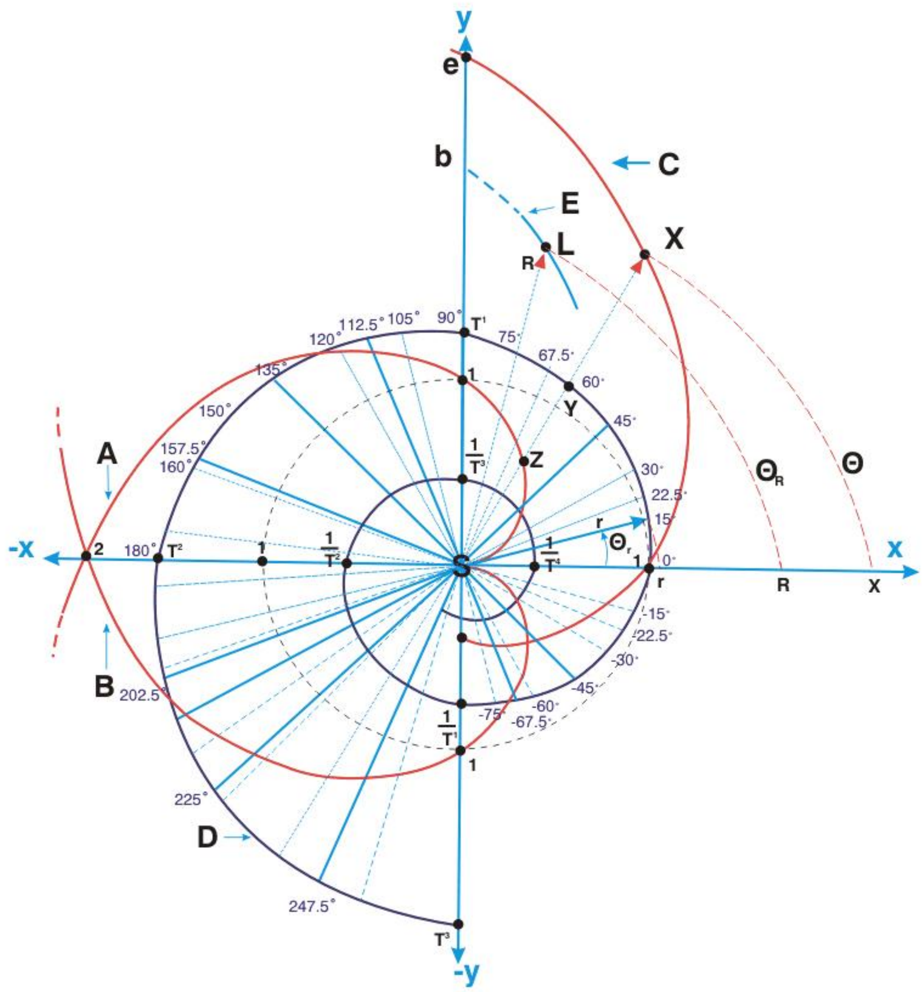
“GOLDEN ROOT SYMMETRIES OF GEOMETRIC FORMS”

By:

Eur Ing Panagiotis Ch. Stefanides BSc(Eng)Lon(Hons) CEng MIET MSc(Eng)Ath MTCG

SYMMETRY FESTIVAL 2006
BUDAPEST HUNGARY



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Front Cover
" SPIRALOGARITHMS" - "ΣΠΕΙΡΑΛΟΓΑΡΙΘΜΟΙ"
Relationships Between Spirals and Logarithms.
A Novel Concept, of "Spiroid " Definition of the Logarithm, relating Spirals to Logarithms,and geometrically related to the the Square Root of the Golden Ratio, via which, the Polyhedra Icosahedral and Dodecahedral, are linked to the Great Pyramid Model, and vice versa.
An Excel design of the "Spiralogarithms", by P.Stefanides, is included [Annex B page 43].

Back Cover
"QUADRATURES"
AutoCad " Ruler and Compass" Method, Interrelating "QUADRATURES" of the Basic Geometric Forms.
A Novel Concept, making use of the "Quadrature Triangle", as it proves to be, according to P. Stefanides's Interpretation of PLATO's Timaeus "MOST BEAUTIFUL TRIANGLE", a similar to the "Kepler's triangle", but not the same, and not as "FAIR" as this.

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To My Wife Mary, and my Daughter Natalia, for their patience and constant support, et Amorem, Qui Mundos Unit.

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Eur Ing Panagiotis Stefanides

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Similarly I thank the Hellenic Mathematical Society for giving me the floor [2-4 Mar. 1989] to present my novel paper "The Most Beautiful Triangle- Plato's Timaeus" at the conference " History and Philosophy of Classical Greek Mathematics"[Professor Vassilis Karasmanis] and also the Hellenic Physicists' Society,[Mrs D. Lelingou and Professor Stefanos Tsitomeneas] for my presenting the paper " Golden Root Symmetries of Geometric Forms" to their International conference "Science and Art" at Technopolis, Gazi, Athens 16-19 Jan 2008, and also, The Institution of Engineering and Technology [IET Hellas- Professor Apostolos Kokkosis] for my presentation "Symmetries of the Platonic Triangles", at the Technical Chamber of Greece, Athens, 30th Oct. 2008.

My special thanks go Dr Stamatios Tzitzis [Directeur de Reserch au CNRS] for directing me to Plato's Timaeus Research, to Dr Argyrios Spyridonos, for his Special suggestions and for our lengthy, over the years, discussions together with Dr Manolis Mavrogiannakis, and also, to Dr Giannis Kandylas, DIng Georgios Mamais and Eng. Kyriakos Michos, for their suggestions and formation of my presentation paper to the Symmetry Festival 2006 , and for similar contributions and assistance DIng Phoebus Symeonides, and the late DIng Dimitris Betsios. And all those attented my presentation in Greece and in Budapest in which the Matouleas family were present.

I thank Dr Shirley B. Gray, California State University, Los Angeles, for projecting my work and similarly Professor Paulo Ferreira da Cunha,University of Porto.

I must mention , thanking, my Professor of Lyceum of Plato, of Classical Greek and Latin, late, Leonids Betsios, who kindly reviewed and proof-checked my earlier original work papers on the same matter.

Finally, I am thankful to my, late, father, Capt. Christos P. Stefanides, who, in the very past, during voyages, introduced me to the concepts of Celestial Navigation, with the involved Mathematics and principles of Spherical Geometry, and also to the idea and involvements of Solar Tracking.
The above gave me additional inspirations, and together with my engineering studies motivated me to embark on this research work at night, burning the midnight oil ,
" *Nauta Solus, In Nocte* **".**

Panagiotis Ch. Stefanides

FOREWORD

The publication of this book, under the title "GOLDEN ROOT SYMMETRIES OF GEOMETRIC FORMS", presented to the International conference "SYMMETRY FESTIVAL 2006" in Budapest Hungary, mainly, has intention to present a novel theory-exposed also to two National Conferences in Greece- to the Scientific Community and to the wider public with interests in particular knowledge.
This theory proposes a new Theorisis and Thesis of PLATO'S TIMAEUS "MOST BEAUTIFUL TRIANGLE."

The proposed geometric form of this triangle is based on a mathematical model, which has been analyzed, in connection with the relevant PLATONIC topics of TIMAEUS. The phrase "ΤΡΙΠΛΗΝ ΚΑΤΑ ΔΥΝΑΜΙΝ" is being taken as "THIRD POWER" and not "THREE TIMES THE SQUARE" as is the current practice of its interpretation in the topic 54 of TIMAEUS.

LIDDEL & SCOTT dictionary states: "math…, power, κατά μεταφοράν η εν γεωμετρίας λέγεται δ., …usu (usually) second power, square, κατά δύναμιν in square, PI.T: 54b, …square root of a number which is not a perfect square, surd, opp. Μήκος, PI. Tht. 147d.

In THEAITETUS, 147d, PLATO speaks in general about "POWERS" (περί δυνάμεων τι ημίν Θεόδωρος όδε έγραφε…").
That's what Theodorus told us about "powers":
"The lines which form an equilateral and plane number we called them length, those the scalene one we called them powers because they are not symmetric, as to the length, with those lines, but only with the areas they form. We did the same with the solids."

Here, it is concluded that Plato by the phrase "…we did the same with the solids" (και περί τα στερεά άλλο τοιούτον"), correlates solids (their volumes) with "POWERS" ("ΔΥΝΑΜΕΙΣ") as well (περί δυνάμεων …όδε έγραφε).

In PLATO'S POLITEIA, topic 528B (Book Z), and Plato states: "After the plane form, I said, we got the solid which is in circular motion, before examining the solid itself. The just thing is after examining the two dimensional to examine those having three dimensions. I think, this exists, in the Cubes and the bodies, which have depth. This is true, he said, but Socrates these ones have not yet been invented.

ΕΠΙΓΡΑΜΜΑ - EPIGRAMME

ΤΟΙΝ ΔΗ ΔΥΟΙΝ ΤΡΙΓΩΝΟΙΝ ΤΟ ΜΕΝ ΙΣΟΣΚΕΛΕΣ ΜΙΑΝ ΕΙΛΗΧΕ ΦΥΣΙΝ, ΤΟ ΔΕ ΠΡΟΜΗΚΕΣ ΑΠΕΡΑΝΤΟΥΣ· ΠΡΟΑΙΡΕΤΕΟΝ ΟΥΝ ΑΥ ΤΩΝ ΑΠΕΙΡΩΝ ΤΟ ΚΑΛΛΙΣΤΟΝ. ΕΙ ΜΕΛΛΟΜΕΝ ΑΡΞΑΣΘΑΙ ΚΑΤΑ ΤΡΟΠΟΝ· ΑΝ ΟΥΝ ΤΙΣ ΕΧΗ ΚΑΛΛΙΟΝ ΕΚΛΕΞΑΜΕΝΟΣ ΕΙΠΕΙΝ ΕΙΣ ΤΗΝ ΤΟΥΤΩΝ ΞΥΣΤΑΣΙΝ, ΕΚΕΙΝΟΣ ΟΥΚ ΕΧΘΡΟΣ ΩΝ ΑΛΛΑ ΦΙΛΟΣ ΚΡΑΤΕΙ· ΤΙΘΕΜΕΘΑ Δ' ΟΥΝ ΤΩΝ ΠΟΛΛΩΝ ΤΡΙΓΩΝΩΝ ΚΑΛΛΙΣΤΟΝ ΕΝ, ΥΠΕΡΒΑΝΤΕΣ ΤΑΛΛΑ, ΕΞ ΟΥ ΤΟ ΙΣΟΠΛΕΥΡΟΝ ΤΡΙΓΩΝΟΝ ΕΚ ΤΡΙΤΟΥ ΣΥΝΕΣΤΗΚΕ. ΔΙΟΤΙ ΔΕ, ΛΟΓΟΣ ΠΛΕΙΩΝ· ΑΛΛΑ ΤΩ ΤΟΥΤΟ ΕΞΕΛΕΓΞΑΝΤΙ ΚΑΙ ΑΝΕΥΡΟΝΤΙ ΜΗ ΟΥΤΩΣ ΕΧΟΝ ΚΕΙΤΑΙ ΦΙΛΙΑ ΤΑ ΑΘΛΑ. ΠΡΟΗΡΗΣΘΩ ΔΗ ΔΥΟ ΤΡΙΓΩΝΑ, ΕΞ ΩΝ ΤΟ ΤΕ ΤΟΥ ΠΥΡΟΣ ΚΑΙ ΤΑ ΤΩΝ ΑΛΛΩΝ ΣΩΜΑΤΑ ΜΕΜΗΧΑΝΗΤΑΙ, ΤΟ ΜΕΝ ΙΣΟΣΚΕΛΕΣ, ΤΟ ΔΕ ΤΡΙΠΛΗΝ ΚΑΤΑ ΔΥΝΑΜΙΝ ΕΧΟΝ ΤΗΣ ΕΛΑΤΤΟΝΟΣ ΤΗΝ ΜΕΙΖΩ ΠΛΕΥΡΑΝ ΑΕΙ.

ΠΛ.-ΤΙΜ. 54. PL.

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Symmetry in art and science education, 1.

GOLDEN SECTION

IN MEMORIAM Y. NE'EMAN: PHYSICAL SYMMETRIES

CHIRALITY AND ASYMMETRY IN MATERIAL SCIENCES

ABSTRACT

Under "GOLDEN ROOT SYMMETRIES OF GEOMETRIC FORMS", my Work and Artwork involving Symmetries of Geometric Forms such as Circles, Squares, Triangles, Areas, Solids, Spirals and Logarithms, having affinity with the GOLDEN ROOT, which unifies them, shall be presented to the "SYMMETRY FESTIVAL" by exposition of POSTERS and TALK, appreciating that "SYMMETRIES EXPRESS UNIVERSAL LAWS".

The theory behind this work is based on my, proposed interpretation of Plato's Timaeus triangles of the structure of matter, "THE MOST BEAUTIFUL" and "THE ISOSCELES" [Pl. Ti 54 B] and also "THE "SOMATOIDES" and "THE STEREOID-MOST BEAUTIFUL BOND" [Pl.Ti.31B, C/32 B] It is additionally based on my special theory, proposed, relating Spirals and Logarithms to various bases.

Of particular interest, to me, is the Form of Nautilus, the kind of which, after measurements of a Shell, found to comply with the logarithm having as base that of the GOLDEN ROOT. By GOLDEN ROOT it is implied the SQUARE ROOT OF THE GOLDEN RATIO.

The Classical Greek word for symmetry, "SYMMETRIA", means "WITH MEASURE", "IN MEASURE WITH," "DUE PROPORTION", "COMMON MEASURE", "HARMONY". The concept of "SYMMETRY" contrasts the conditions prevailed before the World was Created, while all elements [FIRE, AIR, EARTH and WATER] were "WITHOUT PROPORTION" [alogos] and "WITHOUT MEASURE" [ametros], and only "TRACES" of them existed, as all things, naturally exist in God's absence. God, under these conditions, transformed them via "IDEAS" and "NUMBERS", for them to become "MOST BEAUTIFUL" and "BEST" as possible, contrary to their previous state [Pl. Ti .53B].

“GOLDEN ROOT SYMMETRIES OF GEOMETRIC FORMS”

I was born in the city of Aegaleo, Athens, in 1945 and grew up in the port of Piraeus.

