Causation **1** (2007), 13-28.

Anti π - Negation of Archimedes' constant π.

By Ilija Barukčić[*, 1, 2]

[1] 26441 Jever, Germany.
[2] http://www.barukcic-causality.com/

Abstract

Archimedes' constant π , also known as π = C / d, the ratio of a circle's circumference C to its diameter d in Euclidean geometry, appears routinely in many equations describing fundamental principles of our world, like Magnetic permeability of free space, Coulomb's law for the electric force, Einstein's field equation of general relativity, Heisenberg's uncertainty principle and so on. But even under the most optimistic conditions, it is not possible to calculate an exact value of **Archimedes' constant** π, an uncertainty in the calculation of this "constant" remains. The numerical value of π truncated to 50 decimal is about 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510. An exact value of π is still not known. The question naturally arises, is Archimedes' constant π at the end not a constant? This publication will proof, that Archimedes' constant π is not a constant, Archimedes' constant π is changing all the time and is determined by the relationship

$$\pi * (\text{Anti } \pi) \leq (c^2) / 4 .$$

Key words: Anti π, Archimedes' constant π, General relativity, General Contradiction Law.

1. Background

The numerical value of the number π has been known since ancient times. Babylonian mathematicians were using π = 25/8 about the 19th century BC. In the Egyptian Rhind Papyrus, which is dated about 1650 BC, the value of π is π = 4*(8/9)*(8/9) = 3.16. The first theoretical calculation of the value of the number π seems to have been carried out by **Archimedes** of Syracuse (Beckmann, 1971). Archimedes of Syracuse (287-212 BC) obtained the approximation (223/71) < π < (22/7). Mathematicians have found dozens of dramatic and astonishing formulas to compute the numerical value of the number π. But it is important to realise that besides of all, no one has claimed to have discovered the exact value of π, an exact numerical value of π is still unknown. The intrinsic randomness of π is determined by the fact, that the decimal expansion of π never ends and it does not repeat. Why not, is there a cause for the intrinsic randomness of π? Is π a mathematical constant or is π determined by a natural process?

[*] Corresponding author: e-mail: Barukcic@t-online.de, Phone: +00 49 44 23 991111, Fax: +00 49 44 23 991112. GMT + 1 h.

2. Material and Methods

There are many ways to calculate the numerical value of the number π. Nevertheless, the number π appears in Einstein's investigation of the relationship between energy, time and space too. Thus, we will use Einstein's field equations of general relativity, which relate the presence of the curvature of spacetime and matter, to investigate the true nature of the number π. In so far, our starting point to proof whether the number π is a constant or not is Einstein's field equation.

2.1. Einstein's field equation.

Einstein's theory of general relativity, especially **Einstein's field equation** describes how energy, time and space are interrelated, how the one changes into its own other and vice versa. It needs Newton's gravitational constant γ for the description of spacetime and vice versa. Newton's gravitational constant γ can be described by **Einstein's field equation**.

Einstein's basic field equation (EFE).

Let

R_{ab} denote the Ricci tensor,

R denote the Ricci scalar,

g_{ab} denote the metric tensor,

T_{ab} denote the stress-energy tensor,

h denote Planck's constant, $h \approx$ **(6.626 0693 (11)) * 10^{-34} [J * s],**

π denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be about

π ≈ 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510,

c denote the speed of all electromagnetic radiation in a vacuum, the speed of light, where

$$c = 299\,792\,458 \text{ [m / s]},$$

γ denote Newton's gravitational 'constant', where

$$\gamma \approx (6.6742 \pm 0.0010) * 10^{-11} [m^3 / (s^2 * kg)],$$

Einstein's field equation describes how a field or energy (or matter) and time changes space and vice versa. Einstein's basic field equation (EFE) is usually written in the form

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) + ((R * g_{ab}) / 2)) = (R_{ab}). \quad (1)$$

The stress-energy-momentum tensor is known to be the source of spacetime curvature and describes more or less the density and flux of **energy** and momentum in spacetime in Einstein's theory of gravitation.

The metric of spacetime is determined by the matter and energy content of spacetime. The Ricci scalar/metric tensor completely determines the curvature of spacetime and defines such notions as **future, past**, distance, volume, angle and ...

The Ricci tensor, named after Gregorio Ricci-Curbastro, is a key term in the Einstein field equations and more or less a measure of **volume distortion**.

3. Results

3.1. Archimedes' constant π is not a constant

Let us assume that Archimedes' constant π is a constant. If this is true, then π can not change as such under any circumstances otherwise it would not be a constant. In so far, the stress-energy-momentum tensor T_{ab} or the Ricci scalar/metric tensor ((R*g_{ab}) /2)) should not have any influence at all on the numerical value of the number π. On the other hand, it is equally true that especially **Einstein's field equation** doesn't work at all without Archimedes' constant π.

