

# DEVELOPMENT OF A DESIGN PROJECT FOR FUR PRODUCTS FROM WASTE USING THE MODULAR METHOD

**Nigora Jurakhonovna Ergasheva**

PhD student Tashkent Institute of Textile and Light Industry  
Tashkent, Uzbekistan

**Fatima Usmanovna Nigmatova**

Doctor of Technical Sciences,  
Professor Tashkent Institute of Textile and Light Industry  
Tashkent, Uzbekistan

**Muhtabar Shamahsimovna Shomansurova**

Doctor of Philosophy (PhD) Tashkent Institute of Textile  
and Light Industry  
Tashkent, Uzbekistan

**Dilnoza Xayriddinovna Qodirova**

Doctor of Philosophy (PhD) Bukhara Engineering Technological Institute,  
Uzbekistan

***Аннотация.** Применение модульного метода проектирования является актуальным при разработке швейных изделий с унифицированными деталями кроя. Основным принципом модульного проектирования состоит в создании широкого ассортимента изделий из ограниченного количества модулей – фигур с простой геометрической формой.*

***Ключевые слова:** меховое производство, модульное проектирование, инновационные технологии, ресурсосберегающие технологии, каракулеводство, орнаментальная композиция, кожаная ткань.*

***Abstract:** The use of a modular design method is relevant when developing garments with standardized cut details. The basic principle of modular design is to create a wide range of products from a limited number of modules - figures with a simple geometric shape.*

***Keywords:** fur production, modular design, innovative technologies, resource-saving technologies, karakul breeding, ornamental composition, leather fabric.*

During the process of cutting fur skins and making patterns for products, waste is generated: parts and scraps from the tanned skins, which mostly undergo further processing in the fur industry or are discarded. Efficient use of fur semi-finished products plays a significant role, so great attention is paid to the issue of waste-free utilization. The main directions of rational use include using natural fur waste to make clothing parts, various accessories, and art objects, as well as creating avant-garde product forms using innovative design techniques with other materials. The sizes of waste in the fur industry range from 1 cm to 10-15 cm. In the modern world of fashion, there are numerous hyperbolic decorative ideas in costumes using fur waste. On fashion runways, you can see items that are completely unsuitable for the everyday needs of the average consumer. High-fashion items like detachable fur basques corset over dresses, boleros for women,

etc., have made their way from haute couture to mass-market. The expansion of the fashionable range of fur products is facilitated by the use of various finishes, new methods of creating textured surfaces, reversible items, and fabrics combining different elements. In such conditions, the best way to enhance the functionality of a sewing product may be through transformation or applying a modular design approach in product design.

The use of a modular design method allows you to create a variety of textured compositions from waste, the combination of which results in many original surfaces, which provides great opportunities for expanding the range of fur products.

A module is a unit of measure, and from a design point of view, a module is a single form of many times repeated parts in a project. Thus, St. Basil's Cathedral in Moscow, with all its variety of design solutions, is composed of certain types of figured bricks, which we have the right to call "modules" [4].

The analysis [4] showed that the use of most modular design techniques used in the design of architecture and interior items is impossible when creating clothing. This is due to the fact that clothing has a fundamentally different plasticity and functionality. However, some techniques based on assembling a structure from cut parts of the same shape are actively used by world clothing designers [6].

The purpose of the theoretical and practical research was to develop methodological foundations for the design of fur clothing, consisting of waste of a certain geometric shape, which are modules that together form a complex spatial shape of the product. Using the modular method in design will allow you to create clothing models with unique aesthetic properties, designed for human self-expression in modern society.

In recent years, in connection with the development of three-dimensional design technologies, modular design has begun a new round of its development in costume design [4,5,3,6,7]. Current clothing models of world designers increasingly consist of many parts of the same or homothetic shape. The use of combinatorics carried out through the introduction of a modular design method, allows you to create models of fur clothing that, by all indications, can be classified as art objects designed to express the individuality of their owner, emphasizing his desire for self-expression.

Modules can be used in the design of fur clothing made from flaps as structural, structural, and decorative and decorative structural elements [7], [8]. But of particular interest from a design point of view is the combinatorial ornamentation of the surface of clothing with pieces of fur [2].