My basic, high school education in Greece [Lyceum of Plato], was mainly in Classics including Arts and languages, and my University [London and Athens] studies in Engineering, included a big content of Mathematics.

By my continuous contact, with Engineering and Scientific knowledge, in subjects concerning motion, forces, energy, power etc., I noticed, that, there exist seven (7) basic forms, which appear to derive one from the other and thus related. These forms (relationships) necessary for the creation of a (powerful) work element, from its conceptual idea to materialization are Line, surface, volume per unit time* (mass rate*of unity water density), momentum, force, work (or energy) and power. They are fractions with numerators powers of space (length) and denominators powers of time

L^1 /T^0 , L^2 /T^0 , L^3 /T^1 , L^4 /T^1, L^4 /T^2, L^5 /T^2, L^5 /T^3.

Length (L^1) and surface (L^2) are timeless (T^0 =1), Encephalic Concepts.

I will refer here to contents of various sources which are related to the Greek Culture, Art, and, and Geometry. In Encyclopaedia Britannica (Vol. 10, 1972, page 829, Greek Architecture) it is stated:
“To the Greeks fell the role of inventing the grammar of conventional forms on which all subsequent European Architecture was based. Greek was the patient genius, with which perfected every element, rarely deviating from the forward path to invent new forms or new solutions of old problem. This conservative adherence to older types led to such masterpieces as the Parthenon and Erechtheum.

According to THEOPHANIS MANIAS [3, 4], the Greek Beauty and the Greek Spirit found in many works of Antiquity, were not ruined by time, death of people or peoples', fanatism and mania. Cities and Sacred Temples were founded according to plans and scientific computations. Religion of the Ancients was the Absolute Beauty, and the Greeks believed as God this Absolute Beauty. Aesthetic Beauty, Optical Beauty, in forms and colours, and Acoustic Beauty in music, Ethic Beauty, found in virtue, and Spiritual Beauty in good learning and knowledge Man sensed, and conquered, all kinds of Beauty, through Love, because Love is the Synectic Substance of the Harmonic Universe. The Ancients had studied this subject, with religious piety. They had observed the existence, of another Beauty, in Nature. Beyond this Harmony, which is

Visible, and used, today, by architects, decorators, and generally all those occupied with Aesthetics and Arts, there is another Invisible Geometric Harmony. Circle, Square, Equilateral Triangle, Regular Hexagon, Cube, Pyramids etc., have a Visible Beauty that man senses by his eyes and he finds it in these geometric forms. Symmetries, analogies and other mathematical relationships, were found in the leaves of trees, the petals of flowers, the trunks and branches of plants, the bodies of animals and most important, the human body, which composed an Invisible Harmony, of forms and colours superior than the Visible Harmony. This Invisible Harmony, we find, in all expressions of the Hellenic Civilization.

EVAGELOS STAMATIS (Hellenic Mathematics No. 4 Sec. Ed. 1979), states that THEOPHANIS MANIAS, discovered that the Ancient Sacred Temples of the Hellenic Antiquity, were founded according to Geometrical Computations and measurements. In the distances, between these Sacred Locations, THEOPHANIS MANIAS, observes, application of, the Golden Section. EVAGELOS STAMATIS, also, states that the German Intellectual MAX STECK, Professor of the University of Munich, in his article, which he published in the Research and Progress Magazine, supports that the Western Civilization, Arts, Crafts and Sciences, derive from the influence of the Greek mathematics. The sources that we get knowledge from, about the Greek Mathematics, are the archaeological researches and the literature of the works of the ancient writers.

MATILA GHYKA [1,2], in his books, presents widely, the Golden Section and Geometry in relation to painting, sculpture, architecture of human faces and bodies, as well as bodies of animals, plants, and shells, in relation to logarithmic spiral.

ROBERT LAWLOR[5],similarly, elaborates on these subjects, and additionally, he states, that, the Egyptians, while building the Pyramid, used the ratio 4/SQR[Phi] , for the value of Pi (ratio of the circumference of a circle by its diameter).

MAX TOTH (Pyramid Prophesies Edition 1988), correspondingly, refers to this ratio, as a useful, approximate form. He also states that, the Mathematicians, from HERODOTUS, have modelled an Orthogonal Triangle, whose small perpendicular, is equal to Unity, the bigger one is equal to SQRT(Phi), and its hypotenuse, is equal to Phi [i.e. GOLDEN NUMBER]. Also, KEPLER refers to the same, triangle (of MAGIRUS) in a letter to his former professor Michael Mastlin- according to Professor Roger Herz-Fischler [8].

Personally while building a conceptual heliotropic machine [Figure 4], a Solar Tracking contrivance for energy, I found GOLDEN RATIO approximate relationship of the maximum azimuthal angle of the Sun [max. day hours], with respect to 360 Deg., around the 38^{th} Parallel,

Athens [21 June Greece S. Rise 05:03 –S. Set 19:51, Dif. =14H: 48First = 14.8H, ratio 24H/14.8H=1.62..].

With all above, in mind I was motivated to search further the subject related to the PYTHAGOREAN THEORY, and particularly the PLATONIC TIMAEUS, which gave me the chance to approach THE GOLDEN RATIO, SECTION or NUMBER and its SQUARE ROOT.

In section 53, of PLATO'S "TIMAEUS", PLATO speaks about the shapes of the Four SOLIDS, of their kinds and their combinations. These are Fire (Tetrahedron) Earth (Cube), Water (Icosahedron), and Air (Octahedron). They are bodies and have depth.

The depth necessarily, contains the flat surface and the perpendicular to this surface is a side of a triangle and all the triangles are generated by two kinds of orthogonal triangles the "ISOSCELES" Orthogonal and the "SCALENE". From the two kinds of triangles the "Isosceles" Orthogonal has one nature. (i.e. one rectangular angle and two acute angles of 45 degrees), whereas the "scalene" has infinite (i.e. it has one rectangular angle and two acute angles of variable values having, these two acute angles, the sum of 90 degrees).

From these infinite natures we choose one triangle "THE MOST BEAUTIFUL". Thus, from the many triangles, we accept one of them as "THE MOST BEAUTIFUL", and we leave those by which the equilateral triangle is constructed (i.e. by using six "scalene" orthogonal triangles, having 30 and 60 degrees their acute angles). The "SCALENE" orthogonal triangle, has its hypotenuse [Stefanides Interpretation] equal to the "CUBE" [T^3], of the value of its horizontal smaller side [T^1] and its vertical bigger side the value of the "SQUARE" [T^2] of its smaller horizontal side.

Thus, by Pythagoras [T^3]^2 =[T^2]^2 + [T^1]^2 or T^6=T^4+T^2 or T^4 - T^2 - 1 = 0 [Figure 1 and Figure 2]

The value of the smaller horizontal side (T) is equal to the Square Root of the GOLDEN RATIO, the ratio of the consecutive sides is equal, again, to the Square Root of the GOLDEN RATIO (geometrical ratio) and the Tangent of the angle between the hypotenuse and the smaller horizontal side is also equal to the SQUARE ROOT of the GOLDEN RATIO (Θ=51Deg. 49 first 38 sec. 15third ….). The product of the smaller horizontal side and that of the hypotenuse is equal to the "SQUARE" of the bigger vertical side, of this triangle, and at the same time the "PYTHAGOREAN THEOREM" is valid. The values of the sides of this triangle are given by surd numbers, (solution of a fourth degree equation). Reorganizing this triangle, we get another one with the same angle values, which has its bigger vertical side equal to FOUR (4), its smaller horizontal side equal to FOUR divided by the SQUARE ROOT of the GOLDEN RATIO, and its hypotenuse equal to FOUR multiplied by the SQUARE ROOT of the GOLDEN RATIO [the complement of the angle Θis (90- Θ) =38 Deg. 10 first 21 sec. 44 third….].

Further relating PLATOS, TIMAEUS (section 54) where Plato refers to the "MOST BEAUTIFUL TRIANGLE" and that of the SOMATOIDES (section 31 and 32- stating that "whatever is Born must be Visible Tangible and BODILY") where the Four Elements are BOUND TOGETHER to become UNITY by the MOST BEAUTIFUL-STEREOID-BOND (which most perfectly unites into one both itself and the things which it binds together, and to effect this in the Most BEAUTIFUL manner is the natural property of PROPORTIONS), analysing these ratios:
FIRE : AIR = AIR : WATER and AIR : WATER = WATER : EARTH and thus FIRE : AIR = AIR: WATER = WATER: EARTH and CONFIGURING them [Stefanides] as TWO PAIRS OF ORTHOGONAL SCALENE TRIANGULAR SURFACES [one pair of orthogonal triangles each with sides T^3 , T^2 , T^1 and the other pair with sides T^2, T^1 and 1, i.e. four triangular surfaces] BOUND together IN SPACE on a system of three Orthogonal Cartesian Axes of reference (X,Y,Z,), we construct a SOLID [Figure 3] the SOMATOIDES [STEREOID BOND], with coordinates:

(0,0,0),(0,0,T^2), (T,0,0) ,(0,1/T, 1/T^2).

This SOLID, with its COMPLEMENT [which is a SOLID too], have a Skeleton Structure of TWO PERPENDICULAR, to each other, ORTHOGONAL TRIANGLES ,the ISOSCELES, and the MOST BEAUTIFUL, and constitute together 1/8 th of the Great Pyramid Model.[G.P. Model]. The SOMATOIDES to its COMPLEMENT is by VOLUME in GOLDEN RATIO as their sum is to the SOMATOIDES [a third Wedge Shaped SOLID complements the first two, to form ¼ G.P.Model].
On the basis of the fourth order equation, above, the COMPASS and RULER GOLDEN ROOT is drawn here, assuming the knowledge of drawing, as such, the GOLDEN SECTION [Phi]=[T^2] [Figure 5].
.http://www.stefanides.gr/gmr.htm

Relating this triangle with circles squares and parallelograms we get Geometric relationships [Figure 6 and Figure 7]

http://www.stefanides.gr/quadrature.htm
http://www.stefanides.gr/corollary.htm and

[Figure 8 and Figure 9]

http://www.stefanides.gr/piquad.htm ,
http://www.stefanides.gr/quadcirc.htm]

involving quadratures and relationships with logarithms and spirals
[Figure 10, Figure 11, Figure 12, Figure 13 and Figure 18]

http://www.stefanides.gr/nautilus.htmhttp://www.stefanides.gr/why_logarithm.htm

[The curve points of the spirals may be obtained graphically by compass and ruler, since expressions of series containing powers may be obtained graphically, step by step, making use of the orthogonal triangle property of multiplying all of its sides by the same length].

By using sections of the four solids, we find the relationships, between them i.e. the Icosahedron with the Octahedron, the Tetrahedron and the Cube. In addition, if we add selective sections (one next to the other), of the three solids, Icosahedron, Octahedron and Tetrahedron, we find an angle [epsilon 41.8103149.Deg.=2*arctan{1/T^4}=arctan{1/sqrt (1.25)}] which we find also in a section of the Dodecahedron.
So, in this manner we obtain a relationship, of the Dodecahedron with the other Four Platonic Solids. Dodecahedron was considered as the Fifth Solid, mentioned by PLATO in his Timaeus, which "God used it up to Ornament the World", and was given the name AETHER, by the philosophers.

THE GOLDEN RATIO is found in Section of the Dodecahedron, as also it is found in Section of the Icosahedron, Figure 14 , is the section of Icosahedron http://www.stefanides.gr/icosohadron.htm, and Figure Decorated Platonic Solids http://www.stefanides.gr/dec_plastic.htm Figure 16 and Figure 17 Quadrature Presuppositions

http://www.stefanides.gr/theo_circle.htm,
http://www.stefanides.gr/quad.htm .

CONCLUSION

Via the GOLDEN ROOT we get relationships of Geometric structures, Logarithms and Spirals.
It is concluded that by "THE MOST BEAUTIFUL TRIANGLE", PLATO correlates the Elements (UNIFIED THEORY) through the general analogies of their sides i.e. Fire/Air is equal to Air/Water is equal to Water/Earth, is equal to T the GOLDEN ROOT.
Finally, we see that by the use of the METRON or SYMMETRY of the GOLDEN ROOT, we realize PLATO'S statement that all triangles derive from two ORTHOGONAL TRIANGLES the ISOSCELES and the SCALENE.

