

THE FORMATION OF A SUIT ON THE EXAMPLE OF THE APPLICATION OF THE PRINCIPLE OF CLASSICAL SYMMETRY

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The article discusses the shaping process in a suit based on the use of elements and details of clothing according to the principle of classical symmetry. The study uses a constructive method of shaping, which makes it possible to obtain variable solutions of costume shapes with specified properties, original proportions and accents. The patterns of transformation of elements and details considered by the example according to the principle of classical symmetry are presented as a multilevel system with the identification of large and small components and connections of formative units that play an appropriate role in the artistic formation of the costume. The regular arrangement of the elements gives the appearance of the costume artistic expressiveness, due to the expediency and subordination to the compositional logic, according to which consistency with the form is determined. These insights empower designers to engineer garments that honor cultural heritage while embracing contemporary aesthetics, functionality, and consumer expectations within diverse global fashion markets.

Keywords: shaping, costume elements, constructive method, classical symmetry, shape transformation.

КЛАССИКАЛЫҚ СИММЕТРИЯ ҚАҒИДАСЫН ҚОЛДАНУ МЫСАЛЫНДА КОСТЮМНІҢ ПІШІН ҚАЛЫПТАСУЫ

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Мақалада классикалық симметрия қағидасы бойынша киімнің элементтері мен бөліктерін пайдалану негізінде костюмдегі пішін қалыптастыру процесі қарастырылады. Зерттеуде белгілі бір қасиеттері, өзіндік пропорциялары мен екіпіндері бар костюм пішіндерінің өзгермелі шешімдерін алуға мүмкіндік беретін конструктивті пішін қалыптастыру әдісін қолданады. Классикалық симметрия принципі бойынша элементтер мен бөліктерді түрлендіру заңдылықтарының мысалында қарастырылған, костюмнің көркемдік қалыптасуында тиісті рөл атқаратын пішін бірліктердің үлкен және кіші құрамдас бөліктері мен байланыстарын анықтайтын көп деңгейлі жүйе ретінде ұсынылады. Элементтердің табиғи орналасуы костюмнің көрінісіне композициялық логиканың орындылығы мен бағыныштылығына байланысты көркемдік мәнерлілік береді, оған сәйкес пішінмен үйлесімділік анықталады. Бұл тұжырымдамалар дизайнерлерге мәдени мұраны сақтай отырып, заманауи эстетиканы, функционалдылықты және тұтынушылардың күтулерін әртүрлі жаһандық сән нарықтарында үйлестіретін бұйымдар жасауға мүмкіндік береді.

Негізгі сөздер: пішінді жасау, костюм элементтері, конструктивті әдіс, классикалық симметрия, пішінді өзгерту.

ФОРМООБРАЗОВАНИЕ КОСТЮМА НА ПРИМЕРЕ ПРИМЕНЕНИЯ ПРИНЦИПА КЛАССИЧЕСКОЙ СИММЕТРИИ

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В статье рассматривается формообразовательный процесс в костюме на основе использования элементов и деталей одежды по принципу классической симметрии. В исследовании используется конструктивный метод формообразования, который дает возможность получить вариативные решения форм костюма с заданными свойствами, оригинальными пропорциями и акцентами. Рассмотренные на примере закономерности преобразования элементов и деталей по принципу классической симметрии представляется как многоуровневая система с выявлением крупных и мелких составных частей и связей формообразовательных единиц, играющие соответствующую роль в художественном формировании костюма. Закономерное расположение элементов придает виду костюма художественную выразительность, обусловленную целесообразностью и подчиненностью композиционной логике, согласно которой определяется согласованность с формой. Эти выводы позволяют дизайнерам создавать изделия, которые сохраняют культурное наследие, одновременно воплощая современные эстетические тенденции, функциональность и ожидания потребителей на различных мировых модных рынках.

Ключевые слова: формообразование, элементы костюма, конструктивный метод, классическая симметрия, преобразование формы.

