STUDYING SYSTEMIC FORMULAS USE TO DESIGN THE WOMEN'S BASIC BLOCK AND PROPOSING ADJUSTED COEFFICIENTS

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ABSTRACT

Through teaching process and combining with real evidence shows that formulas design patterns having many places that aren't fit when wearing the human body. So, the research's purpose is looking for advantages and disadvantages of the systemic formulas, which is used to design basic block. From there, takes fit adjusted coefficients. Research's contents in this paper include the study on formulas using in women basic patterns design like American's formulas, England's formulas. This research uses the 2D method to design patterns of the basic block by American's formulas and England's formulas to compare and analyze formulas system using in making patterns by trying on the body and mannequin. Next, the research is fit for patterns and ways to adjust. Likert scale's method is used to evaluate results by the Cronbach's Alpha. This study has scientifically and applied to teach, production practices as a premise of supporting contents on research making systemic formulas of basic blocks for many kinds of garments and customers.

Keywords: *systemic formulas; basic block; adjusted coefficient; mannequin; 2D method.*

1. INTRODUCTION

Designing patterns form the basic block has many advantages, which is used in advanced countries in the world. Those are serving customers with high fit, reduce time because of new designing for every style. In Vietnam, designing from a basic block doesn't use common because of the habit of the designer. All most companies and schools have taught pattern design by a method of designing for an individual. The basic block includes upper body patterns and skirt patterns. This basic block can make by 2D method [1, 2] or 3D method [3]. Making a basic block by 2D method needs many body dimensions but making the following needs few body dimensions [4]. Designing pattern by 3D method is needing the mannequin [5], this method is divided two ways, that are making direct on the real mannequin [6] and drafting patterns to 2D finish pattern. Another designing clothing by 3D simulation software is using patterns that are designed by 2D method to drape on the avatars and edit patterns or avatar's measurements to having the finish patterns [7]. There are many correlation studies to design by the 2D method, such as the study "Computer-aided clothing pattern design with 3D editing and pattern alterations" [8], authors researched editing of the basic block measurements (extracting form 3D through digital probe) direct on the 3D form. Next, output 2D patterns. The disadvantage in this subject is the style simulation having a simple shape, so can't apply to produce. The subject "Study on completion of the basic block for Vietnam women to apply production for industrial sewing" [9], the author researched completed the designing system for women basic and they are used to make the mannequin to support designing women's garments. The research presents in this paper concentrate on formulas to design the basic block by Gerber Accumark software [10], which is using at many advanced countries in the world. Those formulas are American's formulas, England's formulas. The research's result is analysis tables of formulas system and an analysis table for not fit on the basic block together with adjusting patterns.

2. MATERIALS AND METHOD

2.1 Target research

Researching systemic formulas designing women's basic block by the 2D method to establish adjusted coefficients for fit ease.

2.2 Methodology

This uses the 2D method to design patterns of the basic block by American's formulas and England's formulas to compare and analyze formulas system using in pattern making. The results are valued by Likert scale through Cronbach's Alpha coefficients.

2.3 Limit research

Material: The muslin is the cotton fabric 100%.

Mannequin made in China, which has the size M (Medium) and has measurements suitable for Vietnam's body measurements and neighbor countries.

Software: The research uses Gerber Accumark8.3 software to design patterns, and SPSS software to evaluate results of experiences [11].

2.4 The base chooses the designing method

The study chooses systemic formulas to pattern design by the 2D method, those are American's systemic formulas and England's systemic formulas to research. Those formulas are using many countries in the world and Vietnam, which is teaching at the College, University that trains garment technology and fashion design.

3. RESULTS

3.1 The result from the analysis of the systemic formula

With the 2D method to design the basic block is a person who is measurement will wear body suit or underwear. The ease for each location is calculated carefully. This method is different from the method of designing for the individual, which gets eases thanks to designer's experiences. By the individual method is not high fit like designing by the basic block. The result presents in table 1.

3.2 Locations are not fit on the basic block

Patterns of the basic block are designed by the 2D method of the systemic formulas on the base mannequin size M's measurements will sew to wear on the mannequin. Results show that having many locations haven't fit at the body block and the skirt block as present in table 2.

3.3 The result of establishing for ease's adjusted coefficient

In the American's systemic formulas are body block having many locations to need editing, those are a part of the front body at underbust, a part of the back body at the center back and near the waist. Sleeves reduce the length of the sleeves. The front skirt needs editing width at the hip line.

For the British' systemic formulas need adjusting a width of the front neck, the width of the cross front waist and the cross back waist. Reducing armhole's length of the sleeves.

Adjusted coefficient's details are showed in table 3.

Table 1. *Systemic formulas for pattern design*

Special comparison	**American's systemic formulas (Helen Armstrong) [1]**	**England's systemic formulas (Winifred Aldrich) [2]**
Design formulas	The base to make design formulas from the research body surface and body shape when putting them are static and dynamic.	The base to make design formulas from the research body surface and body shape when putting them are static and dynamic.

