TEXTILE DESIGN ON THE BASE OF THE GOLDEN GEOMETRY AND BULGARIAN NATIONAL TRADITION

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Abstract: The Golden and Fibonacci geometry forms are symbols of beauty and harmony. The shapes and symbols in the national traditions are always a source of creative ideas. The paper presents textile designs on the base of creations from the Golden and Fibonacci geometry and Bulgarian national tradition. Fourteen textile design project are presented with the use of the Golden spiral in the Golden square, Fibonacci series tiling with equalitarian triangles named Fibonacci rose and the spiral square with four Golden spirals from the Golden and Fibonacci geometry, and the three turtles – symbols from Kolobar tradition in Bulgarian national culture. The forms from the Golden and Fibonacci geometry are used directly as ornaments, constructional elements for ornaments, or as frames for entered elements. The symbols from Kolobar tradition are used directly as ornaments. Every design is presented in suitable two, three or four color model. The used geometrical forms from the Golden geometry and the Bulgarian national tradition are the base for successful textile design using the mirror, radial and translated symmetry and the plain rhythms as result from their combinations. The design is more successful when the geometrical ornaments are combined with suitable colors according to the connections between colors and lines on the base of their meaning, the latest fashion trends, and national traditions.

Key words: textiles, the Golden spiral, Fibonacci rose, the spiral square, Kolobar tradition.

1. INTRODUCTION

There are so many geometrical forms, which are created on the base of the Golden and Fibonacci geometry. There are very interesting geometrical symbols and shapes in Bulgarian folklore and national tradition. The paper presents design of textiles with geometrical ornaments on the base on creations from the Golden and Fibonacci geometry and Bulgarian national tradition.

2. THE GOLDEN AND FIBONACCI FORMS

Figures from 1 to 5 present geometrical forms, which are created on the base of the Golden and Fibonacci geometry. These creations are used for design of textile ornaments, parts of which are shown in this paper.

2.1 The Golden Spiral

The Golden spiral, presented in Figure 1, is created in the frame of a rectangle with sides in proportions of the Golden ratio or 1,618. For the creation of the spiral the rectangle is divided in a square and a rectangle. The smaller rectangle is divided in a square and a rectangle, and that

continues in a spiral direction. Squared circles are entered in every square and by that way the Golden spiral are created. [1]
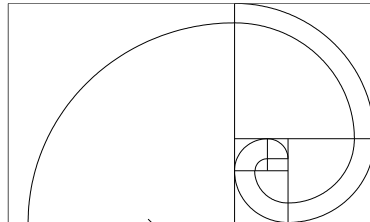

Fig. 1: The Golden spiral in the Golden rectangle

2.2 Fibonacci Rose

Fibonacci sequence is a sequence of numbers, in which every next number is a sum of previous two ones. Geometrical mosaics from equalitarian polygons have been created with proportions between sides, which are equal to Fibonacci sequence. The tiling with equalitarian triangles is named Fibonacci rose. Fibonacci rose, in which the triangle tiling forms two spirals, is presented in Figure 2. [2]
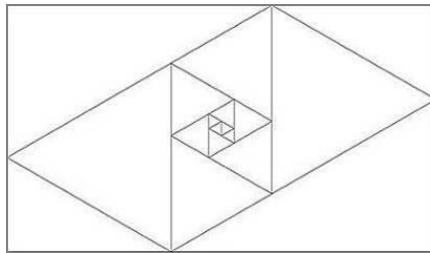

Fig. 2: Fibonacci rose

2.3 The Spiral Rectangle

Figures 3, 4, and 5 present variants of geometrical ornaments, created on the base of the spiral square (Figure 3). [3] The spiral square includes four logarithmic or Golden spirals.
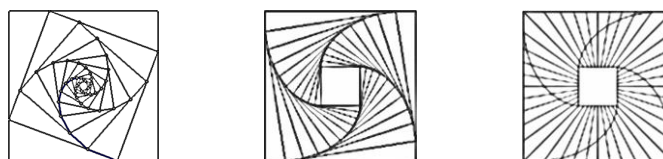

