An Empirical Discussion on Golden Ratio, Φ

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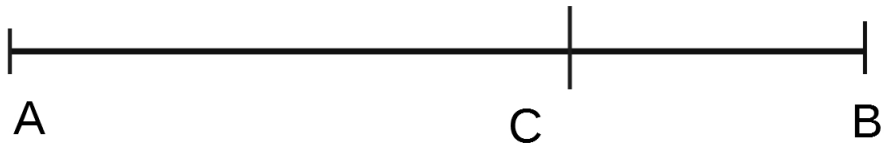
Golden Ratio, first depicted and described by Euclid in the golden age of Greek Knowledge, discusses about a fundamental characteristics in the number theory. A number is said to be in a Golden Ratio if their ratio is found to be same as the ratio of their sum to the larger of the two. The greek letter ϕ is used as the symbol of Golden Ratio. The value of ϕ is 1.61803398875. The number itself is irrational. The term "Golden" has been used as it is considered to be aesthetically pleasing and examples of the ratio can be drawn from the nature itself.

In terms of mathematics, the Golden Ratio can be described in many different ways. However, for the sake of simplicity, we must start from the first description of the ratio, as depicted by Euclid, the line segment theory. It goes in this way-



As can be seen from the image, length of AB is greater than that of AC and AC is greater than CB. if $AC : CB$ is equals to $AB : AC$, then we can conclude that the line has been cut in a Golden Ratio [1].

Problem 2

Interviewee- Niloy Eric Costa

He is a MSc candidate in Computer Science at York University. His supervisor is Manos Pappagelis and he is a member of the Data Mining Lab. He works in Interactive Data Visualization.

Q1. What are you researching on?

A1. I am working on Interactive Data Visualization.

Q2. Are there any other fields in Computer Science or Mathematics you are interested in?

A2. In the field of Mathematics I'm interested in Geometry and Number Systems and in the field of Computer Science I'm interested in Data Visualization, Database Systems and Data Mining.

Q3. Have you heard of any irrational constants in Mathematics?

A3. I have researched on some irrational constants like π,e,Khinchins Constant (K).

Q4. What do you know about Golden Ratio,Φ ?

A4. Well to explain it.Two quantities are in the golden ratio if their ratio is the same as the ratio of their sum to the larger of the two quantities. For quantities a and b such that $a > b > 0$,

$$(a + b)/a = a/b$$

Q5. Do you know when we celebrate phi day?

A5. Haha. Yeah, 18th June.

Q6. Phi is named after a Greek sculptor; do you know his name?

A6. Yes, Phidias.

Q7. Do you know any other names golden ratio is known by?

A7. Yes.It is known by the Golden Mean, Phi, the Divine Section, The Golden Cut, The Golden Proportion, The Divine Proportion, and tau(t).

Q8. How do you derive the value of golden ratio?

A8. By using the quadratic equation $x^2 - x - 1 = 0$

Q9. Can you tell us about any applications of Golden Ratio?

A9. The golden ratio is used mostly in the Geometry to create designs that are in proportions and are pleasing to the eye. It is not used as such in Mathematics directly but even the ratio of consecutive numbers in fibonacci series are close to the golden ratio.

Q10. Can you describe some uses of Golden Ratio in architecture and art?

A10. The Great Pyramids of Gaza, Parthenon in Athens, Michelangelo's The Creation of Adam on the ceiling of the Sistine Chapel and Da Vinci's Mona Lisa are some of the famous examples that use the Golden Ratio.

Q11. The ancient Egyptians used the golden ratio in their pyramids. At that time, the golden was known to them by another name, do you know the name?

A11. The Sacred Ratio.

Q12. Do you know about any other fields golden ratio is claimed to appear?

A12. The golden ratio is claimed to appear in many fields, such as cosmology, theology, arts, architecture, botany and others.

Q14.Would you like to include Irrational constants like Golden ratio in the calculator?

A14. Yes. I would prefer it.

References

[1] Mario Livio. *The golden ratio: The story of phi, the world's most astonishing number*. Broadway Books, 2008.