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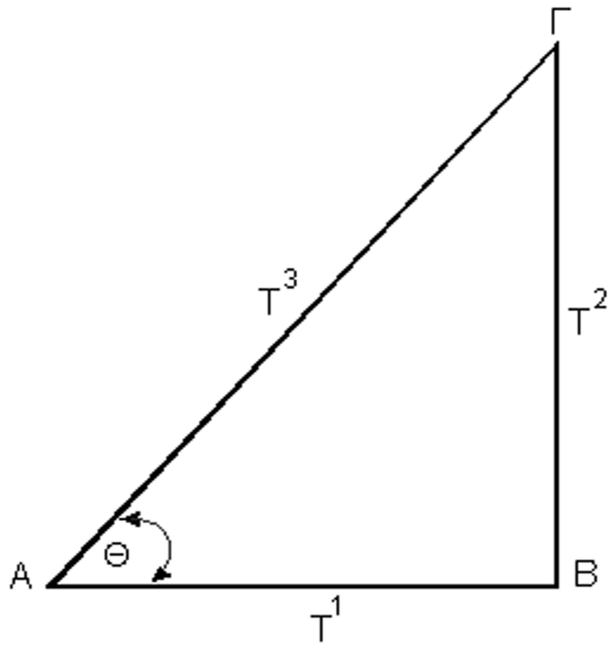
APPENDIX A



$$T^4-T^2-1=0$$

$$T^6-T^4-T^2=0$$

$$T^6=T^4+T^2$$

$$(T^3)^2=(T^2)^2+(T^1)^2$$

$$(A\Gamma)(AB)=(\Gamma B)^2$$

$$TAN\ \Theta=\frac{T^2}{T^1}=T$$

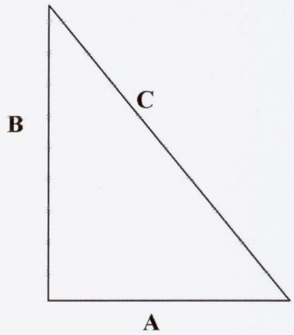
$$\Theta=TAN^{-1}(T)$$

$$\frac{A\Gamma}{\Gamma B}=\frac{\Gamma B}{BA}=T$$

Figure 1

$B^2 = 3A^2$

B^2 , THE BIG VERTICAL SIDE “SQUARED” IS THREE TIMES THE SQUARE OF THE SMALL



$C = 2A$

C IS HYPOTENUSE OF THE ORTHOGONAL 30/60 DEGREES TRIANGLE

$C^2 - A^2 = B^2$
$4A^2 – A^2 = 3A^2$

THIS IS THE CURRENT INTERPRETATION OF THE ORIGINAL CLASSICAL GREEK TEXT

A

A IS THE SMALL HORIZONTAL SIDE LENGTH

HOWEVER , THE GREEK TEXT DOES NOT “<u>DIRECTLY</u>” STATE <u>THE “SQUARE” OF THE SIDE</u> , IT STATES “THE SIDE IS THREE TIMES THE SQUARE ” IF THIS IS THE CORRECT INTERPRITATION OF :
“...ΤΡΙΠΛΗΝ ΚΑΤΑ ΔΥΝΑΜΙΝ ΕΧΟΝ ΤΗΣ ΕΛΑΤΤΟΝΟΣ ΤΗΝ ΜΕΙΖΩ ΠΛΕΥΡΑΝ ΑΕΙ”
<u>IT SHOULD HAVE STATED</u> :
“...ΤΡΙΠΛΗΝ ΚΑΤΑ ΔΥΝΑΜΙΝ ΕΧΟΝ ΤΗΣ ΕΛΑΤΤΟΝΟΣ ΤΗΝ ΜΕΙΖΩ ΠΛΕΥΡΑΝ *<u>ΚΑΤΑ ΔΥΝΑΜΙΝ</u>* ΑΕΙ”

<u>THE PROPOSED INTERPRETATION IS :</u>
THE CUBE OF THE SMALL HORIZONTAL SIDE IS THE HYPOTENUSE OF THE TRIANGLE AND THE BIG VERTICAL IS THE SQUARE OF THE SMALL.
SO FOR $A = T$ THEN $B = T^2$ AND $C = T^3$
THE RATIO OF EACH OF THE SIDES TO ITS NEXT IS :
$T^3 / T^2 = T^2/T^1 = T$, AND THE FOLLOWING EQUATION HOLDS :
$T^4 – T^2 – 1 = 0$ for which T is The GOLDEN ROOT,or the SQUARE ROOT OF THE GOLDEN SECTION.

Figure 2

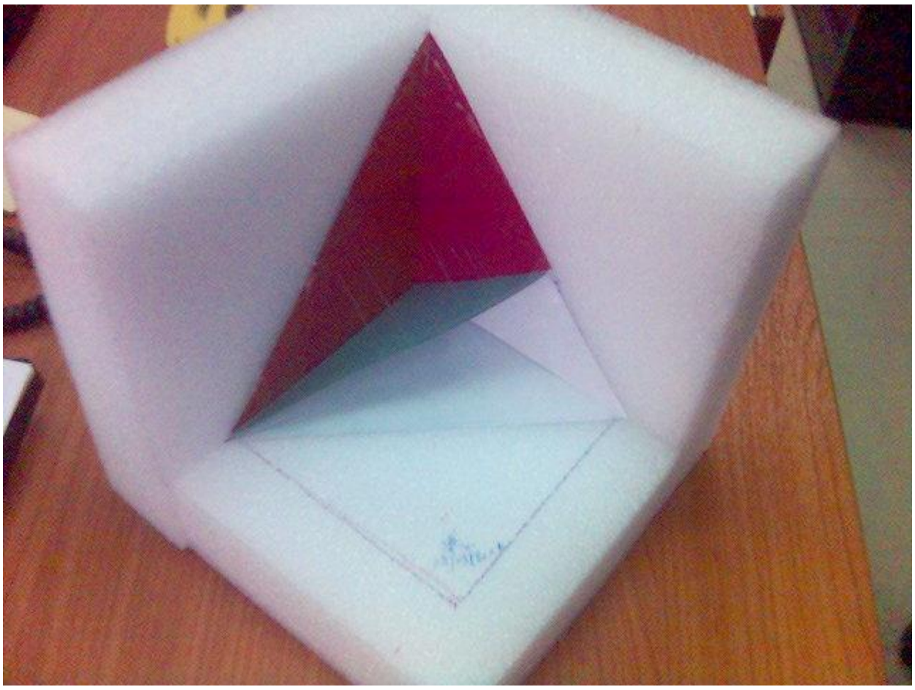


Figure 3

Figure 4

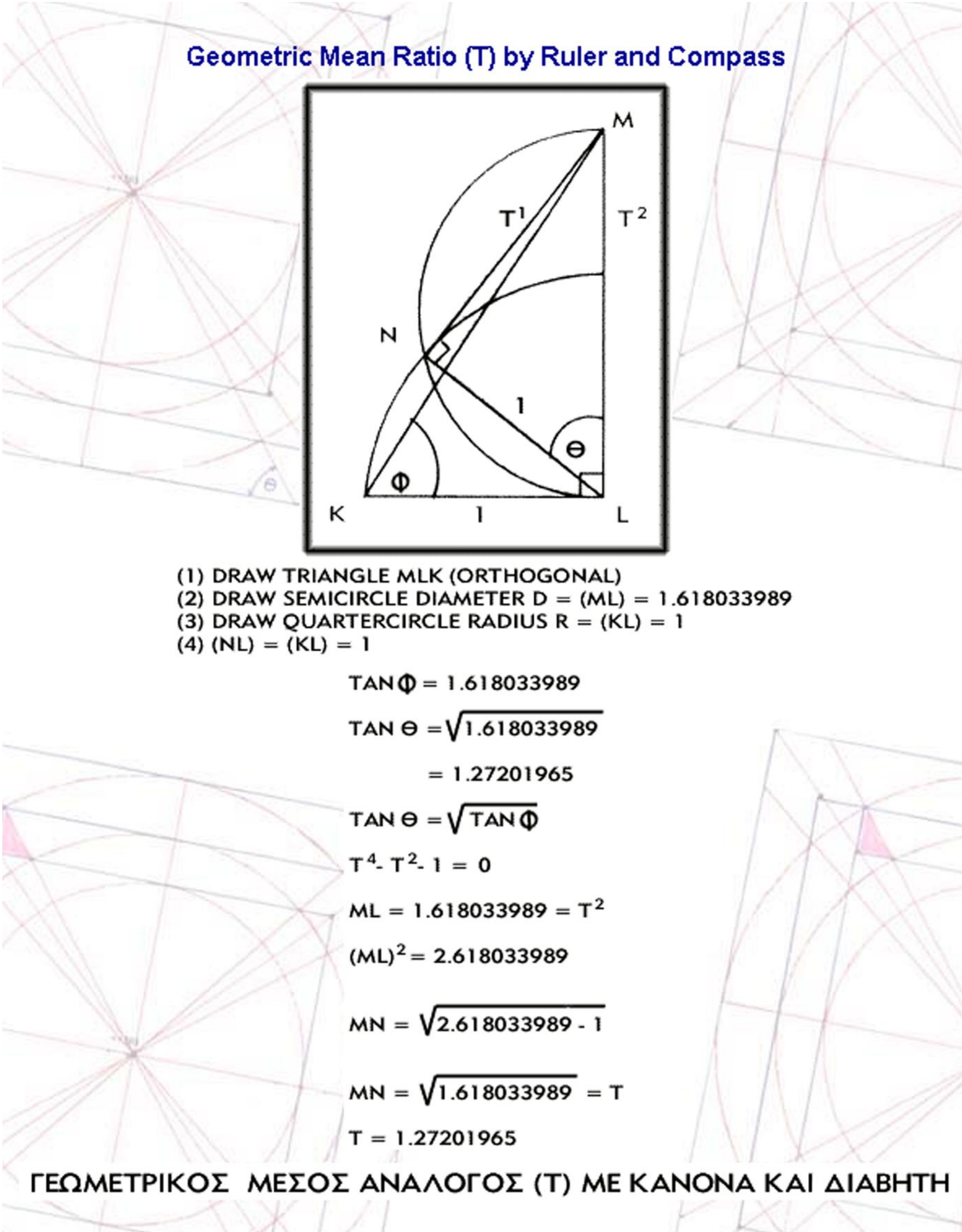
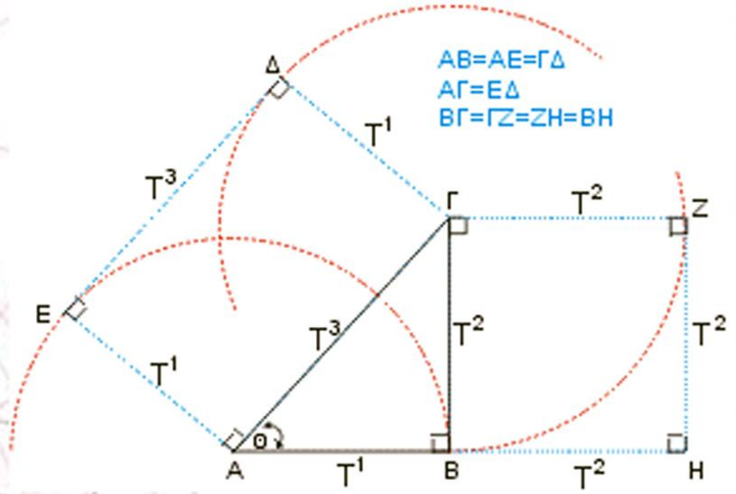

Geometric Mean Ratio (T) by Ruler and Compass
M
T^1
T^2
N
1
Θ
Φ
K
1
L
(1) DRAW TRIANGLE MLK (ORTHOGONAL)
(2) DRAW SEMICIRCLE DIAMETER D = (ML) = 1.618033989
(3) DRAW QUARTERCIRCLE RADIUS R = (KL) = 1
(4) (NL) = (KL) = 1
$TAN\,\Phi = 1.618033989$
$TAN\,\Theta = \sqrt{1.618033989}$
$= 1.27201965$
$TAN\,\Theta = \sqrt{TAN\,\Phi}$
$T^4 - T^2 - 1 = 0$
$ML = 1.618033989 = T^2$
$(ML)^2 = 2.618033989$
$MN = \sqrt{2.618033989 - 1}$
$MN = \sqrt{1.618033989} = T$
$T = 1.27201965$
ΓΕΩΜΕΤΡΙΚΟΣ ΜΕΣΟΣ ΑΝΑΛΟΓΟΣ (Τ) ΜΕ ΚΑΝΟΝΑ ΚΑΙ ΔΙΑΒΗΤΗ

Figure 5

Quadrature Master Theorem
(Based on the geometric mean ratio T)



$$T^4 - T^2 - 1 = 0$$
$$T^6 - T^4 - T^2 = 0$$
$$T^6 = T^4 + T^2$$
$$(T^3)^2 = (T^2)^2 + (T^1)^2$$
$$(A\Gamma)(AB) = (\Gamma B)^2$$
$$TAN\,\Theta = \frac{T^2}{T^1} = T$$
$$\Theta = TAN^{-1}(T)$$
$$\frac{A\Gamma}{\Gamma B} = \frac{\Gamma B}{BA} = T$$
$$(AE)\bullet(A\Gamma) = T^1 \bullet T^3 = T^4$$
$$(B\Gamma)\bullet(BH) = T^2 \bullet T^2 = T^4$$
$$\boxed{(AE)\bullet(A\Gamma) = (B\Gamma)\bullet(BH)}$$
$$T = \sqrt{\frac{\sqrt{5}+1}{2}}$$

Κύριο θεώρημα τετραγωνισμού
(βασισμένο στο γεωμετρικό μέσο ανάλογο Τ)

