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THE POSSIBILITY OF THE IMPOSSIBLE IN SUPERMATHEMATICS

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ABSTRACT

The paper presents some impossibilities in the old (ordinary) mathematics, now called centric mathematics (CM), which become possible in the new ex-centric mathematics (EM). The unification (reunion) of the two mathematics (CM and EM) constitutes what has been called SuperMathematics (SM), in which CM has only one member, while EM has an infinity of members for each entity. This gives the possibility of describing an elliptical function such as Neville Theta C with ex-centric circular SM functions. There is also the curiosity (sister to the impossible!) for a function to be almost identical to its variable. All this defies the possible, so it can be said like Professor Florentin Smarandache: "Everything is possible, even the impossible." In SuperMathematics!

1. INTRODUCTION

Florentin Smarandache is a Romanian-American mathematician and computer scientist by profession. Between 1982 and 1984 he worked as a mathematics teacher in Morocco. Persecuted for political reasons, he is expelled from education in Romania. He fled the communist country in 1988, arriving in Turkey. After 2 years in a refugee camp, he emigrated to the USA.

He is now professor of mathematics at the University of New Mexico, where he held the position of head of the Department of Science and Mathematics. He is famous in the Theory of Numbers for the notions that bear his name, Smarandache Functions and Sequences.

He links his destiny to a new avant-garde movement, the Paradoxism. He is a supporter of SuperMathematics, a field in which he has made important and numerous contributions.

What he says about himself:

“Those who build and those who marry are never safe, says a Swedish proverb. So creation, which is a construction, involves a risk, attracting friends but also enemies, and leaving a third category of people indifferent (as in neutrosophic logic).

In the second half of my life my literary output dwindled, and I was absorbed in (and sponsored for) applied scientific creation (mathematics used in engineering, robotics, medicine, aeronautics, or sporadic attempts in theoretical physics). Apart from self-translations (which are difficult to move forward due to lack of time), and productions in the field of 'electronic art' (on the computer), I also wrote many memoirs about the various international scientific conferences at which I am invited to present papers, research or seminars.

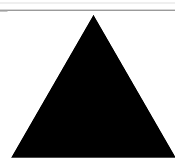
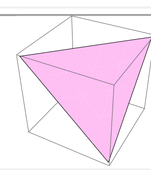
Memoirs which, in fact, are reportages - historical, geographical, philosophical, anthropological, religious, artistic, etc. documentaries from various museums, art galleries, monuments and cultural places that I visited - combined with the exposition of scientific ideas and theories. New literary writings collected in volumes were occasional, consisting in interviews ("a prudent question is half the wisdom," said F. Bacon), short essays and tributes, translations, or poetry on a specific theme requested by publishers."

Romania should be proud of such people!

He also introduced the phrase: "Everything is possible. Even the impossible!".

2. ABOUT THE POSSIBLE IMPOSSIBLE IN MATHEMATICS. IN EXCENTRIC MATHEMATICS!

In mathematics - in the centric one - the equations of the line, the circle, the ellipse, the parabola, the hyperbola, etc., are known, but the equations of the triangle, the square, the pentagon, and other perfectly flat or rounded polygonal figures are unknown, as are those of the pyramid, the perfect cube, the conopyramide, and other objects bordered by flat surfaces, and so on. As a result, drawing these objects with the equations of centric mathematics (CM) becomes impossible! And yet, they can be represented in mathematics, as shown in *Figure 1* below.

Graphics[Polygon[{{1,0}, {0, Sqrt[3]}, {−1,0}}]]	Graphics3D[Polygon[{{1,0,0}, {1,1,1}, {0,0,1}}]]
	
Row[Table[Graphics[{EdgeForm[Bla LightRed, ngon[n, 1]}, ImageSize → 70], {n, 3,14}]]	Row[Reap[Table[Table[If[CoprimeQ[Sow[Graphics[{EdgeForm[Black], Lig ngon[p, q]}, ImageSize → 70]]], {q, 2, p/2}], {p, 5,12}]][[2,1]]