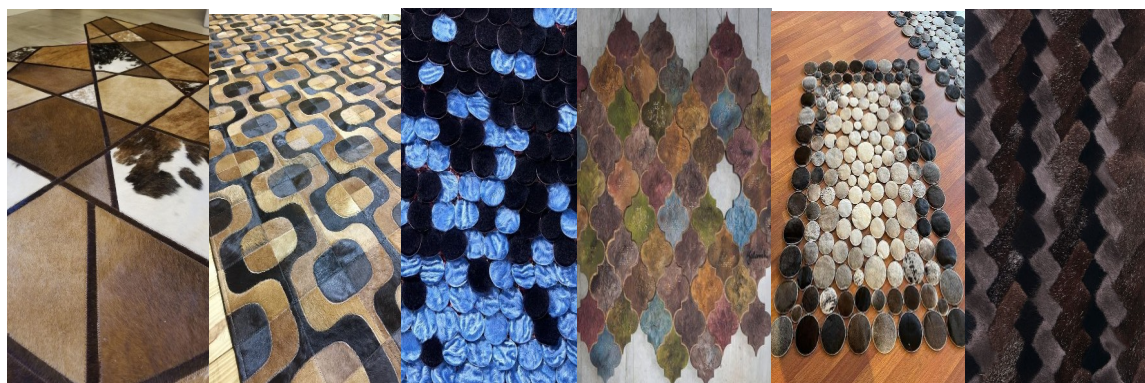
The ornament is a complex patterned figure, which is formed by the orderly and symmetrical placement on the surface of a few repeatedly repeating patterned elements [2].

It is recommended to use the following techniques for decorating surfaces made from waste:

- a combination of parts made from different types of fur;

- the use of various configurations of elements (templates, skins, parts of skins, paws, half-paws of a furrier's flap).

Any ornament is a complex patterned figure, which is formed by an orderly, symmetrical, and generally free (without tight connection) placement of a few repeatedly repeating patterned elements on the surface [2]. According to the content of the graphic forms of the canvas, the designed canvases from waste are divided into geometric, floral, and plant and plot ornaments. The most widespread are geometric patterns, characterized by a strict alternation of rhythmic elements and their color combinations (Fig. 1).



**Fig. 1. Fur patterns with geometric patterns**



**Fig. 2. Fur patterns with floral, floral, and plot ornaments**

Using a limited number of modules, the designer must find a solution that, on the one hand, allows taking into account the diversity of consumer requirements, and on the other hand, has an original compositional design that ensures the achievement of proportionality and integrity of the form and product. The solution to this issue can be found in the modern theory of combinatorial shaping when the creation of a complex multi-component object is associated with the combination of typification of individual components within a single subject system with a variety of possible consumption situations.



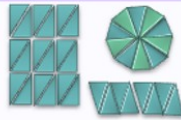



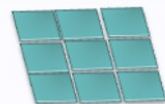

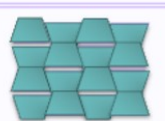

All the properties of the general theory of combinatorics apply to the method of producing canvases from waste. Fabrics from waste can be made from semi-finished fur products, differing in fur type, geometry, size, color, hair characteristics, leather fabric, and coloring, which can significantly expand the number of combinatorial forms obtained [2].

At the same time, geometry, as a carrier of the spatial properties of form, is the main of these basic parameters, and color, texture, decor and material participate in combinatorial shaping as its additional parameters. The formation of complex forms in the form of canvases from repeatedly repeated components is carried out by their various interconnected arrangements, which are based on the compatibility of the parts, their spatial-compositional unity, harmony and integrity [2]. The properties of materials and manufacturing technology largely determine the size of the modules that will be used in clothing design, and also determine the overall composition of the models. The combinatorial composition must fit into the overall composition and decor of the model. Fabrics from modules can be made from semi-finished fur products that differ in the characteristics of the hair, leather fabric and coloring, which allows you to significantly expand the number of combinatorial forms obtained [2,8,9].

The most labor-intensive part in furrier production when using fur production waste is the selection of a fur flap for a specific product, obtaining dense layouts from it, which requires a highly qualified specialist and knowledge of the properties of fur. These ornamentation schemes have to be developed for each model or part separately. For the same model, several schemes can be developed depending on the area of the flap and the designed sketch of the model.

Table 1 shows 10 types of constructing a flat ornament, which can serve as a basis when choosing the structure of a modular product. The use of ornamental meshes enriches the possibilities of modular shaping meshes, making modular clothing not only functional and rational in production, but also aesthetically attractive. In addition to the basic geometric shapes such as square, rhombus, rectangle, triangle, trapezoid, polygon, parallelogram, circle, torus, and oval, there may be other types of architectural modules.

Table 1. Classification of flat geometric meshes [5].

Rectangular		Semicircular	
Triangular		Ring-shaped	
Diamond-shaped		Oval	
Parallelogrammatic		Polygon mesh	
Trapezoidal (curvilinear, straight, convex)		Cube	

Some of the symmetrical grids look static, and some look dynamic, this allows you to vary the visual perception when shaping modular products.

The combinatorial design method was implemented in the development of analog series of women's coats, taking into account the following indicators:

- silhouette solution;
- constructive and constructive-decorative divisions;
- separate sections of our products.

The method consists of identifying modular elements (parts) that are typical for most structures, and their combinatorial combination and transformation to obtain possible combinations of parts in the structure. This method is presented in the form of programmed shaping of the geometric shapes of a woman's coat from modular elements, compiled based on studying their assortment [2] obtained by reducing the shape of the product to a conventional structural image (Fig. 3).

