Pattern Making in the Context of Sustainability

Learning Objectives

After this lecture you should be able to:

- Make correct patterns of women's clothes with sustainable long life fashion elements of all types of drapes using facilitated constructional sequences and easy calculations.

- Make correct patterns of women's clothes with long life fashion element of peplum.

- Design patterns with sustainable proportions of the golden ratio and Fibonacci sequence in direct use or with application of geometric figures.

- Create pattern designs with lower consumption of textile material and minimizing cutting waste.

- Create zero waste pattern designs.

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Slow Fashion Trendless Designs and Pattern Making

The slow fashion trendless designs are result of combinations of high quality design, making of high quality pattern, and high quality of fabrics and other materials.

In other words, the high quality design, based on the long life fashion elements, require high accuracy of the geometrical constructional approaches, used for pattern making of clothes with their application.

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Long Life Fashion Elements

As it is shown in the previous topic, the elements with long life in fashion are:

- Drapes: free drapery; drape, formed with a seam or darts; twist knot drape, or drapery, fixed in a knot; and twisted drapery.

- Other 3D elements. The tucks, pleats, gathers, and ruffles are with long life in fashion too.

- Peplums.

- Non volume silhouettes. They are always in trends.

The next slides present geometrical approaches of accurate and facilitated pattern design of clothes with the fourth types of drapes.

Draped Neckline

The volume of drape folds is a result of darts' rotation. The drape sometimes needs additional opening in the rotated darts or seldom in other splits of the piece. The easy and correct pattern design is realized through zero or minimized number of splits of the piece, as the number of the drape folds depends on the form of the curves of shoulders.
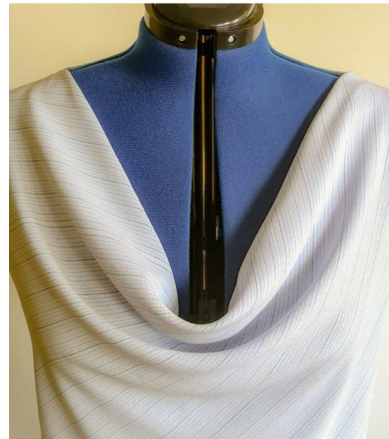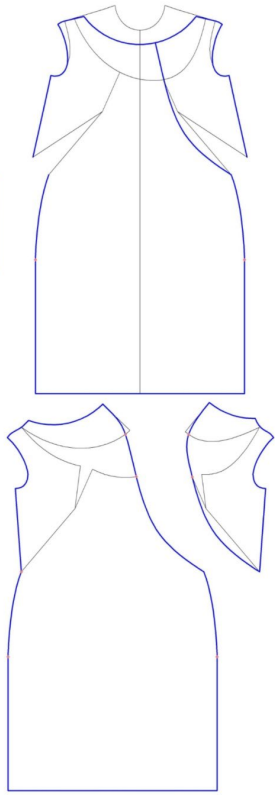

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Drape Formed with a Seam or Darts

Similarly to the symmetric draped neckline (free drape), the pattern making of clothes with asymmetric draped neckline (made with a seam or darts), is constructed based on rotation of darts and additional opening in the rotated darts or other divisions. Minimized number of splits gives more accuracy and facilitates the pattern design.
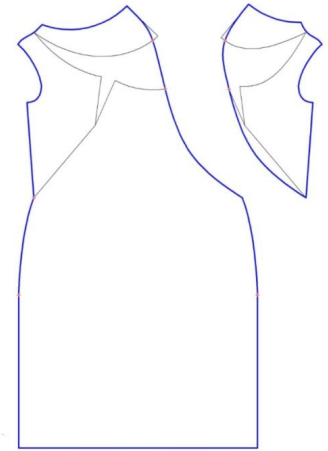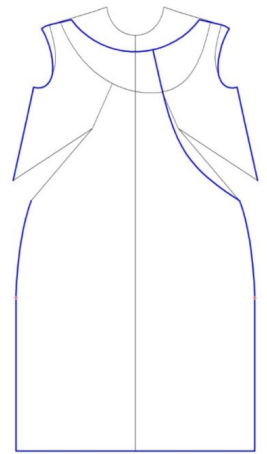
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Pattern designs, made with a seam (in blue) and with darts (in green).

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Twist Knot Drape

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The correct and facilitated pattern making is a result of the minimizing of the piece's divisions for drape's folds and a dependence between the diameter of the twist knot and the width of the draped places, presented by formulas:

$$W = 5{,}15 \cdot D - 4{,}4,$$
$$D = 0{,}2 \cdot W + 0{,}85,$$

where W, cm is the widths of the draped pieces in the place of twist; D, cm - the diameter of the knot.
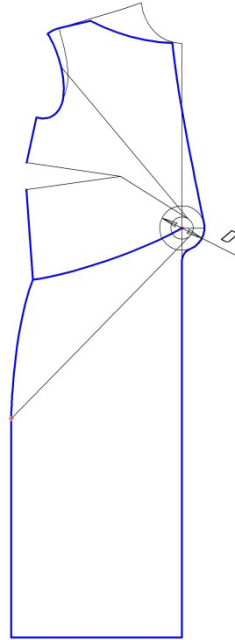
Twist Knot Drape

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Depending on the design idea, a variant of the formula is used.

The width of the draped pieces in the place of twist W is limited from 16,5 to 32,5 cm. The width bigger than 32,5 cm leads to unnecessary volume. The minimal width is 16,5 cm, because the smaller width leads to small number and volume of folds.

The applying of the formulas gives possibility of correct pattern design for all combinations of sizes of the diameter of the knot D and the width of the draped pieces W in the limited values.

Twist Knot Drape

CC BY Kazlacheva
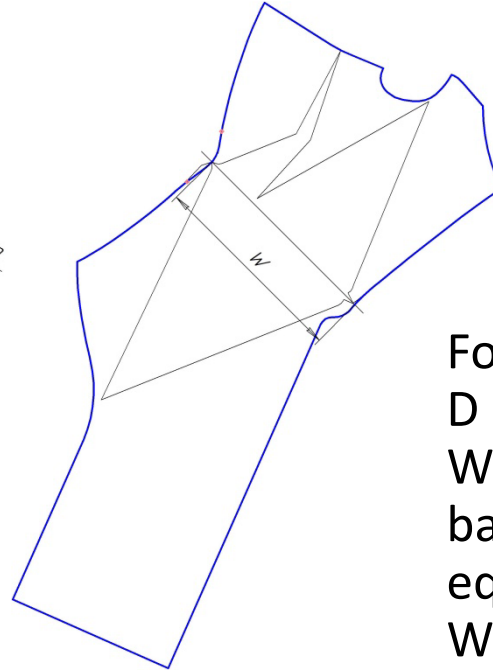
For presented design:
D = 7,0 cm, W = 31,65 cm.
W is calculated on the base of D, using the equation:
W = 5,15 . D – 4,4.

Twist Knot Drape
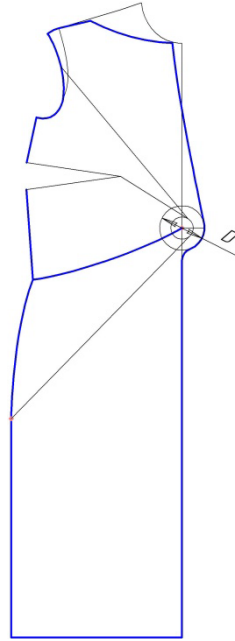
The pattern making on the front is shown. The center of the circle of the knot with diameter D = 7,0 cm is located on the front middle line between the waist and the bust dart apex. The seam of connection of both twisted pieces is under the knot circle by the middle line. The neck opening is formed over the circle of the knot. The seam of drapery fixing is situated between the center of the knot circle and the point of intersection of the waist and the side seam.

Twist Knot Drape

CC BY Kazlacheva
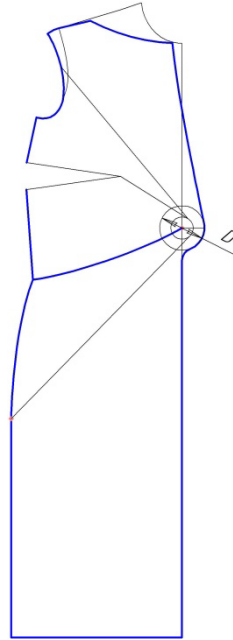
A second circle is drawn with the same center of the knot circle, but with diameter which is half of the dimeter of the knot. The lines, which determine the places of additional volume for drapery, are tangents to the smaller circle. They start from the arm hole and bust dart for the top part of the draped piece, and the point of interaction of hip and side seam for the down part of the draped piece.

Twist Knot Drape
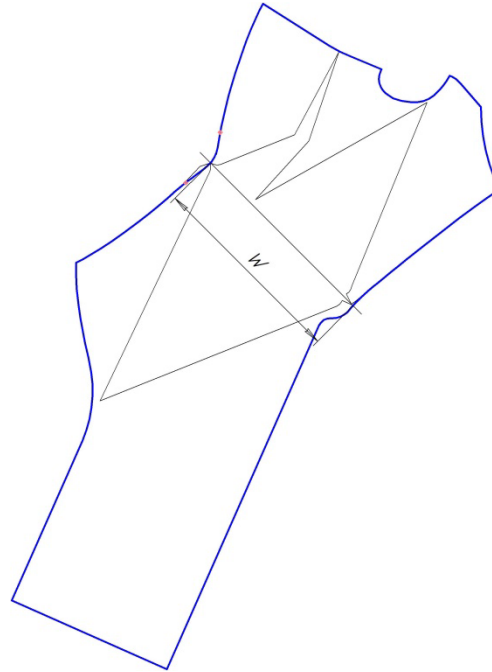
It is presented the pattern of the draped piece after additional opening for drapery volume, which sizes the width of the draped pieces in the place of twist W = 31,65 cm. After the additional opening the upper and lower parts of the draped piece are connected each other on a line in diagonal direction (the skew direction of the fabric), which determines the place of twisting.
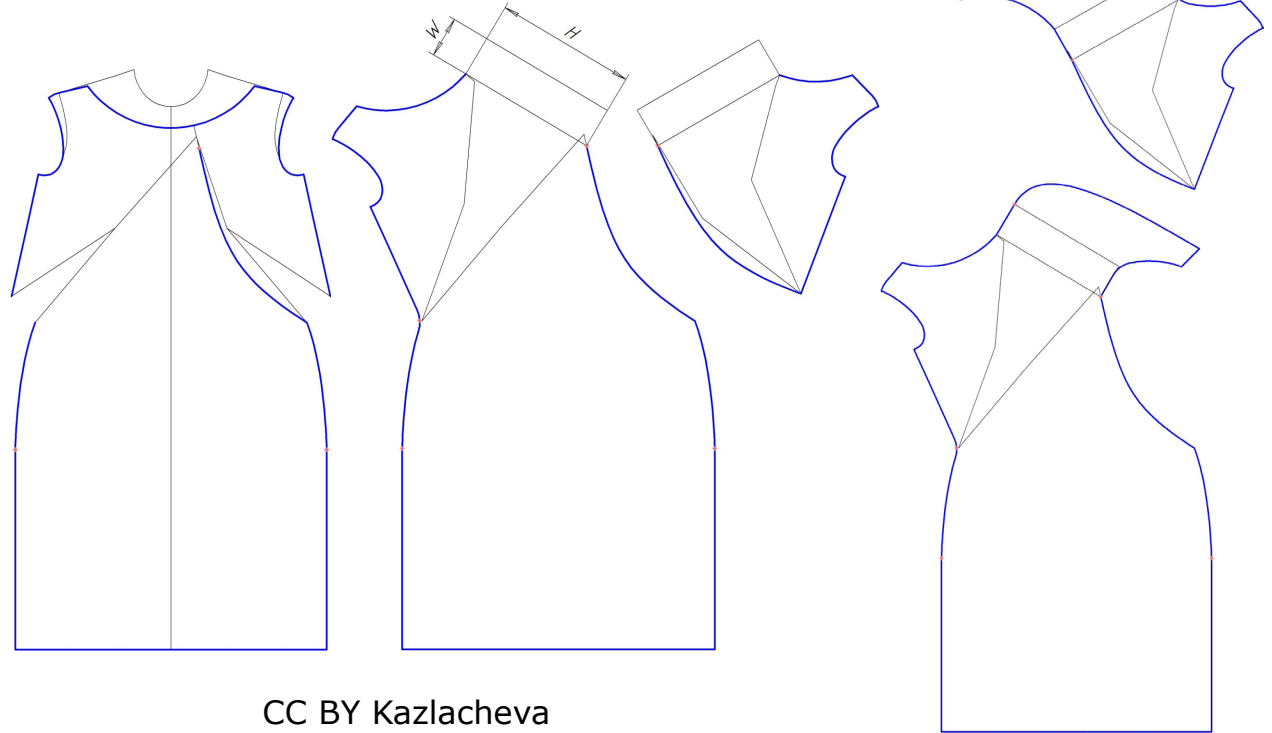
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Twist Knot Drape
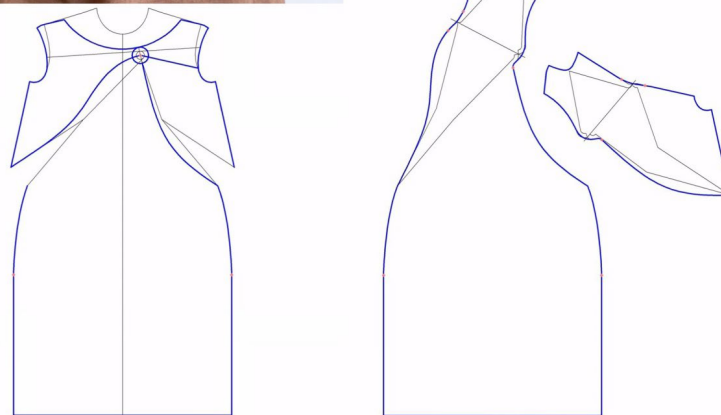
For presented design:
W = 16,5 cm, D = 4,15 cm.
D is calculated on the base of W, using formula:
D = 0,2 . W + 0,85.