Introduction

Form generation is the creation of shape in space and time. In the context of artistic design, the formation of form is a fundamental phenomenon that reveals the silhouette and compositional interconnections of the product as a whole. Thus, form generation in costume design is the process of creating shapes or their relationships by general patterns of holistic structure, aimed at achieving the optimal solution.

The form of a costume becomes purposeful and expressive when it is aesthetically well-designed – that is, when the silhouette is expressive, the proportional relationships between the parts of the costume are accurate, the rhythmic arrangement of elements and details is clear, the color scheme corresponds to its purpose, and so on – in other words, when the fundamental principles of composition are observed. The main idea of costume form generation is structuring, meaning the consistent relationships between parts of the whole, expressed through a characteristic rhythm of geometric elements [1].

Among the various aspects of studying costume form, researchers highlight a complex system of morphological, technological, material, and artistic interconnections. The analysis of the mechanisms of change in costume design – that is, the identification of internal interactions between its components – represents a certain level of

generalization and abstraction, a structural level of research that requires the conditional isolation of simple geometric elements and symbolic images from visual complexity. This approach to studying form is especially important at the initial stage of form generation, where artistic thinking and the individuality of the image are primary [2].

The aim of this study is to create three-dimensional silhouette forms of women's costume based on the use of principles of form-generating elements in the artistic design of clothing.

The choice of the research object is due to the fact that, firstly, the development of costume models based on the principle of classical symmetry is one of the most complex and responsible stages of the work, as it requires a high degree of accuracy in reflecting all the constructive and decorative elements of the clothing design.

Secondly, the improvement of the artistic design system for costume models enhances the functional and aesthetic qualities of garments within the context of modern small-scale production assortments.

Thirdly, the study of costume form-generation methods and the analysis of its internal structure for the purpose of perceiving and harmonizing model elements provides valuable data for identifying the principles of creating three-dimensional forms from geometric

shapes. This makes it possible to introduce significant changes to the appearance of traditional model constructions, thereby expanding and enhancing this type of product assortment.

Important scientific works in the field of costume form generation, the periodicity of its shapes, the cyclical development of structure, and the creation of volumetric-silhouette clothing forms include the research of scholars such as T.V. Kozlova [1], F.M. Parmon [3], G.I. Petushkova [4–6], E.M. Androsova [7], and V.V. Ermilova [8]. Additionally, the results of research on the artistic design of costume are presented in the works of I.D. Markelova [9], A.A. Chernyaeva [10], and T.V. Belko [11].

Materials and research methods

The study applied modern theories and methods of systems analysis, scientific principles of systematization, theoretical and practical achievements in the field of artistic design, including the method of constructive costume design. The design study uses a constructive method of design, which consists of selecting an object of study and identifying its newly formed shape.

The constructive shaping method makes it possible to obtain a specified costume shape with unconventional properties, original proportions, and accents in line with contemporary fashion trends [12].

Formation reflects the overall structure of the costume, which is a necessary link in the research, translating the process of searching for new artistic forms into a specific system of multi-variant solutions.

The peculiarity of this study lies in the fact that, on the one hand, structure is a set of stable connections of form that ensure its integrity, i.e., the preservation of its basic properties under various external and internal changes. On the other hand, it is a system of flexible connections, in which, by rearranging the elements and some other structural components of one object, it is possible to obtain a second, third, and other variants [13].

Two basic geometric structures were chosen as the basis for the costume design: rectangular and trapezoidal. These basic shapes constantly interact and change structurally, altering their dimensions, angles of contact, intensity of scale, and curvature of lines, forming countless analogues of costume shapes [1, 14].

Table 1 shows waist and shoulder garments according to geometric shapes, in accordance with the method of transforming the shapes of costume elements in classical symmetry. It is worth noting that in each case, the shape of the costume can be transformed by reflection, translation, or rotation in space and on a plane.

Reflection or mirror symmetry (Table 1, A) is the most common compositional technique used in the construction of costume details. Mirror symmetry occurs when shapes are reflected from a certain imaginary plane, with the shapes switching places: the right shape becomes the left, the left becomes the right, the top becomes the bottom, and the bottom becomes the top.

