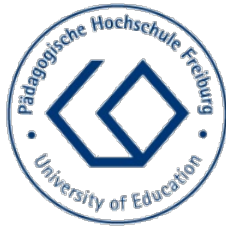


Selected Student Projects at Partner Universities (Part 2)



Hochschule Reutlingen
Reutlingen University



Learning Objectives

After this lecture you should be able to:

- Design clothing applying sustainable long life fashion elements: drapes, other 3D elements and peplums.
- Design clothing using sustainable proportions, based on the golden ratio and Fibonacci sequence.
- Make correct patterns of draped clothes using easy calculations.
- Make correct patterns of 3D peplum dresses.
- Create minimizing waste designs on the base on the golden ratio and Fibonacci sequence tilings.

Students projects

The theme includes selected results of PhD and MSc Theses in the fields of Fashion Design and Pattern Making of students at the Faculty of Technologies of Yambol, Trakia University, Bulgaria:

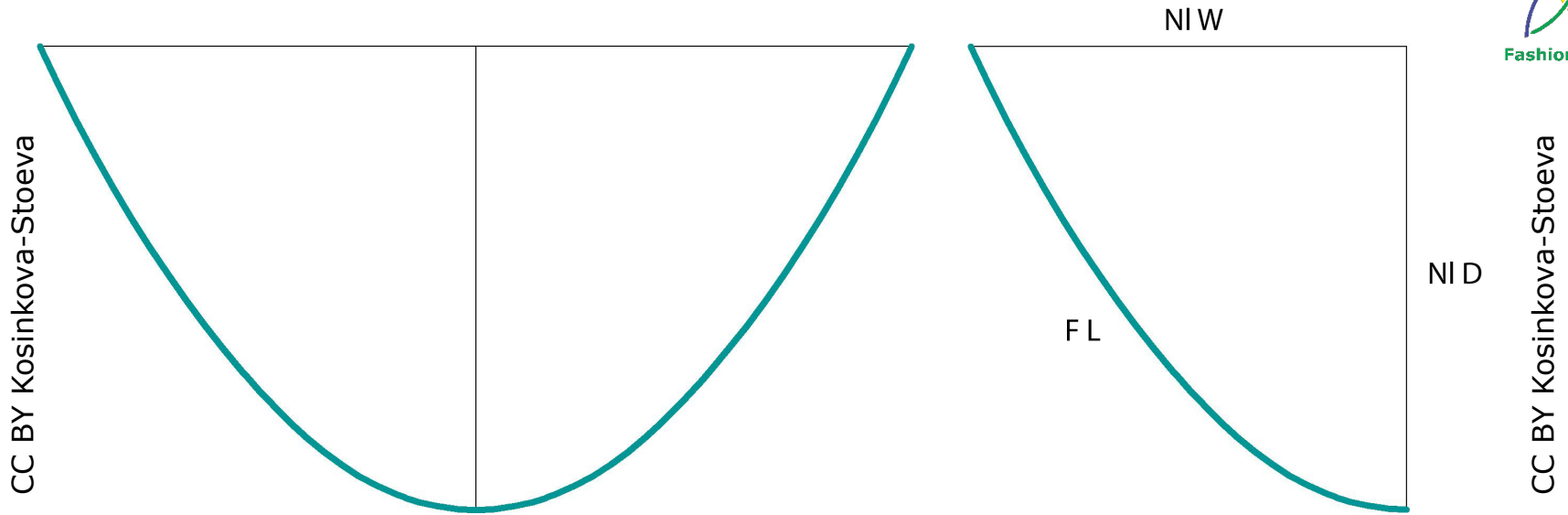
Petya Dineva, Tanya Peneva, Angelina Kosinkova-Stoeva, Krasimira Radieva, Irina Ruseva, and Krasimira Genova.

Draped neckline

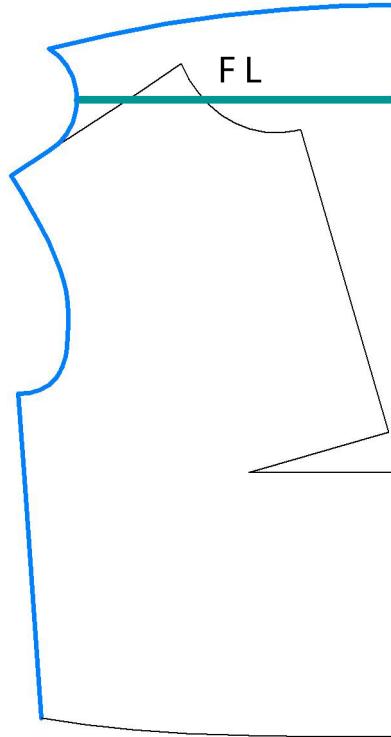
The pattern making of clothes with sustainable fashion element of draped neckline is improved by a formula of calculation of the length of the main drape fold. The equation is based on a connection with the neckline width and neckline depth and gives opportunities of correct and easy pattern design with variety of sizes of the width and deepness of the draped neck opening.



CC BY Kazlacheva



The form of the main drapery fold, when the draped neckline garment is worn, is presented: F L is the length of the half drapery fold; NI W is the half neckline width; and NI D is the neckline depth.



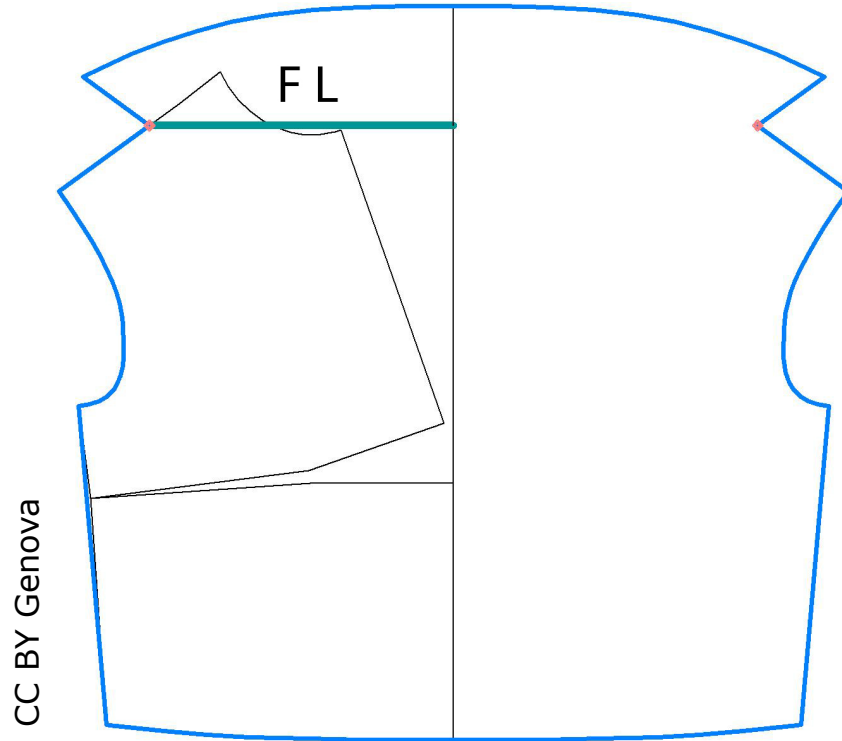
The equation for calculation of the length of the main drape fold is:

$$F L = 0,7 \cdot N I W + 0,8 \cdot N I D,$$

where $F L$, cm is the length (half length) of the main drapery fold (the neckline roll line); $N I W$, cm – the width (half width) of the neckline; and $N I D$, cm – the depth of the neckline.

If a knitted fabric is used, the formula of main drape calculation is:

$$F L = 0,63 \cdot N I W + 0,85 \cdot N I D.$$



CC BY Genova

The calculation of the main drapery fold length FL can be implemented in the construction through additional opening in darts or other opening between parts of the constructional base, or through the curved line, which forms the shoulder. For example, in the previous slide F L is implemented in the pattern through the shoulder curve. In the left figure, FL is a results of additional opening in rotated dart.

Draped neckline in sustainable proportions

How to combine the pattern design of the clothes with sustainable long life fashion element of draped neckline with the sustainable proportions based on the golden ratio and Fibonacci sequence? The ratio between the neck opening width and depth can be in Golden or Fibonacci proportions. For example, if the golden proportion is applied, the formula of sizing of the main drapery fold in garments from woven fabrics is transformed in:

$F L = 1,7 \cdot N I W$, if the neckline width is bigger than the neckline depth;

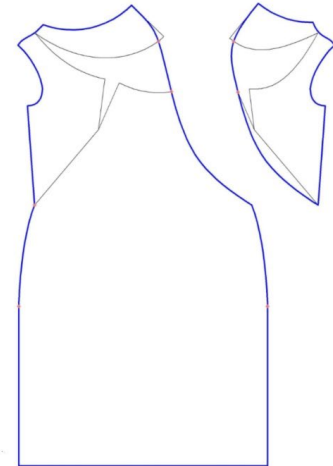
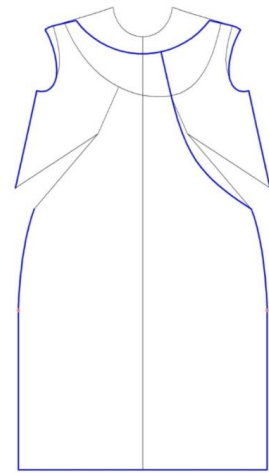
$F L = 3,3 \cdot N I W$, if the neckline width is smaller than the neckline depth.