Twisted Drape

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Twisted Drape

The accurate and easy pattern design depends on the dependence for calculation of the sizes of the rectangle of twisting, presented by equation:

$$W = 0,4 . H - 2,65,$$

where W, cm is the width of the twisting or the width of rectangles of twisting; H, cm – the height of drapery or the height of the rectangles of twisting.

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Twisted Drape

The height of the draped pieces in the place of twisting H is limited from 15 to 30 cm. The height bigger than 30 cm leads to unnecessary volume. The height smaller than 15 cm leads to small number of folds and volume of drape. The applying of the formula gives possibility of correct pattern design for all combinations of sizes of the diameter of the width W and the height H of twisting in the limited values.

In example, shown in the previous the slide: H = 24 cm, W = 6,95 cm. W is calculated on the base of H, using presented in the previous slide formula.

Twisted Drape
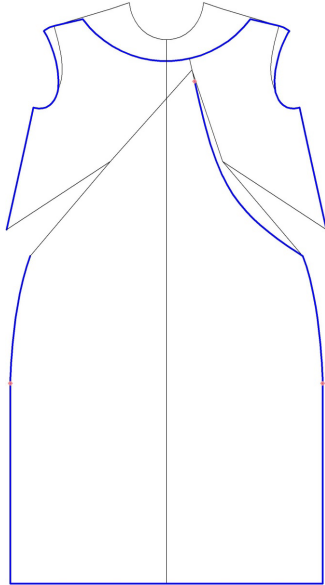
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The decorative and constructive seam, which divides the front in two pieces, is drawn with a curve between the neckline and the left side seam in the waist. This seam is the line of fixing of the drapery. The place of the twisted drapery is in the connection between the neckline and the decorative and constructive seam. The place of the twisting is measured from the neckline on the seam and it is 4,0-5,0 cm, and the center point of this place is connected with apexes of the bust darts with straight lines. These straight lines define the main directions of the drape folds and they are the lines of dividing of the front pieces for the drapery.

Twisted Drape
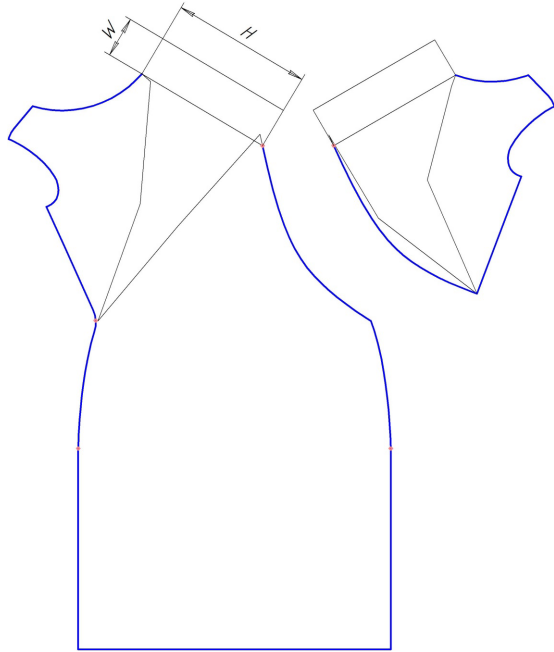
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The figure shows the openings for folds and volume of drapery in the pieces of the front. The bust darts are rotated and included in the divisions and by this reason the drapery. Additional openings are made with help of rotation of divided pats around points of intersection between the side seams and waist. The height of drapery in the place of twisting H for both pieces is defined by place for twisting (4,0-5,0 cm on the fixing seam) plus the opening for folds and volume.

Twisted Drape
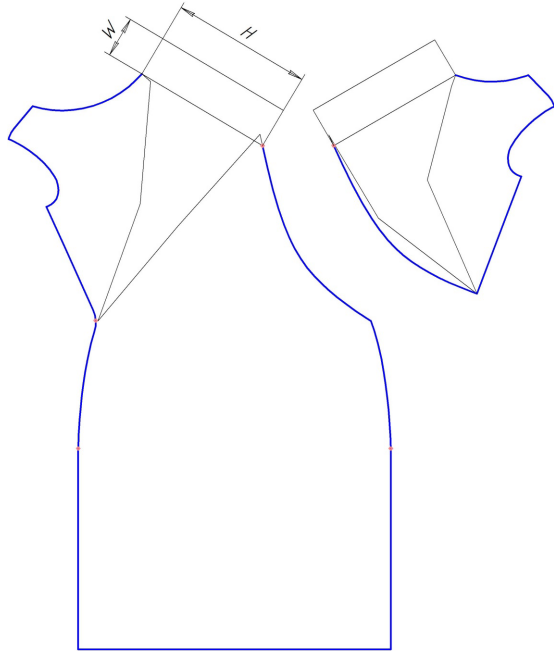
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The figure presents the determination of the width of the twisting and the forming of the place of twisting with rectangles in both pieces. The width of twisting or the width of the rectangles W is defined by the height of drapery or the height of the rectangles H. In the presented design the height of drapery H = 24,0 cm is chosen, result of bust dart transformation and additional opening. The width of twisting W = 6,95 cm is calculated with the use of dependence: W = 0,4 . H – 2,65.

Peplum

The pattern design of peplums is a result of additional openings in vertical divisions. The openings are made with rotation of the piece parts around the points of intersection of the dividing lines and the line of connection of the peplum to the bodice.

The next two slides presents pattern designs of women's dresses with full and partial peplums.
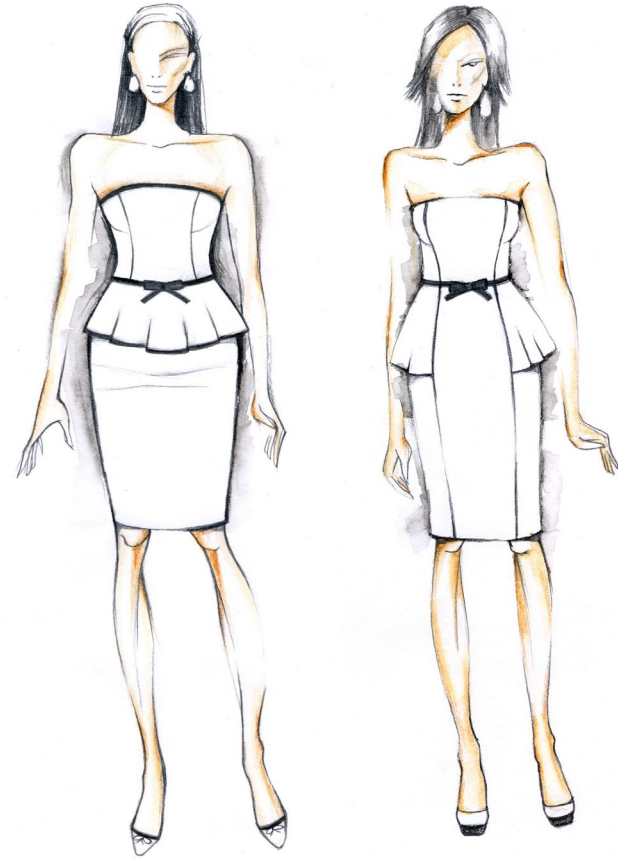
CC BY Dineva
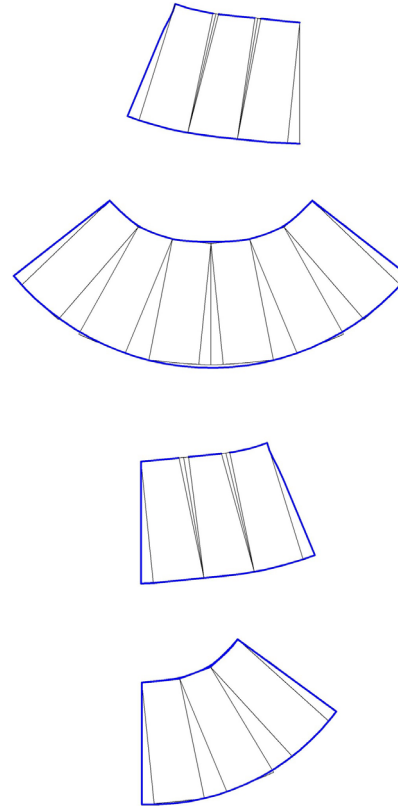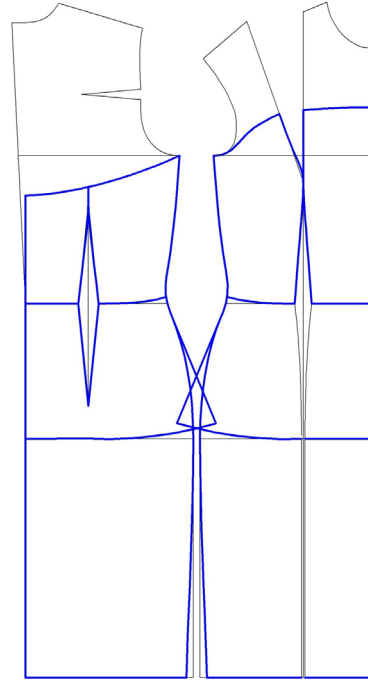
Pattern making of a women's dress with a full peplum.
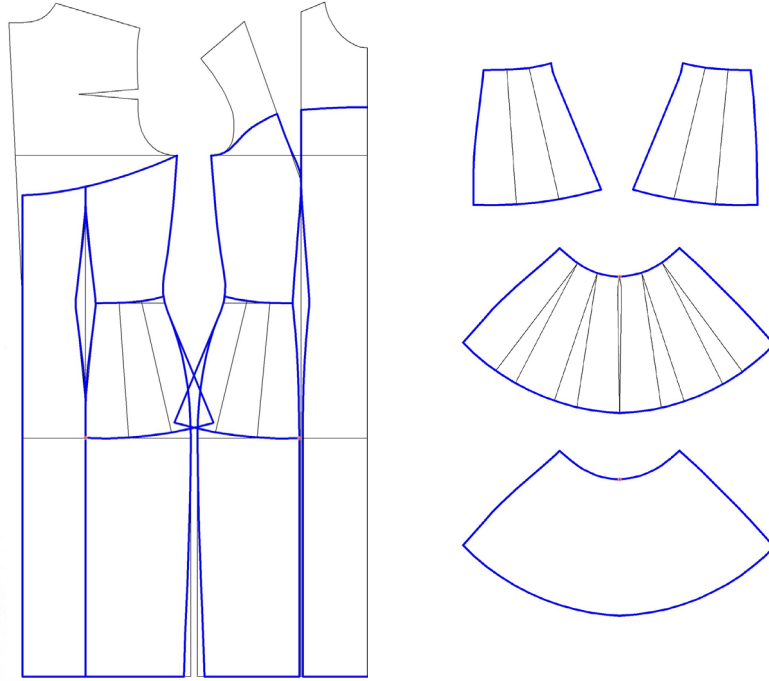
Pattern making of a women's dress with a partial peplum.