Theorem 1. Archimedes' constant π is not a constant**.**

Let

R_{ab} denote the Ricci tensor,

R denote the Ricci scalar,

g_{ab} denote the metric tensor,

T_{ab} denote the stress-energy tensor,

h denote Planck's constant, h **≈ (6.626 0693 (11)) * 10 $^{-34}$ [J * s],**

π denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be about

π ≈ 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510,

c denote the speed of all electromagnetic radiation in a vacuum, the speed of light, where

c **= 299 792 458 [m / s],**

γ denote Newton's gravitational 'constant', where

γ ≈ (6.6742 ± 0.0010) * 10 $^{-11}$ [m^3 / (s^2 * kg)],

Einstein's field equation describes how a field or energy (or matter) and time changes space and vice versa. Einstein's basic field equation (EFE) is usually written in the form

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) + ((R * g_{ab}) / 2)) = (R_{ab}).$$

Then

$$\pi = (c^4)*((R_{ab}) - ((R * g_{ab}) / 2)) / (4 * 2 * \gamma * T_{ab}).$$

Proof. Eq.

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) + ((R * g_{ab}) / 2)) = (R_{ab}) \quad (2)$$

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) = ((R_{ab}) - ((R * g_{ab}) / 2)) \quad (3)$$

$$(4 * 2 * \pi * \gamma * T_{ab}) = (c^4)*((R_{ab}) - ((R * g_{ab}) / 2)) \quad (4)$$

Let us assume, that a division by (T_{ab}) is allowed and possible.
If the division by (T_{ab}) is not allowed or possible, set (T_{ab}) = 1.

$$\pi = (c^4)*((R_{ab}) - ((R* g_{ab}) / 2)) / (4 * 2 * \gamma * T_{ab}) \quad (5)$$

Q. e. d.

What are the consequences of this solution of Einstein's field equation. First of all, Eq. (5) states more or less that

$$(\pi = \text{constant1}) = \text{constant2} *((R_{ab}) - ((R* g_{ab}) / 2)) / (4 * 2 * \gamma * T_{ab}).$$

If Archimedes' constant π is nothing then a true constant, then

$$\mathbf{((R_{ab}) - ((R* g_{ab}) / 2)) / (4 * 2 * \gamma * T_{ab}) = constant3}$$

too, since c according to Einstein is a constant. Let us set the Ricci tensor R_{ab} = 0, theoretically Archimedes' constant π according to Eq. (5) can survive. Let us assume that the Ricci scalar / metric tensor (($R* g_{ab}$) / 2) = 0 or vanishes, theoretically Archimedes' constant π can survive too. Contrary to this, Archimedes' constant π is not able to survive if T_{ab} = 0, since we are not allowed to divide by 0. Conclusion: Archimedes' constant π seems to be dependent or determined at least by the stress-energy tensor T_{ab}.

3.2. Anti π - the otherness of Archimedes' constant π

Is Archimedes' constant π something able to change and something that is changed too?

Theorem 2. **Anti π - the otherness of Archimedes' constant π.**

Let

R_{ab} denote the Ricci tensor,

R denote the Ricci scalar,

g_{ab} denote the metric tensor,

T_{ab} denote the stress-energy tensor,

h denote Planck's constant, h ≈ **(6.626 0693 (11)) * 10^{-34} [J * s],**

π denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be about

π ≈ 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510,

c denote the speed of all electromagnetic radiation in a vacuum, the speed of light, where

***c* = 299 792 458 [m / s],**

γ denote Newton's gravitational 'constant', where

γ ≈ (6.6742 ± 0.0010) * 10^{-11} [m^3 / (s^2 * kg)],

Einstein's field equation describes how a field or energy (or matter) and time changes space and vice versa. Einstein's basic field equation (EFE) is usually written in the form

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) + ((R * g_{ab}) / 2)) = (R_{ab}).$$

The unified field equation (Barukčić 2006e) is known to be

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) * ((R * g_{ab}) / 2)) \le ((R_{ab})*(R_{ab})) / 4,$$

thus

$$\pi * (\text{Anti } \pi) \le (c^2) / 4$$

or

$$\text{Anti } \pi \le ((4 * \gamma * T_{ab})*(R * g_{ab})) / ((c^2)*((R_{ab})*(R_{ab}))).$$

Proof. Eq.

$$(((4 * \pi * \gamma) * T_{ab}) / (c^4)) * ((R * g_{ab}))) \le ((R_{ab})*(R_{ab}))/ 4 \quad (6)$$

Let us assume that the division by $((T_{ab})*((R*g_{ab})))$ is allowed and possible.
If the division by $((T_{ab})*((R*g_{ab})))$ is not allowed and possible, set $((T_{ab})*((R*g_{ab}))) = 1$.

