

The analysis of machine embroidery stitches types classification

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S u m m a r y : The article deals with the problems of the lack of uniformity in machine computer embroidery terminology, as well as the existing classification of types of embroidery stitches that are based on the basis of specific software tools of embroidery editors. There have been analyzed both their advantages and disadvantages. There have been defined the basic types of machine computer embroidery.

Key words: machine embroidery, stitches type, classification.

INTRODUCTION

Currently, Ukraine has a small amount of embroidery businesses compared with Western Europe, North America and Asia, where the industry is thriving in small and medium sized businesses. However, the number of such enterprises is rapidly spreading. Embroidery extensively uses computer technology, Internet technology for data transmission, which, undoubtedly, is quite comfortable. But at the same time, enterprises point out the insufficient amount of information in this area.

The purpose of this article is overview existing classifications of types stitches embroidery.

Object of study – the process of classification a type stitches machine computer embroidery.

The subject of the study – the type of embroidery stitches.

The majority of Ukrainian publications that are devoted directly to the issues of machine embroidery, are usually represented by advertising publications and interviews of small embroidery firms and distribution companies of foreign corporations. Since 2010, the most comprehensive source have been documentation translations of foreign software and materials from organizations web sites that are engaged in machine embroidery. Auxiliary barriers to information are related with the desire of organizations to preserve trade secrets of domestic production developments.

Nowadays there is a number of overseas embroidery companies associations, there is issued periodical literature and there work special schools, there are organized international conference, as well as online conferences on machine embroidery. Thus, among the foreign periodicals there should be noted Eurostitch magazine, Printwear, Stitch & Print, Embroidery, Stitches magazine, Designs in machine embroidery, Creative machine embroidery magazine and others.

OBJECTS AND PROBLEMS

Among the foreign authors, who are covering embroidery machine issues, there are: B. Geer, J. Lamb, B. Start, H. Hart Momsen, D. Jones and others, whose articles are widely published in periodicals and online publications. Thus, one of the pioneers in the field of machine embroidery – Barry Start – distinguishes in his works the following types of stitches: step, cross, satin, stem, star [3]. The peculiarity of his classification is the commitment to outdated machine embroidery design, that is: hand position design of each puncture ("a stitch is a stitch punching"), the use of graphic tablets and perforation, which, in our opinion, is a disadvantage.

In his research, «You can digitize» [11] James M. Lamb is studying embroidery programs design based on the opportunities and software editor of computer embroidery Pulse Signature (Tajima DG / ML). The author suggests the description of stitches types used in the editor (Fig. 1).

The peculiarity of his classification is binding to the ways of setting up a certain stitch type using specific software tools of embroidery editor Pulse Signature (Talma DG / ML).

V. Tikhomirov (LLC "SysTech", Russia) in the description of embroidery editor GR3 [27] identifies the following types of stitches as half-stitch, line, zigzag, tatami etc. The classification of V. Tikhomirov is also based on a software tool for building stitching used in the GR3 editor.

D. Chernenko's work [3] divides embroidery stitches (or stitches overfilling) into three basic types: the line, glad' and satin. His classification is based on the completed form of stitch fillings that convey the basic elements of artistic composition – contours, lines, spots (Fig. 2). With this approach, as claimed by D. Chernenko [2, 3], there are considered the geometric and visual properties of stitch fillings, regardless of the program editor and algorithms by which they were created. However, in our opinion, this classification has many disadvantages, which will be touched upon further.

In the embroidery design program editor "Urfinus" (LLC "Dzhussoft", Russia) [18] types of stitches are classified as simple and complex objects (Fig. 3). The peculiarity of this classification is that instead of the stitch type the authors use the term "object". Classification is based on the capabilities of the software editors "Urfinus".