Pattern making using golden and Fibonacci proportions

The previous topic has presented the application of the golden ratio and Fibonacci sequence as sustainable proportions in fashion design. In most cases, they are applied is in pattern making as direct proportioning or through geometrical figures. The figures are used as shapes of elements and pieces, or as a frame of forming of shapes of elements and pieces.

The next slides show examples of applying of the golden section and Fibonacci series in pattern making through directly use or geometric figures: the golden triangle, the golden rectangle, the golden ellipse. Some of designs combine the golden ratio and Fibonacci sequence proportioning and long life fashion elements of different types of drapes and 3D elements.
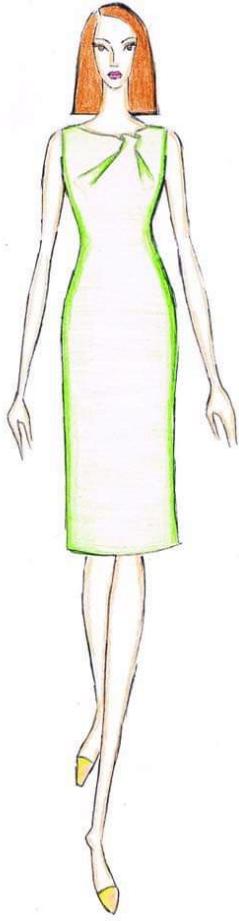
φ.C φ.C
C C
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φ.C φ.C
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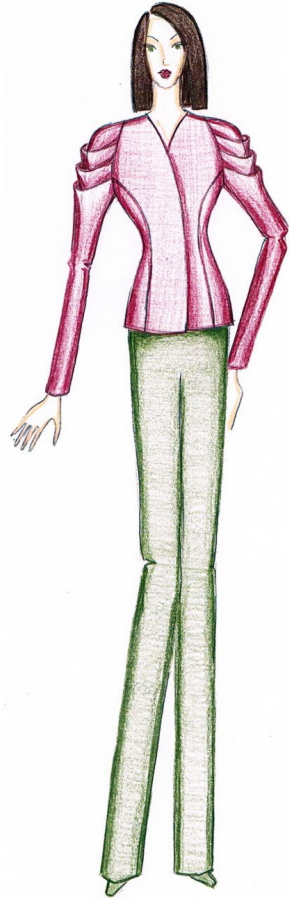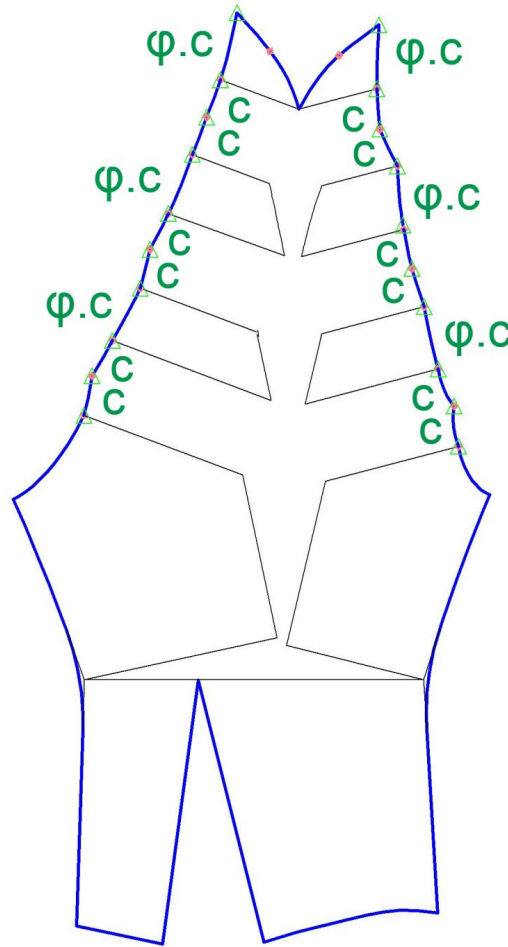
Pattern making of a jacket's draped sleeves using the golden proportion. The proportion between the distances between tucks and their width is equal to the golden ratio.
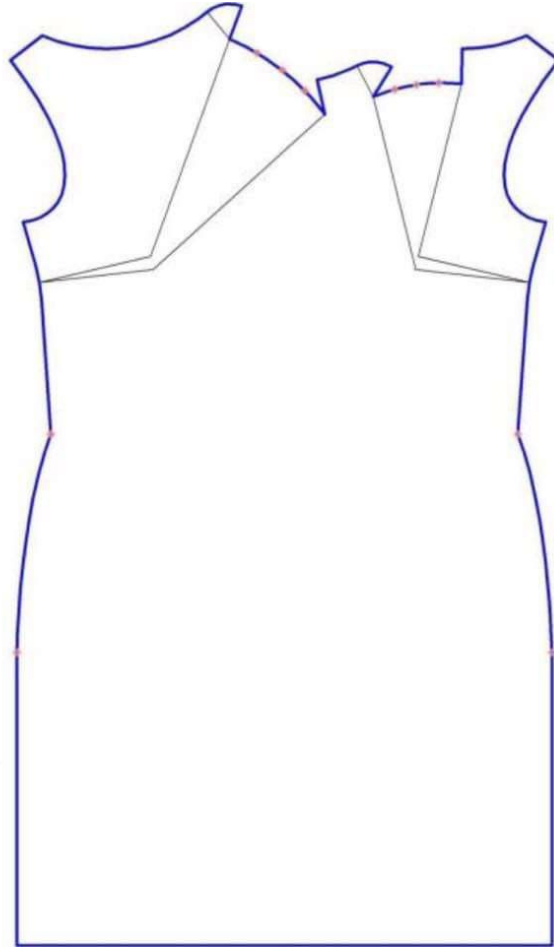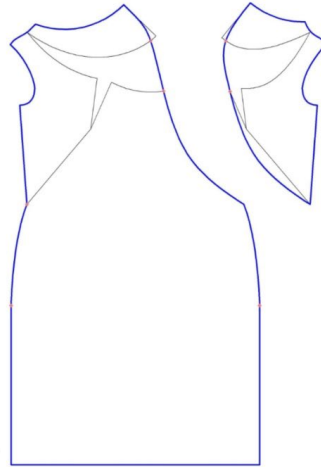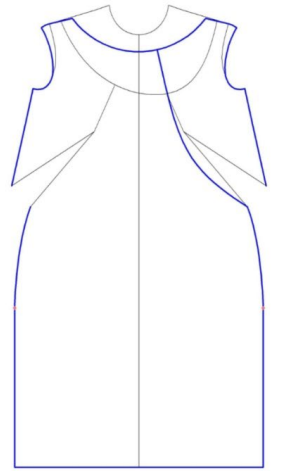
Pattern making of a dress with combined 3D element with the use of golden proportions. The ruffles divide the neck opening in proportions of the golden ratio.

Pattern making of a dress with combined 3D element with the use of golden proportions. The ruffles divide the neck opening in proportions of the golden ratio: d, φ.d, and φ^2.d (or φ.φ.d).
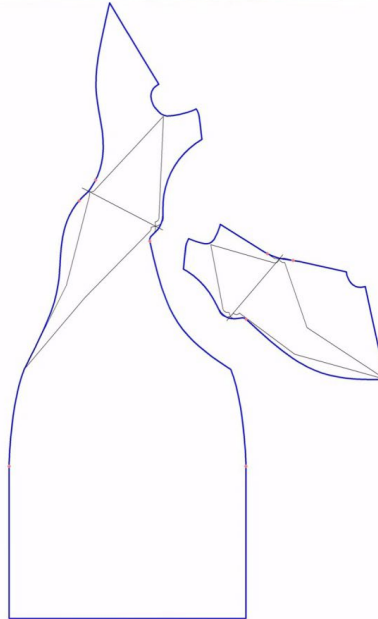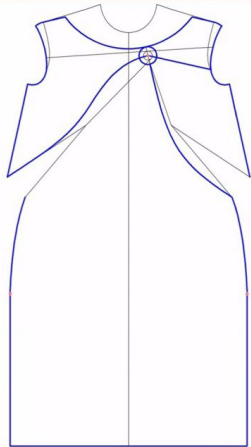
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Pattern making of a women's dress with asymmetric draped neckline in golden proportion. The forming seam divides the neckline and the drape in the golden ratio.
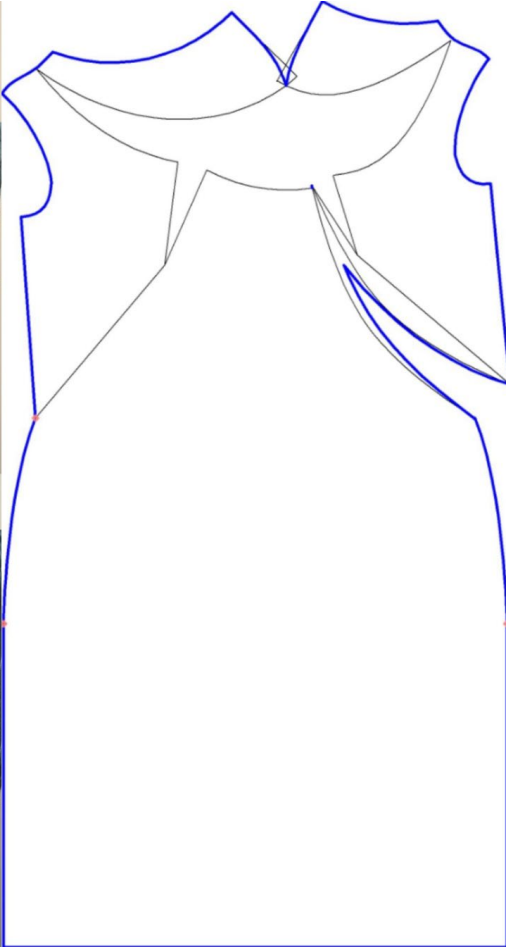
Pattern making of a women's dress with asymmetric draped neckline in golden proportion. The forming darts divide the neckline and the drape in the golden ratio.
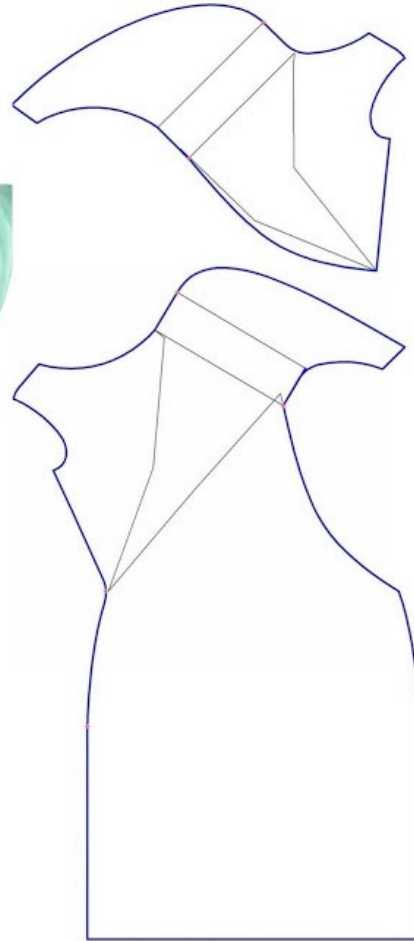
Pattern making of a dress with twist knot drape in a proportion of the golden ratio. The knot divides the neckline in golden proportion.