$$\pi \le ((c^4 / (4 * 4)) * ((R_{ab})*(R_{ab}))) / (((\gamma) * T_{ab})*(R * g_{ab})) \quad \textbf{(7)}$$

$$\pi \le ((c^2 * c^2) / (4 * \gamma * 4)) * ((R_{ab})^2 / (T_{ab})*(R * g_{ab})) \quad (8)$$

$$\pi \le (\text{Anti } \gamma * (c^2 / 4)) * (((R_{ab})*(R_{ab})) / (T_{ab})*(R * g_{ab})) \quad (9)$$

Let us assume, that the division by $((R_{ab})*(R_{ab}))$ is allowed and possible.
If the division by $((R_{ab})*(R_{ab}))$ is not allowed and possible, set $((R_{ab})*(R_{ab})) = 1$.

$$((4 * 2 * \pi * \gamma * T_{ab})*(R * g_{ab})) / (2*(c^4)*((R_{ab})*(R_{ab}))) \le 1 / 4 \quad (10)$$

$$((4 * \pi * \gamma * T_{ab})*(R * g_{ab})) / ((c^2)*((R_{ab})*(R_{ab}))) \le (c^2) / 4 \quad (11)$$

$$\pi * ((4 * \gamma * T_{ab})*(R * g_{ab})) / ((c^2)*((R_{ab})*(R_{ab}))) \le (c^2) / 4 \quad (12)$$

$$\pi * (((T_{ab}) * (R * g_{ab})) / ((\text{Anti } \gamma)*((R_{ab})*(R_{ab})))) \le (c^2) / 4$$

According to the general contradiction law (Barukčić 2006d) $((c^2) / 4)$ is the unity and the struggle of X and Anti X. Set $\pi = X$. Thus we obtain Anti X as

$$\text{Anti } \pi \le (((T_{ab}) * (R * g_{ab})) / ((\text{Anti } \gamma)*((R_{ab})*(R_{ab})))) \quad (13)$$

$$\pi * (\text{Anti } \pi) \le (c^2) / 4 \quad (14)$$

Q. e. d.

Anti π, the otherness of π, can be defined as **Anti $\pi \le (c^2 / (4 * \pi))$.**

3.3. The unity of Euler's number e and Archimedes' constant π

Archimedes' constant π and Euler's number e are determined by each other.

Theorem 3. The unity of Archimedes' constant π and Euler's number e.

Let

e denote the mathematical constant e, also known as **Euler's constant.** The numerical value of π truncated to 20 decimal places is known to be:

$$\mathbf{e} \approx 2.71828\ 18284\ 59045\ 23536,$$

Anti e denote the otherness of the mathematical constant e, denoted as **Anti Euler's constant.** Let the numerical value of Anti e truncated to 20 decimal places is known to be:
Anti e = (π - e) ≈ 0.423310825130748**.** Let us assume that **e ≥ (Anti e)** . Let
e + (Anti e) = π,

π denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be:

$$\pi \approx \mathbf{3.14159\ 26535\ 89793\ 23846\ 26433\ 83279\ 50288\ 41971\ 69399\ 37510.}$$

π is known to be $\pi \leq (\text{Anti } \gamma * (c^2 / 4)) * ((R_{ab})^2 / (T_{ab}) * (R * g_{ab})),$

then

$$\mathbf{e * (Anti\ e) \leq (\pi^2 / 4)}$$

Proof.

$$\mathbf{e \geq Anti\ e} \quad (15)$$

$$e + e \geq e + (\text{Anti } e) \quad (16)$$

$$2e \geq \pi \quad (17)$$

$$e \geq \pi/2 \quad (18)$$

$$e - (\pi/2) \geq 0 \quad (19)$$

$$(e - (\pi/2))^2 \geq 0^2 \quad (20)$$

$$(e^2) - (e*\pi) + (\pi^2)/4 \geq 0^2 \quad (21)$$

$$(e^2) - (e*\pi) \geq -(\pi^2)/4 \quad (22)$$

Eq. (22) time (-1) yields Eq. (23).

$$-(e^2) + (e*\pi) \leq +(\pi^2)/4 \quad (23)$$

$$+(e*\pi) - (e^2) \leq +(\pi^2)/4 \quad (24)$$

$$(e) * (\pi - e) \leq (\pi^2)/4 \quad (25)$$

$$\mathbf{(e) * (Anti\ e) \leq (\pi^2) / 4} \quad (26)$$

Q. e. d.

Based on the famous Basel problem in 1735 it is known that

$$(\pi^2/4) \approx (3/2)*(\lim_{n\to+\infty} ((1 + (1/1^2)) + (1 + (1/2^2)) + (1 + (1/3^2)) + ... + (1 + (1/n^2))).$$

In so far it is equally true that

$$\mathbf{e*(Anti\ e) \leq (\pi^2)/4} \approx (3/2)*(\lim_{n\to+\infty} ((1 + (1/1^2)) + (1 + (1/2^2)) + (1 + (1/3^2)) + ... + (1 + (1/n^2))).$$

3.4. The "constant" (1 / (4 * π))

Theorem 4. The constant (1/(4*π)) is determined by Einstein's field equation.