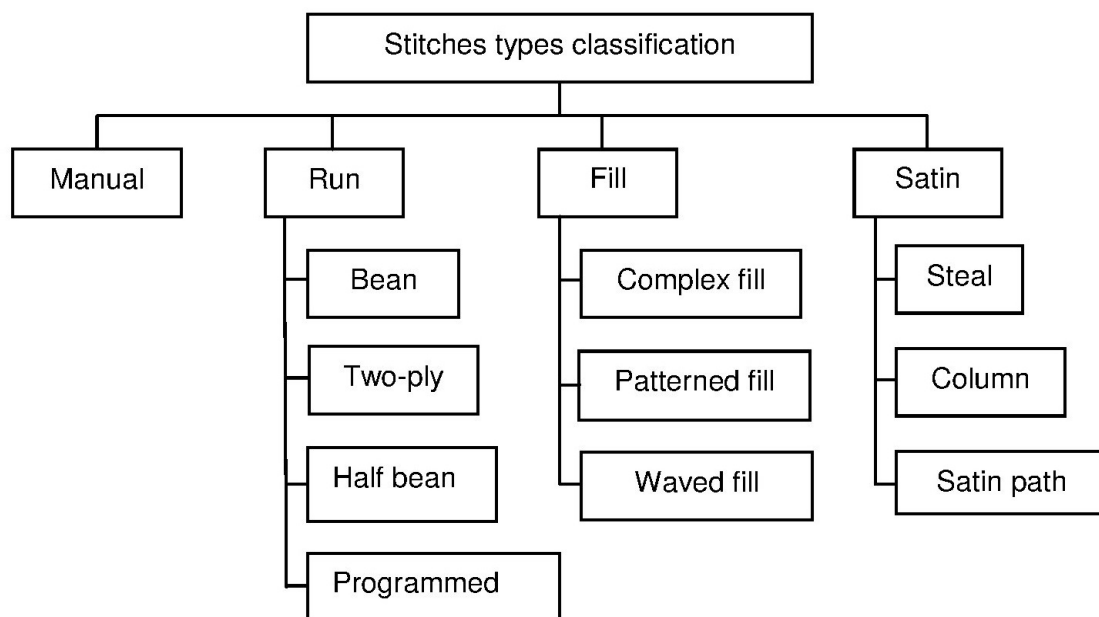


Fig. 1. Stitches types classification (J. Lamb)

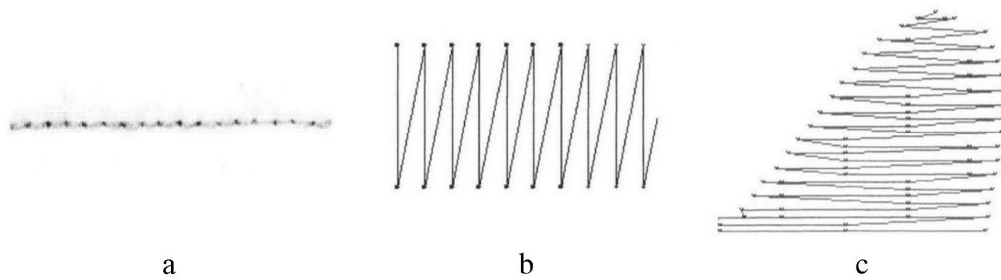


Fig. 2. Stitch fillings classification [3]: a – line, b – satin, c – glad'

