



DESIGN OF UNUSUAL COLLARS

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Abstract:

An investigation of the design of unusual collars, which are formed around oval, square, trapezium, or pentagon necklines in lady's clothing, is presented in the paper. The study aim is creating of a new mode for correct and facilitating design of these kinds of collars. Similar investigations were made for collars with lapels, shawl or other design, formed around traditional V necklines, shaped with straight or curved lines. The approach for previous investigations is used in the present investigation. It includes a new depending, deduced with the use of multiple regressions and new geometrical drawing.

The results of the presented study and the new geometrical mode give possibilities for facilitating and correct design constructing collars with aesthetic form and shape position toward bodice, and creation of models variety around oval, square, trapezium, or pentagon necklines. The new design constructional mode is suitable for both traditional manual and drawing with CAD systems.

Keywords:

Design, clothing constructing, collars, different types of necklines.

1 INTRODUCTION

The collars often are the center of the composition in the garments and designers often create new models only by changes of the collar forms. The lapel, shawl collars, or other shape of collars usually are designed around V necklines. Sometimes in lady's clothing these kinds of collars are formed around oval (like first model in figure 1), square, trapezium (like second model in figure 1), or pentagon necklines. The paper presents an investigation of design constructing of collars around these necklines, designed overall unusual collar form. The study aim is creating of a new geometrical mode for correct and facilitating design of these kinds of collars.

2 EXPERIMENTAL METHODOLOGY

The constructional mode by the system M. Müller + Sohn, which is used for design of collars around V necklines [1], can be used for design constructing collar around oval, square, trapezium, or pentagon necklines. The construction is presented in figure 2. The neckline can be extra sunk. The segments $1 \div 2 = 2 \div 3 = 1,5-2,0$ cm define the collar stand height by the shoulders. They are parallel to the back middle line. The segments $4 \div 5 = 5 \div 6 = 1 \div 2 + 1,0$ define the collar stand height by the back middle. Points 2 and 5 are connected with a curved line. Points 3 and 6 are connected with a curved line, too. The segment $7 \div 8$ defines the tangent line to the neckline in the point of intersection between the neckline and shoulder. Point 7 is situated on a horizontal line which is located 8-10 cm over the bust dart point. 8 is the point of interception of the front neckline and shoulder. For design of collars around oval, trapezium, or pentagon neckline point 7 have to be located to the left than point 8. The segment $7 \div 8$ is in vertical position if the neckline is designed in square form. The front neckline is formed with a curved line, formed oval form, like the model on figure 2, or combination from curved or straight lines, created square, trapezium or pentagon form. An arc is drawn with centre point 7 and radius $7 \div 8$. On the arc: $8 \div 9 = 9 \div 10 = 1 \div 2 = 2 \div 3$. $8 \div 9$ and $9 \div 10$ defines the collar stand height by the shoulders, too. The distance $8 \div 11$ defines the collar width by the shoulders.



Figure 1: Collars around oval and trapezium necklines



The back is held position over the front as the distance between points 3 and 10 is 0,75 cm, and the front and back shoulders are crossed each other in the point 11. The distance 5÷12 defines the collar width in the back middle. The point 13 defines the collar beginning on the the neckline. The curve 10÷14 is the same the curve 8÷13, as the segment 7÷10 is the tangent line to 10÷13 in the point 10. The line of collar connection is curve 14÷10÷3÷6. The collar edge is drawn with a curved line between points 12 and 14 through point 11.