Let

R_{ab}	denote the Ricci tensor,
R	denote the Ricci scalar,
g_{ab}	denote the metric tensor,
T_{ab}	denote the stress-energy tensor,
t	denote the (space) time,
h	denote Planck's constant, h ≈ **(6.626 0693 (11)) * 10^{-34} [J * s].**
π	denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be: **π ≈ 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510.**
c	denote the speed of all electromagnetic radiation in a vacuum, the speed of light, where ***c* = 299 792 458 [m / s].**
γ	denote Newton's gravitational 'constant', where **γ ≈ (6.6742 ± 0.0010) * 10^{-11} [m^3 / (s² * kg)].**
μ_0	denote the permeability constant, the magnetic constant**,** the permeability of free space or of vacuum,
ε_0	denote the permittivity of vacuum, the electric constant.

$$\textbf{Recall, } (\mu_0 * \varepsilon_0 * (c^2)) = 1.$$

Set $((R_{ab}) - ((R* g_{ab}) / 2))) \neq 0$.
Recall, it is known that Einstein's field equation describes how a field or energy (or matter) and time changes space and vice versa. Einstein's basic field equation (EFE) is usually written in the form

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) + ((R* g_{ab}) / 2)) = (R_{ab}).$$

Then

$$\mathbf{1 / (4 * \pi) = (((2 * \gamma) * T_{ab}) / ((c^4) * ((R_{ab}) - ((R* g_{ab}) / 2)))) .}$$

Proof.

$$\mathbf{(((\ 4 * 2 * \pi * \gamma\ ) * T_{ab}\ )\ /\ (\ c^{4}\ )\ )\ +\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ )\ =\ (\ R_{ab}\ )} \tag{27}$$

$$(((\ 4 * 2 * \pi * \gamma\ ) * T_{ab}\ )\ /\ (\ c^{4}\ )\ ) = (\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ )) \tag{28}$$

Let us assume that the division by $(\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ ))$ is allowed and possible. If the division by $(\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ ))$ is not allowed or possible, let us set $(\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ )) = 1$.

$$(((\ 4 * 2 * \pi * \gamma\ ) * T_{ab}\ )\ /\ (\ (\ c^{4}\ ) * (\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ ))\ )\ = \mathbf{1} \tag{29}$$

Recall, $(\ \mu_0 * \varepsilon_0 * (\ c^2\ )\ ) = 1$. Thus, we obtain Eq. (30).

$$(((\ 4 * 2 * \pi * \gamma\ ) * T_{ab}\ )\ /\ (\ (\ c^{4}\ ) * (\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ ))\ )\ = (\ \mu_0 * \varepsilon_0 * (\ c^2\ )\ ) \tag{30}$$

$$(((\ 4 * 2 * \pi * \gamma\ ) * T_{ab}\ )\ /\ (\ (\ c^{6}\ ) * (\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ ))\ )\ = (\ \mu_0 * \varepsilon_0\ ) \tag{31}$$

Eq. (32) follows immediately from Eq. (29).

$$(((\ 4 * \gamma\ ) * T_{ab}\ )\ /\ (\ (\ c^{4}\ ) * (\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ ))\ )\ =\ (\ 1\ /\ (\ 2 * \pi\ )\ ) \tag{32}$$

$$(\ (((\ 4 * \gamma\ ) * T_{ab}\ )\ /\ (\ (\ c^{4}\ ) * (\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ ))\ )\ )^{1/2}\ =\ (\ 1\ /\ (\ 2 * \pi\ )\ )^{1/2} \tag{33}$$

Eq. (33) is needed for Gauss normal distribution too.
At the end, Eq. (34) follows immediately from Eq. (29).

$$\mathbf{(((\ 2 * \gamma\ ) * T_{ab}\ )\ /\ (\ (\ c^{4}\ ) * (\ (\ R_{ab}\ )\ -\ (\ (\ R * g_{ab}\ )\ /\ 2\ )\ ))\ )\ =\ (\ 1\ /\ (\ 4 * \pi\ )\ )} \tag{34}$$

Q. e. d.

The "constant" $(\ 1\ /\ (\ 4 * \pi\ )\ )$ is very important and used everywhere in physics. This "constant" is determined by the basic relation between energy, time and space.