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Pattern making of a dress with twisted drape in a proportion of the golden ratio. The twisting divides the neckline in golden proportion.
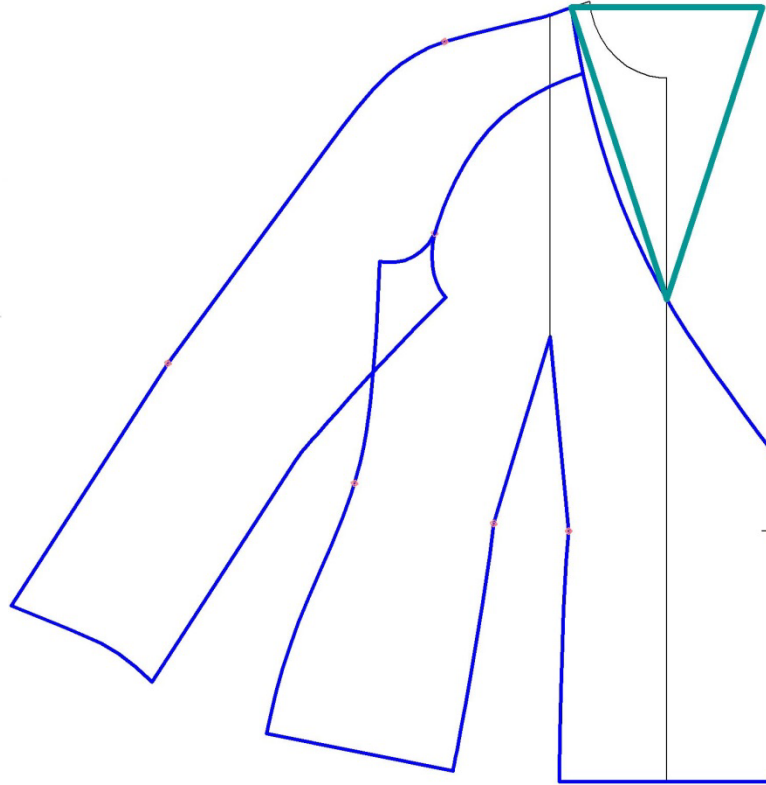
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Application of the golden triangle in pattern making
The triangle is used directly or as a frame of forming of shapes of elements and pieces in presented designs.
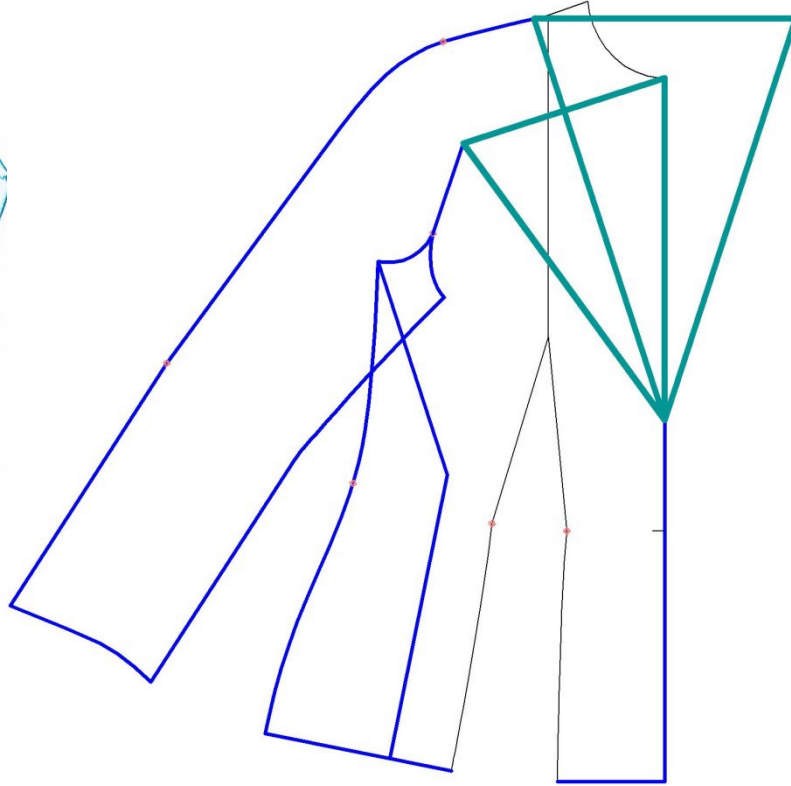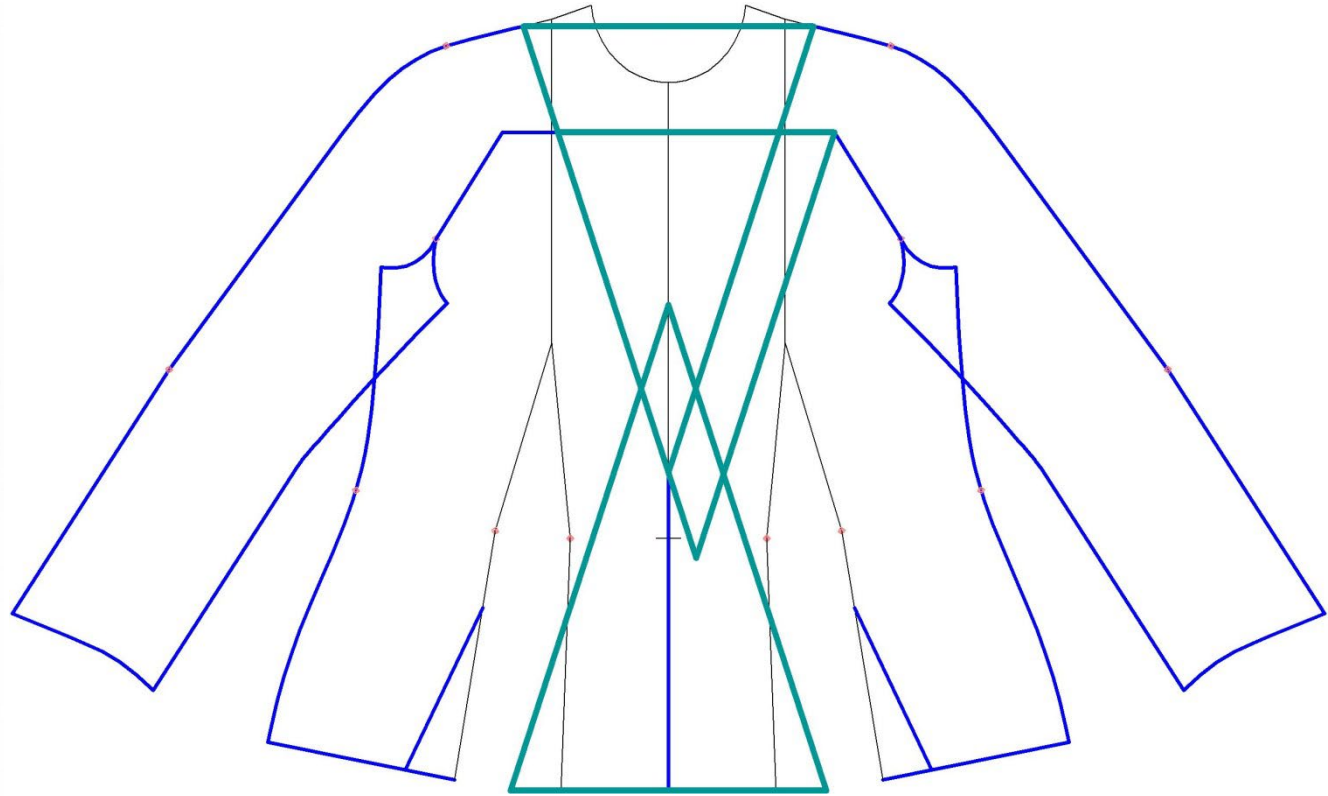
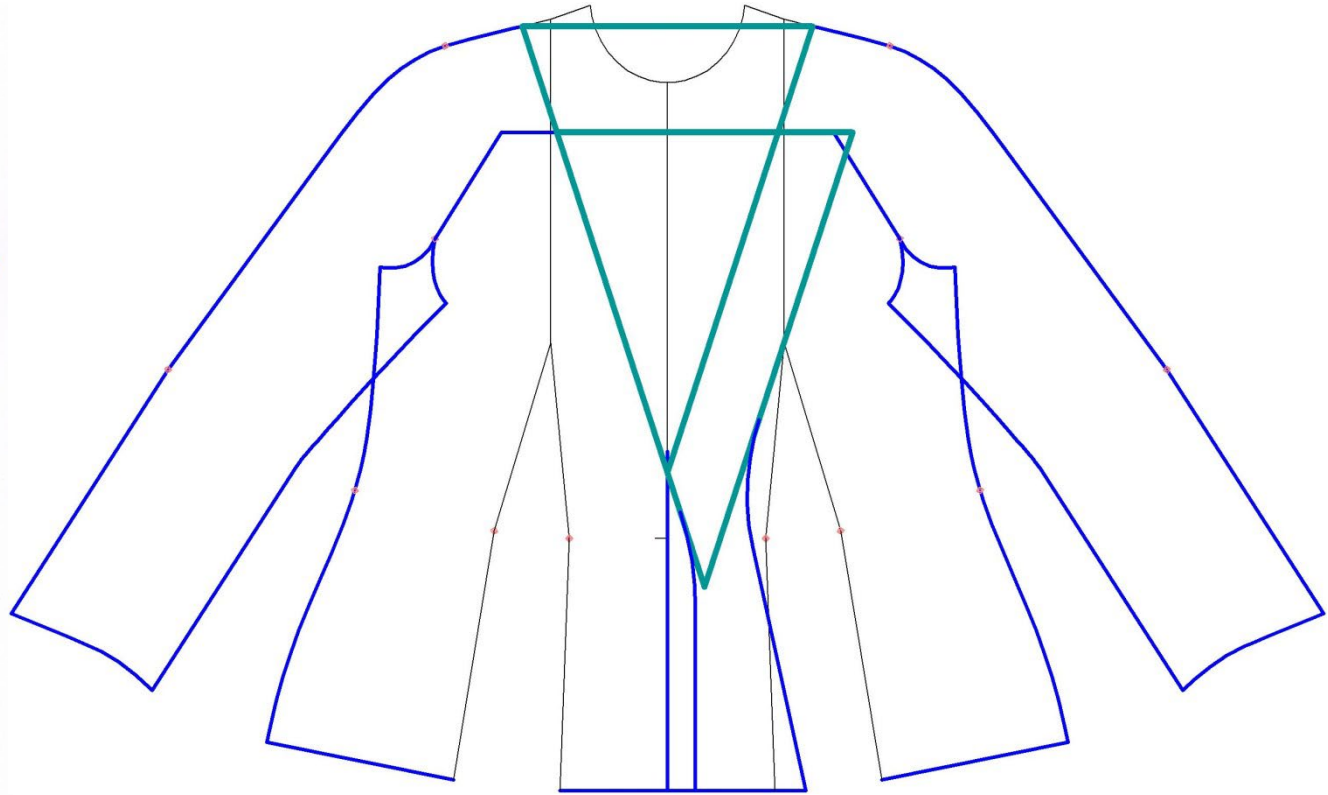Pattern making of a jacket: Applying the golden triangle (in green) as a frame of forming of the neck opening.

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Pattern making of jacket: Applying the golden triangle in forming of the neck opening and raglan sleeve.