Figure 6

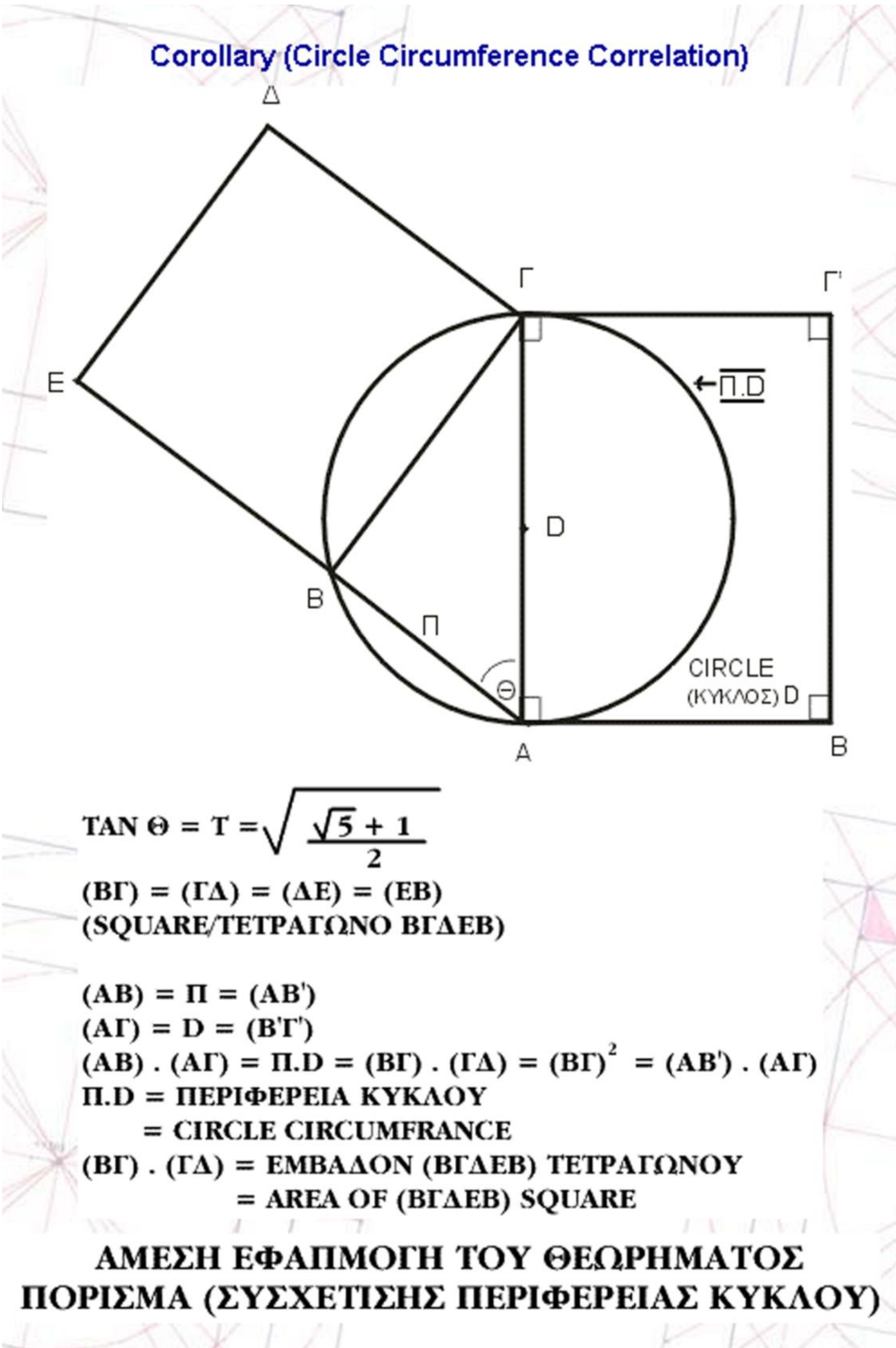

Corollary (Circle Circumference Correlation)
Δ
Γ
Γ'
E
Π.D
D
B
Π
Θ
CIRCLE
(ΚΥΚΛΟΣ) D
A
B
TAN Θ = T = √((√5 + 1)/2)
(ΒΓ) = (ΓΔ) = (ΔΕ) = (ΕΒ)
(SQUARE/ΤΕΤΡΑΓΩΝΟ ΒΓΔΕΒ)
(AB) = Π = (AB')
(ΑΓ) = D = (Β'Γ')
(AB) . (ΑΓ) = Π.D = (ΒΓ) . (ΓΔ) = (ΒΓ)² = (AB') . (ΑΓ)
Π.D = ΠΕΡΙΦΕΡΕΙΑ ΚΥΚΛΟΥ
= CIRCLE CIRCUMFRANCE
(ΒΓ) . (ΓΔ) = ΕΜΒΑΔΟΝ (ΒΓΔΕΒ) ΤΕΤΡΑΓΩΝΟΥ
= AREA OF (ΒΓΔΕΒ) SQUARE
ΑΜΕΣΗ ΕΦΑΠΜΟΓΗ ΤΟΥ ΘΕΩΡΗΜΑΤΟΣ
ΠΟΡΙΣΜΑ (ΣΥΣΧΕΤΙΣΗΣ ΠΕΡΙΦΕΡΕΙΑΣ ΚΥΚΛΟΥ)

Figure 7

Pi, IRRATIONAL, POSITIVE REAL ROOT OF FOURTH ORDER EQUATION

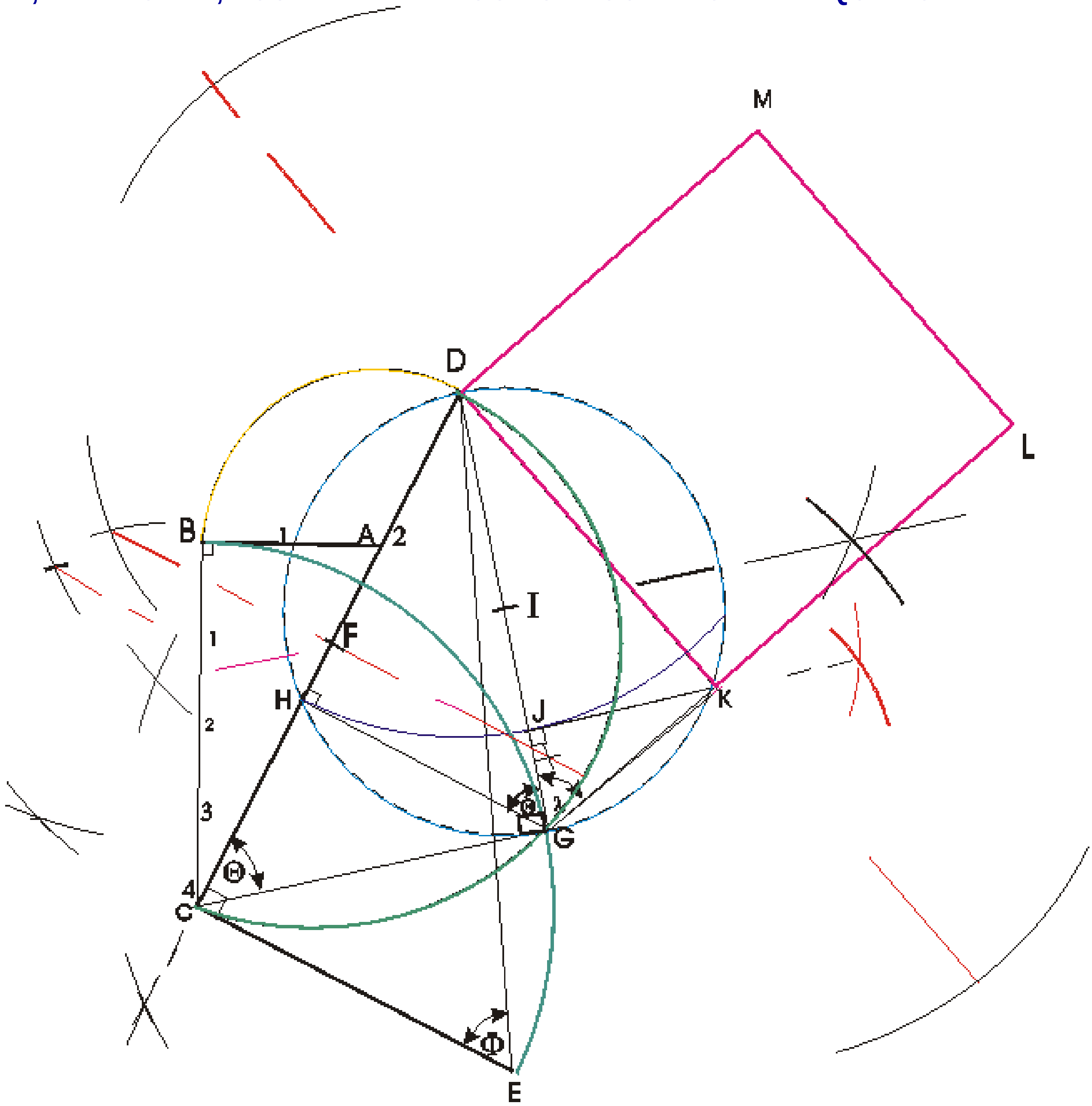


Figure 8

Drawing Steps

1) Draw orthogonal triangle ABC
2) Extend CA to AD = AB
3) Draw orthogonal triangle DCE
4) Draw semicircle on CD diameter
5) Draw quarter circle with radius CE
6) Crossing point G of circle arcs
7) Draw vertical GH to CD
8) Draw circle on diameter DG
9) Draw Circular arc with radius DH crossing DG at J
10) Draw vertical at J crossing circle (I) at K
11) Draw square on DK, (DKLM)
12) Prove GH = Pi

Pi , IRRATIONAL , POSITIVE REAL ROOT OF FOURTH ORDER EQUATION
(RULER AND COMPASS QUADRATURE)
BY EUR ING PANAGIOTIS STEFANIDES

USE Equation : $x^4 + 4^2 x^2 - 4^4 = 0$

Assume $x = \pi = \frac{4}{T} = (HG)$, is the positive real root.

$$T = \frac{\sqrt{\sqrt{5}+1}}{2} \qquad , \left(T^2 = \frac{\sqrt{5}+1}{2} \right)$$

(A B) = 2 units , (BC) = 4 units , (AD) = 2 units

$(CD) = (2\sqrt{5}+2) = 4\left(\frac{\sqrt{5}+1}{2}\right) = 4T^2$, $(CD)^2 = 16T^4$

$(DJ) = (DH) = 4$

$(CE) = 4 = (DH) = (CG) = (CB)$

$(DG) = \sqrt{(CD)^2 - (CG)^2} = \sqrt{(16T^4) - (16)} = 4\sqrt{T^4 - 1}$

(Since $T^4 - T^2 - 1 = 0$ then $T^4 - 1 = T^2$)

$(DG) = 4T$, $(GH) = \frac{4}{T}$, $(DH) = 4 = (DJ)$

$(DJ) \bullet (DG) = (DK)^2$ (Eucleid VI, 8 Theorem)

$4 \bullet (4T) = 16T$ = Area of Square (DKLM)

Area of Circle (of Centre I) is : $\frac{\pi}{4} \bullet (DG)^2 = A$

for $\pi = \frac{4}{T}$ $A = (\frac{4}{T}) \bullet (\frac{1}{4})\ (4T)^2 = 16T$

Area of Square DKLM = Area of Circle Centre I

$\pi = \frac{4}{T}$ is Correct!

Note 1) $\tan \Theta = T$, $\tan \Phi = T^2 \quad \frac{(DG)}{(DH)} = T \frac{(DG)}{(DK)} = \sqrt{T}$

Note 2) Condition for quadrature is that (DH) is quarter of circle (I) circumference .
Condition for quadrature of any circle is obtainable .

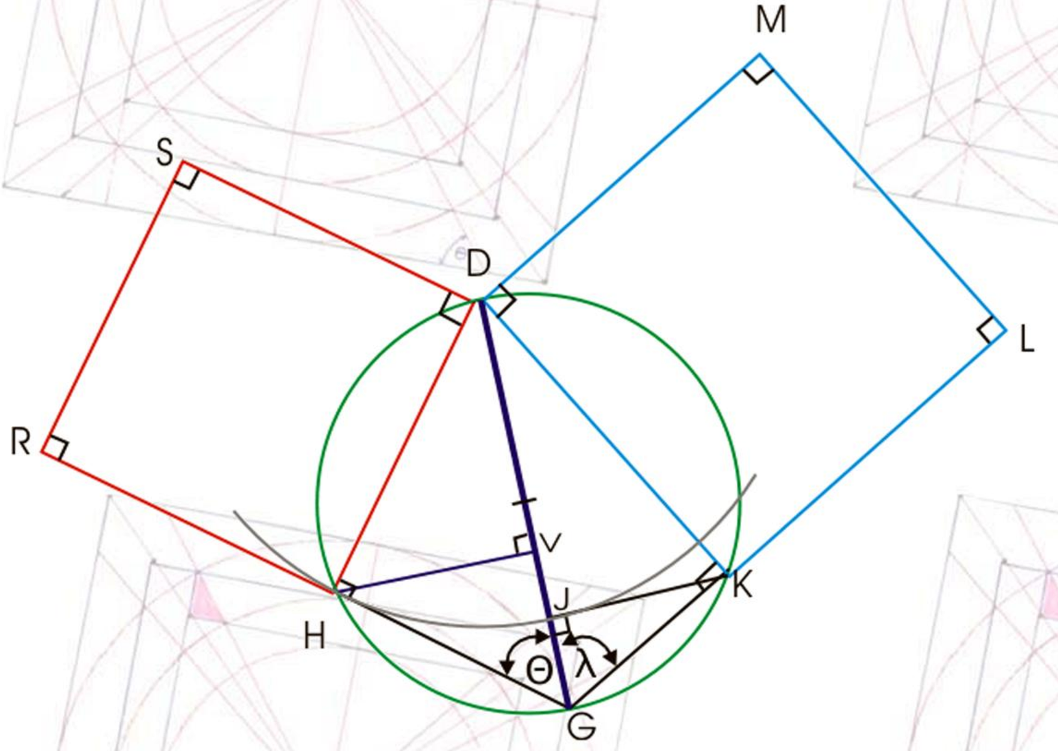
Note 3) The same method is applied , also, for the seconc paired orthogonal triangle (CGH) with (CG) as the relevant circle diameter .

Figure 8[A]

Eur Ing Panagiotis Stefanides

QUADRATURE OF CIRCLE , THEORETICAL DEFINITION

For any circle , if a chord , such as (DH) is a quarter of the circles circumference, then the square , such as (DKLM) has an area equal to that of the circle, and perimeter of square (DHRS) equal to the circumference of the circle.



d=(DG)=Diameter

$(DH)=(\frac{\pi * d}{4})=(DJ)$

$(DK)^2=(\frac{\pi * d}{4})(d)=(DJ)(DG)$

$(DK)^2=(\frac{\pi * d^2}{4})$ i.e. Area of square = Area of circle

$\sin(\Theta)=\frac{\pi}{4}$

$\sin(\lambda)=\sqrt{\frac{\pi}{4}}$

eucleid VI , 8 : $(DV)(DG) = (DH)^2$

2.For one particular circle , in addition to the above theorem (1) , for

$$\tan \Theta = T = \sqrt{\frac{\sqrt{5}+1}{2}} ,$$

$(DV)=(HG)$ and , $(HG) * (GD) = (DH)^2 = (\frac{\pi * d}{4})^2 = \pi * d$, if (HG) is π , then :

$(\frac{\pi * d}{4})^2 = \frac{\pi^2 * d^2}{16} = \pi * d$, or $(\pi * d) = 16$, $d = \frac{16}{\pi}$ and $(\frac{\pi * d}{4}) = (\frac{\pi}{4})(\frac{16}{\pi}) = 4$

Using Pythagoras on triangle GHD , we get

$(\frac{16}{\pi})^2 = \pi^2 + 4^2$, or , $\pi^4 + 4^2\pi^2 - 4^4 = 0$, for which the positive, real root for $\pi = \frac{4}{T}$ and so $\sin(\Theta) = \frac{1}{T}$ and $\sin(\lambda) = \sqrt{\frac{1}{T}}$ for quadrature .