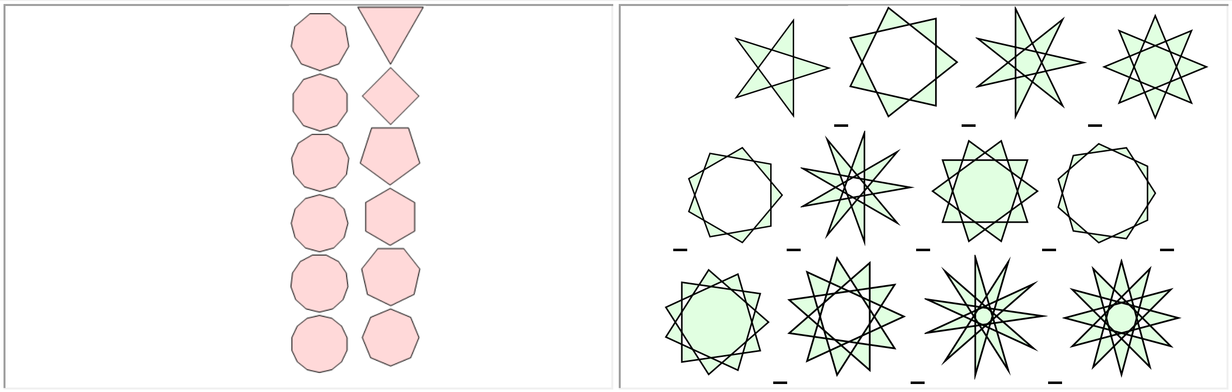
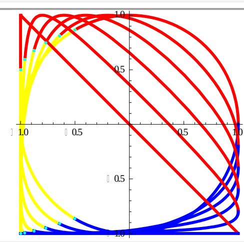
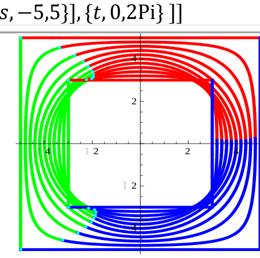
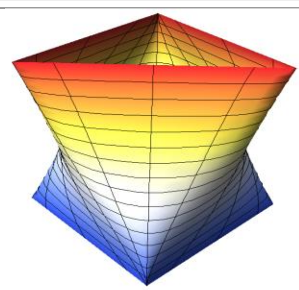
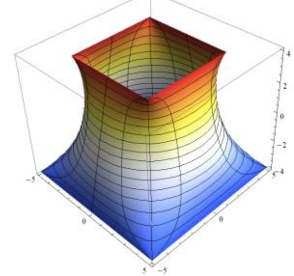
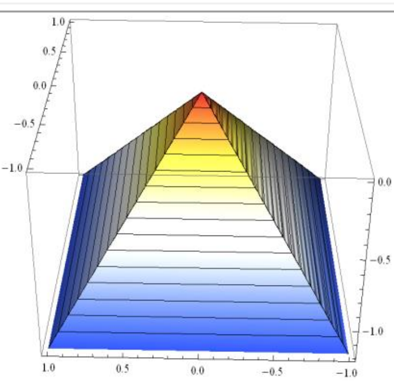
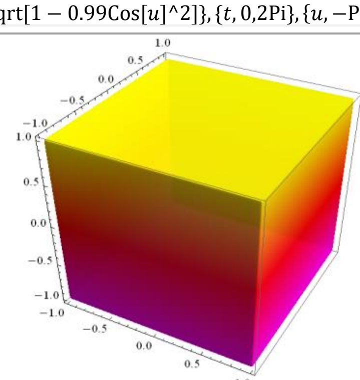


Figure 1: ***2D and 3D polygonal figures*** ▲▶

True, only those that appear in the header of the graphics hide elaborate drawing programs through segments of lines. The computer programmer-mathematician knows how and why!

A new mathematics had to appear 50 years ago, called ***ex-centric mathematics*** (**EM**), a name that comes from the displacement of the pole **P(0,0)** from the origin **O(0,0)** - where it was erroneously placed by the great **Euler**, thus impoverishing 300 years the old, ordinary mathematics, which we now call ***centric mathematics*** (**CM**) - at any other point in the plane of the unit circle CU(O,1), and called, therefore, the ***ex-center S(s, ε)***. The polar coordinates of this ex-center are the new variables and parameters introduced in mathematics under the name of ***ex-centric***: the real linear ex-centricity **e**, or the numerical ex-centricity **s**, and the angular ex-centricity **ε**.