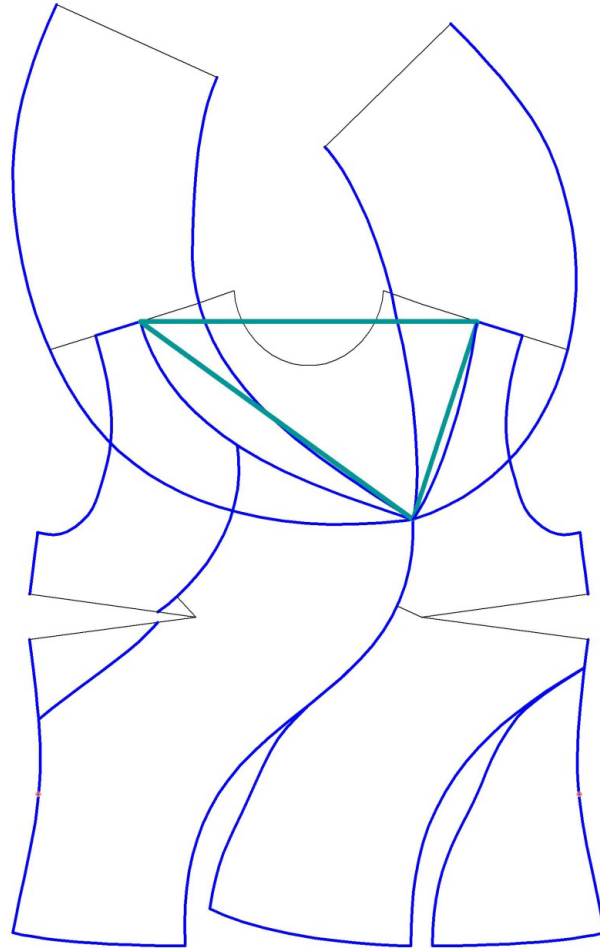Applying the golden triangle as a form of the neckline and the central front pieces.

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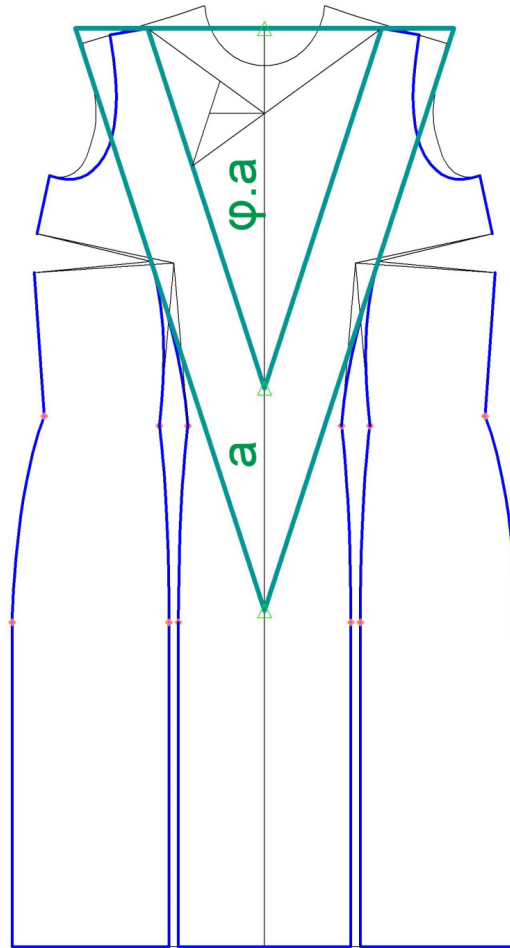Applying the golden triangle as a form of the neckline and a frame of forming of the central front piece.

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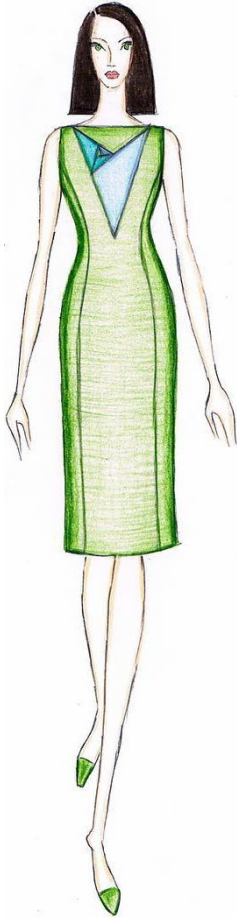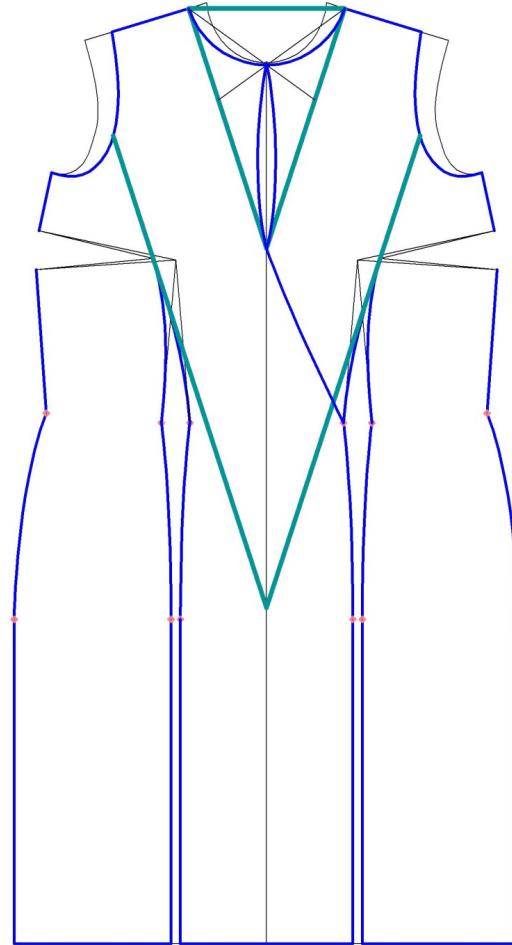
Applying the golden triangle as a frame of forming of the neck opening. Asymmetrical position of the frame.

φ.a

a

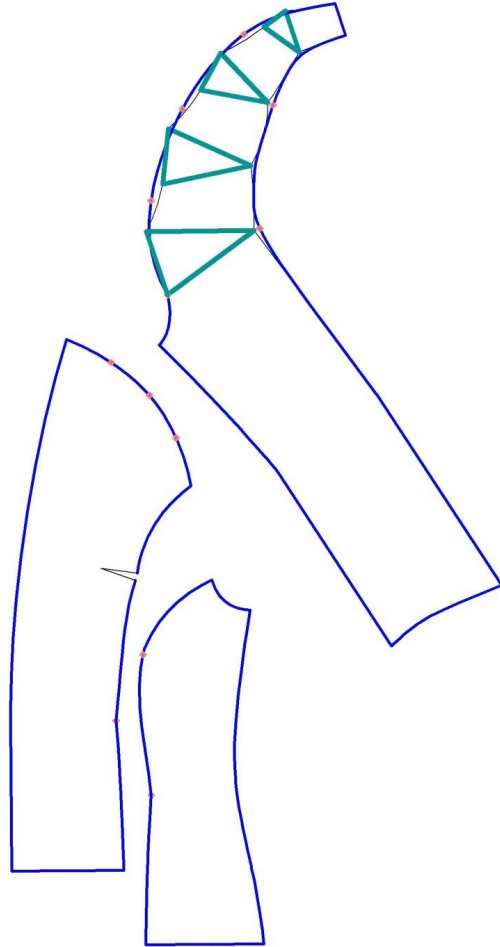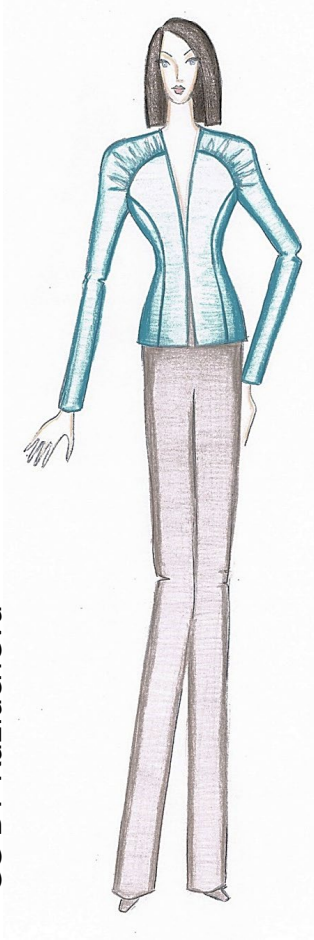Pattern making of a dress with the use of golden triangles, presented with green lines, directly and as a frame.
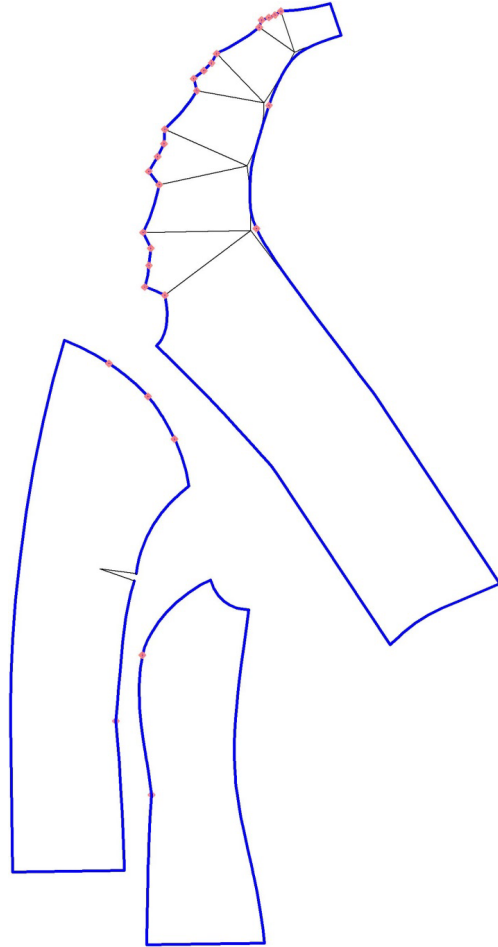
Pattern making of a dress with the use of golden triangles, which are shown with green lines, as frames.

Pattern making of a jacket with 3D elements gathers with the use of the golden triangles, presented in green tick lines.

Pattern making of a jacket with 3D elements bi-sided tucks with the use of the golden triangles, presented in green tick lines.

Application of the golden rectangle and the golden ellipse in pattern making

The rectangle is used directly or as a frame of forming of a shape. Usually, the ellipse is used directly of forming of a shape.
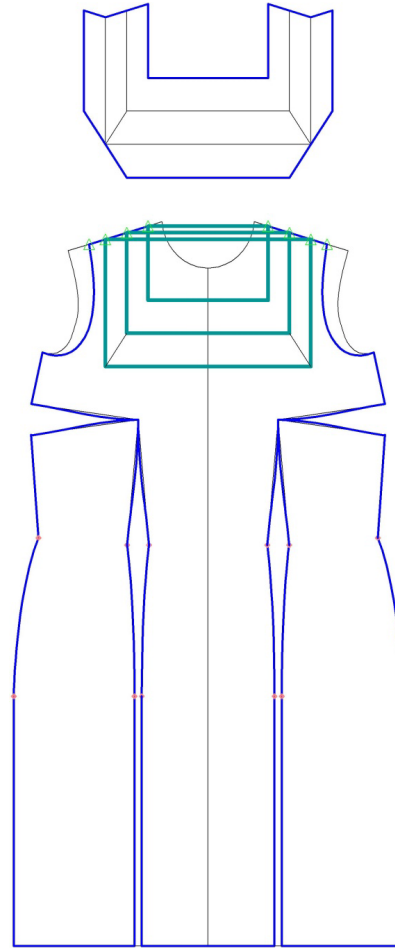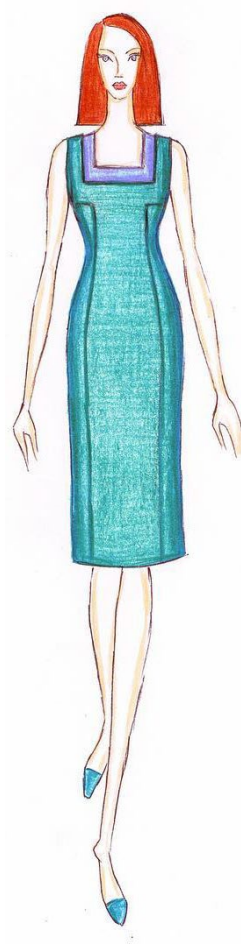
Pattern making of a dress with the direct use of golden rectangles, shown with green lines.
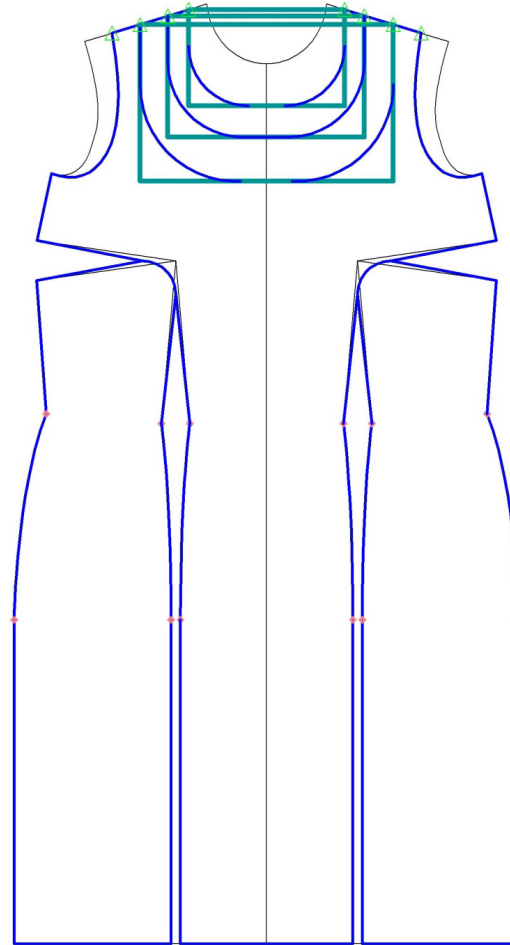
Pattern making of a dress with the use of golden rectangles, presented in green lines, as frames.