Special comparison	**American's systemic formulas (Helen Armstrong) [1]**	**England's systemic formulas (Winifred Aldrich) [2]**
Characteristics and number of measurements	People are measurements wearing bodysuit or underwear when measurement tightly body.	People are measurements wearing bodysuit or underwear when measurement closely body.
	Needing many dimensions (about 46 dimensions).	Needing many dimensions (about 21 dimensions).
	Designing of the body block: 26 dimensions.	Designing of the body block: 26 dimensions.
	Designing of the skirt block: 5 dimensions.	Designing of the skirt block: 6 dimensions.
Ease	Coefficient Δ depends on every point to design.	Coefficient Δ depends on every point to design.
Fit	High	High

Table 2. *Measurement problems*

Formulas / **Pieces**	**American's systemic formulas by the 2D method**	**England's systemic formulas by the 2D method**
Front body block	Front body block is wide and the fabric which underbust to waist is been the width. 	Front neck girth is not flat. Upper body block is extruded.  The waist girth is wide. The chest point is shifted towards the side 2cm. 

Formulas / **Pieces**	**American's systemic formulas by the 2D method**	**England's systemic formulas by the 2D method**
Back body block	Back body block at the center back has wrinkles. 	Back neck is flat. Center back is the width.  .
Sleeves	Sleeves cap are large, so this place has may wrinkles. 	Sleeves' armhole is larger body's armhole, so the fabric at the bottom is wrinkled. 
Front skirt block	Skirt block is wide. It is not fit. 	Having many bias wrinkles. 
Back skirt block	It is fit.	The front skirt's outside from hip to bottom is overlap back skirt's 2cm. 

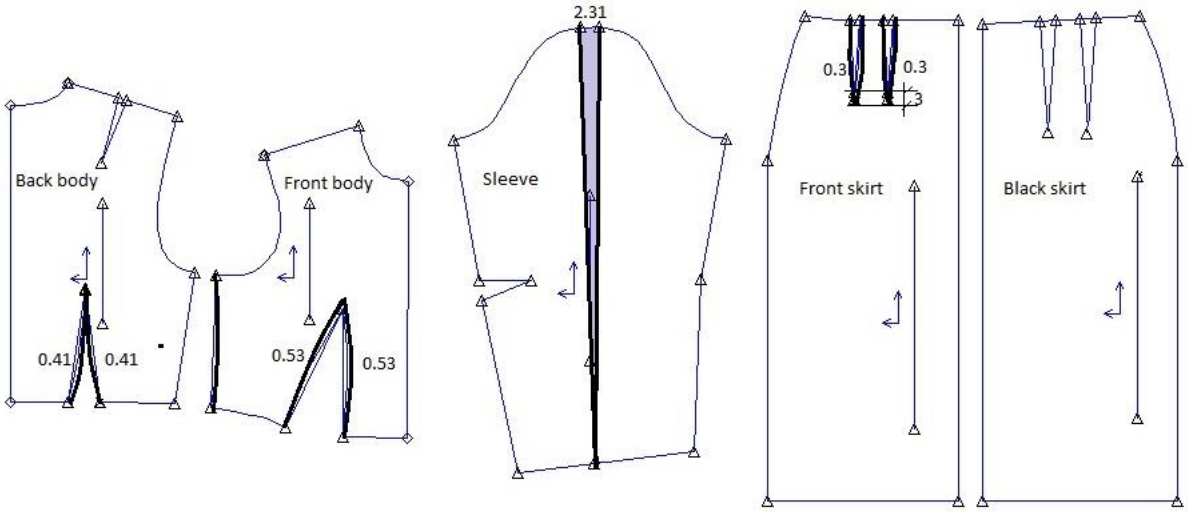

Figure 1. *Before and after adjusting the basic block by American's systemic formulas*