Portable similarities are observed when the shape of geometric figures and details of the costume pattern coincide at all points when superimposed and are repeated at equal intervals with the same elements highlighted (Table 1, B).

The rotation of the original figure around a central point at a certain angle, both in the axis of symmetry and in the plane of symmetry, is called angular symmetry. It can form various compositional structures by sequentially rotating at a certain angle. Movement in a circle around the center, thanks to the closed nature of the trajectory, creates a sense of order and uniformity, and the order around the center of connection creates an impression of completeness and integrity (Table 1, C, D) [15].

Table 1. Formation of costume elements based on the principle of classical symmetry (initial stage)

		Reflection (A)	Garment model	Translation (B)	Garment model	Rotation in space (C)	Garment model	Rotation in plane (D)	Garment model
Rectangle	Shoulder garments								
	Waist garments								
Trapezoid	Shoulder garments								
	Waist garments								

The regularity in the connection of costume elements makes it possible to generalize the identified shape of the details and arrange them into a consistent rhythmic order. In this context, the elements of the details are the simplest, more or less independent units of the costume that carry minimal semantic load.

The transformation of classical symmetry alters spatial positions while preserving its metric properties – length and width – unchanged.

The examined patterns of connecting geometric figure details, taking into account the characteristics of their movement, shape, and the spatial position of the axis of symmetry, make it possible to generate multiple variations in the transformation of costume elements (Table 1).

Results and discussion

The next stage of work within the framework of the constructive method is the process of costume form generation, which involves the specification of the constituent parts of form-generating elements and their decoration. Table 2 presents the sequential transformations of garment details, followed by their modification and the identification of the overall shape, highlighting the decorative form-generating spaces of the costume. The form of a costume can be understood as a multi-level system that includes major components (blouse, trousers, skirt, dress, etc.) and smaller structural parts and connections between form-generating units (collar, sleeves, yokes, tabs, etc.), each playing a specific role in the artistic formation of the costume.

Table 2. Form generation of costume elements based on the principle of classical symmetry (final stage)

	Transformation According to Constructive and Decorative Characteristics		Transformation According to Constructive and Decorative Characteristics	
	 A		 B	
 I				
 II				
 III				
 IV				
 V				
 VI				
 VII				
 VIII				

Each costume form is distinguished by constructive and decorative types of elements of a specific character. At the final stage of form generation of costume elements based on the principle of classical symmetry, the bodice and waist components of the costume were examined as illustrative examples.

If construction defines the shape, the decorative aspect elevates its emotional impact and serves to visually convey the character of the garment. Costume design most often employs abstract decoration—usually geometric and fairly simple in configuration—because such motifs are easier to combine with the garment's structural elements. Let us trace how bodice and skirt (or trousers) are combined in women's dress.

In a rectangular-shaped costume (Table 2, A), constructive-decorative elements are rhythmically repeated along the lower edge of the garment, the bodice, and the sleeves. Internal subdivisions of the decoration embellish and enrich the plastic expressiveness of the costume's overall form. The primary constructive-decorative motifs of this type correspond to variant A in Transformation I (Table 2). Following the same transformation principle, the additional costume variants shown were obtained.

The placement of large structural elements in variants I, II, V, VII, and VIII emphasizes the

stability of the entire garment's form. In Transformations III, IV, and VI, the overall costume shape and the way the composition is redistributed give the silhouette different expressive qualities: plastic static quality in III, and dynamism in IV and VI.

The transformation of costume elements in variants I, II, and VIII is based on a completely different principle of variability. According to their constructive and decorative characteristics, types A and B in transformations I, II, and VIII take on a dynamic form. In the same way, it is possible to determine potential combinations of transformations across all structural components of the costume.