b

φ.b

φ.φ.b
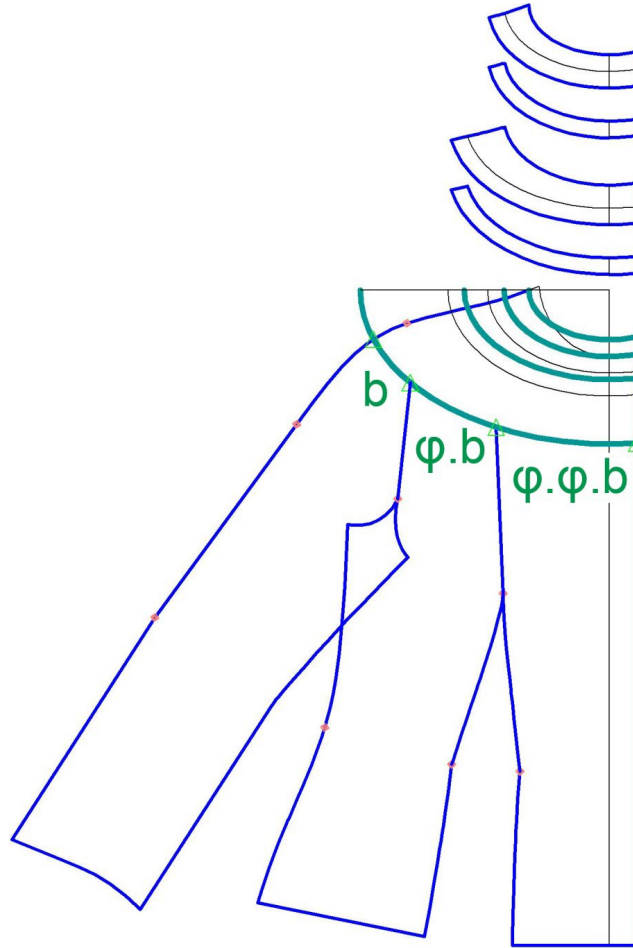
Pattern making of a jacket with direct use of golden ellipses, presented in green curves, and golden proportions.

Fibonacci proportions

Pattern making of a women's dress with the use of Fibonacci proportions
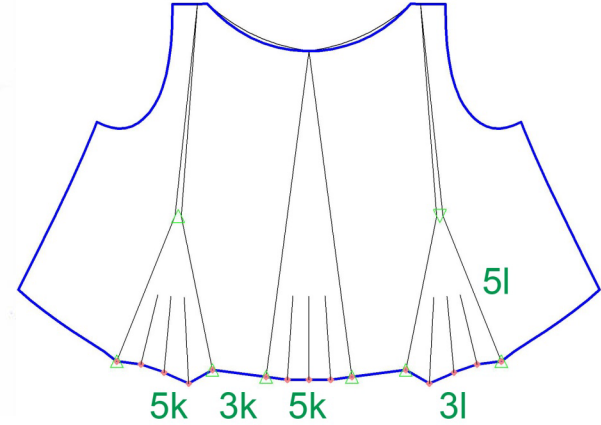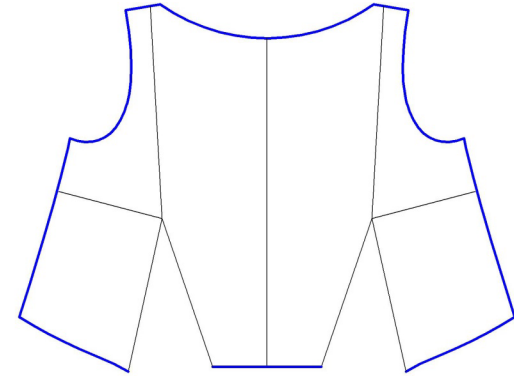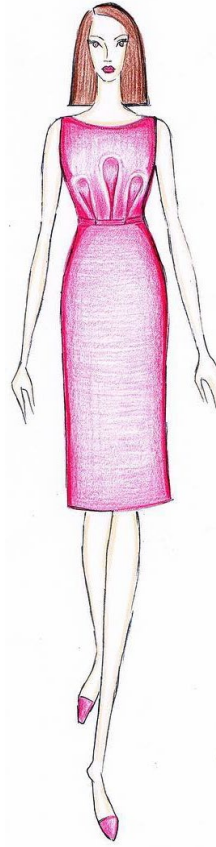
5l

5k 3k 5k 3l

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Pattern making of a women's dress with the use of Fibonacci proportions
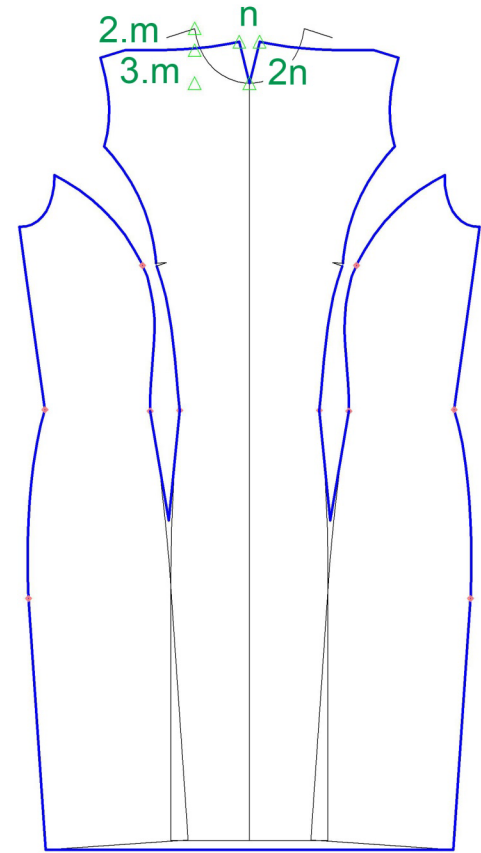
Minimizing waste

Some pattern making solutions offer lower consumption of textile material and minimizing waste cutting. With the help of these constructive solutions, minor changes can be made to the design, keeping the main idea of the design.

For example, the classic one-piece or two pieces sleeves in women's jackets can be replaced with drop shoulder ones. This only one change in the design and pattern making of the jacket leads to the lower consumption of textile material and minimizing waste cutting.

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Drop Shoulder Sleeves

Two variants of a design of a lady's jacket with only one difference in the type of sleeves: an orange one with one-piece sleeves and a green one with drop shoulder sleeves.

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Drop Shoulder Sleeves
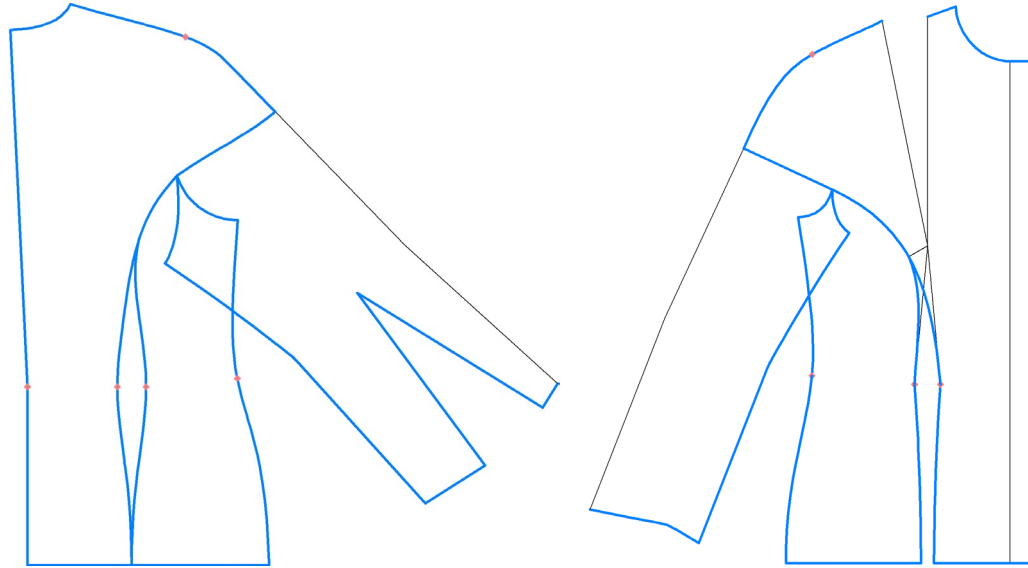
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Pattern making of a lady's jacket with drop shoulder sleeves, presented in the previous slide (in green).

Drop Shoulder Sleeves

Front and back pieces of lady's jacket with drop shoulder sleeves (in green) and one with one-piece sleeves (in orange).
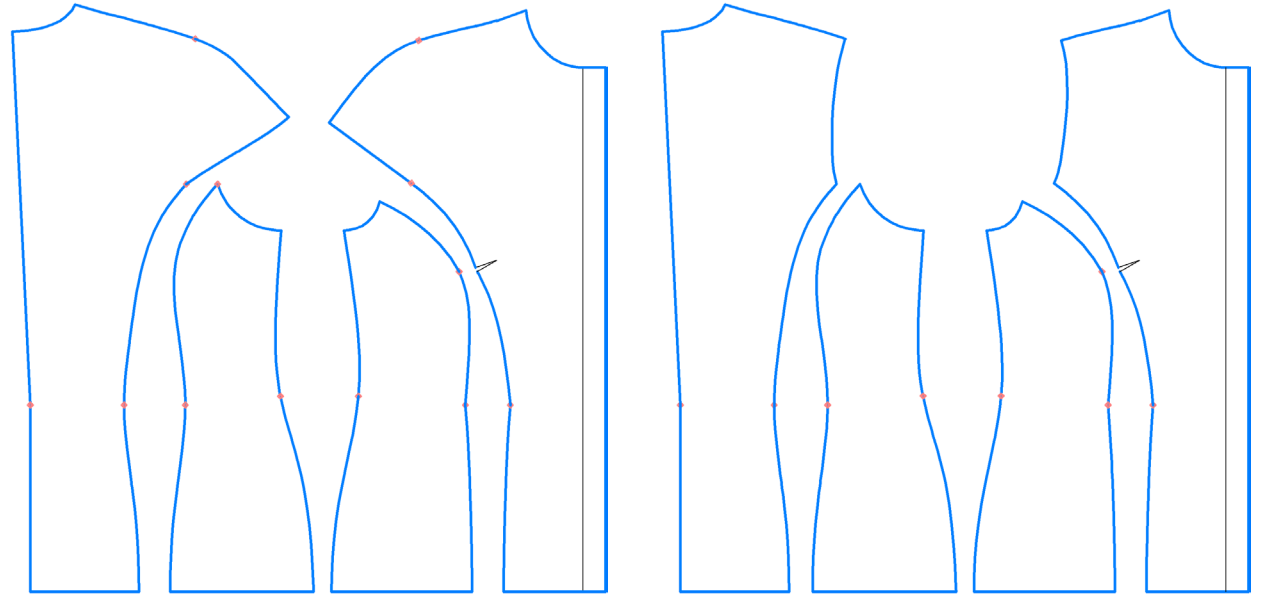
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Drop Shoulder Sleeves