The carping critics might object that ex-centricity was long ago introduced into centric mathematics by **Apollonius of Perga**, who turned the circle into an ellipse, a hyperbola, or a parabola. True. But this ex-centricity, exclusively linear, was realized as a displacement of a section plane of a straight circular cone, which is a completely different ex-centricity. But even so, it was a first step in the multiplication and continuous metamorphosis of the circle into conics, and it is a pity that no one noticed the essential: multiplication from a circle to an infinity of curves in each type of conics, which brilliantly does ex-centric mathematics for <u>all</u> known <u>entities</u> in **CM** and for many new entities appeared with this occasion in **EM**.

ParametricPlot[Evaluate[Table[{Cos[t + ArcSin[0.2sSin[t]]], Sin[t − ArcSin[0.2sCos[t]]]}, {s, 0,5}], {t, 0,2Pi}]]	ParametricPlot[Evaluate[Table[{(4 − 0.2s) Cos[t]/Sqrt[1 − (0.2sSin[t])^2], (4 − 0.2s) Sin[t]/Sqrt[1 − (0.2sCos[t])^2]}, {s, −5,5}], {t, 0,2Pi}]]
	
	
ParametricPlot3D[{{u ∗ Cos[t]/Sqrt[1 − (Sin[t])^2] , u ∗ Sin[t]/Sqrt[1 − (Cos[t])^2] , 1.2u}}, {u, −1,0}, {t, 0,2.1Pi}	ParametricPlot3D[{Cos[t] Cos[u]/(Sqrt[1 − 0.99Sin[t]^2] Sqrt[1 − 0.99Sin[u]^2]), Sin[t] Cos[u]/(Sqrt[1 − 0.99Cos[t]^2]Sqrt[1 − 0.99Sin[u]^2]), Sin[u]/Sqrt[1 − 0.99Cos[u]^2]}, {t, 0,2Pi}, {u, −Pi/2 , Pi/2}]]
	

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ParametricPlot3D[{{0.8Cos[t] Cos[u]/(Sqrt[1 − 0.9Sin[t]²]Sqrt[1 − 0.9Sin[u]²]) , 0.8Sin[t] Cos[u]/(Sqrt[1 − 0.9Cos[t]^2]Sqrt[1 − 0.9Sin[u]^2]) , 1.4 Sin[u]/Sqrt[1 − 0.9Cos[u]^2] + 4}, {0.99u Cos[t]/Sqrt[1 − (0.995Sin[t])²] , 0.99u Sin[t]/Sqrt[1 − (0.99Cos[t])²] , 2u}}, {t, 0,2Pi}, {u, 0, Pi} ]]
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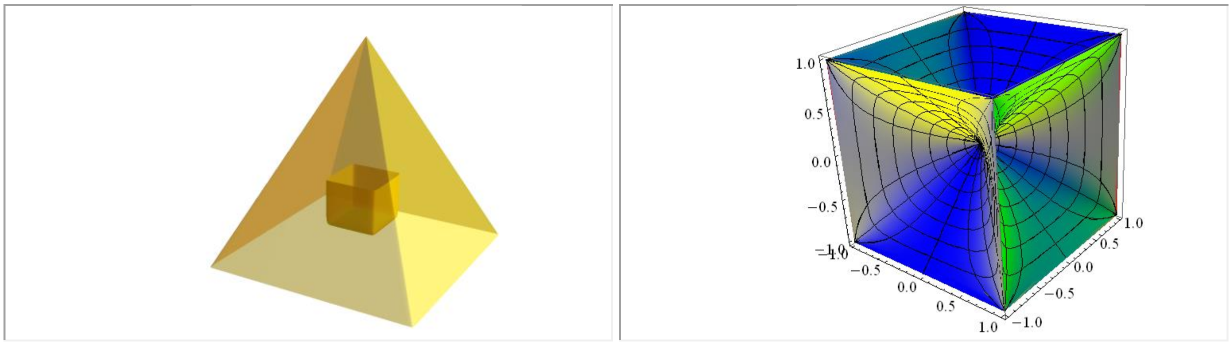


Figure 2: ***The continuous transformation of the circle into a triangle and a square ▲ top and a pyramid and a cube ▼ bottom. Romanian cube, the lightest cube in the world V = 0 ▼▶***

As a result, in the new ex-centric mathematics (**EM**), the circle can be continuously transformed into any polygon (triangle, square, etc.), the sphere can be continuously transformed into a perfect cube, prism, pyramid, etc., as proved in *Figure 2* above. The new **EM** objects are called ***lobes*** in **2D**$^+$ and ***loboids*** in **3D**$^+$. The plus ($^+$) sign indicates the presence of the linear ex-centricities in **2D** or **3D** CM spaces, and in the case of both ex-centricities: **2D**$^{++}$ and **3D**$^{++}$.