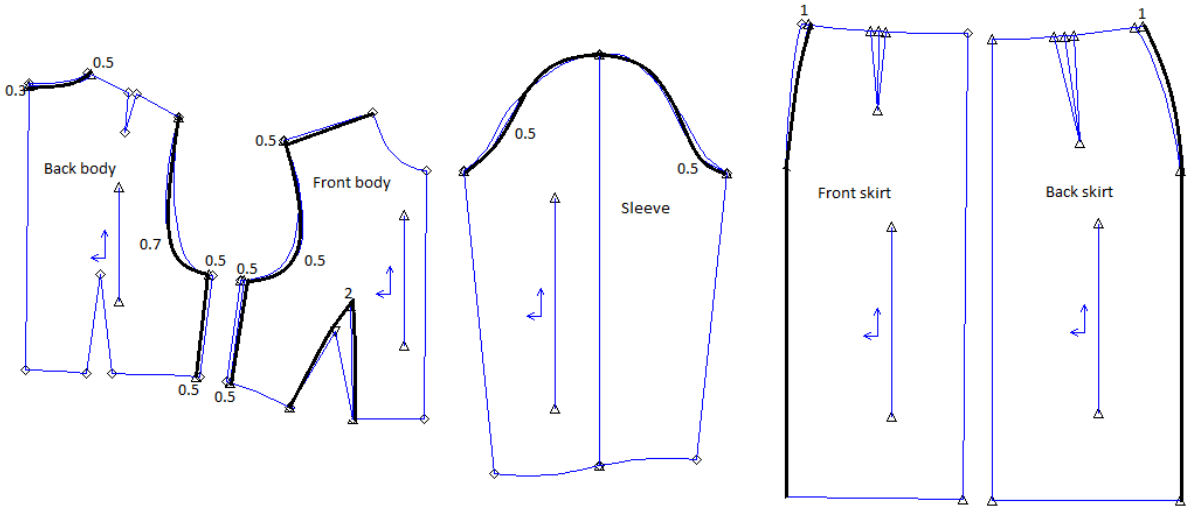

Figure 2*. Before and after adjusting basic block by England's systemic formulas*

In American's formulas combines with adjusting in figure 1, the front body adjusts dart's sides, which dart will draw curved lines about 0.53cm. With the back body, dart's side draws concave lines about 0.41cm. The sleeve block reduces the sleeve caps length about 2.31cm. The front skirt block adjusts dart's sides which dart will draw curved lines about 0.3cm.

In England's formulas combines with adjusting in figure 2, the front body adjust at the shoulder length, the armhole, the side length, dart's sides. The front body of the shoulder length adjusts 0.5cm at the head shoulder, the front armhole adjusts 0.5cm, and the back armhole adjusts 0.7cm. The back neck curve adjusts more width about 0.5cm at the across neck and 0.3 at the deep neck. The both side move 0.5cm. The point bust moves to center length about 2cm and draws curved lines. The sleeve block draws concave lines about 0.5cm. The front skirt and the back skirt adjusts outside 1cm.

3.4 Results of the evaluation after adjusting

Through the results of the correlation function in table 2 will make to design the basis pattern block by the 2D method. Choosing places are used designing patterns will make base on measurement points in figure 1 and table 3.

Table 3. *Cronbatch Alpha coefficients*

Serial	Measurement parameter	Cronbatch Alpha			
		American's systemic		England's systemic	
		Model	Mannequin	Model	Mannequin
1	Center body is straight	.745	.754	.813	.678
2	Across waist is balance	.755	.824	.703	.731
3	The bust girth is fit	.817	.700	.648	.714
4	The bust isn't wrinkles	.773	.630	.796	.824
5	The armhole is fit	.731	.700	.686	.696
6	The waist is fit	.798	.700	.686	.751
7	The neck is smooth	.778	.606	.758	.696
8	The shoulder is smooth	.755	.773	.774	.714
9	Sleeves cap is fit	.870	1.000	.750	.800
10	Sleeves aren't wrinkles	.800	.750	1.000	.800
11	Sleeves aren't tight	.769	.750	.750	1.000
12	The skirt's across the line is the balance	.804	.800	.780	.783
13	The waist girth is fit	.818	.913	.750	1.000
14	The hip girth is fit	.618	.618	.618	.783
15	The side skirt is fit	.682	.618	.667	.783

3.5 Evaluation

The basic block is evaluated fit after wearing on mannequin and model. The results are evaluated by Likert scale following the questions table which shows that produces have a high fit; the fabric surface of the body, the skirt are smooth. Dart placements match with lines on the mannequin. Sleeves have a good balance. Sleeves haven't hung to the back of side seam or forward of the side seam. Cronbach Alpha's value is upper 0.7 that shows results have high reliability (table 3).

4. CONCLUSION

The study on designing of the basic body block and the skirt block by American's systemic formulas and England's systemic formulas is the coincidence with Vietnamese's bodies shows adjusted coefficient for the body block, the skirt block, the sleeve block. In American's formula systemic, designing parameters need adjusting are dart's side of the body block and the skirt block. Besides that, the sleeve cap needs to reduce about 2.1cm. In England's formula systemic, there are ten places to need editing for body blocks, those are front shoulders length, front armholes, front sides length, front darts, the back neck curve, back armholes, back sides length. The sleeve block and the skirt block need to adjust curves like the sleeve cap, the outside. Results of this research are evaluated on the mannequin and human's body shows that surfaces of samples are plane, nothing wrinkles, places combine with haven't tense or slack. Almost samples after adjusting are fit. This result is useful in the teaching's field

for subjects about designing the women's clothing. Furthermore, it makes premise to support problems correlation to establish systemic formulas for many basic blocks for various subjects.

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