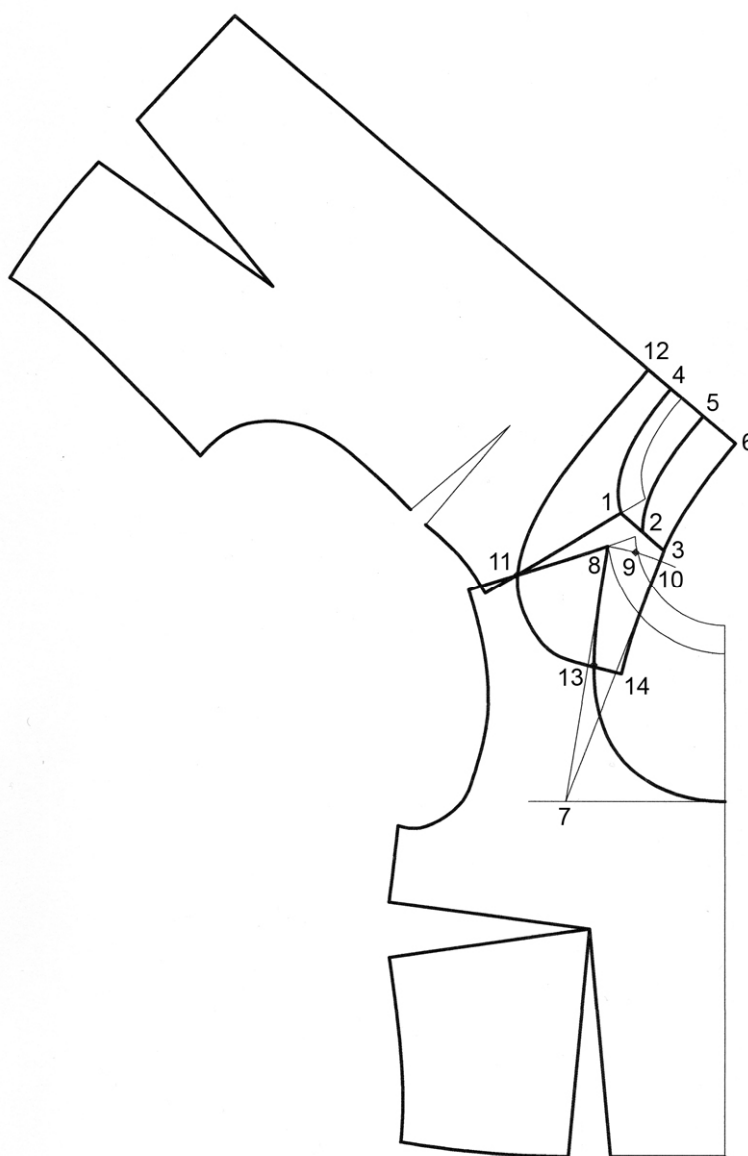


Figure 2: Collar design constructing by the use of the system M. Müller + Sohn

It is seen in the construction in figure 2 that the location on the back over the front defines the collar slope, and if the other way for determination of the slope of the collar will be found, the design constructional mode will be facilitated. In investigations, presented in [2], like in traditional constructional mode for lapel and shawl collar with straight rollline, an arc replace the position on the back over the front in the determination of the collar slope. The same approach is used for facilitation



of the construction in figure 2. In figure 3 points 7 and 9 are connected with a straight line, and the line is extended over point 9. An arc is drawn with center point 10 and radius $10 \div 6$ between point 6 and extended line $7 \div 9$. On the arc: $6 \div a = 5 \div 6$. Distance $6 \div a$ defines the collar stand height in the collar middle. The arc reaches extended line $7 \div 9$ in point b. If the distance $a \div b$ is determined with a formula, which is accurate for different measures of design and constructional elements, the construction will become facilitating.

The distance $a \div b$ is defined by the central angle β of the arc $a \div b$ depending on collar width by the shoulders – distance $8 \div 11$ and the angle between line $7 \div 9$ and a vertical line drawn through point 7 – angle α . The dependence for determination of angle β is found by the use of the method of multiple linear regression.

