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Pythagorean spiral design

A separate archimedes spiral analogue theodore spiral to a triangle with a hypotension of 17 {\displaystyle {\sqrt {17}}} In geometry, theodore spiral (also known as a square root spiral, Einstein spiral or Pythagorean spiral)[1] is a spiral consisting of right triangles, designed from edge to edge. It was named after Cyrene Teodoro. Construction Spiral begins with the right triangle of isolates, the length of each leg is a unit. Another right triangle is formed, the right triangle of automedicine, with one leg being hypotensis of the previous triangle (length √2) and the other leg - 1; the length of hypotension of this second triangle is √3. Then the process repeats; The nth triangle in the sequence is a right triangle with side lengths √n and 1 and the hypotension √n + 1. For example, the sides of the 16th triangle measure 4 (=√16), 1 and hypotension √17. History and exploitation Although all Teodoro's work was lost, Plato put Theodorus into his dialogue Theaetetus, which tells of his work. It is assumed that Theodore has proven that all non-square integers from 3 to 17 square roots are irrational in the Theodore spiral. [2] Plato Theodore does not command 2 square root irrationality, for he was well known before him. Theodore and Theaetetus divided rational numbers and irrational numbers into different categories. [3] Hypotension Each triangular hypotension hn provides a square root of an appropriate natural number with h1 = √2. Plato, curated by Theodore, questioned why Theodore stopped √17. Usually the reason is believed to be √17 hypotensis belongs to the last triangle, which did not coincide with the number. [4] Eric Teuffel, who coincided in 1958, proved that neither of the two hypotenses would ever match, regardless of how much the spiral would continue. In addition, if the sides of the length of the unit are expanded to the line, they will never pass through any other peaks of the entire number. [4] [5] Extension color extended spiral Theodore with 110 triangles Theodorus stopped its spiral triangle with √ 17 hypotension. If the spiral continues with an infinite number of triangles, much more interesting features are found. Growth rate Angle If φn is the angle of the nth triangle (or spiral segment), then: tanning (φ n) = 1 n . {\displaystyle \tan \left(\varphi _{n}\right)={\frac {1}{\sqrt {n}}}.} Therefore , the growth of the n-angle of the other triangle is:[1] φ n = (1 n) . {\displaystyle \varphi _{n}=\arctan \left({\frac {1}{\sqrt {n}\right).} The sum of the first corners of the k triangles is called the general angle φ(k) k triangle. It grows proportionally k square root and the limit correction term c2:[1] φ (k) = ∑ n = 1 k φ n = 2 k + c 2 (k) {\displaystyle \varphi _{n=1}^{k}\bellhi _{n}=2{\sqrt {k}}+c_{2}(k)}, where lim → ∞ c 2 (k) = - 2.157782996659 ... {\displaystyle \lim _{k\to \infty }c_{2}(k)=-2.157782996659\ldots } (OEIS: A105459). Triangular or spiral radius part Growth of the spiral radius in a given triangle n is Δ r = n + 1 – n . {\displaystyle \Delta r={\sqrt {n+1}}-{\sqrt {n}}.} Archimedes spiral Theodorus spiral roughly corresponds to archimedean spiral. [1] Just as the distance between the two Archimedean spiral windings equals the mathematical constant pi, as the number of rotations of the Theodore spiral is approaching infinity, the distance between the two consecutive windings quickly approaches the π.[6] The following table shows two spirals, approaching pi, winding: Winding No.: Estimated average winding distance Average winding distance Accuracy compared to π 2 3.1592037 99.4425 5% 3 3.143455 99.91245 453% 5 3.142395 99.97447% → ∞ → π → 100%As shown, only after the fifth winding distance is 99,97 % exact estimate to π.[1] Continuous curve Davis analytical continuation of theodore spiral, including expansion in the opposite direction from origin (negative nodes figures). The question of how to seamlessly interpolate the discrete Teodoro's spiral points was suggested and answered (Davis 2001, pp. 37–38) by analogy with the formula for euler gamma function as an interpolant of factoral function. Davis found the function T (x) = ∏ k = 1 ∞ 1 + i / k 1 + i / x + k (− 1 < x < ∞) {\displaystyle T(x)=\prod _{k=1}^{\infty }{\frac {1+i/{\sqrt {k}}}{1+i/{\sqrt {x+k}\qquad (-1<x<\infty)}, further investigated by its student leader[7] and Islands (annex to (Davis 2001)). The aximatic description of this function is given (Gronau 2004) as a unique function that corresponds to the functional equation f (x + 1) = (1 + i x + 1) ◄ f (x) , {\displaystyle f(x+1)==\left(1+{\frac {i}{\sqrt {x+1}\right)\cdot f(x),} initial condition f (0) = 1 , {\displaystyle f(0)=1,} and monotonous in both argument, both in the module; alternative conditions and weakenings are also being investigated. Alternative output is provided (Heuvers, Moak & Boursaw 2000). The continuation of Davis, a continuous form of theodore spiral, which extends in the opposite direction from the place of origin, is presented (Waldvogel 2009). In the picture, the original (individual) Teodoro spiral knots appear as small green circles. Blue are the ones that add in the opposite direction of the spiral. Only nodes n {\displaystyle n}with integer r n = ± | n | {\displaystyle r_{n}=\pm {\sqrt {|n|}}} are bound to the picture. Bar circle in the origin of coordinates O {\displaystyle O} is curvature circle O O} . See also Fermat's Spiral List of Spiral Links

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