In conclusion, what is ***impossible*** in **CM**, in **EM** - and therefore in **SuperMathematics** (**SM**), which is their reunion (SM=CM∪**EM**) –, ***it becomes possible***!

The great mathematician Florentin Smarandache perceived it, because he has in-depth knowledge of **SM**, a field in which he has made many notable contributions.

3. NEVILLE THETA C

This section will compare the **FSM**-**EC** $cex_1\theta$ and the special Neville Theta C function.

Neville Theta C functions are **Jacobi** theta functions $\vartheta_1(z,q)$, $\vartheta_2(z,q)v$, $\vartheta_3(z,q)$, $\vartheta_4(z,q)$ in Neville notation.

$$(1)\quad \begin{cases} \vartheta s(u,k) = (2K/\pi)\,\vartheta_1(z,q)\,/\,\vartheta'_1(0,q) \\ \vartheta c(u,k) = \vartheta_2(z,q)\,/\,\vartheta_2(0,q) \\ \vartheta d(u,k) = \vartheta_3(z,q)\,/\,\vartheta_3(0,q) \\ \vartheta n(u,k) = \vartheta_4(z,q)\,/\,\vartheta_4(0,q) \end{cases}$$

where $z = \pi u\,/2K$,

K being the complete elliptic integral of the first case **K(k)** and the mode k.

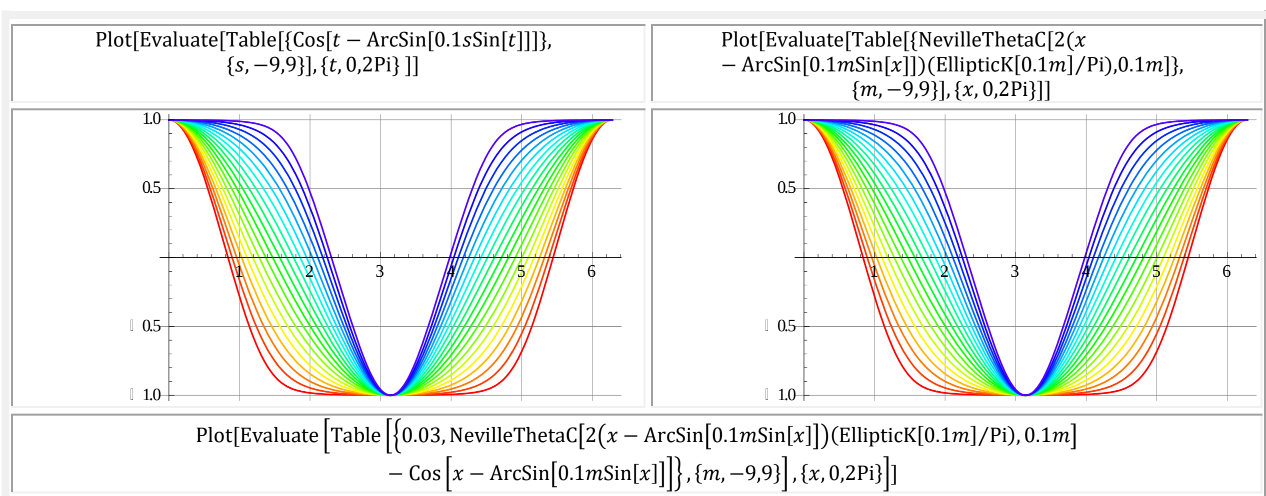
Neville Theta C function can be expressed by the series:

$$\text{Series[NevilleThetaC}[z,0],\{z,0,12\}] =$$
$$= 1 - \frac{z^2}{2} + \frac{z^4}{24} - \frac{z^6}{720} + \frac{z^8}{40320} - \frac{z^{10}}{3628800} + \frac{z^{12}}{479001600} + O[z]^{13}$$

and it is a periodical function of 4**K(k).**

Figure 3 shows, for comparison, the two functions: on the left ◀▲ the **ex-centric circular supermathematic function** (**FSM—EC**) **cexθ** and on the right ▶▲ the **Neville Theta C** function.

In the following row their differences are shown, which indicate a very good approximation, except for a single value that reaches the difference of 0.03. In *Figure 3*, the **Neville theta C** function of period 4K(k) was brought to the period of **2π** by multiplication by **2π / K (k)**.