Figure 9

NAUTILUS LOG BASE [T] SHELL CURVE

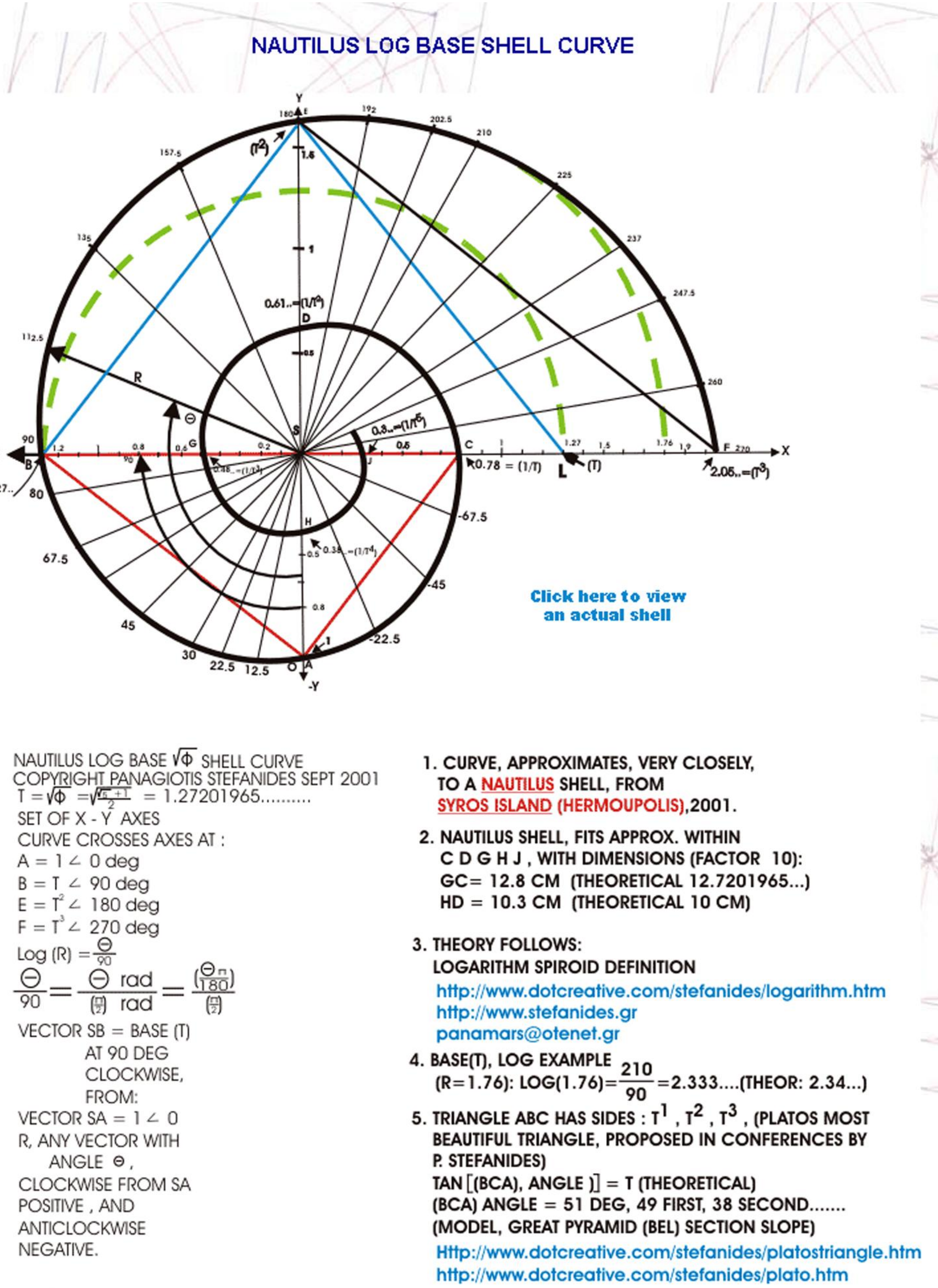
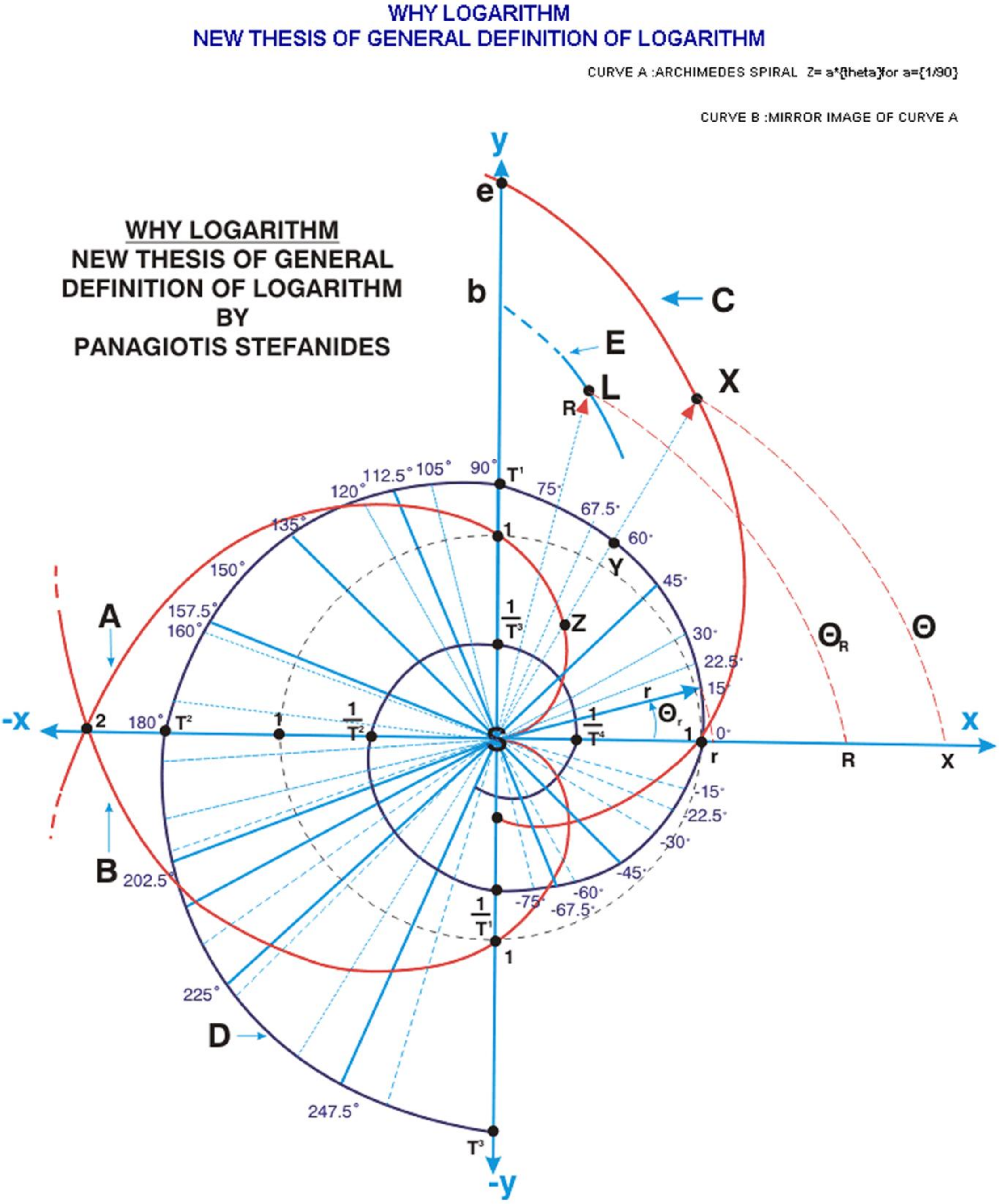

NAUTILUS LOG BASE SHELL CURVE
Click here to view an actual shell
NAUTILUS LOG BASE √Φ SHELL CURVE
COPYRIGHT PANAGIOTIS STEFANIDES SEPT 2001
T = √Φ = √((√5 + 1)/2) = 1.27201965..........
SET OF X - Y AXES
CURVE CROSSES AXES AT :
A = 1 ∠ 0 deg
B = T ∠ 90 deg
E = T² ∠ 180 deg
F = T³ ∠ 270 deg
Log (R) = Θ/90
Θ/90 = Θ rad / (π/2) rad = (Θπ/180)/(π/2)
VECTOR SB = BASE (T)
AT 90 DEG
CLOCKWISE,
FROM:
VECTOR SA = 1 ∠ 0
R, ANY VECTOR WITH
ANGLE Θ,
CLOCKWISE FROM SA
POSITIVE , AND
ANTICLOCKWISE
NEGATIVE.
1. CURVE, APPROXIMATES, VERY CLOSELY, TO A NAUTILUS SHELL, FROM SYROS ISLAND (HERMOUPOLIS),2001.
2. NAUTILUS SHELL, FITS APPROX. WITHIN C D G H J , WITH DIMENSIONS (FACTOR 10):
GC= 12.8 CM (THEORETICAL 12.7201965...)
HD = 10.3 CM (THEORETICAL 10 CM)
3. THEORY FOLLOWS:
LOGARITHM SPIROID DEFINITION
http://www.dotcreative.com/stefanides/logarithm.htm
http://www.stefanides.gr
panamars@otenet.gr
4. BASE(T), LOG EXAMPLE (R=1.76): LOG(1.76)= 210/90 =2.333....(THEOR: 2.34...)
5. TRIANGLE ABC HAS SIDES : T¹ , T² , T³ , (PLATOS MOST BEAUTIFUL TRIANGLE, PROPOSED IN CONFERENCES BY P. STEFANIDES)
TAN [(BCA), ANGLE)] = T (THEORETICAL)
(BCA) ANGLE = 51 DEG, 49 FIRST, 38 SECOND.......
(MODEL, GREAT PYRAMID (BEL) SECTION SLOPE)
Http://www.dotcreative.com/stefanides/platostriangle.htm
http://www.dotcreative.com/stefanides/plato.htm

Figure 10

Nautilus Shell
Figure 11



A + B = STEPHANOID CURVE

A: PHASOR CURVE OF LOGARITHMS
CORRESPONDING TO NUMBERS >1 (BASES>1)

B: PHASOR CURVE OF LOGARITHMS
CORRESPONDING TO NUMBER <1 (BASES>1)

C: BASE e LOGARITHMIC SPIRAL OF PHASORS

D: BASE T LOGARITHMIC SPIRAL OF PHASORS

Figure 12

$$T = \sqrt{\frac{\sqrt{5}+1}{2}}$$

E: BASE b LOGARITHMIC SPIRAL OF PHASORS

(FOR b=1 SPIRAL DEGENERATES TO A CIRCLE OF RADIUS 1)

$$\log_e X = \log_T Y = Z = \frac{\Theta\ \mathrm{DEG}}{90\ \mathrm{DEG}}$$

$$X = e^{[\Theta/90]} = 1+[\Theta/90]+\frac{[\Theta/90]^2}{2!}+\frac{[\Theta/90]^3}{3!}+\ldots$$

$$X = 1 + \log_e X + \frac{[\log_e X]^2}{2!} + \frac{[\log_e X]^3}{3!} + \ldots$$

$$Y = T^{(\log_e X)}$$

$$\log_e Y = \log_e X \bullet \log_e T$$

$$Y = e^{[\log_e X \bullet \log_e T]}$$

$$Y = 1 + [\log_e X \bullet \log_e T] + \frac{[\log_e X \bullet \log_e T]^2}{2!} + \ldots$$

L: POINT ON SPIRAL, E, BASE b, PHASOR R

$$Re^{i\Theta_R} = b^{(\Theta_R/90)} \text{ AND } R^n e^{(in\Theta_R)} = b^{(n\Theta_R/90)}$$

NOTES:

1) **ANY POINT ON THE X-Y PLANE MAY, THUS, BE DEFINED**

2) $Re^{i\Theta_R}$ **IS MULTIVALUED, AND, COMPLEX**

3) $b^{(\Theta_R/90)}$ **IS SINGLE VALUED, AND, REAL!**

4) **Θ IN DEGREES, AND 90, IN DEGREES**

5) **BASES < 1 : HAVE PESITIVE LOGARITHM FOR NUMBERS < 1 AND VICE VERSA.**

6) **X IS A REPRESENTATIVE PHASOR OF Θ DEGREES FROM THE POSITIVE X AXIS, HAVING A LENGTH OF SX, WHICH IS A REAL POSITIVE NUMBER ON THE X AXIS.**