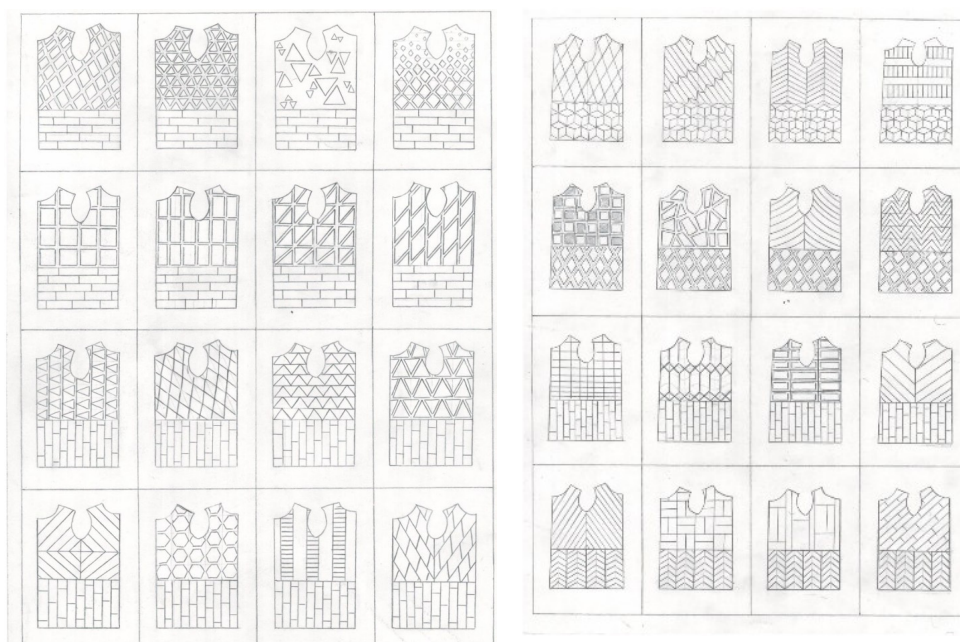


Fig 3. Programmed rows (Matrix) of options for the arrangement of modular elements from fur waste on the product mill (fragment)

The main feature of designing clothing from modular elements and obtaining textured compositions on parts from fur waste is the multivariate nature of the arrangement of skins and connecting seams, which makes modules a complex material for design.

The matrix of options for placing skins on the mill includes longitudinal, transverse, and diagonal arrangements of skins, in herringbone, parquet, checkerboard, and mosaic. The matrix allows the fashion designer to choose the shape and ornamental composition of the designed product. Matrix models are made for straight and trapezoidal silhouettes of coats of various lengths.

## References

1. Kagramanova I.N. Rational use of natural fur in sewing enterprises. Technological processes in the service [Text] M.: ID "FORUM": INFRA-M, 2006. -160 p.
2. Ergasheva N.D. Development of methods for the artistic design of fur clothing using low-intensity technologies: abstract....doctor of technical sciences (PhD). Tashkent; 2021. From 133
3. Gavrilova N.I. Confectioning of materials for clothing: Textbook.-M.:FORUM: INFRA-M, 2006.-1 p.
4. Rudneva S.S., Belik A.I., Lunina E.V. Modular design method in the development of design projects for garments with standardized cut details / News of higher educational institutions. Textile industry technology. 2021. - No. 2(392) - pp. 93–98. A.N. Kosygina" D212.144.01
5. Vozmilova A.A. Petushkova G.I., Methods for creating modular objects in design form creation / Sciences of Europe No. 40, Volume 2, // Global Science Center LP, Prague, Czech Republic, 2019. – P. 3-14.
6. Ermilova, D. Yu. History of costume: a textbook for secondary vocational education / D. Yu. Ermilova. - Moscow: Yurayt Publishing House, 2024. - 392 p.
7. L.P. Shershneva, S.G. Sunaeva Design of garments in CAD: textbook. Manual /.- M.: Publishing House “Forum”,; INFRA-M, 2018.-286 p.
8. Starovoitova A.A. Automation of the design of rational placement of templates on straight fur semi-finished products, dissertation and abstract at the Higher Attestation Commission of the Russian Federation 05.13.12, Candidate of Technical Sciences
9. Nigmatova F.U., Improving the process of preparing leather materials for cutting // Problems of textiles. - Tashkent, 2008, No. 4.- P.65-69.
10. Ф.У.Нигматова., Д.Х. Кадирова., Н.Эргашева Особенности конструирования женской одежды для женщин старшего возраста. Современные инновации, системы и технологии. Modern Innovations, Systems and Technologies год; 2022 2(3). с. 0211-0221.
11. Нигматова Ф.У., Кадирова Д.Х. Yoshi katta ayollarning antropologik xususiyatlarini aniqlash. O‘zbekiston to‘qimachilik jurnali. Ilmiy-texnikaviy jurnal. Тошкент: 2022. 96-103 б.