Fig. 3, 4, and 5: Variants of geometrical ornaments, created on the base of the spiral square

3. GEOMETRICAL CREATIONS IN BULGARIAN NATIONAL TRADITION

One of the main symbols in Bulgarian national culture, especially in Kolobar tradition, is the Turtle. The Kolabar tradition includes three turtle, which symbolize the universe, the stars and the planets. [4] The three turtles are presented in Figures 6, 7, and 8. These symbols are used as ornaments in textile design, presented in the paper.
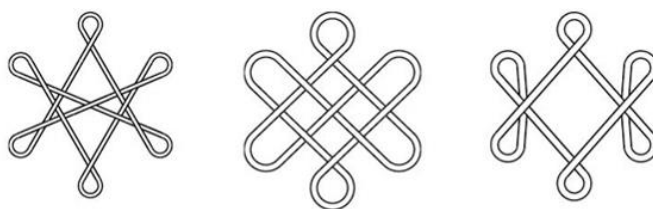
Fig. 6, 7, and 8*: The three turtles*

4. TEXTILE DESIGN ON THE BASE OF THE GOLDEN AND FIBONACCI FORMS

4.1 Textile Design with the Golden Spiral

Figures 9-13 present textile designs with ornaments, which are created on the base of the Golden spiral. Presented designs use three color models.

The textile designs, shown in Figures 9-11, are formed by ornaments in square shapes, which are designed with four Golden spirals arranged around a center using a radial symmetry or a radial rhythm. The square ornaments are set in order of a plain rhythm, formed by two perpendicular linear rhythms, based on symmetry of translation.

In the design, presented in Figure 9, the ornament is formed as the start points of the spirals are situated close to the angles of the square and the biggest arcs of the spirals are located close to the center of the radial symmetry or the radial rhythm.

In the design, which is shown in Figure 10, the ornament is created as the start points of the spirals are situated close to the centers of the square sides and the last point of the biggest arcs of the spirals are situated in the angles of the squares.

In the design, which is presented in Figure 11, the ornament is formed as the start points of the spirals are situated close to the angles of the square, the biggest arcs are located close to the centers of the square sides, and the last point of the biggest arcs are located near to the center of the radial symmetry or the radial rhythm.
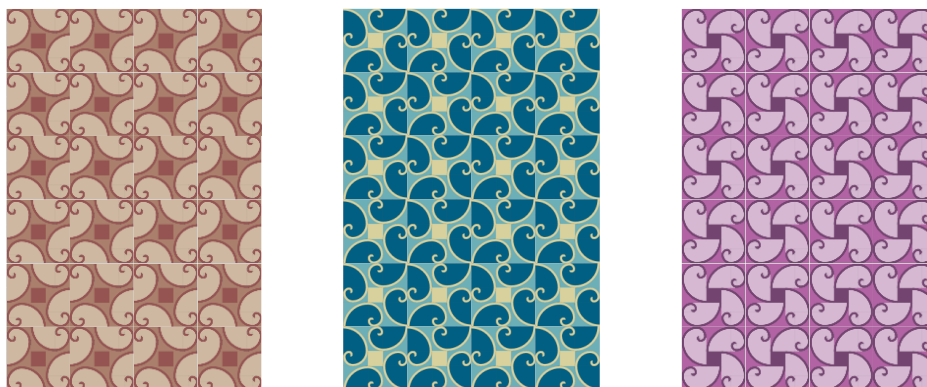

Fig. 9, 10, and 11*: Textile design on the base of square ornaments designed using four Golden spirals arranged by a radial symmetry or a radial rhythm*

The Golden rectangle and the Golden spiral can be used as a frame for entered geometrical elements. Figures 12 and 13 show textile designs formed on the base of an ornament which is created on the base the Golden rectangle and the Golden spiral, and entered diagonals in the squares

in the rectangle. The diagonal lines are chords of the arcs of the Golden spiral. The ornament is designed in three color model. [5]

In the textile design, which is shown in Figure 12, at fists the ornament is arranged in the mirror symmetry. In results a secondary ornament in form of a hearth is designed. The secondary ornaments are set in order of a plain rhythm, formed by three linear rhythms or a triangle net.