In both formulas:

$F L$, cm is the main drapery fold half length; and $N I W$, cm – the neckline half width.

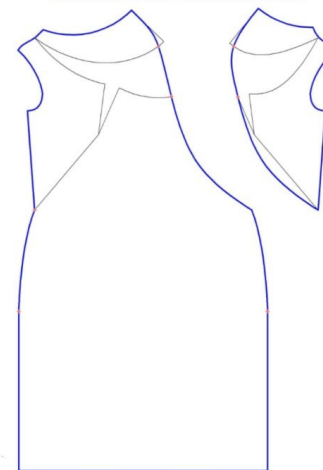
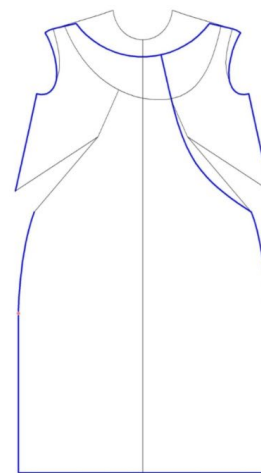
Asymmetric draped neckline

Similarly to the symmetric draped neckline, the pattern making of clothes with asymmetric draped neckline is improved by a formula of calculation of the length of the main drapery fold. The equation is presented in the next slide.



$$F L = 0,5 \cdot NI W + 0,9 \cdot NI D + 0,14 \cdot \alpha - 12,$$

where $F L$, cm is the length of a part of the main drapery fold; $NI W$, cm – the half width of the neckline; $NI D$, cm – the depth of the asymmetric neckline or the main drape fold depth; and α , ° – the angle of the direction of the line between the middle of the neckline width and the deepest point or point of intersection between the main drape fold and the seam or the lower dart of forming of drapery.



Twist knot drape clothes from knitted fabrics

The system of pattern design of clothes with the sustainable long life fashion element of twist knot drape is adapted for knitted fabrics. The difference between pattern making system of twist knot drape garments from woven fabrics and this one for knitted fabrics is the formula of mathematical dependence between the diameter of the knot and the width of the draped pieces in the place of twist.



The formula of mathematical dependence between the diameter of the knot and the width of the draped pieces in the place of twist is very important. Its applying leads to good looking drapery folds with appropriate volume and number of them, result by good looking knots, which are neither too tight nor too loose. Both variants of the formula are:

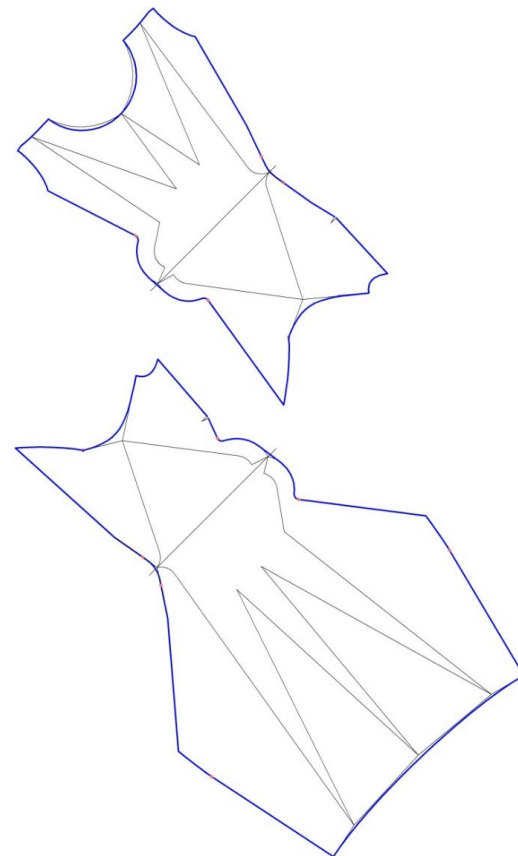
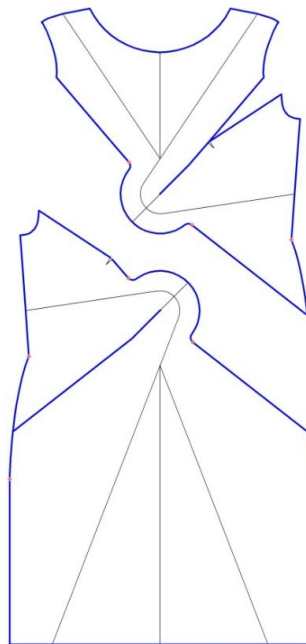
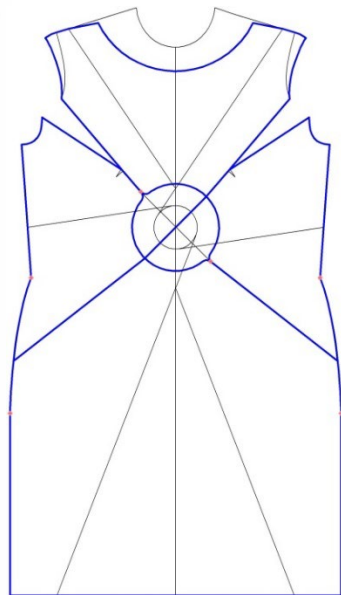
$$W = 6,5 \cdot D - 20,$$
$$D = 0,14 \cdot W + 3,5,$$

where W , cm is the widths of the draped pieces in the place of twist; and D , cm - the diameter of the knot. Depending on the design idea, a variant of the formula is used.

The pattern making of the dress, shown in the photography, is presented in the next slides.



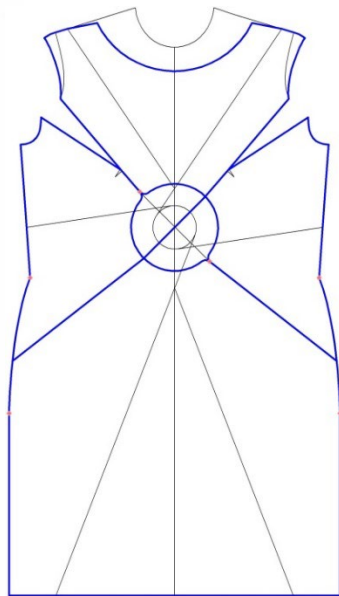
CC BY Kazlacheva



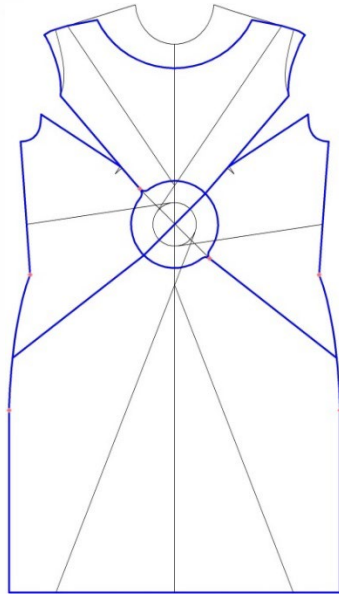
CC BY Kazlacheva

A diameter of the knot $D = 7,0$ cm is chosen. The width of the draped pieces in the place of twist $W = 25,5$ cm is determined by equation $W = 6,5 \cdot D - 20$. The circle of the knot with diameter $D = 7,0$ cm is drawn with center located on the front middle line between the line of waist and the bust dart apex. The seams of joining of the both twisted pieces connect to the circle of the knot and form a diagonal between right armhole and the left seam in the part between waist and hip. The seams of drapery fixing are connected in the center of the knot circle and form a diagonal between left armhole and the right seam in the part between waist and hip.

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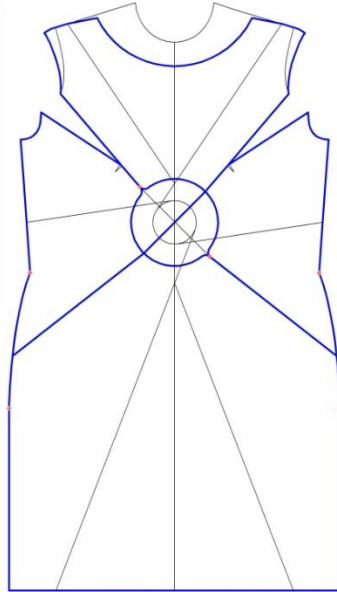


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The bust darts are transformed in the both diagonal lines, which are connected with armholes. The diagonal directions minimize the lengths of seams which is very important for clothing from knitted fabrics. A second circle is drawn with the center of the knot circle but with diameter which is half of the diameter of the knot. The dividing lines, which determine the places of additional volume for drapery, are tangents to the smaller circle.