Figure 13

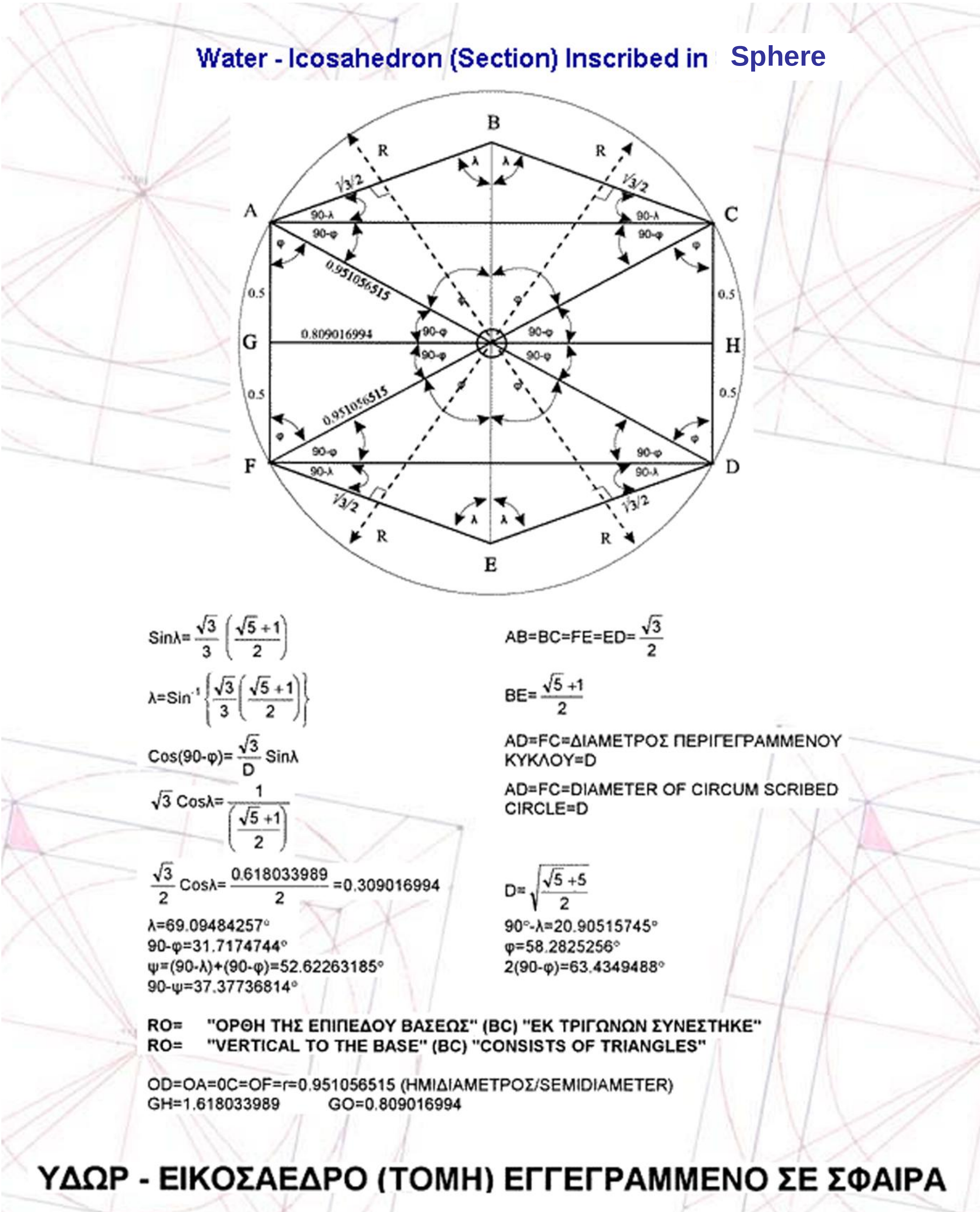

Water - Icosahedron (Section) Inscribed in Sphere
B
A
C
G
H
F
D
E
R
√3/2
90-λ
90-φ
φ
λ
0.5
0.951056515
0.809016994
$\text{Sin}\lambda = \frac{\sqrt{3}}{3}\left(\frac{\sqrt{5}+1}{2}\right)$
$\lambda = \text{Sin}^{-1}\left\{\frac{\sqrt{3}}{3}\left(\frac{\sqrt{5}+1}{2}\right)\right\}$
$\text{Cos}(90-\varphi) = \frac{\sqrt{3}}{D}\,\text{Sin}\lambda$
$\sqrt{3}\,\text{Cos}\lambda = \frac{1}{\left(\frac{\sqrt{5}+1}{2}\right)}$
$\frac{\sqrt{3}}{2}\,\text{Cos}\lambda = \frac{0.618033989}{2} = 0.309016994$
λ=69.09484257°
90-φ=31.7174744°
ψ=(90-λ)+(90-φ)=52.62263185°
90-ψ=37.37736814°
$AB=BC=FE=ED=\frac{\sqrt{3}}{2}$
$BE=\frac{\sqrt{5}+1}{2}$
AD=FC=ΔΙΑΜΕΤΡΟΣ ΠΕΡΙΓΕΓΡΑΜΜΕΝΟΥ ΚΥΚΛΟΥ=D
AD=FC=DIAMETER OF CIRCUM SCRIBED CIRCLE=D
$D=\sqrt{\frac{\sqrt{5}+5}{2}}$
90°-λ=20.90515745°
φ=58.2825256°
2(90-φ)=63.4349488°
RO= "ΟΡΘΗ ΤΗΣ ΕΠΙΠΕΔΟΥ ΒΑΣΕΩΣ" (BC) "ΕΚ ΤΡΙΓΩΝΩΝ ΣΥΝΕΣΤΗΚΕ"
RO= "VERTICAL TO THE BASE" (BC) "CONSISTS OF TRIANGLES"
OD=OA=0C=OF=r=0.951056515 (ΗΜΙΔΙΑΜΕΤΡΟΣ/SEMIDIAMETER)
GH=1.618033989 GO=0.809016994
ΥΔΩΡ - ΕΙΚΟΣΑΕΔΡΟ (ΤΟΜΗ) ΕΓΓΕΓΡΑΜΜΕΝΟ ΣΕ ΣΦΑΙΡΑ

Figure 14

Decorated Platonic Solids and Conceptual Timeic Stereoid Forms of Elements
by P. Stefanides

Figure 15

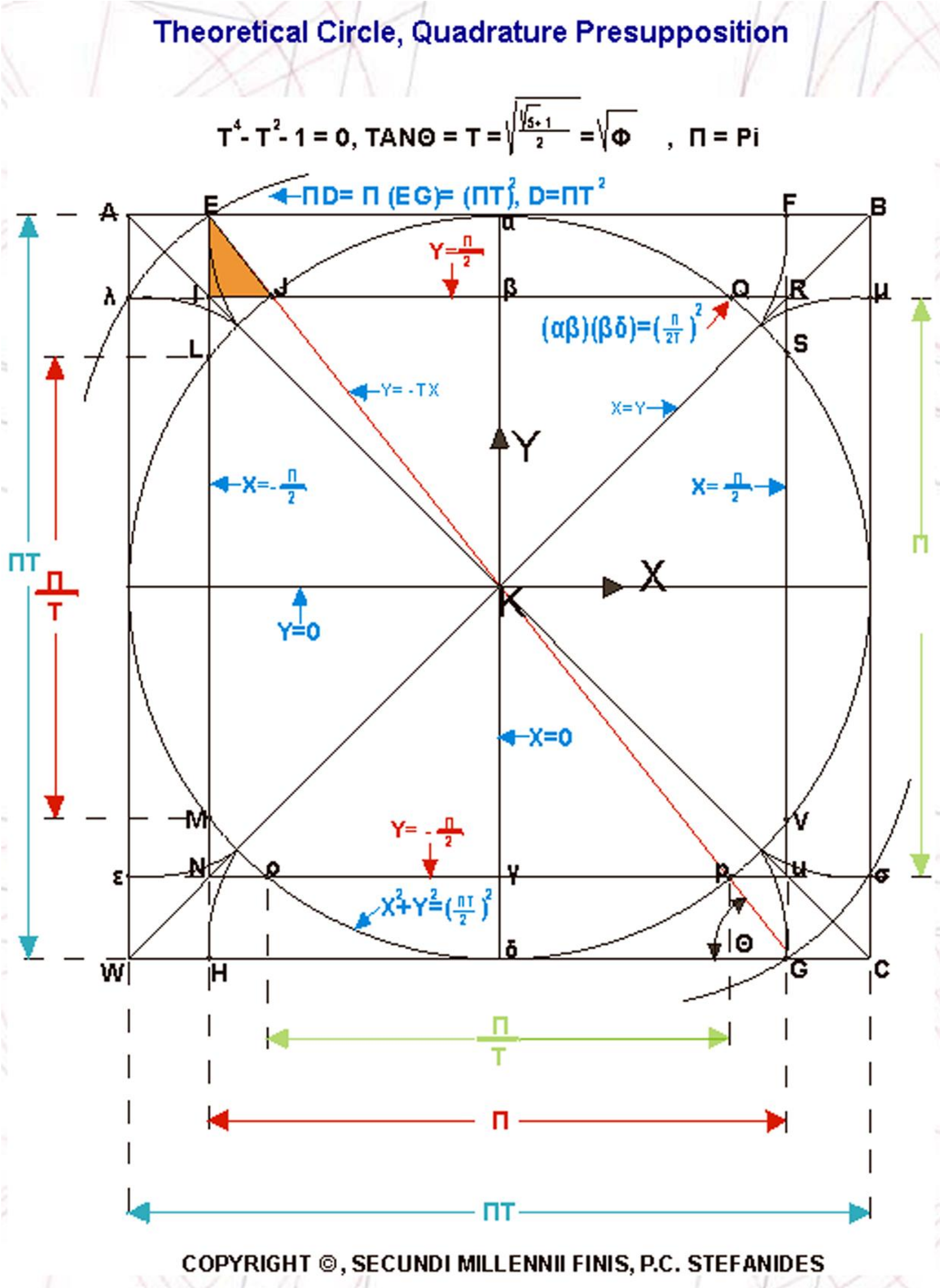

Theoretical Circle, Quadrature Presupposition
T⁴- T²- 1 = 0, TANΘ = T = √((√5+1)/2) = √Φ , Π = Pi
ΠD= Π (EG)= (ΠT)², D=ΠT²
Y=Π/2
(αβ)(βδ)=(Π/2T)²
Y= -TX
X=Y
X=-Π/2
X=Π/2
Y=0
X=0
Y= -Π/2
X²+Y²=(ΠT/2)²
ΠT
Π/T
Π
COPYRIGHT ©, SECUNDI MILLENNII FINIS, P.C. STEFANIDES

Figure 16

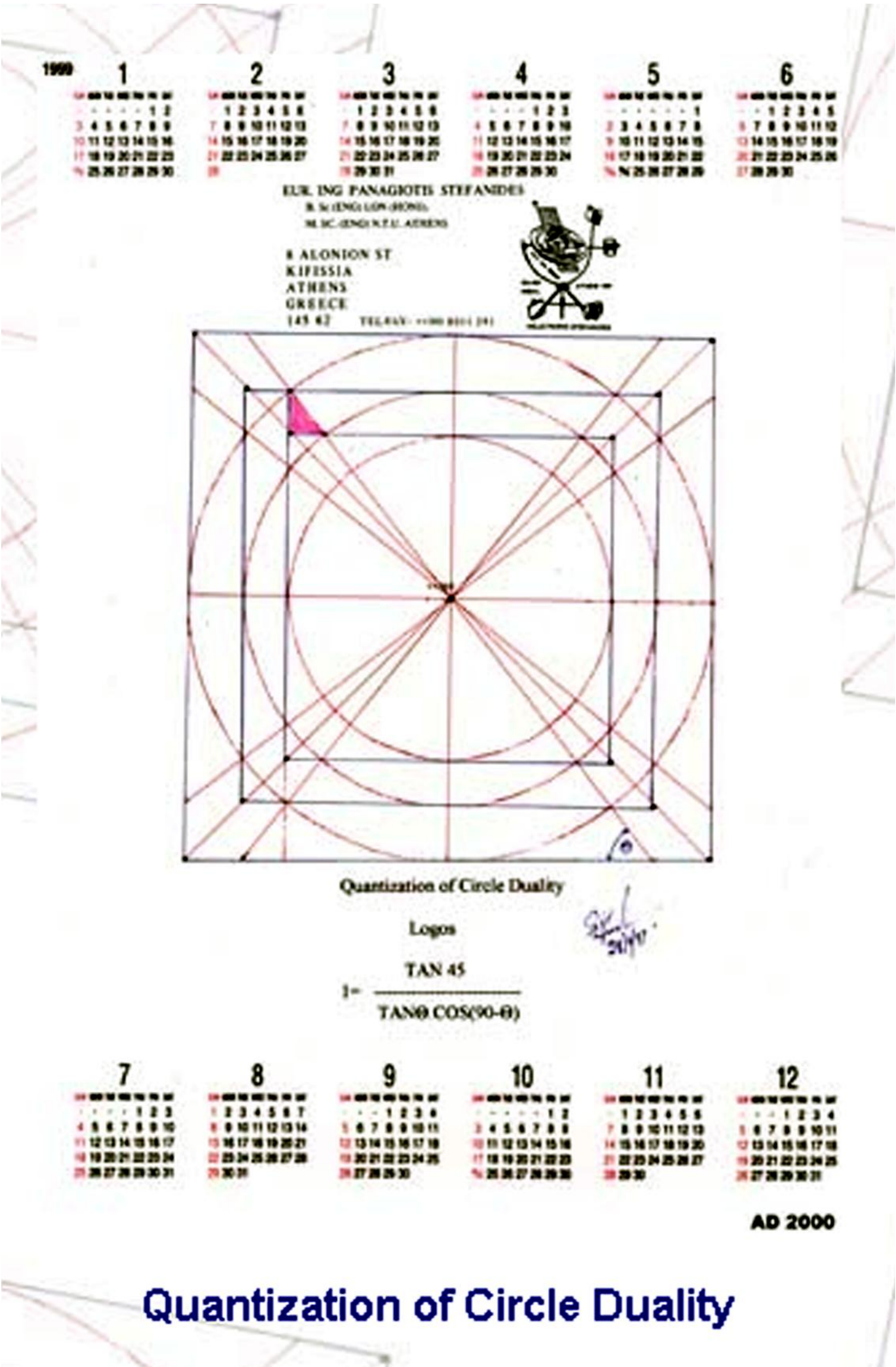
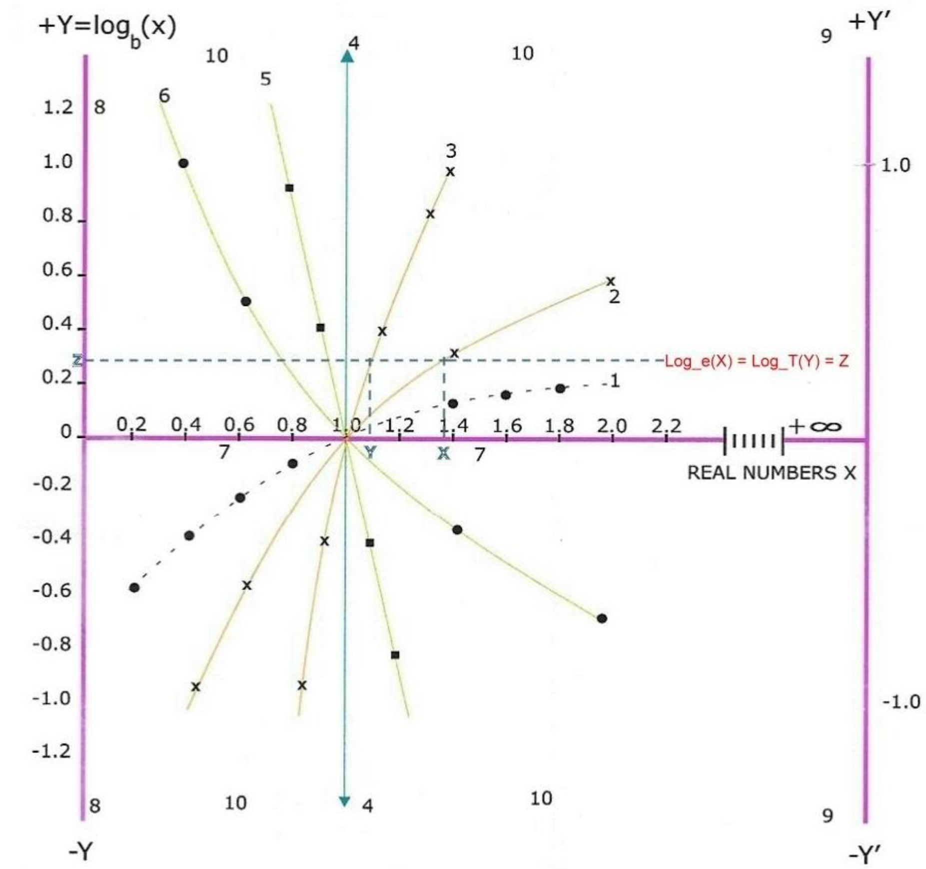

1
2
3
4
5
6
EUR. ING PANAGIOTIS STEFANIDES
8 ALONION ST
KIFISSIA
ATHENS
GREECE
145 62
Quantization of Circle Duality
Logos
TAN 45
1=
TANΘ COS(90-Θ)
7
8
9
10
11
12
AD 2000
Quantization of Circle Duality

Figure 17



1) $\log_{b1}(x)$, $b1 = 10$

2) $\log_{b2}(x)$, $b2 = e = 2.71828182...$

3) $\log_{b3}(x)$, $b3 = T = 1.27201965...$

SLOPES OF CURVES ARE POSITIVE

4) $\log_{b4}(1) = I$ $b4 = 1$, I = INDETERMINATE WITH VALUES FROM $-\infty$ TO $+\infty$ SLOPE $\pm$ INFINITY.