As a result of transformations based on the principle of classical symmetry, costume models were developed that reveal the structural level of form generation—namely, the overall silhouette, internal constructive and decorative segmentation, and the relationships between parts (proportions, geometry, symmetry)—as well as the decorative level (color, ornamentation), as shown in Figure 1. The chosen color palette is based on the use of analogous and complementary colors, such as coral and shades of gray. The designs are given contrast through the addition of green, which draws attention and adds a sense of dynamism.



Figure 1. Models obtained through transformation based on the principle of classical symmetry

Conclusion

Summarizing the above aspects of the costume form-generation process, it can be concluded that the very principle of element placement is subordinated to the constructive and decorative divisions of the form and, depending on the compositional structure, employs its own means of expression.

The regular arrangement of elements gives the costume a natural artistic expressiveness, determined by purposefulness and adherence to compositional logic, which defines its harmony with the overall form.

By using examples of rectangular and trapezoidal elements in the form, along with components of modern costume details, it is possible to develop new design solutions from the perspective of current fashion trends. To ensure that the costume structure remains relatively stable when incorporating a variety of elements, it is essential to apply them thoughtfully and appropriately.

In the assortment of modern costume design, the form generation of elements allows for partial transformations within the construction to enhance aesthetic qualities, as well as significant modifications to the overall structure of the costume.

REFERENCES

1. Основы теории проектирования костюма: Учеб. для вузов. Под ред. Козловой Т.В. - М.: Легпромбытиздат, 1988. - 352 с.
2. Каракова Т.В., Сабилло Н.И. Принципы структурного формообразования в дизайне костюма. Известия Самарского научного центра Российской академии наук, Т. 11, 2009, № 4. С.272...276.
3. Пармон Ф.М. Композиция костюма: Учебник для вузов. - М.: Легпромбытиздат, 1997. 318 с.
4. Петушкова Г.И. Проектирование костюма. - М.: Академия, 2004. 416 с.
5. Петушкова Г.И., Басыйрова А.С. Дизайн костюма: кинетическое формообразование // Научный журнал «Костюмология», 2019, №2, <https://kostumologiya.ru/PDF/08IVKL219.pdf> (доступ свободный)
6. Петушкова Г.И. Трансформативное формообразование в дизайне костюма. Дизайн костюма: Теоретические и экспериментальные основы: учебник. М.: ЛЕНАНД, 2015. 464с.
7. Андросова Э.М. Основы художественного проектирования костюма. - Челябинск: Изд. дом «МедиаПресс», 2004. 184 с.

8. Ермилова В.В., Ермилова Д.Ю. Моделирование и художественное оформление одежды. - М.: Академия, 2010. 224 с.

9. Маркелова И. Д. Пространственно-геометрическое формообразование в костюме. Московский государственный текстильный университет имени А.Н. Косыгина. Автореферат диссер. на соискание ученой степени канд. техн. наук. Москва: 2005. 16 с.

10. Черняева А.А. Разработка метода комплексного проектирования силуэтной формы женской. Московский государственный университет дизайна и технологии. Автореферат диссер. на соискание ученой степени канд. техн. наук. Москва: 2013. 21 с.

11. Белько Т.В. Бионические принципы формообразования костюма Московский государственный текстильный университет имени А.Н. Косыгина. Автореферат диссер. на соискание ученой степени доктора техн. наук. Москва: 2006. 32 с.

12. Чандыбаева А.М. Анализ методики изучения основы формообразования и формы для дизайнеров по костюму. Мир педагогики и психологии №03 (68) Март 2022, Бишкек, 2022 г. С.35-43.

13. Пулатова С.У., Закиряева Н.Г. Формообразование в дизайне современного костюма // Universum: технические науки: электрон. научн. журн. 2022. 5(98). С.24-26.

14. Беляева-Экземплярская С.Н. Моделирование одежды по законам зрительного восприятия. М., 1996; 3-е изд. М.: Ленанд, 2014. с. 90.

15. А.А. Аширова. Формообразование в проектировании костюма. Вестник КРСУ. 2008. Том 8. № 9. Стр 59-61.