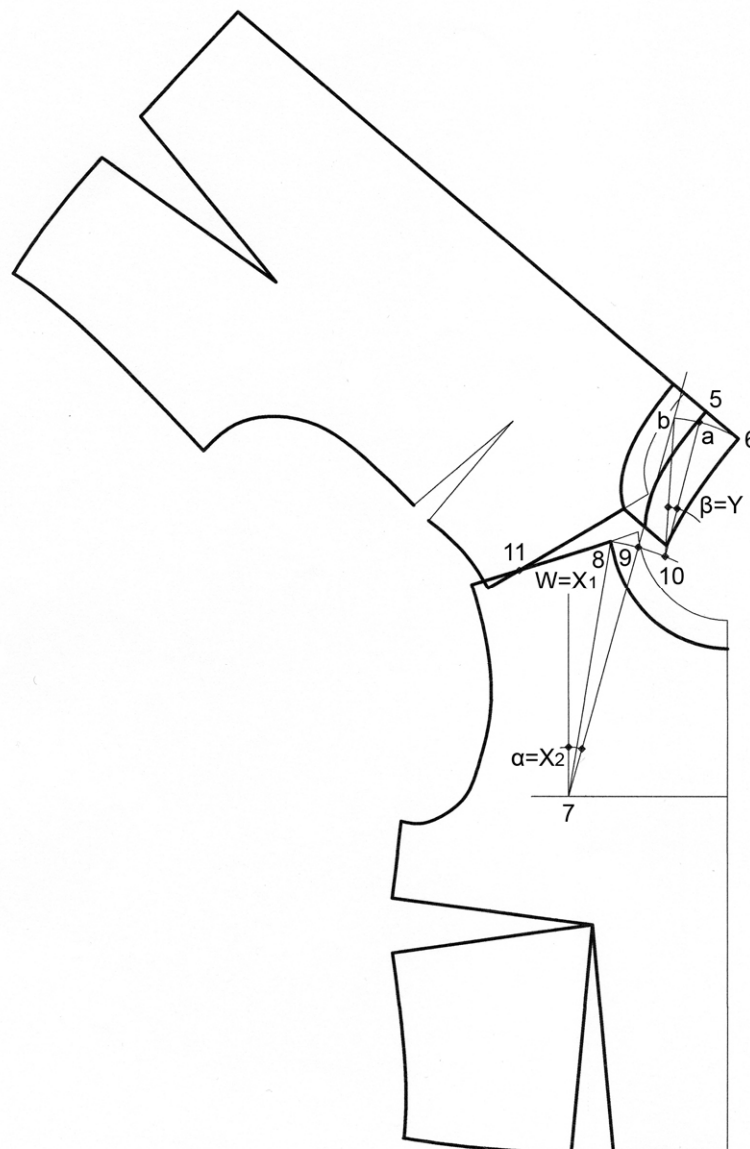


Figure 3: Determination of the collar slope with an arc. Regression model. Dependent and independent variables



For the investigation two constructional bases of lady's jacket are drawn by two different methodologies [1, 3] for two different size. With the use of the constructional bases the constructions from the type, presented in figure 3, are designed for different combination of values: $\alpha = 4,76-23,65^\circ$ (The value of angle α depends of the location of point 7 on the horizontal line, which is drawn on 9 cm over the bust dart point.); the extra neckline depth is 0-2,0 cm; the collar stand height by the back middle is 2,5-3,0 cm; the collar width by the shoulders is $W = 4,0-10,0$ cm.

In this investigation traditional linear regression formula (1) acquires mode (2).

$$Y = b_0 + b_1 \cdot X_1 + b_2 \cdot X_2 \quad (1)$$

Y is dependent variable, X_1 and X_2 – independent variables, b_0 – constant, b_1 and b_2 – slopes.

$$\beta = b_0 + b_1 \cdot W + b_2 \cdot \alpha \quad (2)$$

$\beta, ^\circ$ is the central angle of the collar slope arc (arc a÷b in figure 3) , W , cm – the collar width by the shoulders, $\alpha, ^\circ$ – the roll line angle (the angle between segment 7÷9 and vertical line).

3 RESULTS

The statistical analysis is made with the use of the software STATISTICA 7 [4]. The linear regression results are $b_0 = 14,45538$, $b_1 = 1,19105$, $b_3 = -0,65842$. The accuracy of the regression model is provided by the values of $p < 0,0000$, R-square = 0,82119082, Std. Error of estimate = 2,4755.

On the base of the statistical analysis formula (2) assumes form (3).

$$\beta = 14,5 + 1,2 \cdot W - 0,65 \cdot \alpha \quad (3)$$

The linear interaction between dependent and independent variables is presented in figure 4.