5) $\log_{b5}(x)$, $b5 = \frac{1}{T} = 0.786151378...$

6) $\log_{b6}(x)$, $b6 = \frac{1}{e} = 0.367879441...$

SLOPES OF CURVES ARE NEGATIVE

7) $\log_{o}(x) = \log_{+\infty}(x) = 0$, FOR $0 < x < +\infty$, X - AXIS (SLOPES ZERO).

8) $\log_{o}(o) = \log_{+\infty}(o) = I$

9) $\log_{+\infty}(+\infty) = \log_{o}(+\infty) = I$

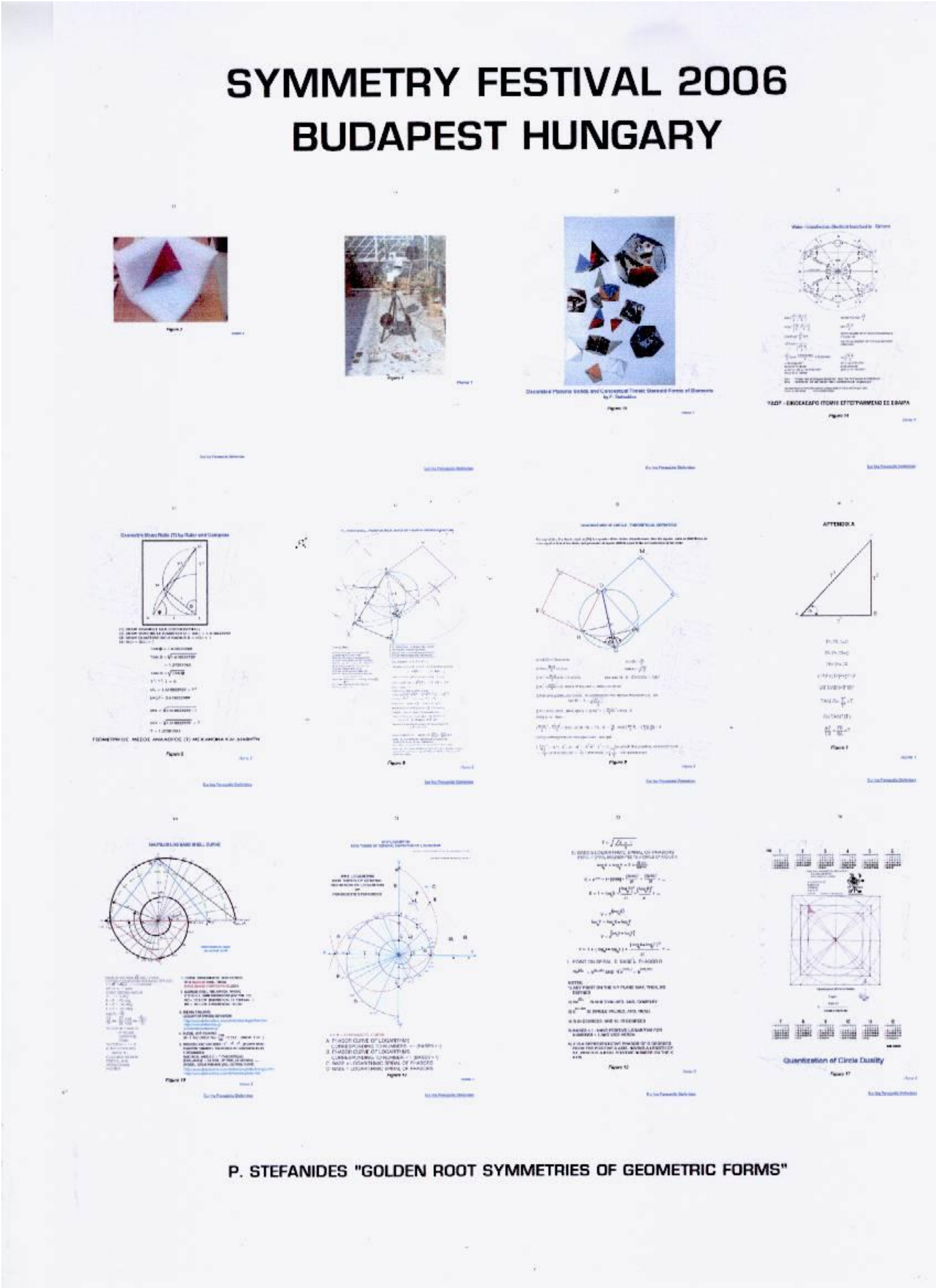
INDETERMINATE WITH VALUES FROM $-\infty$ TO $+\infty$ SLOPES $\pm$ INFINITY (Y AND Y' AXES).

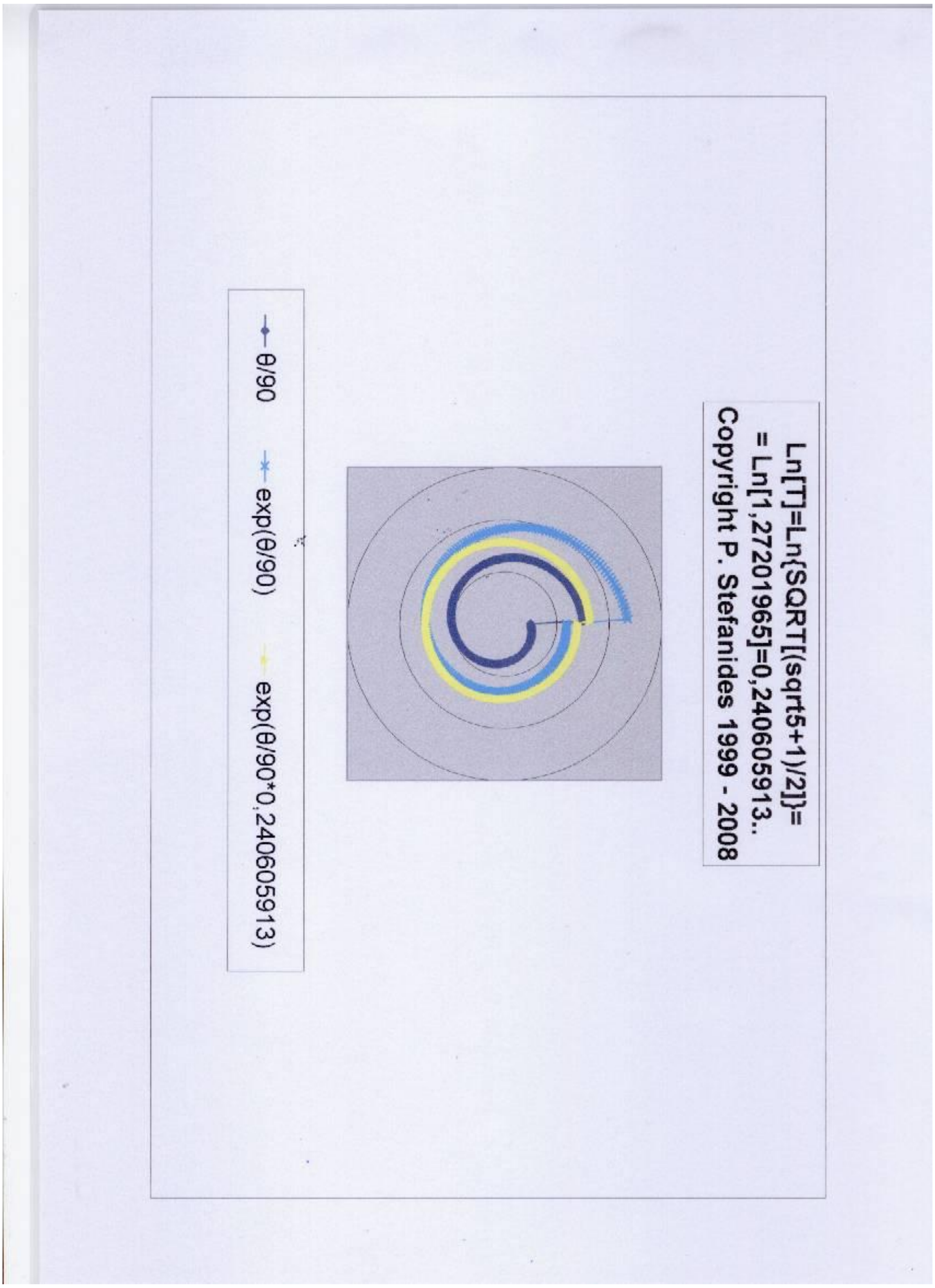
10) $\log_{1}(x) = \pm\infty$ FOR $+\infty \geq x > 1$ OR $O <= X < 1$

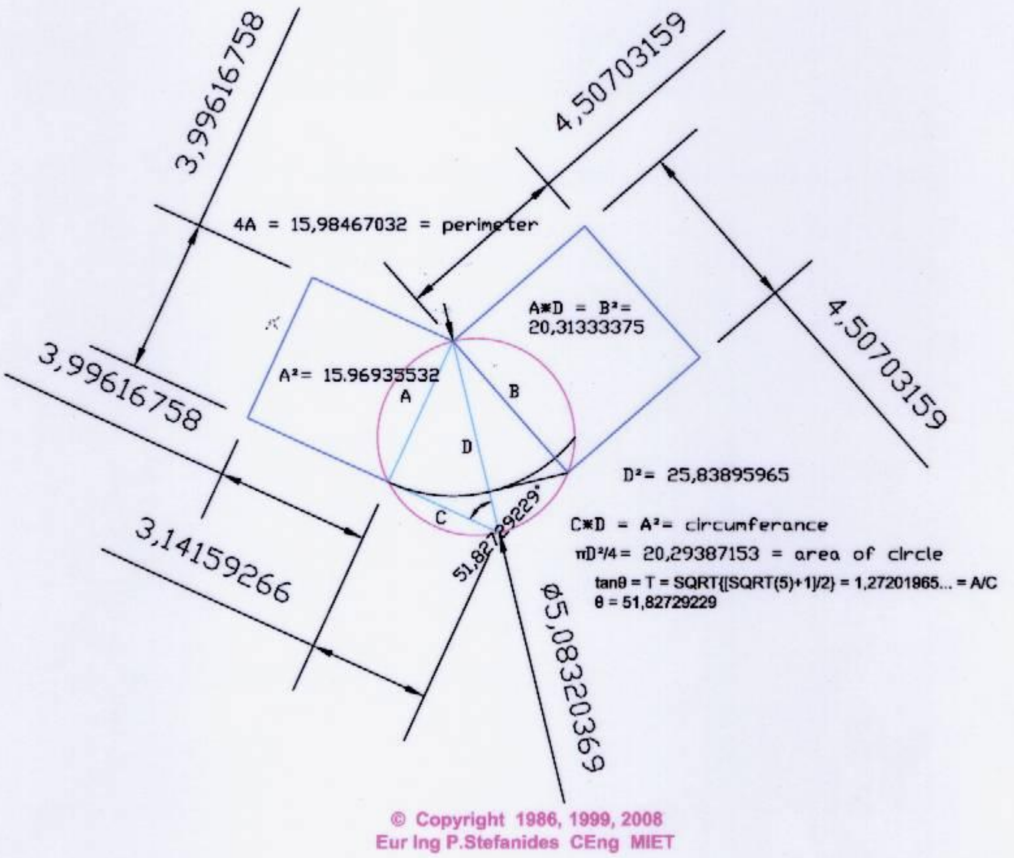
N.B.: $b1 > b2 > b3 > b4 > b5 > b6$

Figure 18

APPENDIX B


SYMMETRY FESTIVAL 2006
BUDAPEST HUNGARY
Quantization of Circle Duality
P. STEFANIDES "GOLDEN ROOT SYMMETRIES OF GEOMETRIC FORMS"


Ln[T]=Ln{SQRT[(sqrt5+1)/2]}=
= Ln[1,272019665]=0,240605913..
Copyright P. Stefanides 1999 - 2008
θ/90
exp(θ/90)
exp(θ/90*0,240605913)



3,99616758
4,50703159
4A = 15,98467032 = perimeter
A*D = B² = 20,31333375
A² = 15.96935532
A
B
D
C
3,99616758
4,50703159
D² = 25,83895965
C*D = A² = circumferance
πD²/4 = 20,29387153 = area of circle
tanθ = T = SQRT{[SQRT(5)+1]/2} = 1,27201965... = A/C
θ = 51,82729229
51,82729229°
3,14159266
Ø5,08320369
© Copyright 1986, 1999, 2008
Eur Ing P.Stefanides CEng MIET