In the design, presented in Figure 13, the ornament is arranged with the help of a radial symmetry or a radial rhythm in a secondary square ornament in a form of a flower. The secondary square ornaments are set in order of a plain rhythm, formed by two perpendicular linear rhythms, based on symmetry of translation.
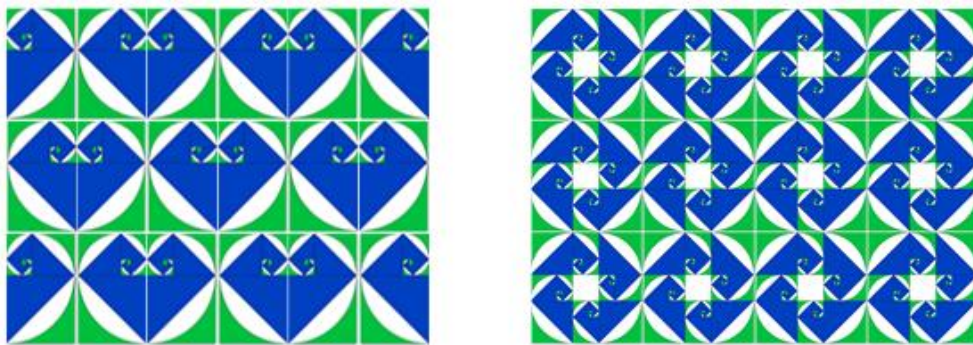

Fig. 12 and 13: Textile designs on the base of ornament with entered diagonals in the frame of the Golden rectangle and the Golden spiral

4.2 Textile Design with Fibonacci Rose

Figures 14-16 present textile designs with ornaments, which are created on the base of Fibonacci rose. Presented designs use two and three color models.
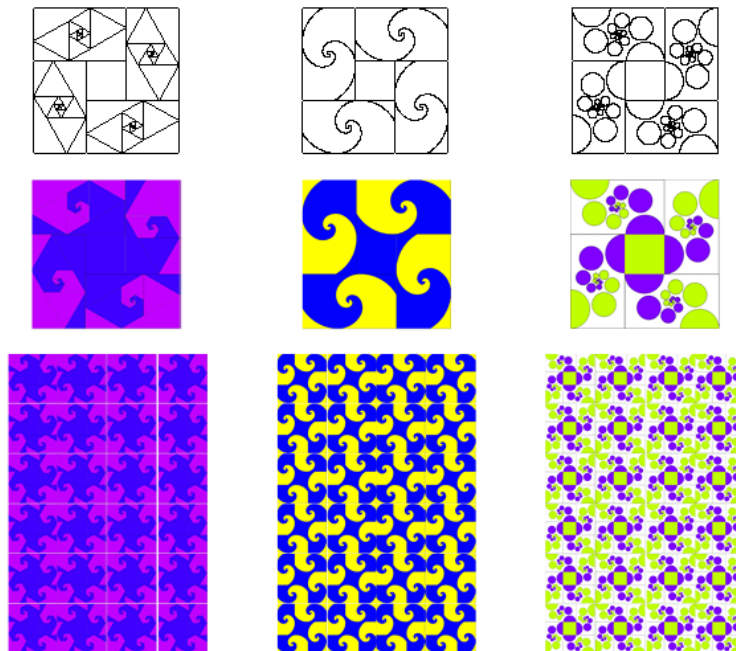

Fig. 14, 15, and 16: Textile design on the base of square ornaments designed using four Fibonacci Roses arranged by a radial symmetry or a radial rhythm

The ornaments in textile designs in Figures 14-16 are in square shapes, which are designed with four Fibonacci roses or geometric elements created on the base of Fibonacci rose arranged around a center using a radial symmetry or a radial rhythm. The square ornaments are set in order of a plain rhythm, formed by two perpendicular linear rhythms, based on symmetry of translation.

