

The Establishment of Blouse'S Parameter Constraint Database Based on Pattern Automatic Generation

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Abstract. This study takes fast pattern generating as the goal and takes blouse pattern as the research object, then raises up the parametric design method based on numerical geometric constraint, and take constraint solving for each part of the blouse pattern, furthermore, this paper uses numerical method of geometry constraint to complete the process of parametric design for clothing patterns, then blouse pattern's complete parametric constraint database and rule base is established, and more important, the study establish data foundation for apparel pattern automatic generation system and interactive modification.

1 Instructions

The clothing industry is a labor-intensive industry. The technical personnel who engage in the clothing structure are clear that, most of the work in the fashion design process is repetitive work. In order to reduce the repeated work of operators as well as improve the production efficiency, researchers put forward the automatic generation of intelligent pattern design ideas, and further introduce the expert system for apparel industry. For example, through the CAD expert system interface, we input a desired style, body size, type size, various parts of the relation data, the expert system will automatically draw the qualified pattern that we need in the computer thus, this will greatly reduces the design difficulty, speeds up the pattern structure design speed, improves the efficiency and ensures the accuracy of the design. Intelligent pattern automatic generation is the development trend of the clothing CAD system.[1][2]

We know that although the garment pattern design is usually the plane structure design, it is still closely associated with the overall effect of clothing, so clothing pattern design process can be replaced by a variety of different parameters or parameters relationship. So in order to realize the automatic generation of the garment pattern, the most important problem we have to solve is the parameterization of pattern structure lines.[3][4]

2 The Determination of Pattern Parametric Design Method

2.1 The concept of parametric design

Parametric design is to use a set of parameters to define the size of geometry graph and restrain the size relationship; the modification of the design results is driven by parameters. And parametric design for clothing pattern is to use a set of structure size sequence obtained by the pattern parameter constraint; there is certain corresponding relationship between parameters and pattern control sizes. When parameters are given different values, we can drive the original pattern into a new pattern. The parametric design is direct application of the technology that computer aided design of artificial intelligence technology. Through this technology, the shape size and positioning size of the designing shape is defined by variable symbols, rather than a set of constant data. Controlled by the shape's size, only through modify the shape's parameters data; we can make the body shape change without having to change the shape itself.

2.2 The determination of the pattern parametric design method

In recent years, there have been made many research results in the field of parameters design, and there is more and more parametric design methods. The methods that more commonly used are: modeling method based on the relationship, modeling method based on feature entity, intelligent method based on geometric reasoning and numerical method based on the geometric constraints.

The numerical method based on geometric constraints is the method that according to the given constraints, firstly represents the relationship of a numerical model with a set of equations, then takes mathematical solutions of equations and obtains the model corresponding to the coordinate value, finally determines the parametric geometric details of the products. And garment pattern designs also rely mainly on mathematical formulas that corresponding to the computation, and finally generate the irregular geometric figures. Therefore, the numerical method for geometric constraint parametric design is the most feasible method.

3 Determination of the Blouse Pattern

Blouse is women's most basic styles, which can very simple but elegant, fashion and changeable. Through blouse pattern's making, we can have a basic understanding of women's pattern design process. This study selected the most common style blouse as the research object and its characteristics is slim in the waist, two waist darts on front and back of blouse, big lapel. Style and structure is shown below, the specifications for the blouse is 160/84A.

Table 1. Drawing standard for women's blouse(unit: cm)

parts	size	Long	chest circumference	shoulder breadth	back length	neck circumference
standard	160/84A	65	94	39	38	38



Figure 1. Blouse style

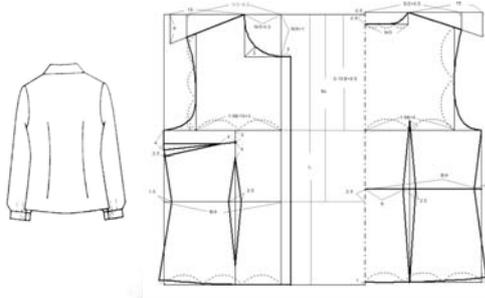


Figure 2. Blouse's pattern

4 The Establishment of Blouse Pattern Parameter Constraint Database

4.1 The establishment of the parameters

This study takes basic blouse's pattern parameters as the example, for other female shirts and other styles of dress; the operation process can refer to the following steps.

Table 2 blouse pattern parameter table(unit: cm)

Order number	parameter name	parameter type	data
1	size	specification parameter	160/84A
2	Long(L)	specification parameter	55
3	chest circumference(B)	specification parameter	94
4	shoulder breadth(S)	specification parameter	39
5	neck circumference(N)	specification parameter	38
6	back length(BL)	technical parameter	38
7	front dart	modeling parameter	2.5
8	back dart	modeling parameter	2.5
9	neck width	modeling parameter	6.5
10	sleeve height	Complex parameter	23.6
11	chest width	Complex parameter	17

12	back width	Complex parameter	18
13	back arc length of neck	geometric parameter	9.65
14	front arc length of neck	geometric parameter	12.74
15	front sleeve cage arc	geometric parameter	22.95
16	back sleeve cage arc	geometric parameter	23.49

4.2 The establishment of blouse pattern parameter constraint database

According to the data relation and the database requirement, the constraint coordinates of each structure point are given according to the data relation and the database.