3.5. Euler's identity and Archimedes' constant π

The mathematical constant ***e***, one of the most important numbers in mathematics, is known to be the base of the natural logarithm. The numerical value of *e* truncated to 20 decimal places, occasionally called **Euler's number** in honour of the Swiss mathematician Leonhard Euler (April 15, 1707 – September 18, 1783), can be calculated as

$$e \approx \lim_{n \to +\infty} (\ 1\ + (1/n)\ )^{n} \approx 2.71828\ 18284\ 59045\ 23536.$$

The formula of **Euler's identity** is known to be defined as

$$-1 + 1 = 0, \text{ or}$$

$$\mathbf{\cos \pi + \sin \pi = 0, \text{ or}}$$

$$\mathbf{e^{(i * \pi)} + 1 = 0.}$$

where

e denote Euler's number, the base of the natural logarithm,

i denote the imaginary unit, one of the two complex numbers whose square is negative one,

π denote Archimedes' constant, the ratio of the circumference of a circle to its diameter.

Recall, **cos π = -1** and **sin π = +1**. Some people named **Euler's identity** as one of the greatest equation ever (Crease 2004). Thus, there must be a relation between **Euler's number e** and **Archimedes' constant** π and at the end between Einstein's field equation too.

Theorem 5. Euler's identity and Einstein's field equation.

Let

R_{ab} denote the Ricci tensor,

R denote the Ricci scalar,

g_{ab} denote the metric tensor,

T_{ab} denote the stress-energy tensor,

t denote the (space) time,

h denote Planck's constant, h ≈ **(6.626 0693 (11)) * 10^{-34} [J * s].**

e denote the mathematical constant e, also known as **Euler's constant.** The numerical value of π truncated to 20 decimal places is known to be:

e ≈ 2.71828 18284 59045 23536**,**

i denote the imaginary unit, one of the two complex numbers whose square is negative one,

Anti e denote the otherness of the mathematical constant e, denoted as **Anti Euler's constant.** Let the numerical value of Anti e truncated to 20 decimal places is known to be:
Anti e = (π - e) ≈ 0.423310825130748**,**

π denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be:

π ≈ **3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510.**

π is known to be $\pi \leq (\text{Anti}\, \gamma * (c^2 / 4)) * ((R_{ab})^2 / (T_{ab})*(R * g_{ab}))$,

c denote the speed of all electromagnetic radiation in a vacuum, the speed of light, where

***c* = 299 792 458 [m / s].**

γ denote Newton's gravitational 'constant', where

$\gamma \approx (6.6742 \pm 0.0010) * 10^{-11} [m^3 / (s^2 * kg)]$.

μ_0 denote the permeability constant, the magnetic constant, the permeability of free space or of vacuum,

ε_0 denote the permittivity of vacuum, the electric constant.

Recall, $(\mu_0 * \varepsilon_0 * (c^2)) = 1$.

Einstein's field equation describes how a field or energy (or matter) and time changes space and vice versa. Einstein's basic field equation (EFE) is usually written in the form

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) + ((R * g_{ab}) / 2)) = (R_{ab}).$$

Then

$$e^{(i * ((\text{Anti } \gamma) * (c * c / 4)) * ((R_{ab})^2 / ((T_{ab}) * (R * g_{ab}))))} + (\mu_0 * \varepsilon_0 * c^2) = 0.$$

Proof.

$$e^{(i * \pi)} + 1 = 0. \quad (35)$$

According to Eq. (9) $\pi \leq (\text{Anti } \gamma * (c^2 / 4)) * ((R_{ab})^2 / (T_{ab}) * (R * g_{ab}))$.

Thus we obtain

$$e^{(i * ((\text{Anti } \gamma) * (c * c / 4)) * ((R_{ab})^2 / ((T_{ab}) * (R * g_{ab}))))} + 1 = 0. \quad (36)$$

Recall, $(\mu_0 * \varepsilon_0 * (c^2)) = 1$.

$$e^{(i * ((\text{Anti } \gamma) * (c * c / 4)) * ((R_{ab})^2 / ((T_{ab}) * (R * g_{ab}))))} + (\mu_0 * \varepsilon_0 * c^2) = 0. \quad (37)$$

Q. e. d.

The relationship between **Euler**'s identity and **Einstein**'s field equation has consequences. Let us assume, that George **Boole** is right, let it be true that "the respective interpretations of the symbols 0 and 1 in the system of Logic are Nothing and Universe" (Boole 1854, p. 49). In this case, 0, the nothing, "the 'black hole' of mathematics" (Barukčić 2006a, p. 56) is full of something according to Euler's identity, it is not only the empty negative, 0 has properties. The nothing according to Boole that 0 is, is a nothing that has within itself a reference to the other of itself, to something. It appears to me that out of such a nothing something can develop. Only, how can something develop out of nothing. It is true +1 = +1. There seems to be a perfect state of symmetry before us although the one is on the left side of a equation and the other on the right side of the same equation. Can such a state of symmetry be violated (cp violation)? Equally it is true -1 + 1 = 0 but the negative 1 is not dominant over the positive 1 and vice versa. Under which conditions can the state of symmetry be violated. Is it possible that the positive 1 is dominant over the negative 1 and what are the consequences? Can Heisenberg help?