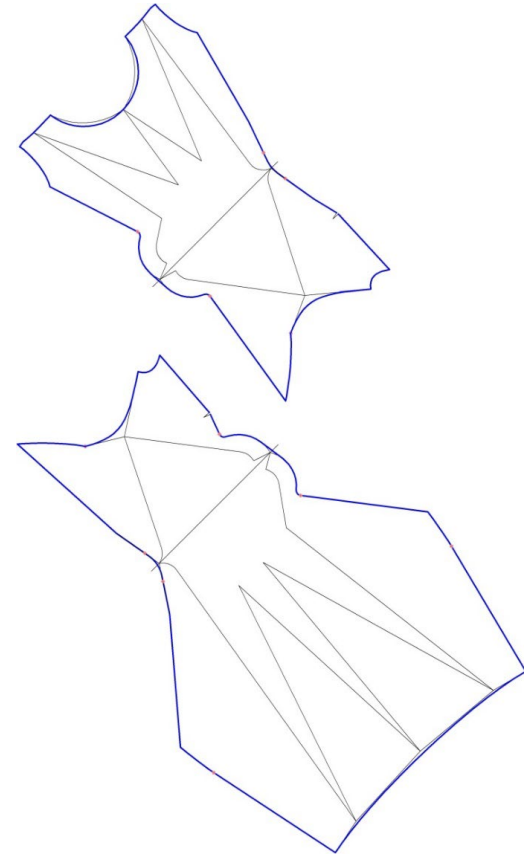
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Because vertical draperies are directed to the areas of big open contours – the neckline and hip, three lines of division are used for vertical draperies which are directed to the neckline and shoulders, but only one of them is tangent to the smaller circle, and three lines of division are used for vertical draperies which are directed to the hip, but only one of them is tangent to the smaller circle.



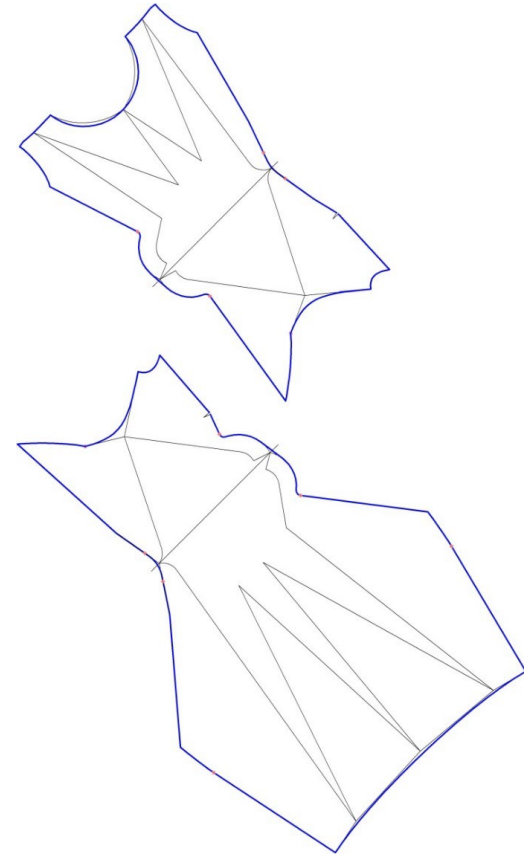
The pattern of the draped pieces are results of additional openings for drapery volume, which sizes the width of the draped pieces in the place of twist $W = 25,5$ cm. The additional openings are made in the lines of division after rotation around points of connection of dividing lines and contours, which in presented design are the neckline, shoulders, side seams, and hip.



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After the additional opening the upper and lower parts of the draped piece are connected each other on a line in diagonal direction, which determines the place of twisting. The diagonal direction is important for clothing from woven fabrics because of stretch in skew direction, which makes better looking drape folds. It is not required for clothes from knitted fabrics, because they have stretch in every direction and the orientation of the patterns in diagonal direction can be seen as an example.



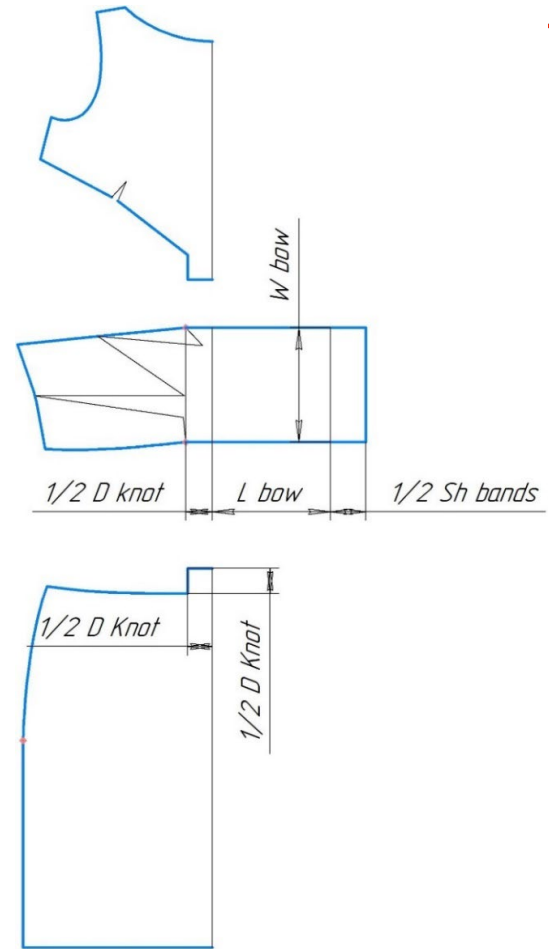
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Twist clothes

A prototype and front patterns of a women's twist dress, in which a knot with a single twist makes a bow, are shown. This twist can be seen as a variant of twist knot drape. The bands of the bow are constructed with modification of the darts and additional openings.



Fashion DIET

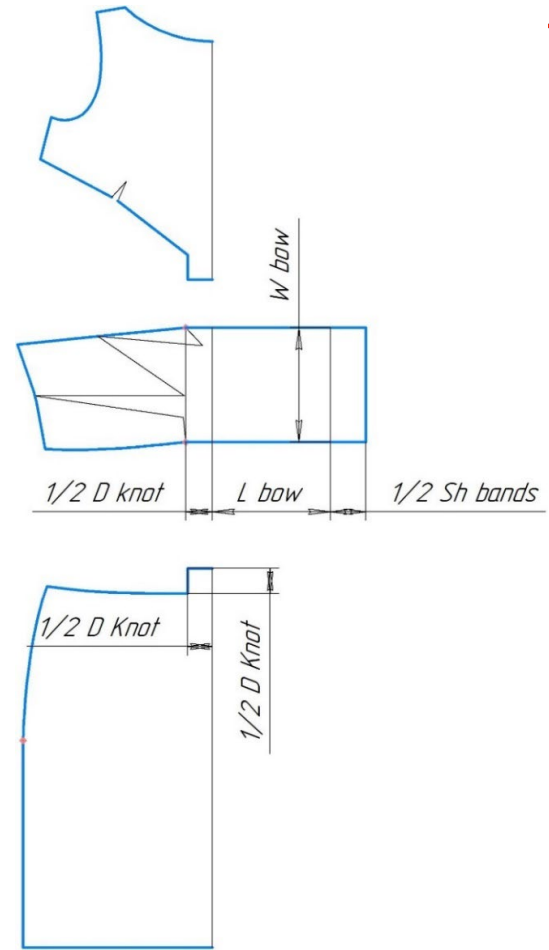


CC BY Kazlacheva, Radieva

A dependence between the diameter of the knot D_{knot} and the width of the bands of bow in the place of twisting W_{bow} is important and useful, because it gives possibility for variety of designs with different values of the knot diameter and the width of the bow's bands.



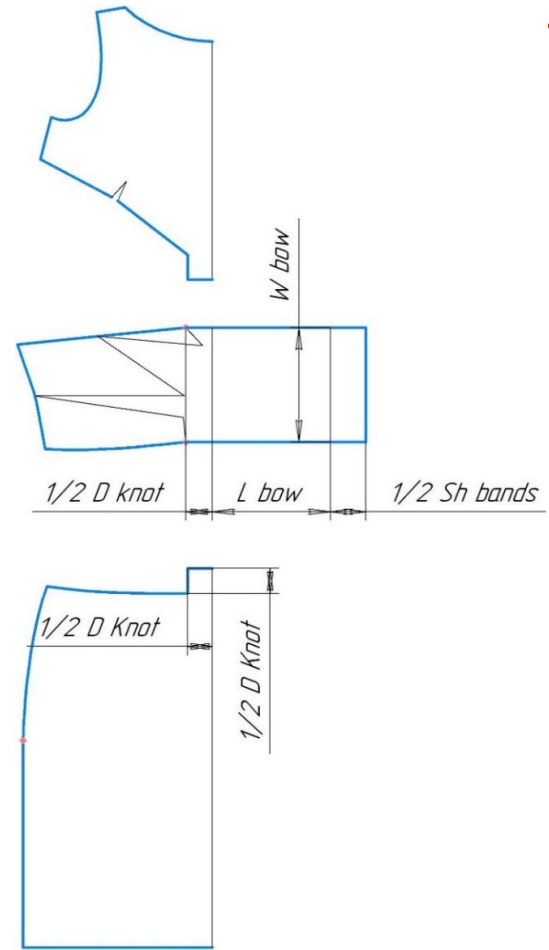
Fashion DIET



It is important for the constructing too because if the bow is embedded in a part of a cloth, the width of the place between both bow's bands have to be equal to the diameter of the single twist knot. The equal width and diameter make good looking knot, which are neither too tight nor too loose, and do not allow untying the knot.



