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USING OF FIBONACCI SEQUENCE

The subject of the article is the analysis of the Fibonacci sequence as an object of mathematical theory. Archimedes, I. Tytsyus, Johann Goethe and many other prominent thinkers and scientists paid much attention to studying of Fibonacci sequence.

Named after Fibonacci, also known as Leonardo of Pisa or Leonardo Pisano, Fibonacci numbers were first introduced in his «Liber abaci» in 1202. The son of a Pisan merchant, Fibonacci traveled widely and traded extensively. Math was incredibly important to those in the trading industry, and his passion for numbers was cultivated in his youth [2].

The Fibonacci sequence is a series of numbers, where a number is found by adding up the two numbers before it. Starting with 0 and 1, the sequence goes 0, 1, 1, 2, 3, 5, 8, 13, 21, 34 and so forth. Written as a rule, the expression is $x_n = x_{n-1}+x_{n-2}$.

Fibonacci first noted the sequence when pondering a mathematical problem about rabbit breeding. Beginning with a male and female rabbit, how many pairs of rabbits could be born in a year? The problem assumes the following conditions:

1. Begin with one male rabbit and female rabbit that have just been born.
2. Rabbits reach sexual maturity after one month.
3. The gestation period of a rabbit is one month.
4. After reaching sexual maturity, female rabbits give birth every month.
5. A female rabbit gives birth to one male rabbit and one female rabbit.
6. Rabbits do not die.

This is best understood in the diagram.

This continues until a year has passed, in which there will be 233 pairs of rabbits [1].

Though the rabbit question may pose completely unrealistic conditions, Fibonacci numbers do actually appear in nature, from sunflowers to hurricanes and galaxies. Sunflower seeds, for example, are arranged in a Fibonacci spiral, keeping the seeds uniformly distributed no matter how large the seed head may be.

A Fibonacci spiral is a series of connected quarter-circles drawn inside an array of squared with F-numbers for dimensions. The squares fit perfectly together because of the nature of the sequence, where the next number is equal to the sum of the two before it. Any two successive F-numbers have a ratio very close to the

Golden Ratio, which is roughly 1.618034. The larger the pair of Fibonacci numbers is, the closer is the approximation. The spiral and resulting rectangle are known as the Golden Ratio [3].

The Golden Ratio is denoted by the Greek letter phi. Greek architects used the ratio 1: phi as an integral part of their designs, including the Parthenon in Athens. Though this was not consciously used by Greeks or artists, the Golden Rectangle does appear in the Mona Lisa and other Renaissance art works. Phi is also the ratio of the side of the regular pentagon to its diagonal. The resulting pentagram forms a star, which is the star seen of many flags [1].

Our further research will be devoted to more detailed studies of using of Fibonacci numbers in trading.

LITERATURE

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