Let

σ(Δx) denote the standard deviation of the uncertainty of the position measurements,

σ(Δp) denote the standard deviation of the uncertainty of the momentum measurements,

h denote Planck's constant, h ≈ **(6.626 0693 (11)) * 10^{-34} [J * s],**

π denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be about

π ≈ 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510,

then

$$\sigma(\Delta x) * \sigma(\Delta p) \geq \left(\frac{h}{4 * \pi}\right). \tag{38}$$

In so far, Heisenberg's uncertainty principle is known to be something like σ(Δx)*σ(Δp) ≥ (h/(4*π)). The immediate consequence of Heisenberg's uncertainty principle is that **σ(Δx)*σ(Δp) - (h/(4*π)) ≥ 0**. The inequallity (a ≥ b) means that **either** (a = b) **or** (a > b) but not both at the same time, in the same respect. According to Heisenberg's uncertainty principle, both ((a = b) **and** (a > b)) are equally possible, allowed and true, but not in the same respect. Thus, if Heisenberg's uncertainty inequality is mathematically correct then Heisenberg's uncertainty principle is valid in both worlds, in a world being **equal to** zero and in a world being **greater then zero**. In so far, according to Heisenberg's uncertainty principle it is either (σ(Δx)*σ(Δp) - (h/(4*π)) = 0) or (σ(Δx)*σ(Δp) - (h/(4*π)) > 0). On the other hand, Heisenberg's uncertainty principle allows a world where

((σ(Δx)*σ(Δp) - (h/(4*π)) = 0) ∩ (σ(Δx)*σ(Δp) - (h/(4*π)) > 0))

and is equally valid in both words. Only a world where (σ(Δx)*σ(Δp) - (h/(4*π)) = 0) is quite different from a world where (σ(Δx)*σ(Δp) - (h/(4*π)) > 0). Thus, Heisenberg's uncertainty relation must be valid before the "Big bang" too. Heisenberg's uncertainty principle enables equally both worlds and is full of contradictions.

Theorem 6. The world before the "Big bang" is not without laws.

Let

X denote something existing independently of human mind and consciousness that can take only the values either 0 or 1,

Anti X denote the opposite, the otherness of something existing independently of human mind and consciousness that can take only the values either 0 or 1,
X + (Anti X) = 1,
X ∩ (Anti X) = 0 (according to the law of contradiction (Barukčić 2006d, p. 8)),

σ(Δx) denote the standard deviation of the uncertainty of the position measurements,

σ(Δp) denote the standard deviation of the uncertainty of the momentum measurements,

h denote Planck's constant, h ≈ **(6.626 0693 (11)) * 10^{-34} [J * s],**

π denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be about

π ≈ 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510,

then

$$\left(X \cap \left(\text{Anti } X \right) \right) \geq \left(\frac{h}{4 * \pi} \right).$$

Proof.

$$\sigma(\Delta \ x) * \sigma(\Delta p) \geq \left(\frac{h}{4 * \pi} \right) \tag{39}$$

Let us assume a world without position, without movement, without space, "a world without changes" in our sense, a world where **σ(Δx)*σ(Δp) = 0**. Thus, we obtain Eq. (40).

$$0 \geq \left(\frac{h}{4 * \pi} \right) \tag{40}$$

According to the law of contradiction, it is true that $X \cap (\text{Anti } X) = 0$ (Barukčić 2006d, p. 8). We obtain Eq. (41).

$$\left(X \cap \left(\text{Anti } X \right) \right) \geq \left(\frac{h}{4 * \pi} \right) \tag{41}$$

Q. e. d.

If Eq. (40) is correct, then h or π or both cannot be constant, they must have the ability of being changed or to change or both. In so far, Heisenberg's uncertainty principle has a reference within itself to **a world equal to 0** and equally to **a world greater then 0**, Heisenberg's uncertainty principle has thus within itself a reference to local hidden and local non-hidden variables, it is a world where A and its own otherness, the Anti X, exist equally. In last consequence, in general, Heisenberg's uncertainty principle is thus the point in nature where the influence of 0, the state of symmetry comes to an end and the infinity of development has to begin, where the positive defeats the negative. In so far, the condition for the "Big Bang" must be found in Heisenberg's uncertainty principle too.