Fashion DIET

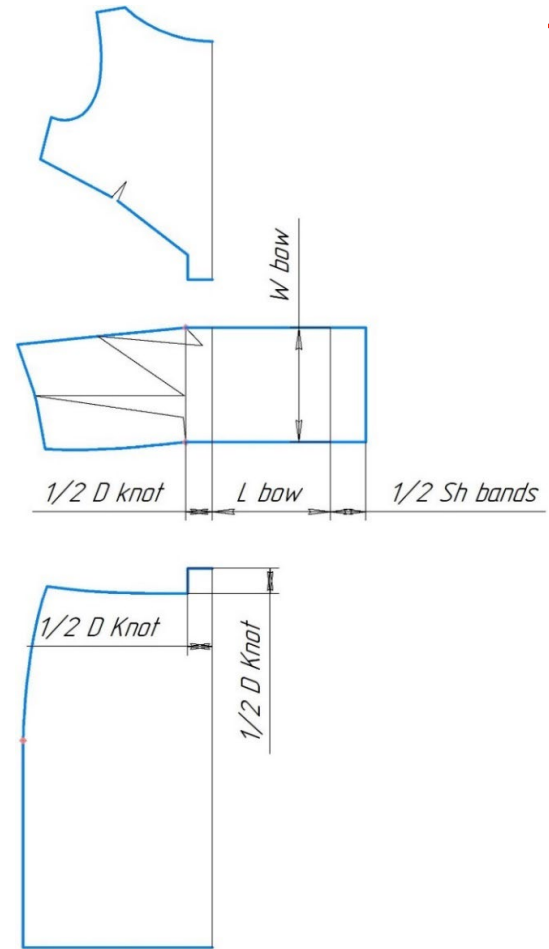


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A dependency of determination of difference between the length of the bands before and the length of the bands after twist L_{bow} or the shortening of the lengths of the bands after twisting Sh_{bands} is important and useful too, because it gives possibility of correct determination of the lengths of bow's bands after and before twisting.



Fashion DIET



Both dependences are:

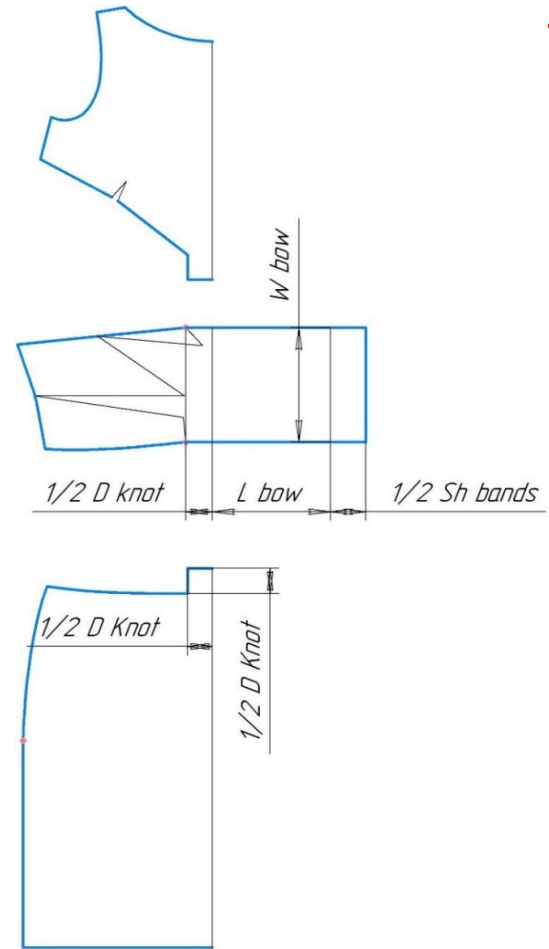
$$D \text{ knot} = 0,27 \cdot W \text{ bow},$$

$$Sh \text{ bands} = 2,26 + 0,11 \cdot W \text{ bow} + 0,58 \cdot D \text{ knot},$$

where Sh bands, cm is the shortening of the lengths of the bands of bow after twisting; W bow, cm – the width of the bands of bow in the place of twist; and D knot, cm – the diameter of knot.



Fashion DIET



Design and pattern making of 3D peplum dress

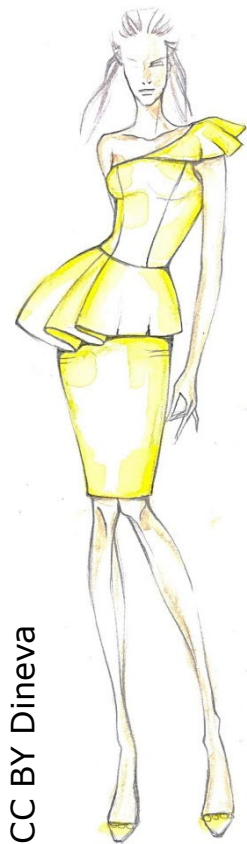
Designs of women's dresses with peplums with 3D elements combine two sustainable elements or element with long fashion life: peplums and 3D elements. The pattern making of 3D peplums is presented.



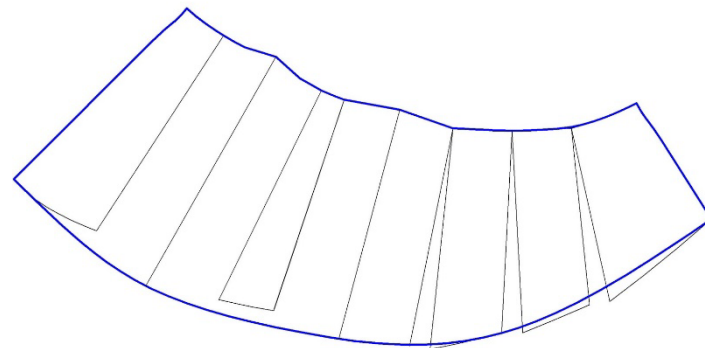
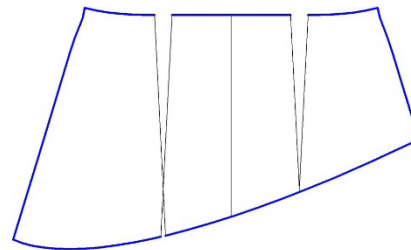
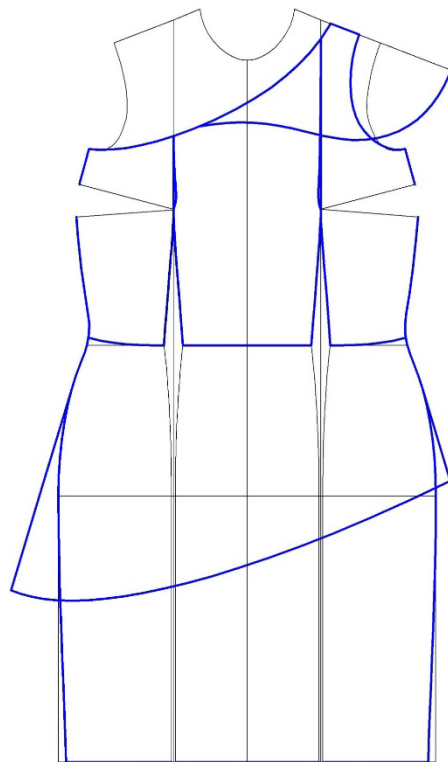


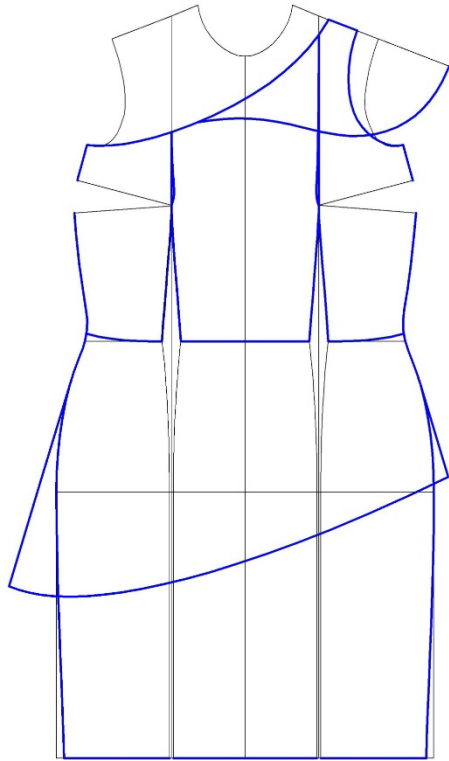
Women's dress with asymmetrical peplum with one-sided unsmoothed pleats

The dress is in a tight-fitting silhouette with an upper part of an asymmetrical bustier with one shoulder shaped with curls. A peplum with asymmetrical lengths is inserted in the waist line, modeled with two one-sided unsmoothed plates in the front part.