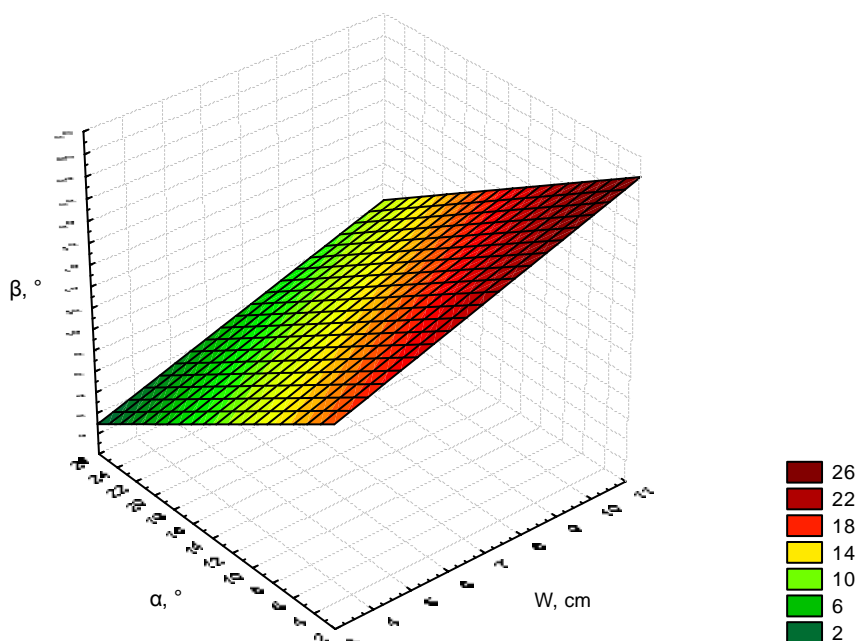


Figure 4: Linear interaction between dependent and independent variables



4 DESING CONSTRUCTING MODE

After defining the collar slope with the use of formula (3), the new geometrical mode of design constructing collars around oval, square, trapezium, or pentagon necklines is developed. The new mode construction is presented in figure 5.

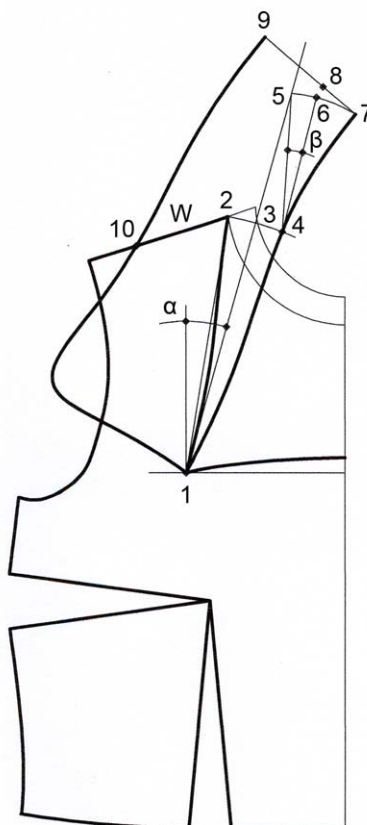


Figure 5: New design constructional mode

In figure 5 point 1 is situated on the horizontal line which is located on 8-10 cm over the bust dart point. 2 is the point of interception of the front neckline and shoulder after the neckline sinking if it is necessary for the model. For design of collars around oval, trapezium, or pentagon neckline point 1 is located to the left than point 2. The segment 1÷2 is in vertical position if the neckline is designed in square form. Segment 1÷2 defines the tangent line to the neckline in the point of intersection between the neckline and shoulder. The front neckline is formed with a curved line, formed oval form, or combination from curved or straight lines, created square, trapezium (like the model in figure 5), or pentagon form. An arc is drawn with centre point 1 and radius 1÷2. On the arc: $2\div3 = 3\div4 = 1,5-2,0$ cm. Distances 2÷3 and 3÷4 define the collar stand height by shoulders. Points 1 and 3 are connected with a straight line, which is extended over point 3. An arc is drawn to the right of line 1÷3 with centre point 4 and radius, equal to the back neckline length after the neckline sinking if the neckline is sunk. On the arc: Distance 5÷6 is defined by its centre angle by formula (3). Distance $6\div7 = 2\div3 + 1,0$ determines the collar stand height by the back middle. Points 4 and 7 are connected with a curved line and curve 4÷7 defines the collar connected line to the back neckline. A line, which is perpendicular to 4÷7 is drawn. On the new line: $7\div8 = 6\div7$. Distance 7÷8 defines the collar stand height by the back middle. Distance 8÷9 determines the collar width by the back middle. On the front shoulder distance 2÷10 define the collar width by the shoulders. The collar edge is drawn with a curved line between



points 1 and 9 through point 10. The collar edge line shape depends from the model and fashion trends. Points 1 and 4 are connected with a curved (like the line in the construction in figure 5) or straight line, which is the same as the line of the neckline – $1 \div 2$. The line $1 \div 4$ defines the collar connecting line to the front neckline.

5 CONCLUSIONS

The results of the presented study and the new geometrical mode give possibilities for facilitating and correct design constructing collars with aesthetic form and shape position toward bodice, and creation of models variety around oval, square, trapezium, or pentagon necklines. The new design constructional mode is suitable for both traditional manual and drawing with CAD systems.

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