3.6. Euler's identity and the (everyday) "Big Bang"

Let us put some "light" on a world without momentum, without position, without movement, without space, "a world without changes" in our sense, a world where **σ(Δx)*σ(Δp) = 0**. Such a world is full of contradictions but not without laws according classical logic and to Heisenberg's uncertainty principle.

Theorem 7. Euler's identity and Big Bang.

Let

R_{ab} denote the Ricci tensor,

R denote the Ricci scalar,

g_{ab} denote the metric tensor,
T_{ab} denote the stress-energy tensor,

σ(Δx) denote the standard deviation of the uncertainty of the position measurements,
σ(Δp) denote the standard deviation of the uncertainty of the momentum measurements,

t denote the (space) time,
h denote Planck's constant, h ≈ **(6.626 0693 (11)) $* 10^{-34}$ [J * s].**
e denote the mathematical constant e, also known as **Euler's constant.** The numerical value of π truncated to 20 decimal places is known to be:

e ≈ 2.71828 18284 59045 23536**,**

i denote the imaginary unit, one of the two complex numbers whose square is negative one,
Anti e denote the otherness of the mathematical constant e, denoted as **Anti Euler's constant.** Let the numerical value of Anti e truncated to 20 decimal places is known to be:
Anti e = (π - e) ≈ 0.423310825130748**,**
π denote the mathematical constant π, also known as **Archimedes' constant.** The numerical value of π truncated to 50 decimal places is known to be:

π ≈ 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510.

π is known to be $\pi \leq (\text{Anti}\gamma * (c^2/4)) * ((R_{ab})^2 / (T_{ab}) * (R * g_{ab}))$,
c denote the speed of all electromagnetic radiation in a vacuum, the speed of light, where

***c* = 299 792 458 [m / s].**

γ denote Newton's gravitational 'constant', where

$\gamma \approx (6.6742 \pm 0.0010) * 10^{-11} [m^3 / (s^2 * kg)]$.

μ_0 denote the permeability constant, the magnetic constant, the permeability of free space or of vacuum,
ε_0 denote the permittivity of vacuum, the electric constant.

Recall, $(\mu_0 * \varepsilon_0 * (c^2)) = 1$.

Einstein's field equation describes how a field or energy (or matter) and time changes space and vice versa. Einstein's basic field equation (EFE) is usually written in the form

$$(((4 * 2 * \pi * \gamma) * T_{ab}) / (c^4)) + ((R * g_{ab}) / 2)) = (R_{ab}).$$

Let

$$e^{(i * ((\text{Anti}\gamma) * (c*c/4)) * ((R_{ab})^2 / ((T_{ab}) * (R * g_{ab}))))} + (\mu_0 * \varepsilon_0 * c^2) = 0.$$

The condition for the "Big bang" can be obtained as

$$e^{(i * ((\text{Anti}\gamma) * (c*c/4)) * ((R_{ab})^2 / ((T_{ab}) * (R * g_{ab}))))} + (\mu_0 * \varepsilon_0 * c^2) \geq \left(\frac{h}{4 * \pi}\right).$$

Proof.

$$\sigma(\Delta x) * \sigma(\Delta p) \geq \left(\frac{h}{4 * \pi}\right) \tag{42}$$

$$\sigma(\Delta x) * \sigma(\Delta p) - \left(\frac{h}{4 * \pi}\right) \geq 0. \tag{43}$$

Let us imagine or assume a world, where σ(Δx)*σ(Δp) = 0. In other words let us set **σ(Δx)*σ(Δp) = 0.** We obtain Eq. (44).

$$0 - \left(\frac{h}{4 * \pi}\right) \geq 0. \tag{44}$$

It is σ(Δx)*σ(Δp) = 0. In other words, it is equaly true that **σ(Δx)*σ(Δp) = 0 = -1 + 1 = e $^{(i * \pi)}$ + 1 .** We obtain Eq. (45).

$$\left(e^{(i*(\pi))} + 1\right) - \left(\frac{h}{4 * \pi}\right) \geq 0. \tag{45}$$

We obtain Eq. (46) according to Eq. (37) and Eq. (45)

$$e^{(i*((\text{Anti } \gamma)*(c*c/4))*((R_{ab})^2 / ((T_{ab})*(R*g_{ab}))))} + (\mu_0 * \varepsilon_0 * c^2) - \left(\frac{h}{4 * \pi}\right) \geq 0. \tag{46}$$

According to Euler's identity, Einstein's field equation, Heisenberg's uncertainty principle and the General contradiction law, we obtain the condition of the "Big Bang" as

$$e^{(i*((\text{Anti } \gamma)*(c*c/4))*((R_{ab})^2 / ((T_{ab})*(R*g_{ab}))))} + (\mu_0 * \varepsilon_0 * c^2) \geq \left(\frac{h}{4 * \pi}\right). \tag{47}$$

Q. e. d.

If Eq. (47) is the formula on which our world is grounded, if Eq. (47) is the condition for the begin of our world, it must be equally the condition for further development of the same and thus present everywhere and every day around us. In so far, if Eq. (47) is correct it must hold true that without Euler's identity, no "Big bang". In this case, people named **Euler's identity** rightly too as one of the greatest equation ever (Crease 2004). What does ***i*** denotes in this context, the imaginary, the absolute? Is something imaginary necessary for the creation, the begin and the further development of our world?