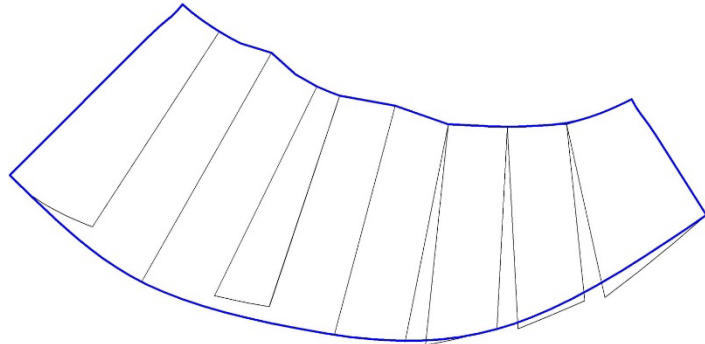
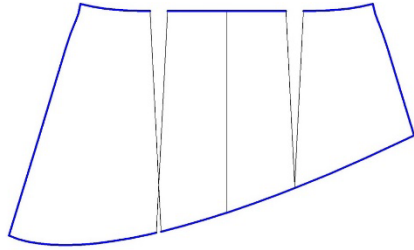
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The figure shows the definition of the initial shape of the peplum of the dress inserted at the waist line. It is asymmetrical and its shape and lengths are determined on the main structure, and on the right and left sides the lengths are 15 cm apart. Slight cutting in the line of the hip peplum expands at the side seams. On the right along the continuation down due to the asymmetrical shape the difference in length and expansion at the hem is larger.



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The modeling of the front part of the peplum is presented. In the right half of the front part of the peplum are added two one-sided plates in the waist line, where in one case the waist bend is transformed. The depth of the pleats at the waist is 8 cm and at the hem 10 cm to get a cut in the hem line of the peplum. The distance between the two panels is 4 cm. The left half is divided into 3 parts and in the waist line the fold is transformed in the hem line in the distance between the elements. After the transformations, the hem of the peplum is formed with a smooth line.

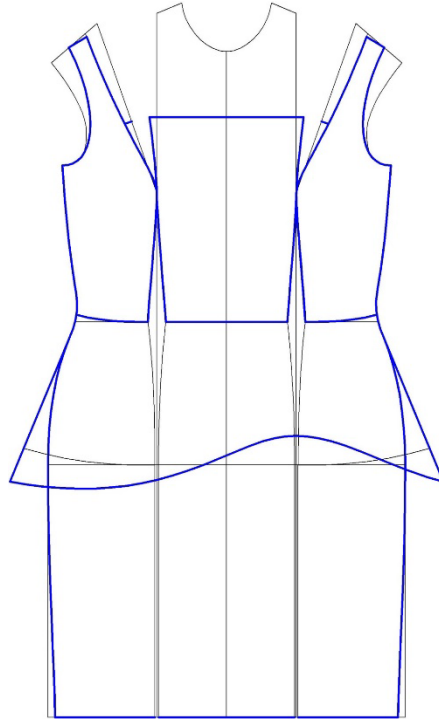
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Women's dress with asymmetrical peplum, modeled with one-sided pleats and gathers

The peplum is formed with one-sided unsmoothed plates and gathers and is with asymmetrical lengths between the front and the back.

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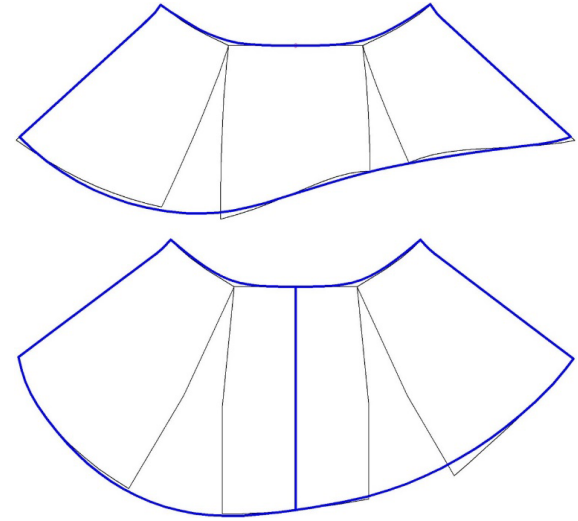
The modeling of the front part. The peplum is formed below the waist line on the main structure and its lengths are determined at the side seams in the line of the hips, front and back. Additional cutting was added in the line of the hem and then formed with a smooth curve.

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The forming of the peplum. The folds are transformed in the cut along the line of the hem, obtained by construction.

The differences in the extension of the hem after the transformation of the folds depends on the differences in the lengths of the peplum. To obtain a good curve in the line of the hem at the side seams, the front and the back are shaped after they have been pre-glued together.

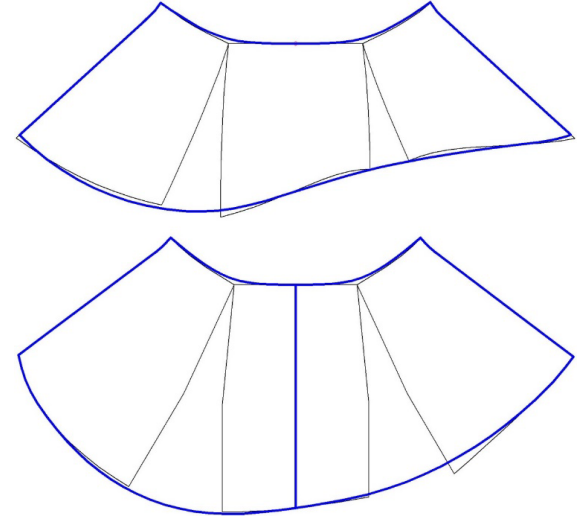


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According to the presented modeling, a classic peplum is obtained with cutting in the line of the hem and fitting in the waist area. To model the peplum of the model in the illustration, it is necessary to add extra centimetres for pleats and gathers at the waist line.



CC BY Dineva

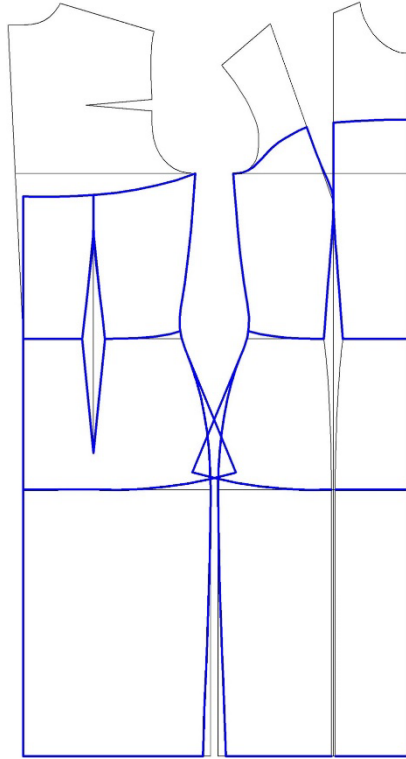
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Design of women's dress with peplum modeled with double-sided smoothed pleats

The model has a peplum of short length obtained by two symmetrically located, double-sided smoothed pleats, three-dimensional elements, giving a geometric look, in combination with crossed straps of the neckline.

CC BY Dineva

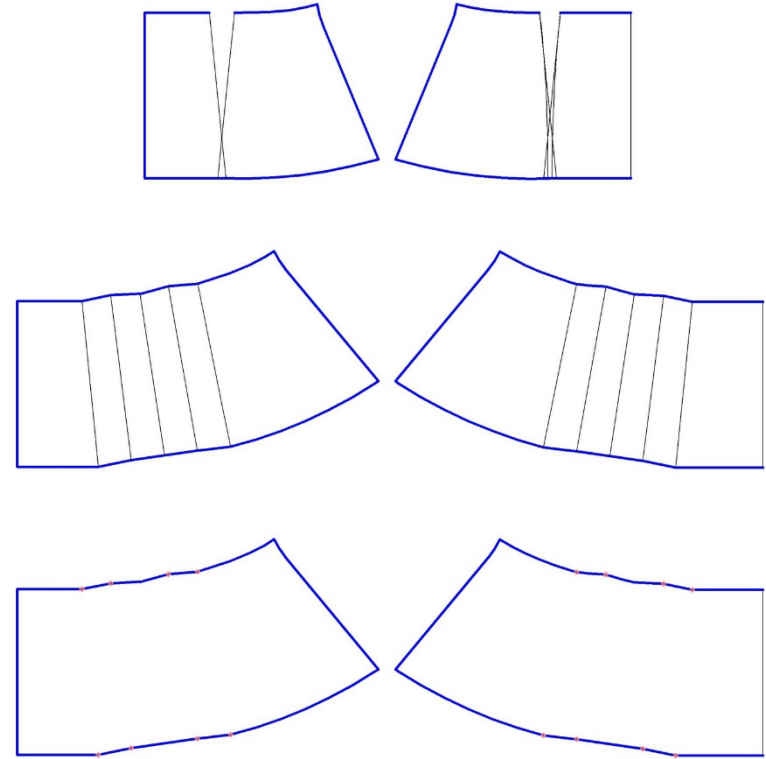


In the waist line is inserted peplum with two in the front and back double-sided smoothed plates. The peplum is 20 cm long and is shaped by expanding by 4,5 cm at the side seam in the hem.

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At the locations of the folds in the front part, pleats with the desired depth are formed, and when folded, they expand along the broken line. Determine the area of the surface from which a depth, in this case 7 cm, is applied to the left and to the right at the waist line.

