenon. In another way, we can say that there is no existence of Tou without Pi.

Again, $\tau = 2\pi$ is a straight line segment passing through the origin whose slope is 2, or **τ** is nothing but the combination of twice clones of **π**, So, **π** is natural and **τ** is artificial. Therefore, it's not a matter of discovery. It already exists in nature as a total circular angle = 2π that is completed. As a man, we want to wear two different socks on our two legs. We don't know which type of single sock or two same socks you wear in your incomplete leg?

It has been mention in the Bible, **τ** can be say to symbolize the Last Day. But unfortunately, since **π** can never stop so, artificial **τ** also can never stop. Therefore, naming **τ** is not perfect and natural. Please, don't take it seriously, it's nothing but Math Fun.

Case - 9: You **τ** believers several times saying that **π is wrong**, and you are not only stopped here but, also by taking Archimedes true circle constant **π**, you make only by naming τ = 2π and claiming **τ** is a true fundamental constant that hearts a lot of mathematicians. How has **τ** become fundamental? Did you express or prove geometrically, $\boldsymbol{\tau = 6.28}$ [Please see [15]]? Can you show us your previous proof without depends upon **π**? Your τ is nothing but twice multiple of π, So, **τ** may be a good choice somewhere but not fundamental because it has made by **π**, i.e., **π** is fundamentals, and **τ** is **π**'s new version only, which may be fit, smoothly in the various field? Perhaps, we are showing angriness to **τ**, sorry! It's not fair to us also. If any usual mathematics reader has to feed the following comments mentioned below in case-10 in The Tau Manifesto, elsewhere, then he/she can't control himself/herself.

Case - 10: Comments on The Tau Manifesto and elsewhere about **π**:

1. It's time to set things right, the **so-called** Pi Manifesto

2. Celebrating **half Tau Day**

3. I'm here to tell you that **Pi Day is wrong** - or rather, **the entire idea of pi as a mathematical concept is wrong.** [Please see at web or see [12]]

4. We come now to the final **objection**. I know, I know, "**π in the sky**" is so very **clever**. And yet, **τ** itself is **pregnan**t with possibilities.

5. 'We begin repairing the **damage wrought by π** by first understanding the **notorious** number itself.'

6. **π is a powerful enemy.**

7. Indeed, the whole problem began as a **historical accident**, tauists say.[see at Let's use Tau]

8. **I won't be celebrating Pi Day next year - and neither should you.**[Please search at not pi]

9. I'm surprised that **Archimedes didn't realize** that $\frac{C}{r}$ is the more Fundamental number.

10. **What a shame** that he (**Euler**) **didn't standardize** on the more convenient choice.

11. '**π is a pedagogical disaster**.'

3. Anxiety about the future

If we believe in far-reaching ideas, we are trying to think about the possibility of conflict arising in the future. There are more branches of science where the symbol τ is used (e.g., torque see [9], tauon see at tau lepton or go to [13], shear stress, please, see at Wikipedia or go to [14],…, etc.) in different conception. We think that so many uses of the same symbol τ will create complexities to coincide with the area of the circle, whereas in the modern unit, the plane angles measure in pi-related radian angles. And in other cases, π is used as the same value that is indicative of distinctive features. So it is better not to associate τ with the circle.

4. Appeal to the World's Mathematical Authorities

Dear Math Lovers, we would like to request you to close your eyes and think about whether it is comfortable to replace your past and present π with $\frac{\tau}{2}$ in the future? Now open your eyes and go ahead as your mind allows. I see a lot of chaos. So, I think it would be logical to request the world's Mathematical Authorities to conclude the consequences of change.

5. Conclusion

Just as it is nice to expect a single symbol τ for a single focal angle in a single rotation, it is also a beautiful expectation for a single symbol π, which we have seen in the existing area $A = \pi r^2$. If we want to bring the first one τ through correction, we will also lose the existing one, π. We will have to accept that there will be no more compassion for the unborn than for the existing one. Not all hopes fulfill in one life. We think no need to switch to τ because all academic books could create a contradiction, and future generations might misunderstand Archimedes, but he was not wrong. Only there is a conflict of multiple and sub-multiple matter of π and τ with one another. In the light of the above discussion, critique, argument, and reality, it seems that somewhere π and somewhere τ exhibit good looking multipliers fitness, but both shows the same approximate numerical value. So considering only the alphabetical τ naming is likely to create a wall of unwarranted confusion and mistrust among the teachers, readers, and students, which we mention in the above sub-sub section 2.2.2. Therefore, we think it is better not to change the name of the correct standard constant π. Otherwise, for the inconsistency of τ somewhere, proposing to come back to the pavilion cannot be completely ruled out. We wish that the importance of the right quality prevails, not conflict.

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