4. Discussion

This publication has proofed that Archimedes' constant π is not a constant, a "dead thing", π changes all the time has to do with the begin of our world too. This "constant" is dependent on energy, time and space and is determined by its own counterpart Anti π. The relationship between Archimedes' constant π and Anti π is based on the general contradiction law. According to the unified field equation and based on the general contradiction law, we were able to derive the relationship between π and Anti π as

$$\pi * (\text{Anti}\ \pi) \leq (c^2) / 4.$$

On the other hand, Euler's number e and Archimedes' constant π are interrelated. The relation between e and Anti e determined by π and can be expressed as

$$e * (\text{Anti}\ e) \leq (\pi^2) / 4.$$

It is claimed that **Euler's identity** is one of the greatest equation ever. It is possible, that this is reasonable since there is a relationship between **Euler**'s identity, **Einstein**'s field equation and Heisenberg's uncertainty principle. Based on this relationship, a condition for the begin of our world, for the "Big Bang", could be found in Euler's identity as

$$\left(e^{(i * ((\text{Anti}\ \gamma) * (c * c/4)) * ((R_{ab})^2 / ((T_{ab}) * (R * g_{ab}))))} + (\mu_0 * \varepsilon_0 * c^2) \right) \geq \left(\frac{h}{4 * \pi} \right). \tag{48}$$

In last consequence,

the creation of our world out of nothing,

according to Boole and Eq. (48),
could be possible.

ISSN 1863-9542

References

Ahmad, A. (1981). "On the π of Aryabhata I, " *Ganita Bharati* **3** (3-4), 83-85.

Barukčić, Ilija. (2006a). Causality. New Statistical Methods. Second Edition. Books on Demand, Hamburg. pp. 488.

Barukčić, Ilija. (2006b). New Method For Calculating Causal Relationships, Montréal: XXIII International Biometric Conference, July 16 - 21 2006.

Barukčić, Ilija (2006c). "Local hidden variable theorem, " *Causation* **1,** 11-17.

Barukčić, Ilija (2006d). "Bell's Theorem - A fallacy of the excluded middle," *Causation* **2,** 5-26.

Barukčić, Ilija (2006e). "General contradiction law," *Causation* **3,** 5-26.

Barukčić, Ilija (2006f). "Unified field equation," *Causation* **4,** 5-19.

Barukčić, Ilija (2006g). "Anti γ - Negation of Newton's constant γ," *Causation* **5,** 5-13.

Beckmann, Petr. (1971). A History of π. The Golem Press, Boulder, Colorado.

Boole, George. (1854). An Investigation Of The Laws Of Thought, On Which Are Founded The Mathematical Theories Of Logic And Probabilities. Reprint 1951. Oxford, Basil Blackwell.

Crease, Robert P. (2004). "The greatest equations ever," Department of Philosophy, State University of New York at Stony Brook. http://physicsweb.org/articles/world/17/10/2.

Einstein, Albert. (1905). "Zur Elektrodynamik bewegter Körper," Annalen der Physik Bd. XVII, p. 891-921.

Einstein, Albert. (1916). "Die Grundlage der allgemeinen Relativitätstheorie," *Annalen der Physik*, Vierte Folge, Vol. 49, **7**, 769 - 822.

Einstein, Albert. (1908). "Über das Relativitätspnnzip und die aus demselben gezogenen Folgerungen," *Jahrbuch der Radioaktivität und Elektronik* **4**, 411-462.

Einstein, Albert. (1908). "Berichtigungen zu der Arbeit: Über das Relativitätspnnzip und die aus demselben gezogenen Folgerungen," *Jahrbuch der Radioaktivität und Elektronik* **5**, 98-99.

Hegel, G. W. H. *Hegel's science of logic*, Edited by H. D. Lewis, Translated by A. V. Miller (New York: Humanity Books, 1998), pp. 844.

Heisenberg, W. (1927). "Über den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik," *Zeitschrift für Physik* **43**, 172-198.

Thompson, M. E. (2006). "Reviews. Causality. New Statistical Methods. I. Barukčić," Editor Dr. A. M. Herzberg, International Statistical Institute. *Short Book Reviews*, Volume 26, No. 1, p. 6.

Acknowledgement

I wish to thank Albert Einstein for the basic field equation.

Published: January 08 th, 2007