REFERENCES

1. Kozlova, T.V. (ed.). Osnovy teorii proektirovaniia kostiuma [Fundamentals of Costume Design Theory]. Moscow: Legprombytizdat, 1988. 352 p. (In Russian)
2. Karakova, T.V., Sabilo, N.I. Printsipy strukturnogo formoobrazovaniia v dizayne kostiuma [Principles of Structural Shaping in Costume Design]. Izvestiia Samarskogo nauchnogo tsentra Rossiiskoi akademii nauk, 2009, Vol. 11, No. 4, pp. 272–276. (In Russian)
3. Parmon, F.M. Kompozitsiia kostiuma [Costume Composition]. Moscow: Legprombytizdat, 1997. 318 p. (In Russian)
4. Petushkova, G.I. Proektirovanie kostiuma [Costume Design]. Moscow: Akademiia, 2004. 416 p. (In Russian)
5. Petushkova, G.I., Basyirova, A.S. Dizain kostiuma: kineticheskoe formoobrazovanie [Costume Design: Kinetic Shaping]. Kostumologiya, 2019, No. 2. Available at:

<https://kostumologiya.ru/PDF/08IVKL219.pdf> (In Russian)

6. Petushkova, G.I. Transformativnoe formoobrazovanie v dizayne kostiuma. Dizain kostiuma: Teoreticheskie i éksperimental'nye osnovy [Transformative Shaping in Costume Design. Costume Design: Theoretical and Experimental Foundations]. Moscow: LENAND, 2015. 464 p. (In Russian)

7. Androsova, E.M. Osnovy khudozhestvennogo proektirovaniia kostiuma [Fundamentals of Artistic Costume Design]. Cheliabinsk: Mediapress, 2004. 184 p. (In Russian)

8. Ermilova, V.V., Ermilova, D.Iu. Modelirovanie i khudozhestvennoe oformlenie odevhdy [Clothing Modeling and Artistic Design]. Moscow: Akademiia, 2010. 224 p. (In Russian)

9. Markelova, I.D. Prostranstvenno-geometricheskoe formoobrazovanie v kostiume [Spatial and Geometric Shaping in Costume]. PhD thesis abstract. Moscow: A.N. Kosygin Moscow State Textile University, 2005. 16 p. (In Russian)

10. Cherniaeva, A.A. Razrabotka metoda kompleksnogo proektirovaniia siluetnoi formy zhenskoi odevhdy [Development of a Method for Comprehensive Design of Women's Silhouette Clothing]. PhD thesis abstract. Moscow: Moscow State University of Design and Technology, 2013. 21 p. (In Russian)

11. Belko, T.V. Bionicheskie printsipy formoobrazovaniia kostiuma [Bionic Principles of Costume Shaping]. Doctoral thesis abstract. Moscow: A.N. Kosygin Moscow State Textile University, 2006. 32 p. (In Russian)

12. Chandybaeva, A.M. Analiz metodiki izucheniia osnov formoobrazovaniia i formy dlia dizainerov po kostiumu [Analysis of the Methodology for Studying the Fundamentals of Form Development and Shape for Costume Designers]. Mir pedagogiki i psikhologii, No. 03 (68), March 2022. Bishkek, 2022, pp. 35–43. (In Russian)

13. Pulatova, S.U., Zakiriaeva, N.G. Formoobrazovanie v dizayne sovremennogo kostiuma [Form Development in Contemporary Costume Design]. Universum: Tekhnicheskie nauki, Electronic Scientific Journal, 2022, No. 5(98), pp. 24–26. (In Russian)

14. Beliayeva-Ekzempliarskaia, S.N. Modelirovanie odevhdy po zakonam zritel'nogo vospriiatiia [Clothing Modeling Based on the Laws of Visual Perception]. 3rd ed. Moscow: LENAND, 2014. 90 p. (In Russian)

15. Ashirova, A.A. Formoobrazovanie v proektirovanii kostiuma. Vestnik KRSU, 2008, Vol. 8, No. 9, pp. 59–61. (In Russian)