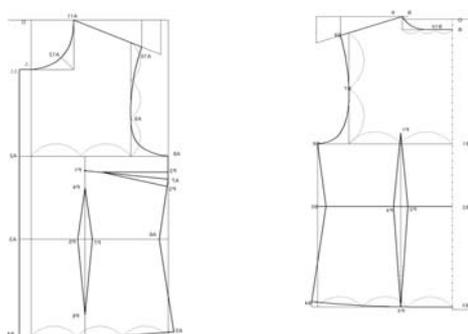


Figure. 3 The coordinates code of each constraint point on the front and back

Table 3. Each structure point 's parametric constraint database of front blouse pattern (unit: cm)

Point code	Series number	Coordinate(X)	Coordinate(Y)	Last point	Next point	Next two point	law
O	O	0	0		A	A1	0
A	1	2	$N/5+1$	O	A1	A2	0,1
A1	2	2	$N/5+1$	A	A2	A3	1,1
A2	3	2	$0.15B+9.5$	A1	A3	A4	1,1
A3	4	2	BL	A2	A4	A5	1,1
A4	5	2	L	A3	A5	A6	1,2
A5	6	$-(B/4+1)$	$L-1$	A4	A6	A7	2,1
A6	7	$-(B/4-1.5)$	BL	A5	A7	A8	1,1
A7	8	$-B/4$	$0.15B+9.5+4$	A6	A8	A9	1,1
A8	9	$-B/4$	$0.15B+9.5$	A7	A9	A10	1,2
A9	10	$-(0.15B+3)$	$0.15B+9.5-$ $(S/2-N/5-0.2)\tan 22^\circ$	A8	A10	A11	2,2
A10	11	$-(S/2-0.5)$	$(S/2-N/5-0.2)\tan 22^\circ$	A9	A11	A12	2,1
A11	12	$-(N/5-0.3)$	0	A10	A12	A	1,2
A12	13	$-(N/5-0.3-3\sin 45^\circ)$	$N/5+1-3\sin 45^\circ$	A11	A		2,2
P1	14	-	$0.15B+9.5+3$	A7	P2	P3	1,1
P2	15	$[(0.15B+3)/2+0.7]$ $-B/4$	$0.15B+9.5+2.75$	P1	P2	P1	1,1
P3	16	$-B/4$	$0.15B+9.5+5.5$	P2	P1		1,1

P4	17	- [(0.15B+3)/2+0.7]	0.15B+9.5+7	P1	P5	P6	1,1
P5	18	- [(0.15B+3)/2+0.7- 1.25]	BL	P4	P6	P7	1,1
P6	19	- [(0.15B+3)/2+0.7]	SL-5	P5	P7	P4	1,1
P7	20	- [(0.15B+3)/2+0.7+1.2 5]	BL	P6	P4		1,1

Table 4. Each structure point 's parametric constraint database of back blouse pattern (unit: cm)

Point code	Series number	Coordinate(X)	Coordinate(Y)	Last piont	Next point	Next two point	law
O	0	0	0		A	A1	0
B	1	0	2	O	A1	A2	0,1
B1	2	0	0.15B+9.5	A	A2	A3	1,1
B2	3	0	BL-2.5	A1	A3	A4	1,1
B3	4	0	SL-1	A2	A4	A5	1,2
B4	5	B/4+1	SL-2	A3	A5	A6	2,1
B5	6	B/4_1.5	BL-2.5	A4	A6	A7	1,1
B6	7	B/4	0.15B+9.5	A5	A7	A8	1,2
B7	8	0.15+4	0.15B+9.5-(S/2- N/5)tan18°	A6	A8	A9	2,2
B8	9	S/2	(S/2-N/5)tan18°	A7	A9	A10	2,1
B9	10	N/5	-0.5	A8	A10	A	1,2
B10	11	N/15	2	A9	A		2,2
P1	12	(0.15B+4)/2	0.15B+9.5-2		P2	P3	1,1
P2	13	(0.15B+4)/2-1.25	BL-2.5	P1	P3	P4	1,1
P3	14	(0.15B+4)/2	BL-1	P2	P4	P1	1,1
P4	15	(0.15B+4)/2+1.25	BL-2.5	P3	P1		1,1

Note: the points which are on the contour line marked with A(front) and B (back) , other modeling point marked with P, the connection method between one point and the last and next point respectively denote by data 0,1,2,they respectively denote point, line and curve.

5 Conclusion

Today, a major development trend for clothing pattern design is intelligence, and parameterization is one of the core modules for realizing the automation of clothing pattern design. This study takes blouse pattern as the research object, use numerical method of geometry constraint to complete the process of parametric design for clothing patterns, then this paper establishes the complete parametric constraint database and rule base of blouse pattern, and establishes the foundation for the blouses pattern automatic generation system and interactive modification .

References

- [1] Wang.Z,Newton.E,R & Zhang.H.Ease distribution in relation to the X-line style jacket.Part I: Development of a mathematical model.The Textile Institute.2006.(3): 247-256.
- [2] Zhang .H&Zhang.X. Method of automatic generation for tailored clothing pattern, Knitting industry, 2005. 12: 29-31
- [3] Wei.G&Zhang. H.Z.Analysis of the application of parametric design of garment pattern, Tianjin Textile Science & Technology, 2007, 45(02):34-36
- [4] Song.H.H,Research on automatic generation system of men's pattern, Shanghai: Shanghai University of Engineering Science, 2007:35 – 37