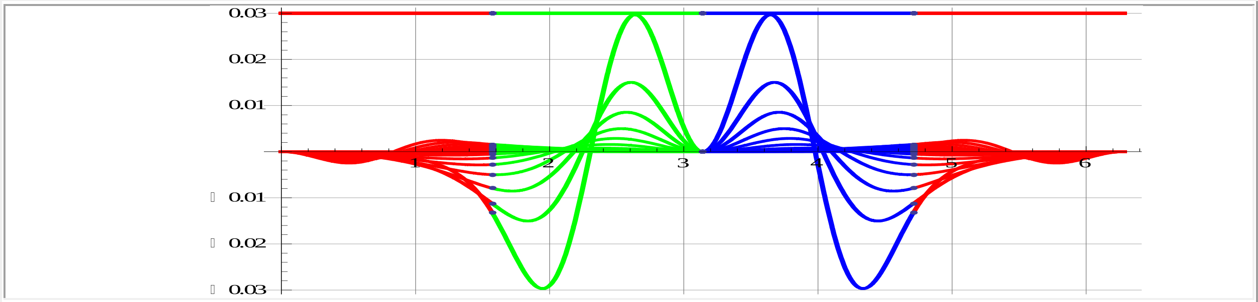


Figure 3: ***Comparison between* FSM—EC cexθ *and the elliptical function Neville Theta C***

4. THE ALMOST POSSIBLE IMPOSSIBLE

To remain in the realm of the impossible, we present in *Figure 4* a function which we have called an ex-centric amplitude of ex-centricity ***β(θ)*** or peripheral ex-centric amplitude ***aep β(θ)*** of the equation:

(2) $\boldsymbol{aep\ \beta(\theta)} = \frac{0.1s\mathrm{Cos}[t]}{\sqrt{1-0.01s^2\mathrm{Sin}[t]^2}}$

and the sinus function of the aforementioned function, called the peripheral ex-centric sinus ***sin[aepβ(θ)]***:

(3) $\boldsymbol{sep\ \beta(\theta) \equiv sin[aep\beta(\theta)] = sin}[\frac{0.1s\mathrm{Cos}[t]}{\sqrt{1-0.01s^2\mathrm{Sin}[t]^2}}]\}$.

What is the impossible here?

In the fact shown on the left ◄ of the *Figure 4* that function (2) is almost identical with function (3), that is, the function is almost identical to its argument:

(4) $\boldsymbol{aep\beta(\theta) \cong \mathrm{sin}[\mathrm{aep}\beta(\theta)]}$

The author has never encountered such a case in mathematics, in which the variable is almost identical with the function of that variable, which is why he wanted to present and emphasize this fact.