The piece of drop shoulder sleeves (of a jacket in green) and the piece of one-piece sleeves (of a jacket in orange).
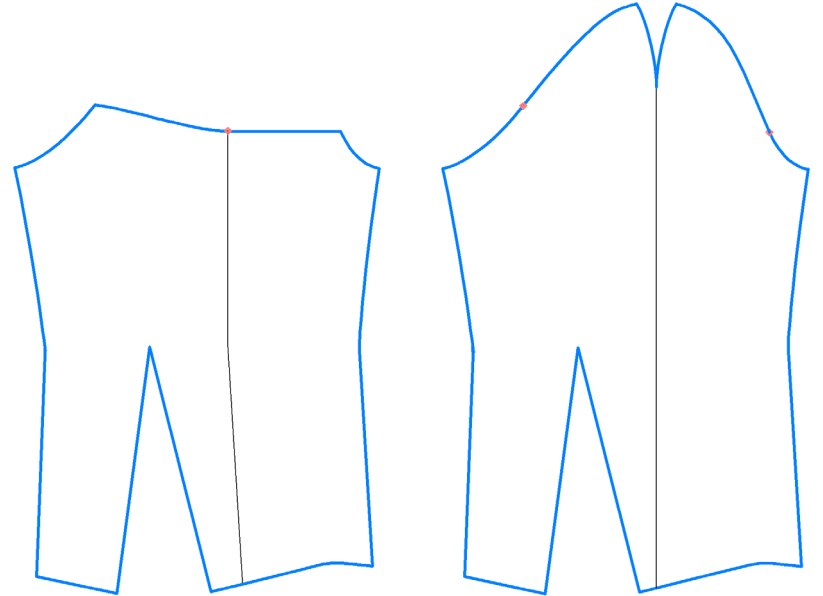
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Drop Shoulder Sleeves

The lower consumption of textile material in cutting of garments with drop shoulder sleeves mainly is a result of the difference between the heights of the drop shoulder sleeve and other types.
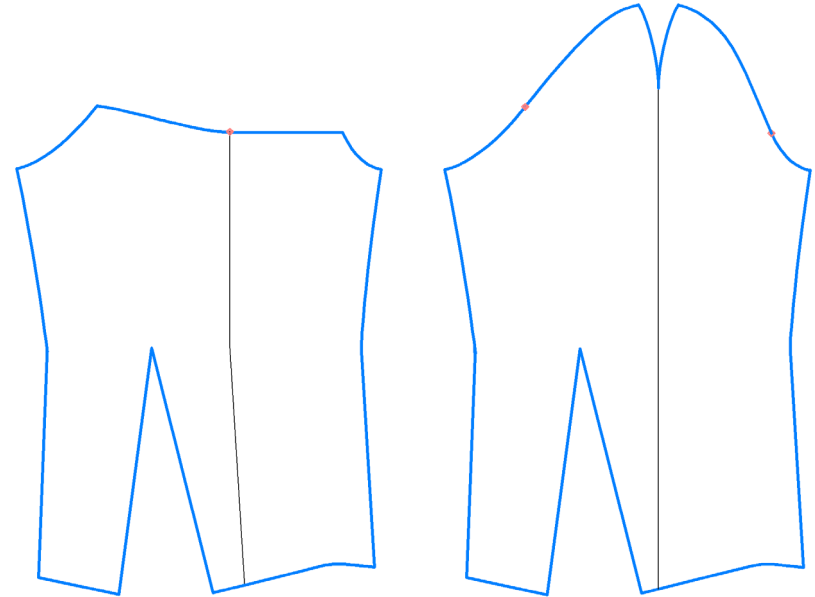
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Drop Shoulder Sleeves

The lower consumption of textile material is better seen in made to measure clothing, which are one of the objects of the slow fashion – clothes with sustainable design and quality pattern making made from quality textile materials.
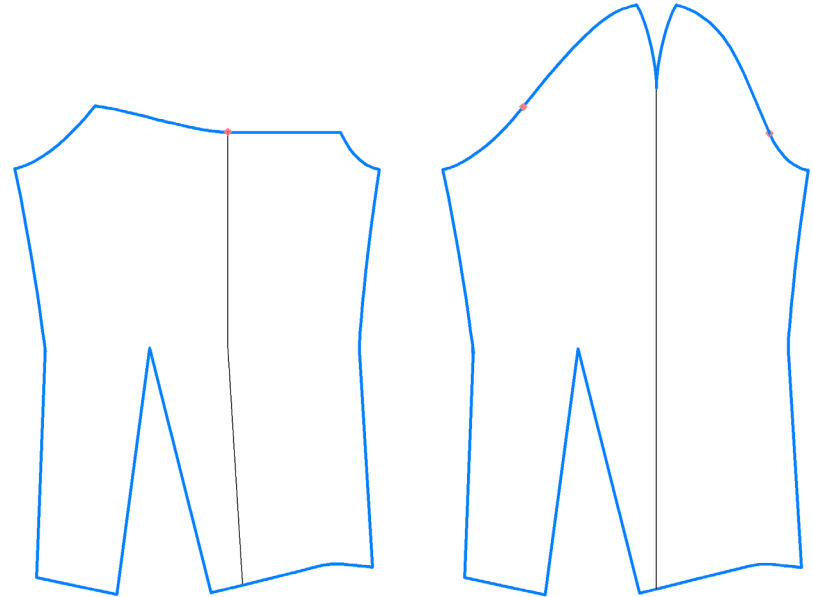
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Drop Shoulder Sleeves

The cutting waste of drop shoulder sleeves jacket is reduced not only as result of lower material consumption. The drop shoulder parts of the front and back fill partially the armhole. And it is better not only for made to measure garments, but also for the big cutting markers for ready to wear clothing too.
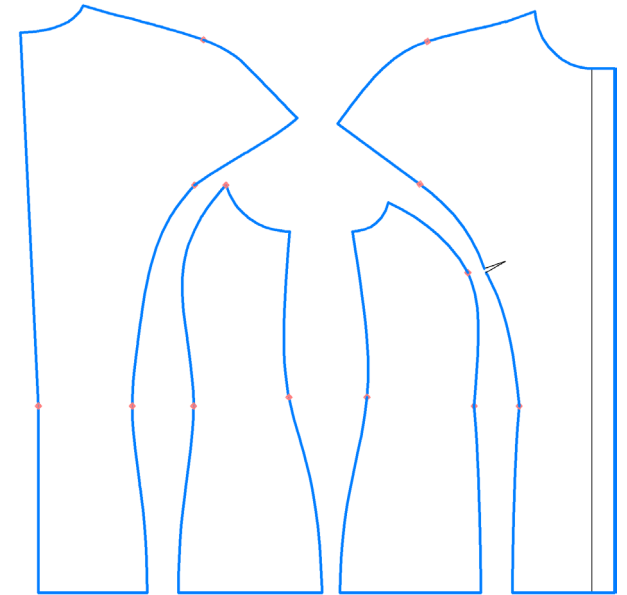
CC BY Kazlacheva

Drop Shoulder Sleeves

Regardless of the marker constructing the armhole has to be filled for the waste reducing and it is possible with small pieces. But according to the fashion trends the small pieces of clothing are not sustainable fashion elements because they don't have long life in trends.
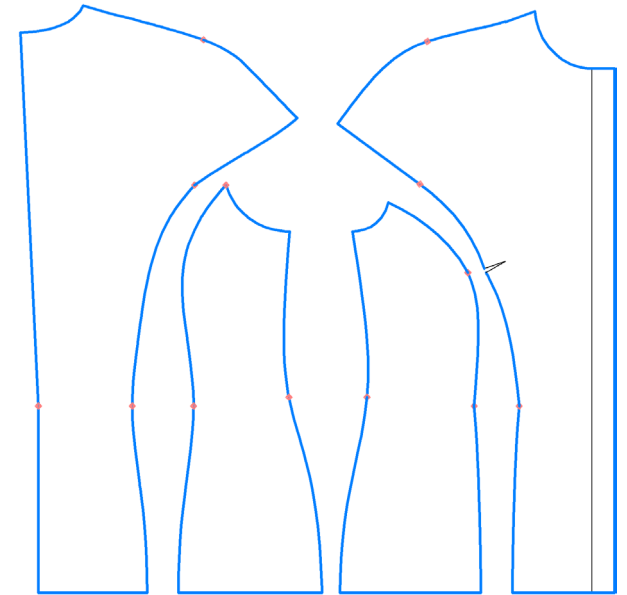
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Zero Waste

Zero waste fashion conception about design and pattern making, which eliminate cutting waste, offers interesting constructional ideas.

An idea for easy zero waste cutting of A line skirts, lower parts of dresses, or peplums is presented in next slides.

Zero Waste a Line Skirts and Peplums

1 | W/8 + 1 | W/8 + 1

Lengthwise fold

W/4 + 2

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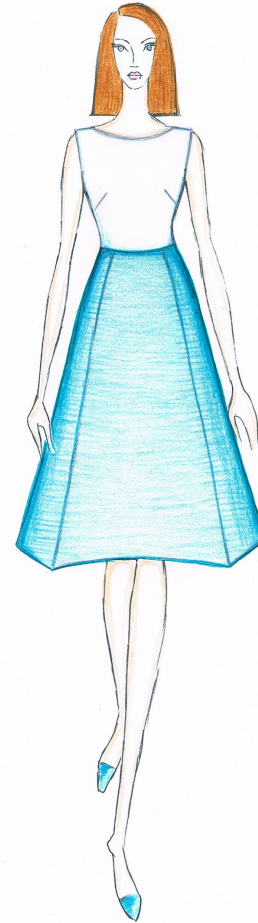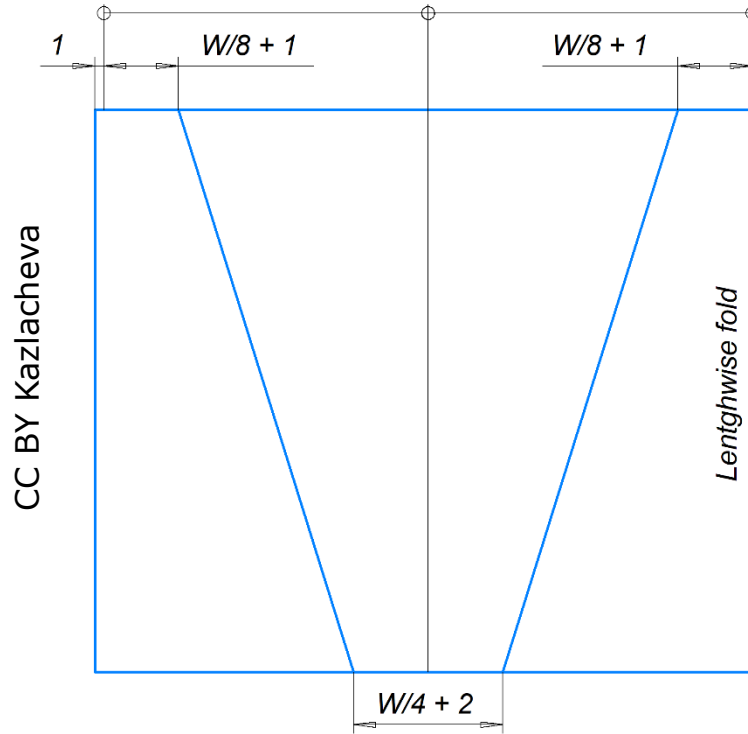
The zero waste pattern making of the A line skirt is based on zero waste cut of five pieces, which form four trapeziums – three whole ones and one from two pieces. In the construction: W, cm is the waist width. The shorter base of trapeziums is equal to W/4 + 2,0 cm (for two seam allowances). The length of the larger base of trapezium depends on the waist width W and the fabric width.