$\tan\theta = T = SQRT\{[SQRT(5)+1]/2\} = 1{,}27201965... = A/C$

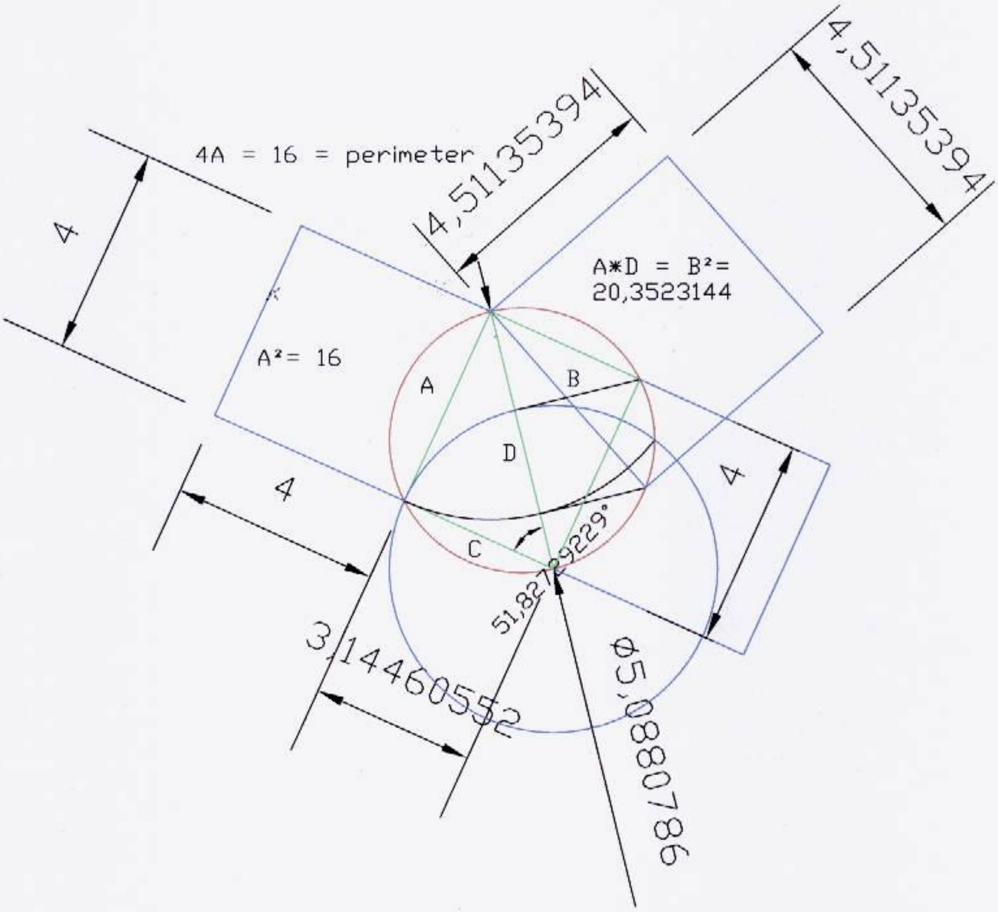
$\theta = 51{,}82729229$

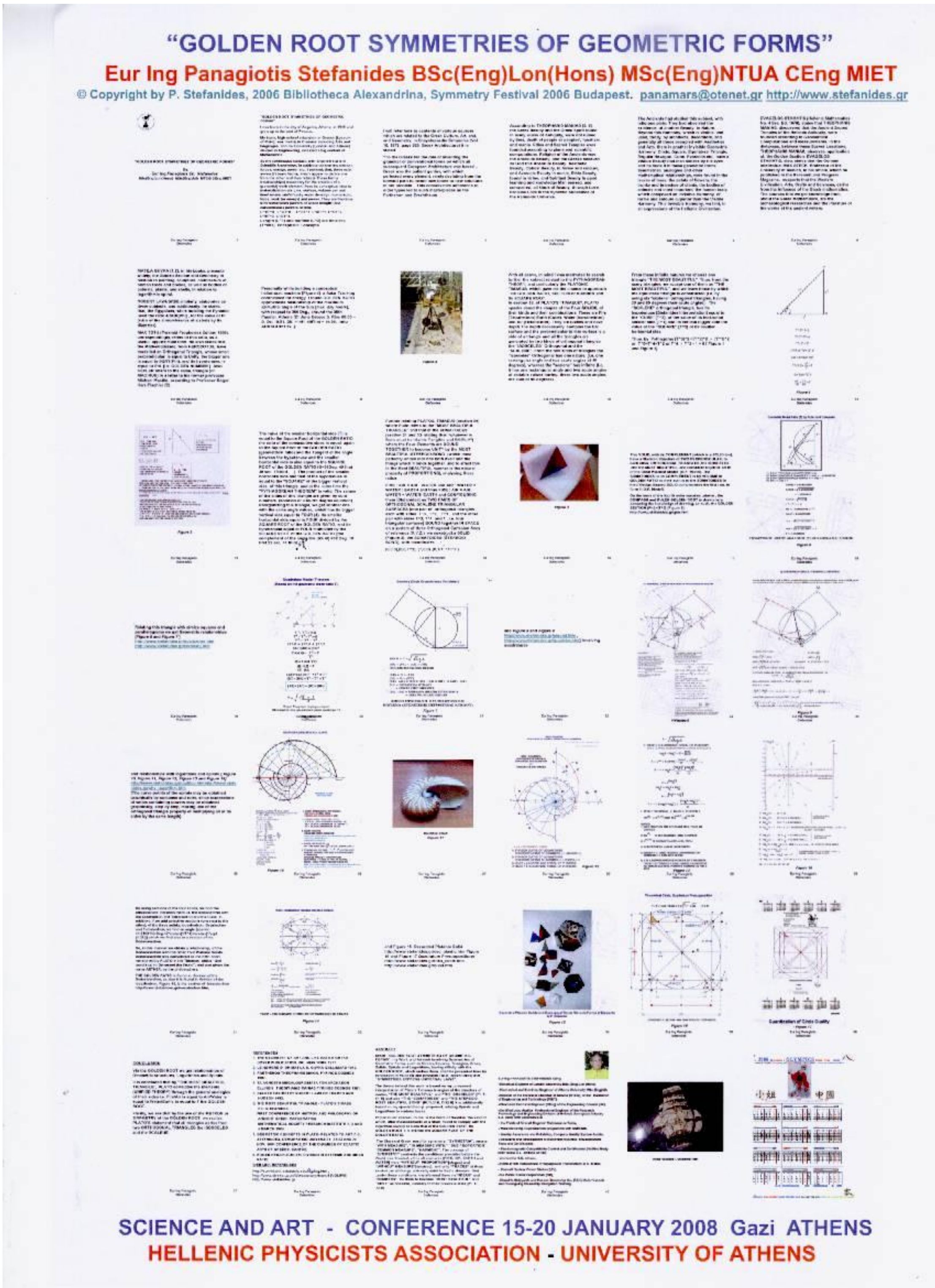
$D^2 = 25{,}88854384$

$C*D = A^2 =$ circumferance

$\pi D^2/4 = 20{,}3523144$ = area of circle

[for $\Pi=\Pi_{\Sigma x}=3{,}1446055...$




"GOLDEN ROOT SYMMETRIES OF GEOMETRIC FORMS"
Eur Ing Panagiotis Stefanides BSc(Eng)Lon(Hons) MSc(Eng)NTUA CEng MIET
© Copyright by P. Stefanides, 2006 Bibliotheca Alexandrina, Symmetry Festival 2006 Budapest. panamars@otenet.gr http://www.stefanides.gr
SCIENCE AND ART - CONFERENCE 15-20 JANUARY 2008 Gazi ATHENS
HELLENIC PHYSICISTS ASSOCIATION - UNIVERSITY OF ATHENS

The IET Today and Symmetries of the Platonic Triangle

Speaker: Professor Apostolos Kokkosis and Panagiotis Stefanides

Date 30 October 2008
iCalendar Entry (What's this?)

Time

18.45hrs - Arrival
19.00 - 19.30hrs - The IET Today by Professor Apostolos Kokkosis
19.30 - 20.15hrs - Symmetries of the Platonic Triangle by Panagiotis Stefanides, Manager, Hellenic Aerospace Industry

Location

TEE (Technical Chamber of Greece)
Karageorgis Servias 4 (STOA),
Lecture Room 5th floor,
Syntagma Square,
Athens.

The IET today', an introduction about IET, and the requirements in order to become MIET, CEng, IEng, Eng. Technician.

followed by

Lecture by Panagiotis Stefanides, Head of Standards and Certification EMC Hellas SA, affiliate Aerospace Industry S.A, titled “Symmetries of the Platonic Triangles” on the triangular shapes of the Four Elemental Bodies, of their kinds and their combinations.

ADDENDUM

BIOGRAPHY

Eur Ing **Panagiotis Chr. Stefanides** BSc(Eng) Lon(Hons)
MSc(Eng)Ath TEE CEng MIET,
Emeritus Honoured Member of the Technical Chamber of Greece

Born: 05. Jan..1945, Aigaleo, Athens.
Professional and Academic Qualifications:

- **[2002] Chartered Engineer of the Engineering Council (UK),**
- **[2002] Member of the IEE[IET] ,**
- **[1997] Certified Lead Auditor [Cranfield University],**
- **[1977] Member of the Technical Chamber of Greece TEE,**
- **[1975] Electrical and Mechanical Engineer of the Technical University of Athens,**
- **[1974] Electrical Engineer of the University of London .**

Professional Experience:

30 Jun 2010-1978 [HAI]
- **Electromagnetic Compatibility,Head of Standards and Certification, EMC Hellas SA, Affiliate of HAI,**
- **Research and Development,Lead Engineer, of the Electronic Systems Tests and Certification,**
- **Engineering Quality and Reliability Section, Lead Engineer, and HAI's Quality System Lead Auditor,**
- **Engines' Directorate Superintendent, Managed the Engineering Methods Division of the M53P2 Engine Nozzle Manufacturing, of the SNECMA- HAI Co-production, MANAGED Engineering Methods Section.**
- **Engines' Tests and Accessories Superintendent,**
- **Engines' Electrical Accessories Supervisor.**

1978-1974
- **G.E., Athens Representatives, Sales Engineer / Assistant Manager,**
- **Continental Electronics Dallas Texas, and EDOK-ETER Consortium Engineer, of a 2MW Superpower Transmitters'**
  installation Programme, in Saudi Arabia,
- **Chandris Shipyards Engineer and Vessel repairs Superintendent, Salamis Island.**

Training:
- **Public Power Corporation [GR], Sizewell Nuclear Power Station [UK], Oceangoing Steamship [S/S Chelatros] and Motor Vessels' Navigation [Celestial, Radio, Coastal] and Engines', of "Kassos" Shipping Co. Ltd. [R&K London].**

Presentations, Publications, Conferences, Awards :
http://www.stefanides.gr/Pdf/CV_STEFANIDES.pdf .
(C.V.) http://www.stefanides.gr

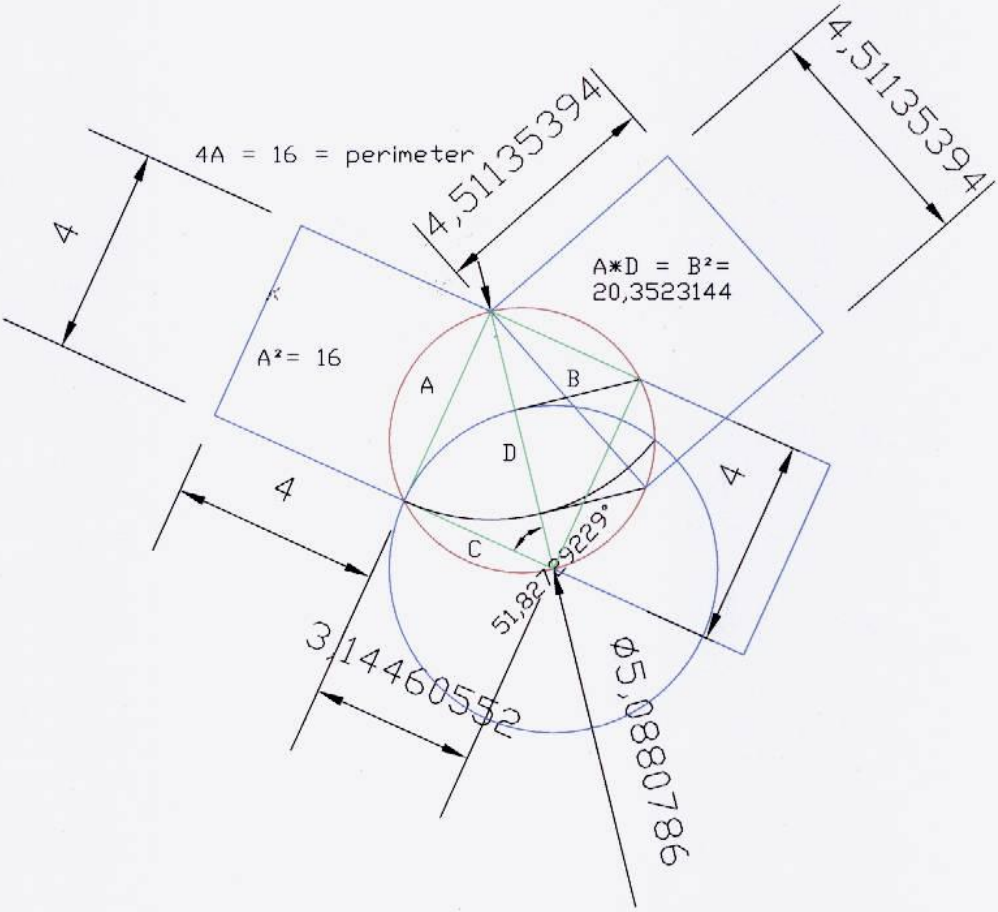
Latest paper issued to MEDPOWER 2008 [IET] in Thessaloniki [2-5 Nov. 2008] under the title:
"Compliance of Equipment in Accordance with an Adequate Level of Electromagnetic Compatibility",
Eur Ing Panagiotis Chr. Stefanides, Head of Standards and Certification EMC Hellas sa,Affiliate of Hellenic Aerospace Industry sa [HAI] 2-4, Messsogion Ave[Athens Tower], 11527 Athens, Greece.
http://medpower08.com/data/General%20Programme.pdf
http://www.youtube.com/pstefanides#g/u

$\tan\theta = T = SQRT\{[SQRT(5)+1]/2\} = 1,27201965... = A/C$
$\theta = 51,82729229$

$D^2 = 25,88854384$

$C*D = A^2 =$ circumferance

$\pi D^2/4 = 20,3523144 =$ area of circle
[for $\Pi = \Pi_{\Sigma x} = 3,1446055...$



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