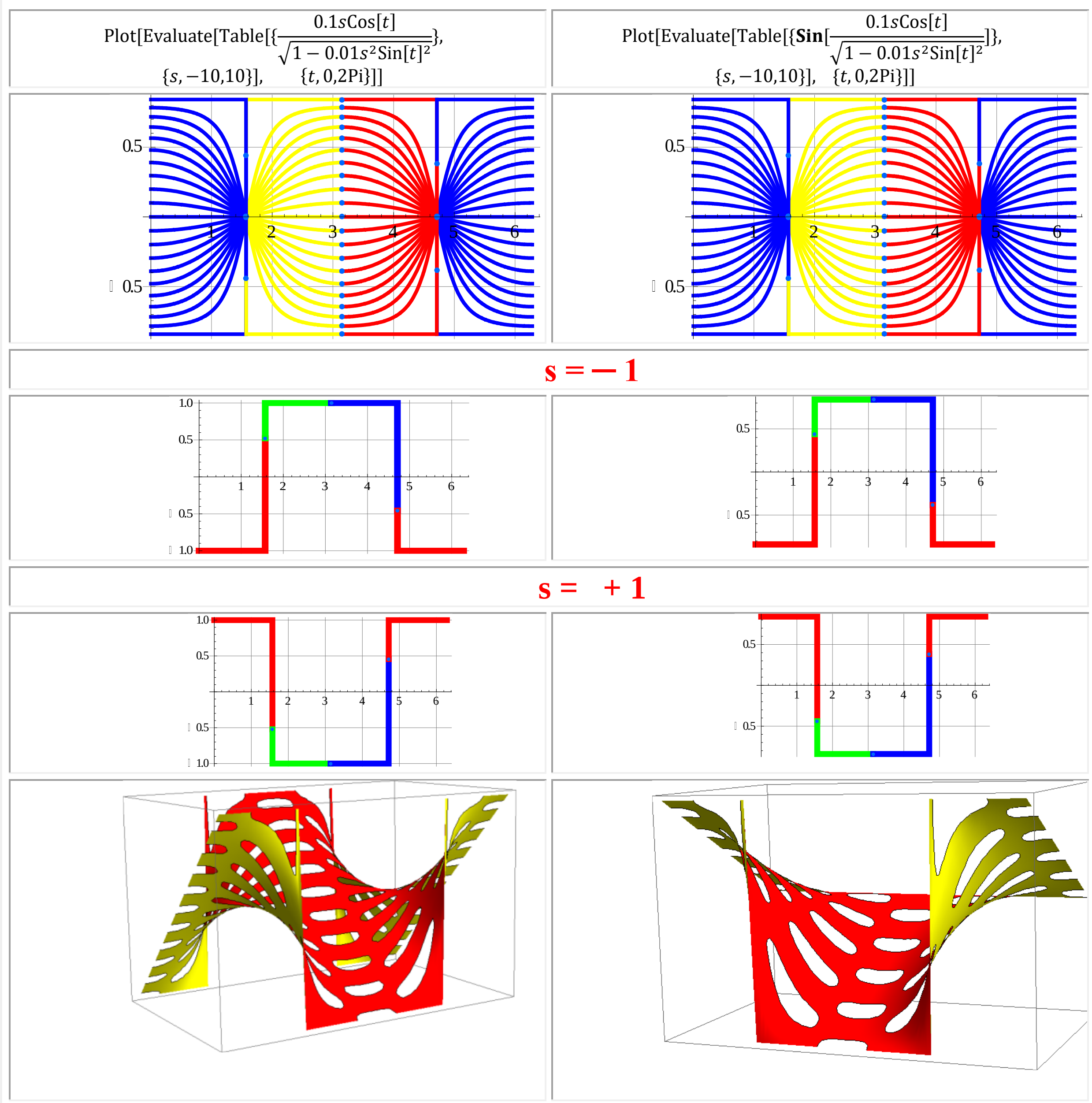


Figure 4: ***The resemblance between a function and its argument***

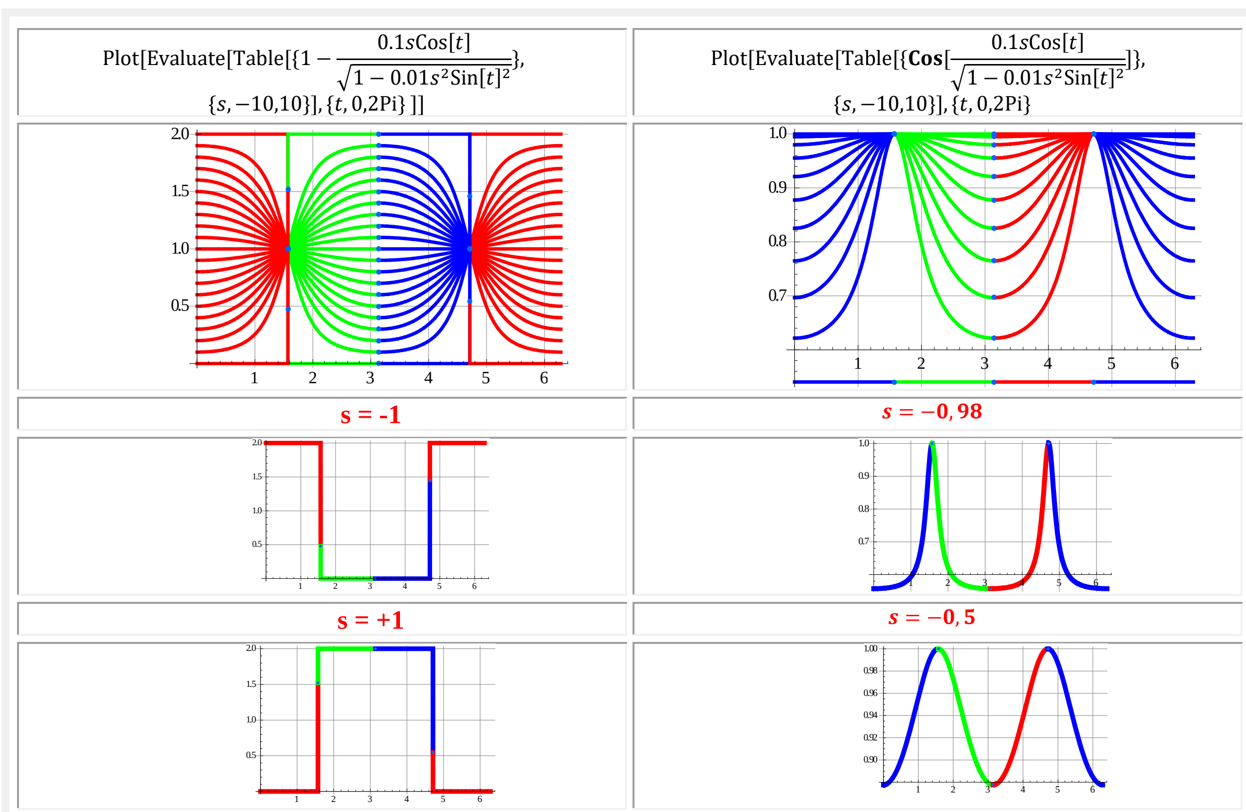
In addition, these two functions are almost identical to a third, which is the ***ex-centric circular supermathematic function*** (**FSM–EC**), ***ex-centrically derived*** from the ex-centric variable θ of changed sign, i.e. **−dexθ−1**, of the equation of definition:

