

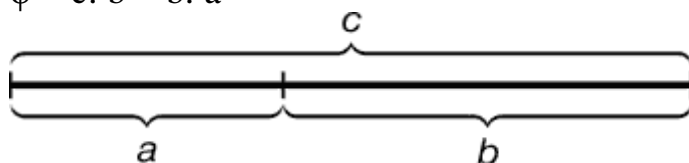
## **HARMONY IN MATHEMATICS**

Since ancient times people, studying Mathematics, tried to prove not only bare mathematical facts and theorems but also find certain harmony. In fact a man always aspires to harmony. Consequently people noticed certain ratio which is named the golden. Such an amazing proportion we can find in any sphere of our life: in science, technologies, art and even in nature. The principle of the golden ratio has a large value and that is why it is considered to be the highest manifestation of the whole structural perfection and its parts.

The golden section is such a proportional division of the segment into equal parts, in which the entire segment refers to a bigger part, as a bigger part refers to a smaller one [2].

If we write it into the mathematical language, then we will have

$$\varphi = c : b = b : a$$



The number  $\varphi$  is sometimes called the "golden number" and it is  $\approx 1,618$ .

The notion of the golden section will be incomplete, if we don't mention about the spiral. The form of twisted spiral shells attracted the attention of Archimedes.

People noticed the helical and spiral arrangement of leaves on the branches of trees long ago. The spiral was seen in the arrangement of sunflower seeds, in cones of pine, pineapple, cactus, etc. Spider weaves web spiral too. DNA molecule is twisted in the form of a double helix. Goethe called spiral "curve of life". The golden section proportion is shown in these examples in parts perpendicular to the direction of its growth. Nature made the division into symmetrical parts and golden ratio by itself. We can see the repetition in parts of the structure [1].

Another object of the study was the human body and then scientists identified several major gold proportions of the body:

- the distance from the fingertips to the wrist and from the wrist to the elbow is 1: 1.618
- There are a lot of examples of proportions in facial features, which are close to the formula of the golden section. The golden section in a human face is considered to be the criterion of a perfect beauty.
- the distance from the tip of the chin to the top of the eyebrows and from the top line of the eyebrows to the top is 1: 1.618
- the distance from the tip of the chin to the tip of the upper lip and from the tip of the upper lip to the nostril is 1: 1.618[1].

Of course, this is not a full list, but scientists understood one important thing: the principle of the golden section we can find everywhere and in everything that nature created. So our bodies can be considered to be ideal.

The components of galaxies are in the shape of the spiral too. Periods of the solar system planets are subordinated to the principle of the golden section.

The formula of the golden section and the golden proportions are well known to all creative people, because these are the main rules of aesthetics. Any work of art, designed in strict accordance to the proportions of the golden section, is perfect in terms of aesthetics [2].

So, it is easy to see that even such a science, as Mathematics, has beauty and harmony, that our body and everything that was created by nature is close to ideal. But even things which were created by man like a masterpiece of art, architecture, art, photography and etc. can be ideal if the object was created in accordance to the principle of the golden section.

### **LITERATURE**

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2. А. Азевич "Двадцять уроків гармонії". – М., "Школа-Пресс", 1998.