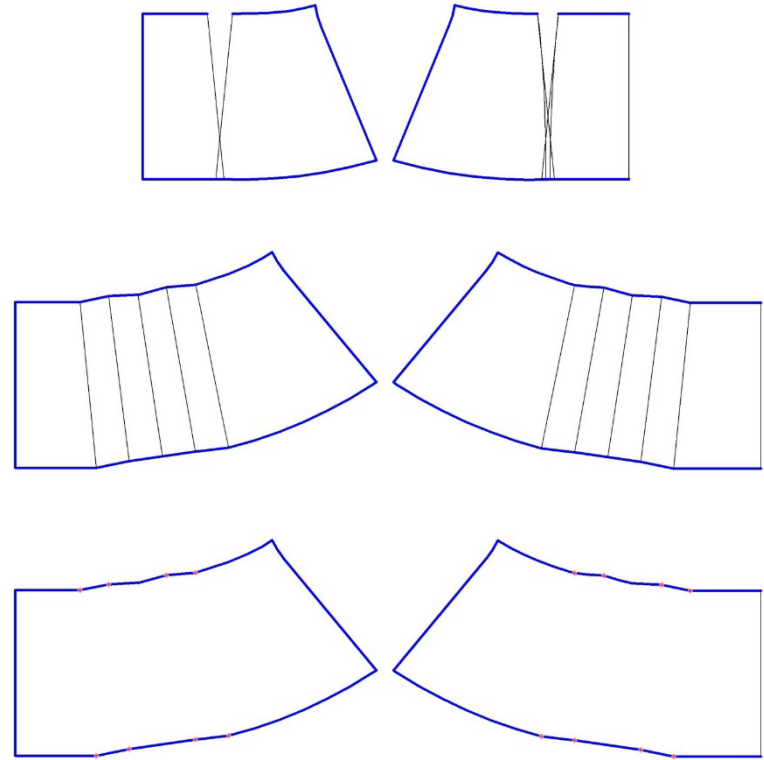


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Additional centimeters, in this case 8 cm, are added at the hem to obtain the desired width. The shape of the bod on the back is identical to that on the front. The peplum on the front part is whole, and in the back part it is in two parts, where the fastening is formed.



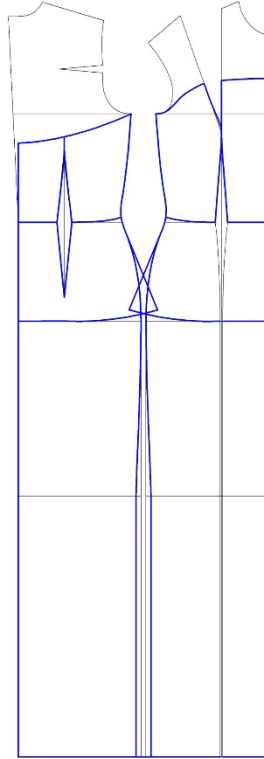
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Women's dress with uneven length peplum with gathers in the waist area

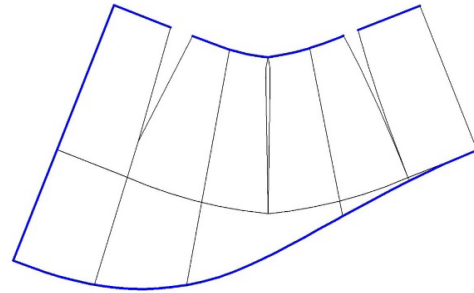
The dress in is in a close-fitting silhouette following the lines of the body. The upper part is shaped like a bustier, and a peplum is inserted in the waist, which emphasizes it. The peplum is modeled with gathers and is with uneven lengths between the front and the back.

CC BY Dineva



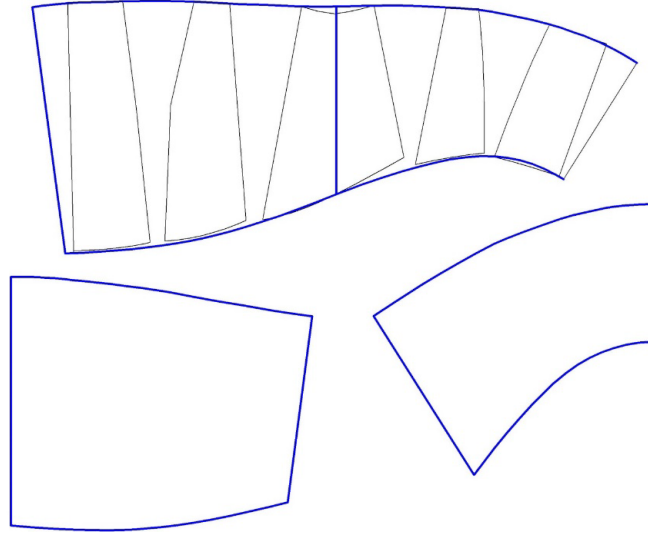
The initial shape of the peplum is determined, and its modeling on the main structure with emphasis on its geometric shape is presented.

CC BY Dineva



The peplum has asymmetrical lengths between the front and the back. The lines dividing the peplum into 6 parts are defined, two of which reach the tops of the waist folds. The hem line is formed with a slightly concave curve for the front, passing into a convex at the back.

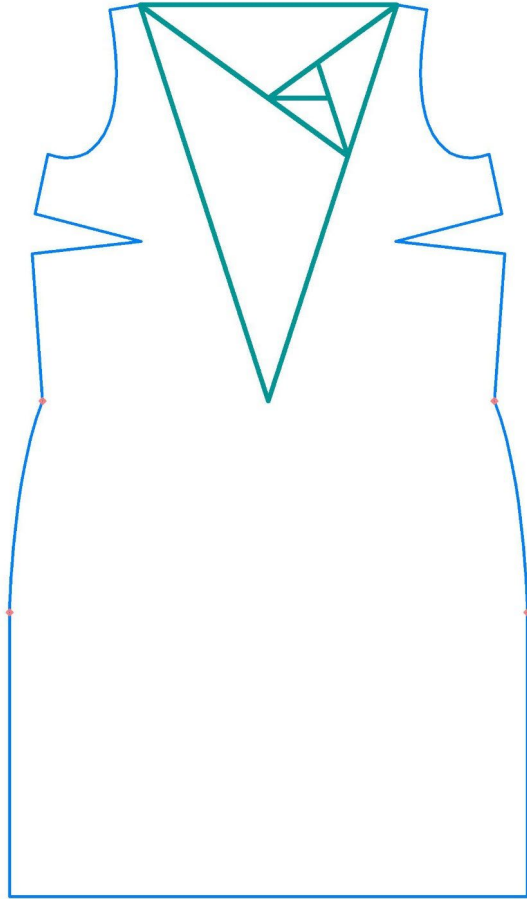
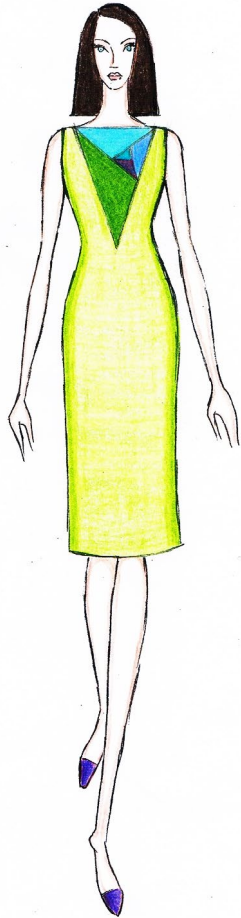
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The final design of the peplum. The peplum is divided into 6 parts, which in the waist to get a set of 70% we expand by 10 cm between them, and in the middle line of the front and back 5 cm. After that, the waist and hem lines are formed by smooth curves, concave for the front and convex on the back.

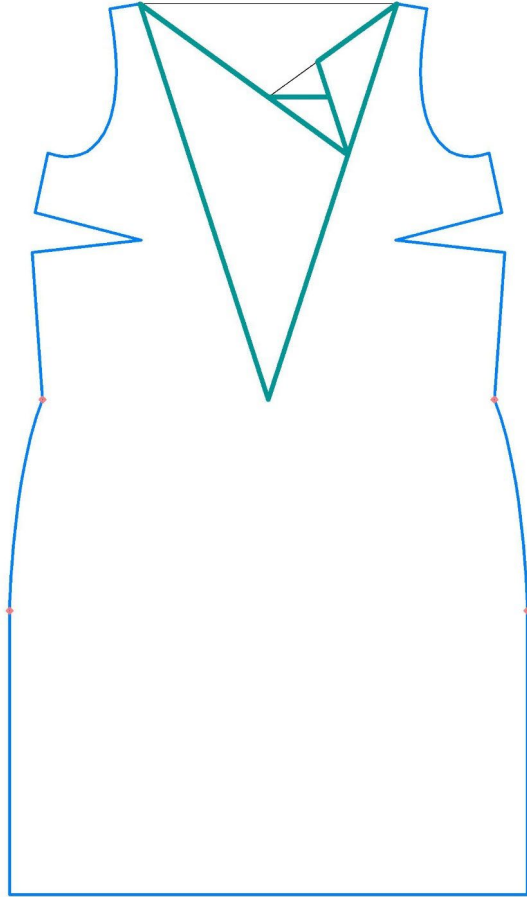
Minimizing waste designs applying the golden ratio and Fibonacci series tiles

Designs with the golden ratio and Fibonacci sequence tilings combine both minimizing waste and the sustainable design principles. Based on the sustainable proportions of the golden ratio and Fibonacci sequence, tilings with geometric figures are constructed. These tiles can be applied in fashion not only in design of clothes with applying of golden and Fibonacci proportions as sustainable aesthetic and harmonic ones, but the golden section and Fibonacci series tilings give possibilities of utilization of small pieces of fabrics in patchwork or another similar style.