(5) $\quad \mathbf{dex\theta} = 1 - \frac{0.1s\mathrm{Cos}[t]}{\sqrt{1-0.01s^2\mathrm{Sin}[t]^2}}.$

Therefore, we have the equalities:

(6) $\quad \mathbf{sin[aep\beta(\theta)]} \cong \boldsymbol{aep\beta(\theta)} \equiv \mathbf{1 - dex\theta}$

which is a very big surprise for the author.



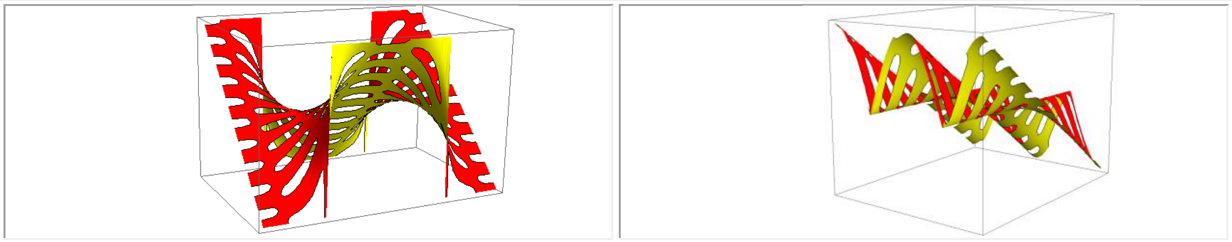


Figure 5 : ***FSM—EC peripheral ex-centric amplitude aepβ(θ), and also peripheral ex-centric sinus sepβ(θ) and peripheral ex-centric cosine cepβ(θ) in 2D⁺ and in 3D⁺***

What happened for the peripheral ex-centric sinus ***sin[aepβ(θ)]*** did not repeate for the peripheral ex-centric cosine ***cos[aepβ(θ)]*** in *Figure 5* ▶.

On the other hand, from the footer of the graphs and from their definition equations, the following equality can be observed:

$$\text{(7)} \quad \mathbf{cos[aep\beta(\theta)]} = \frac{0.1s\cos[t]}{\sqrt{1-0.01s^2\sin[t]^2}} = -\,\mathbf{dex\theta} = -\left[\,1 - \frac{0.1s\cos[t]}{\sqrt{1-0.01s^2\sin[t]^2}}\right].$$

which shows that they are equal functions but of opposite signs (▲▶ / ▼▶).

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[4] Weisstein, Eric W. "Smarandache Paradox." From MathWorld--A Wolfram Web Resource. https://mathworld.wolfram.com/SmarandacheParadox.html. *Smarandache Paradox:* Let <A> be some attribute (e.g., possible, present, perfect, etc.). If all is <A>, then the <non-A> must also be <A>. For example, "All is possible, the impossible too," and "Nothing is perfect, not even the perfect."