Zero Waste a Line Skirts and Peplums
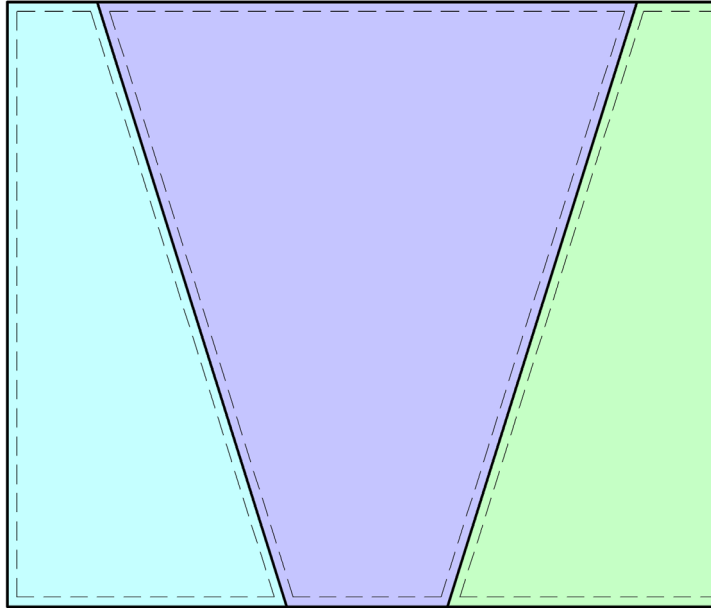
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The four trapeziums with all seam allowances are shown in different colors.

Zero Waste a Line Skirts and Peplums
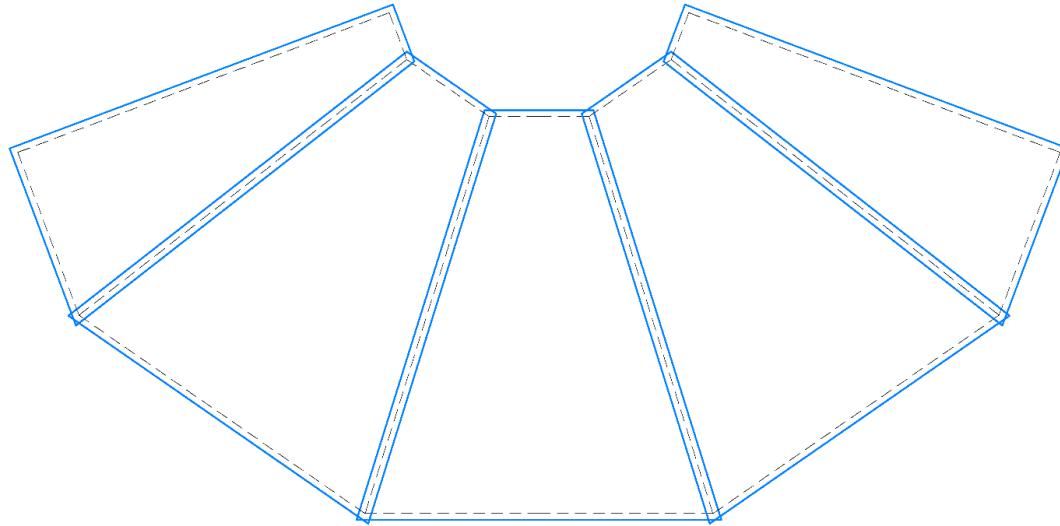
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On the base of their connections, the fourth trapeziums form an A line skirt with uneven hem. The slope of the A line of skirt depends on the waist width W and the length of the skirt.
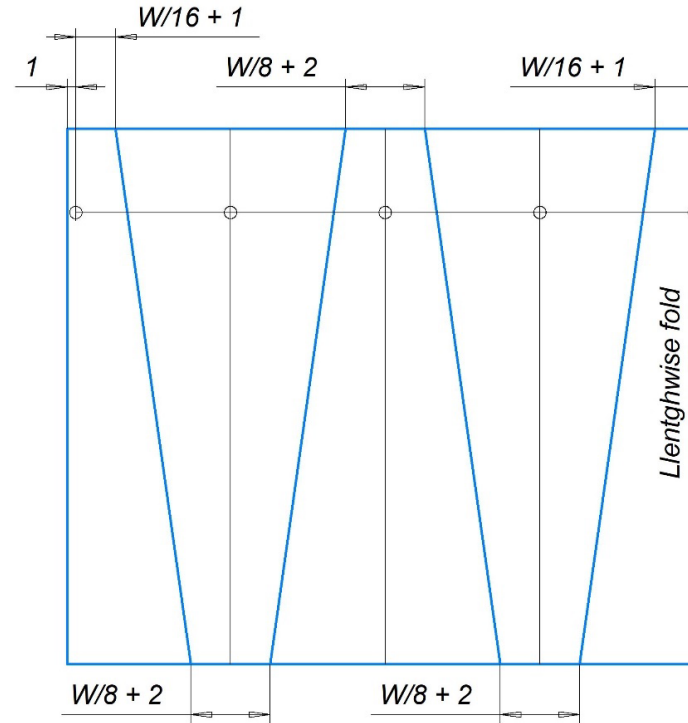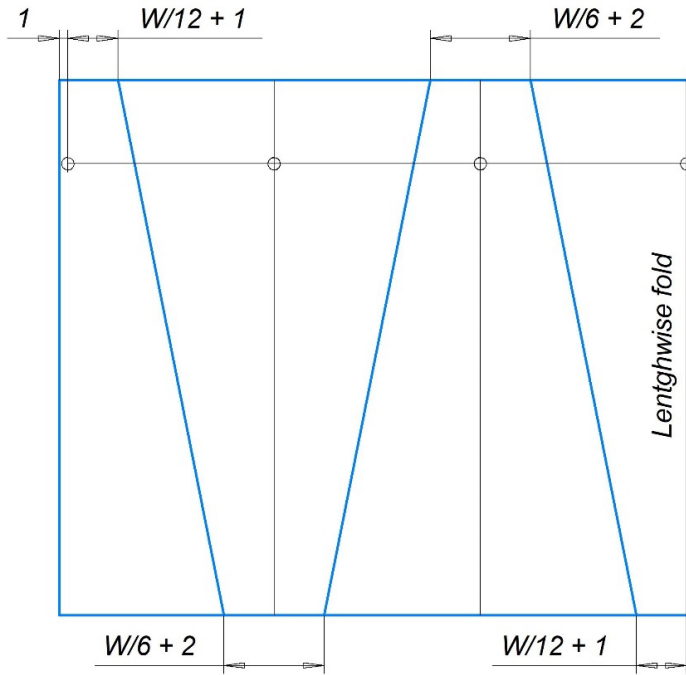
The way of zero waste pattern making of A line skirt or peplum based of four trapeziums can be applied in pattern design with 6, 8, or bigger even number trapeziums. A larger number of trapeziums results in a more flattened hem.

Zero Waste Design of Hictorical Costumes

The historical and folk costumes can be seen as sources of zero waste design ideas. In the previous topic the ancient Greek and ancient Thracian chiton was presented as an example of zero waste cut. Tronska Bulgarian women's folk costume, presented in the picture, is another zero waste design example.

Zero Waste Design of Hictorical Costumes

The cut of the dress, named sukman of Tronska women's folk costume. The front and back are cut by one double long rectangular piece with a hole for the neck opening. The side wedges are cut by rectangles with the same width as the front and back. The rectangles are divided in diagonal directions.
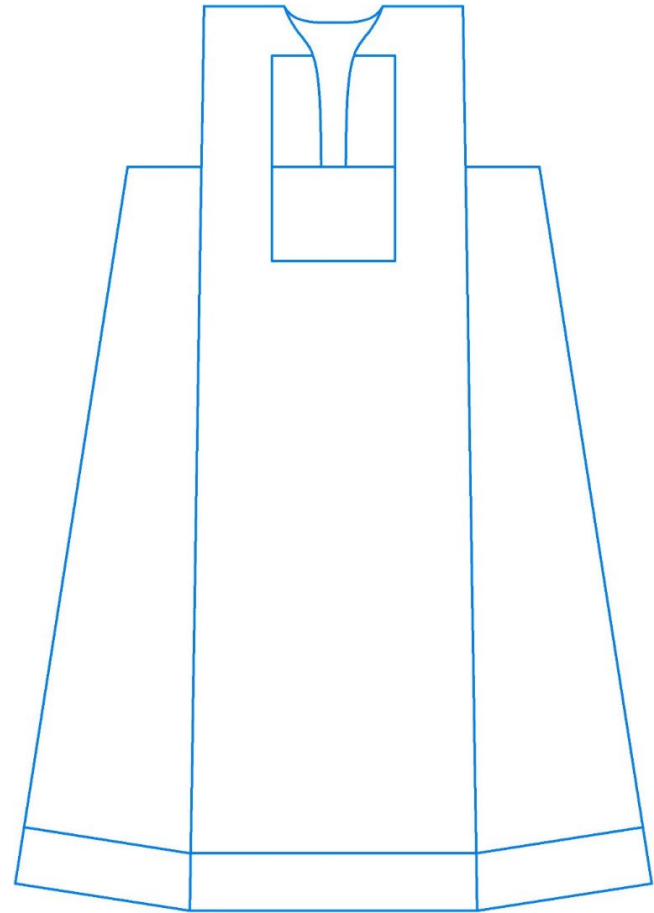
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Zero Waste Design of Hictorical Costumes
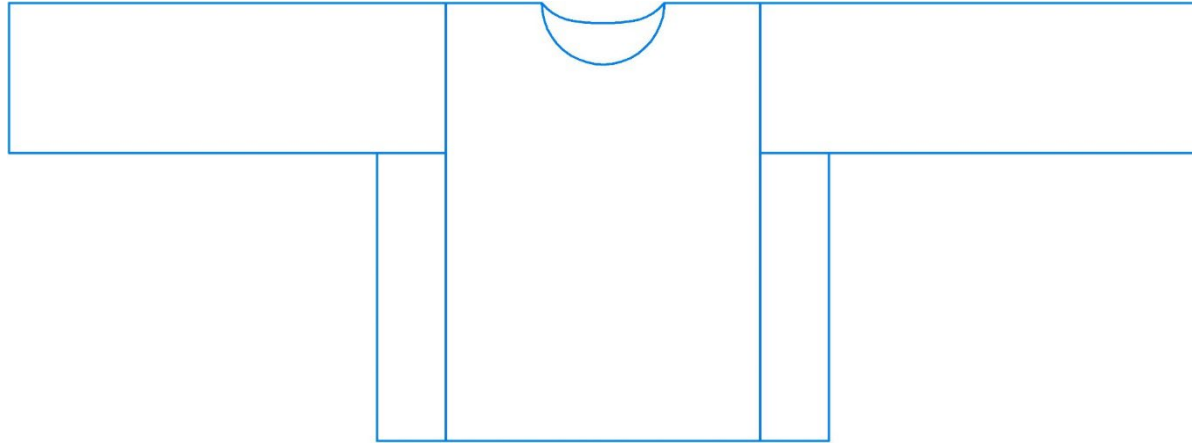
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The cut of the shirt of Tronska women's folk costume. The front and back are cut by one rectangular piece with a hole for the neckline. The sleeves are cut by rectangles in the same width. The side wedges are cut by rectangles with a quarter width.

Conclusion

The accuracy of presented approaches of pattern making of women's clothes with drapes is based on the correct and facilitated geometric sequences of constructing of the fourth types, and the correct and easy formulas, used for the twist knot and twisted draperies. The applying of the formulas lead to correct pattern design for all possible combinations of sizes of the elements of drapes.

The presented pattern designs are examples of sustainable and correct pattern making of women's clothes with sustainable long life fashion elements of all types of drapes, peplums, and 3D elements; sustainable golden and Fibonacci sequence proportions through direct proportioning or geometric figures; lower consumption of textile material and minimizing waste cutting; zero waste pattern cutting; and combinations between them.

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