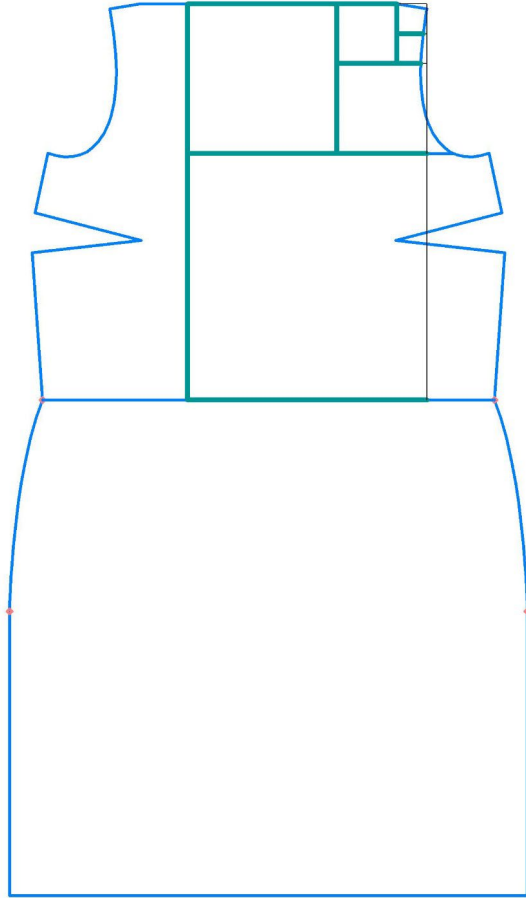
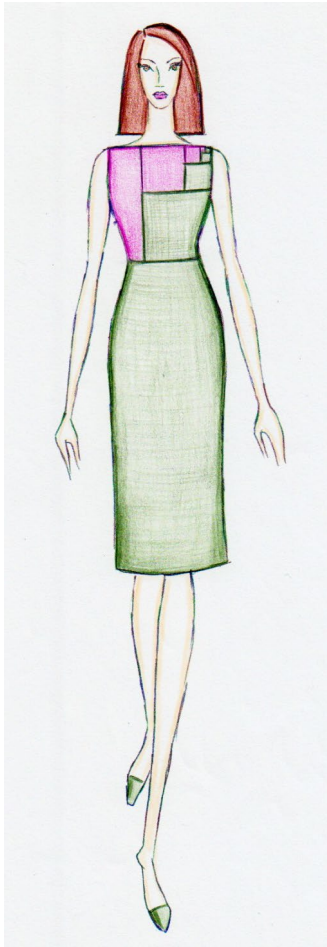
Applying of the golden triangle tiling

In presented case the golden triangle tiling, in green in the pattern design, is used directly in whole in a design of a women's dress. The golden isosceles acute-angled triangle, in which the tiling is made, is situated between the waist and neckline in the front, as its base forms the neckline. The triangles in the tiling can be presented in different colors, which allows small pieces of fabrics in different colors to be used for cutting.



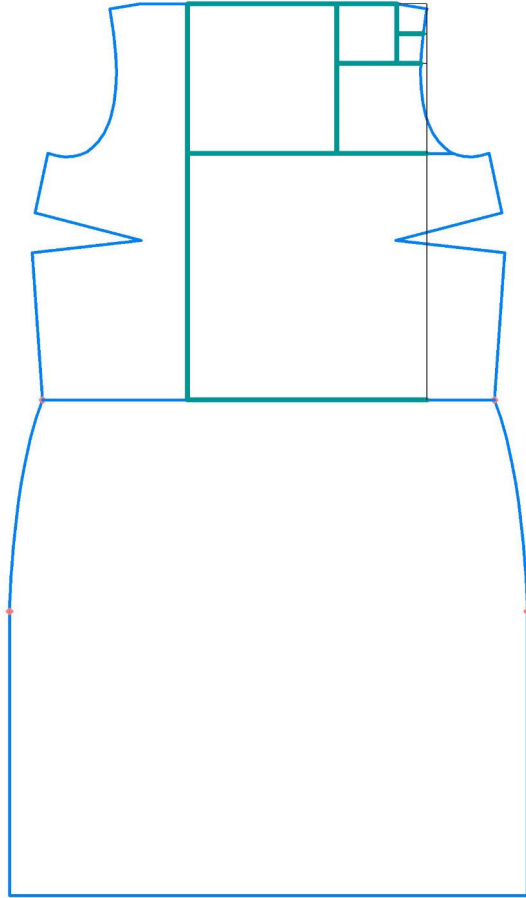
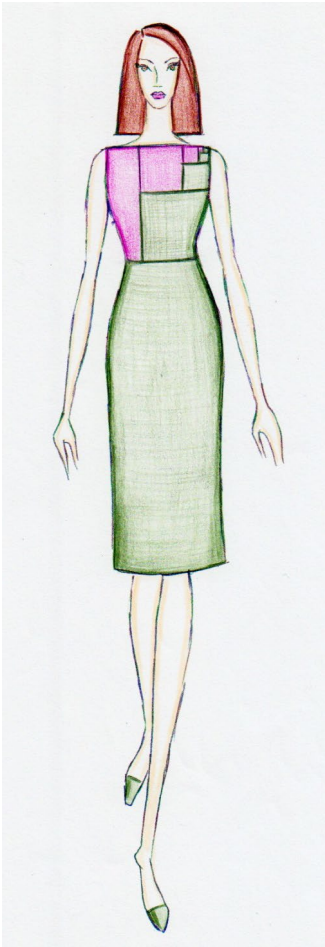
Applying of the golden triangle tiling

The figure presents a modification of the previous design with another application of the golden triangle tiling. The tiling is not fully used. The applied triangles from the tiling are shown in green in the construction. The presented design gives possibilities of minimizing cutting waste with triangles from a fabric in one color, as it is in the presented dress design, or different fabrics in multi-colors combination.

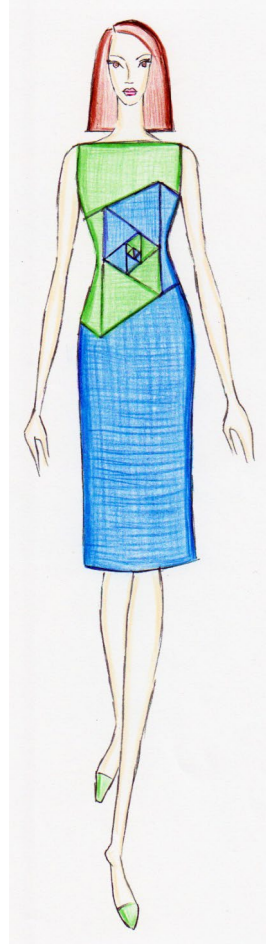
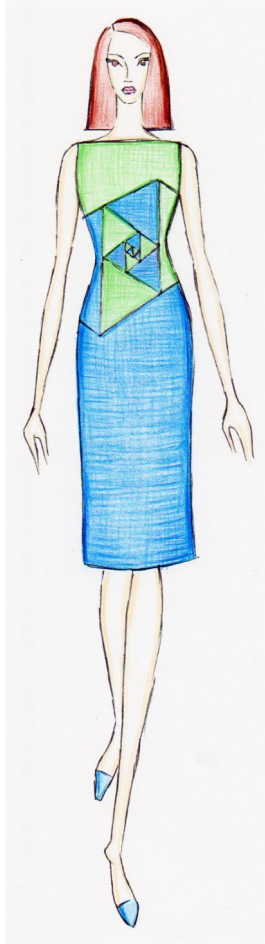


Applying of Fibonacci series tiling with squares, situated in two perpendicular directions

The applied tiling is presented in green in the front in the pattern making model. In the presented design of a women's dress, the tiling is situated in the front upper part. The tiling is used directly in whole, and it is adapted to the pattern. According to the design, one-, bi- or multi-colors combination can be applied and therefore small pieces of different fabrics can be used.