In the design, presented in Figure 14, the both spiral areas, which are formed with triangles in Fibonacci rose, are colored in different colors.

The design, shown in Figure 15, use double curved spiral, created on the base of the triangles' spiral forms in Fibonacci rose. The areas between both curved spirals are colored in different colors. [6]

The design, presented in Figure 16, use double circles' spiral, created on the base circles entered in the triangles of Fibonacci rose. The both circles' spirals are colored in different colors. [6]

4.3 Textile Design with the Spiral Square

Figures 17-19 present textile designs with the Spiral squares as ornaments in three and four color models.

In the textile design, presented in Figure 17, the spiral squares are arranged in a square set by a plain rhythm which is result of two perpendicular linear rhythms on the base symmetry of translation.

In the textile design, presented in Figure 18, the spiral squares are arranged with the help of a plain rhythm, which is a result of repeated mirror symmetries in both perpendicular directions.

In the textile design, shown in Figure 19, the spirals squares are set in a plain rhythm which combines the mirror symmetry in the one of the both linear rhythms, and the symmetry of translation in the other perpendicular linear rhythm.

Fig. 17, 18, and 19: *Textile design on the base of the spiral square using the radial symmetry and the symmetry of translation*

5. TEXTILE DESIGN ON THE BASE OF SYMBOLS IN BULGARIAN NATIONAL TRADITION

Figures 20-22 present textile designs on the base of the turtles from Kolobar tradition, part of Bulgarian national culture, which are presented in Figure 6-8. The turtles are used directly as ornaments in a plain rhythm, formed by two perpendicular linear rhythms, based on symmetry of translation. The geometry of the ornaments is combined with colors, which are traditional for Bulgarian national costume. [7]
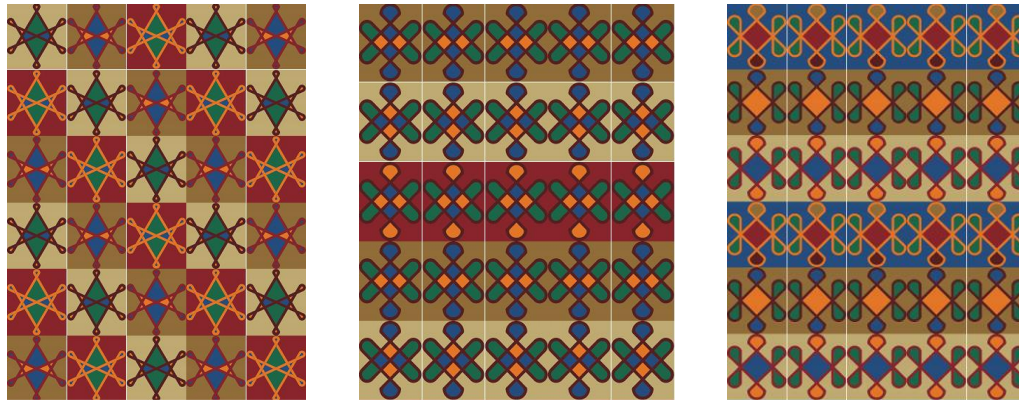
Fig. 20, 21, and 22*:*
Textile design on the base of the turtles from Kolobar tradition, a part of Bulgarian national culture

6. CONCLUSIONS

The presented geometrical forms from the Golden geometry and the Bulgarian national tradition are the base for successful textile design using the mirror, radial and translated symmetry and the plain rhythms as result from their combinations.

The design is more successful when the geometrical ornaments are combined with suitable colors according to the connections between colors and lines on the base their meaning, the latest fashion trends, and national traditions.

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