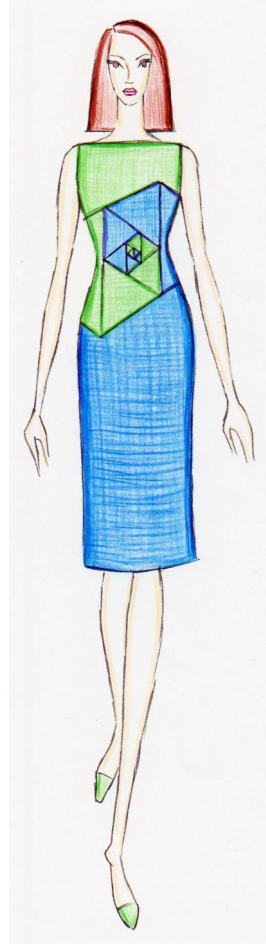
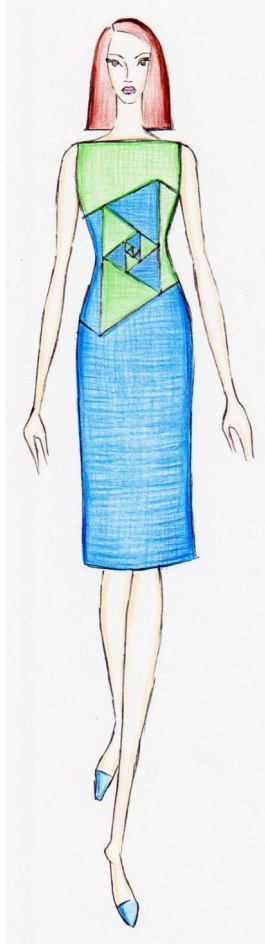
In presented case, the squares from both perpendicular directions are designed in two colors. In application of this tiling, the bi-colors combination can be used in equidistant way, in which the 1st square is in one color, the 2nd and 3rd squares are in another color, the 4th and 5th ones are colored as the 1st square, the 6th and 7th squares are colored as the 2nd and 3rd ones, etc.



Applying of Fibonacci series tiling with triangles named Fibonacci rose

The figures illustrate a design of a women's dress with an applying of Fibonacci series tiling with triangles, in which the beginning of both spiral or the joint side of both first smallest triangles is situated in the middle of the waist in the front.

The difference between both design variants, is the way of presentation of the bi-colors model.

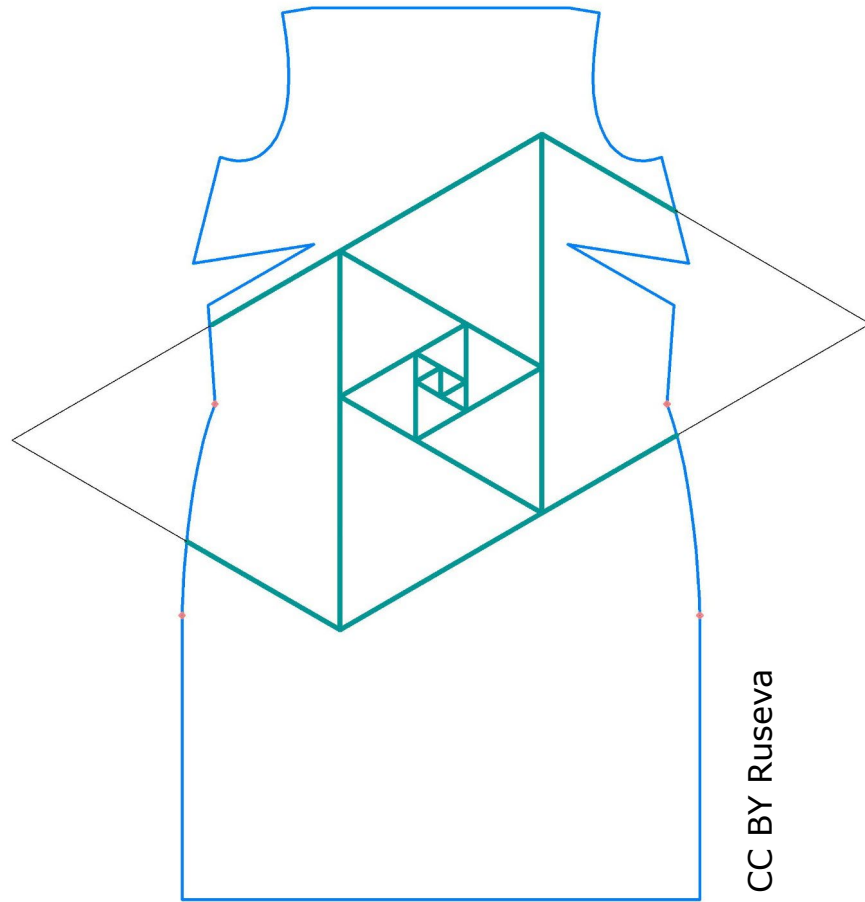
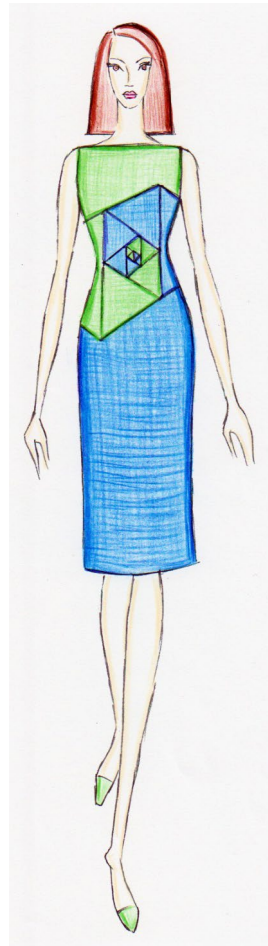
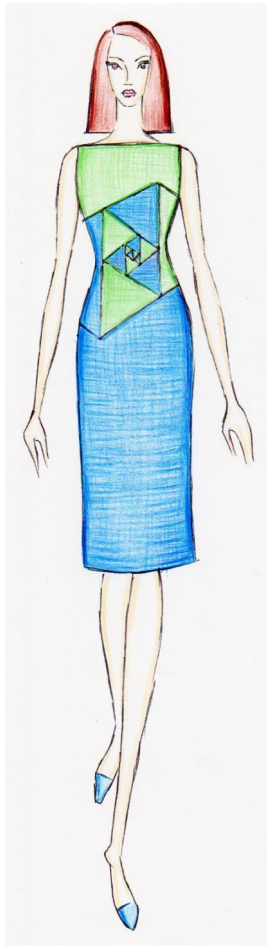


In the left variant, the triangles, situated in one direction, are designed in one, and these in the opposite direction are designed in another color.

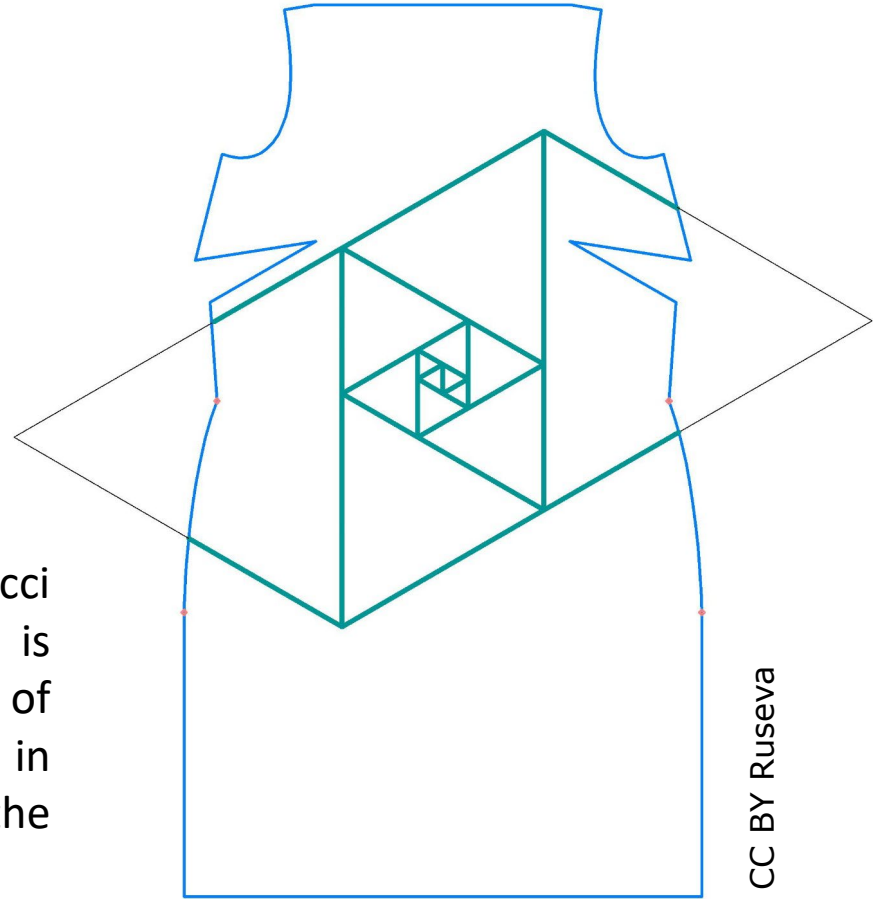
In the right variant, both spirals are designed in two different colors.

Similarly to other presented tiles, the applying of the applying of Fibonacci rose allows multi-colored design decisions and combination of small pieces from several fabrics in this case in form of equilateral triangles.

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The pattern design with Fibonacci rose is shown. Fibonacci rose is presented in green in the frame of the front. It is used directly in whole, and it is adapted to the pattern.

Conclusion

The presented students' projects on sustainable design and pattern making of women's clothes can be seen as examples for development of new ideas and creation of new slow fashion designs with different types of long-life elements, golden and Fibonacci proportions, minimizing waste, and combinations between them.

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