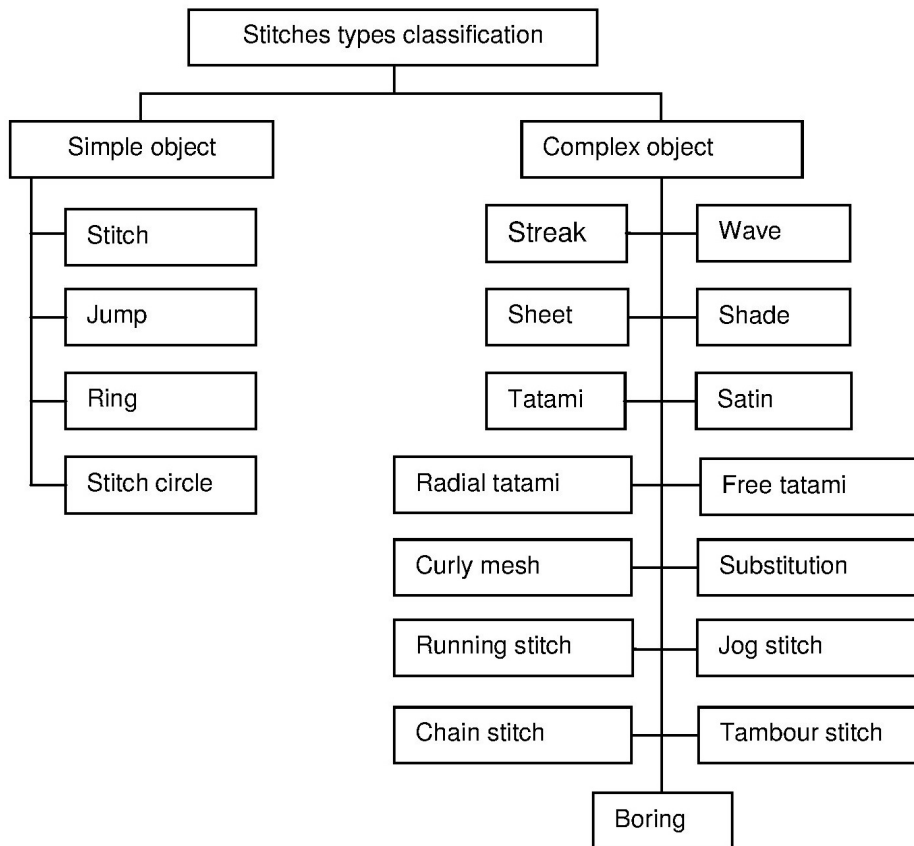


Fig. 3. Stitches types classification of “Urfinus” editor (LLC “Dzhussoft”)

Since the task of the embroidery design programming is the distribution of a given pattern into separate filling areas, and different areas tend to require different types of filling, which differ in density and direction of filling, in the picture of filling etc., then the object is a piece of the program saved in a special format (*.urf) as a set of nodal points that describe the shape of the object, and list their properties that define the method of object filling [18].

The disadvantage is the lack of classification such term as type of stitch.

Among the domestic companies the should be pointed out Ltd. “Epsima, NPP” (Zhytomyr, Ukraine) [12], which classifies the stitches on the principle that is based on the manual traditional seams. During their seminars on technological foundations of machine embroidery, the specialists distinguish only two basic types of stitches with modifications (Fig. 4).

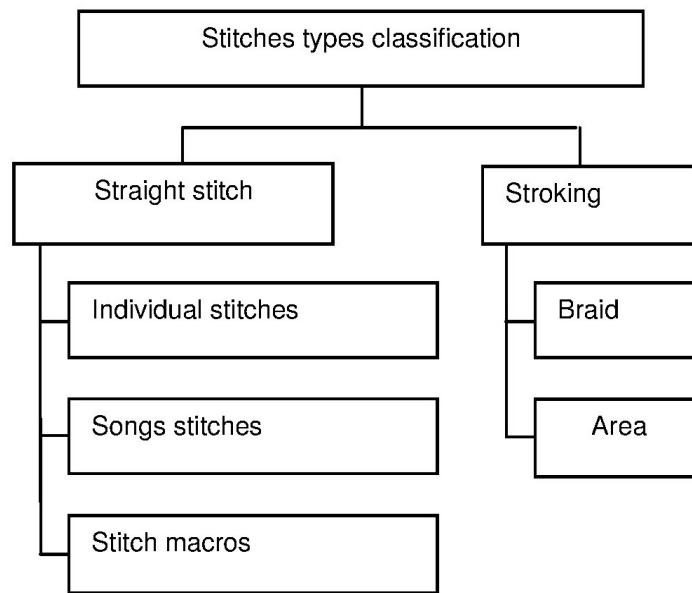


Fig. 4. Stitch types classification, based on the materials of Ltd. "Epsima, NPP"

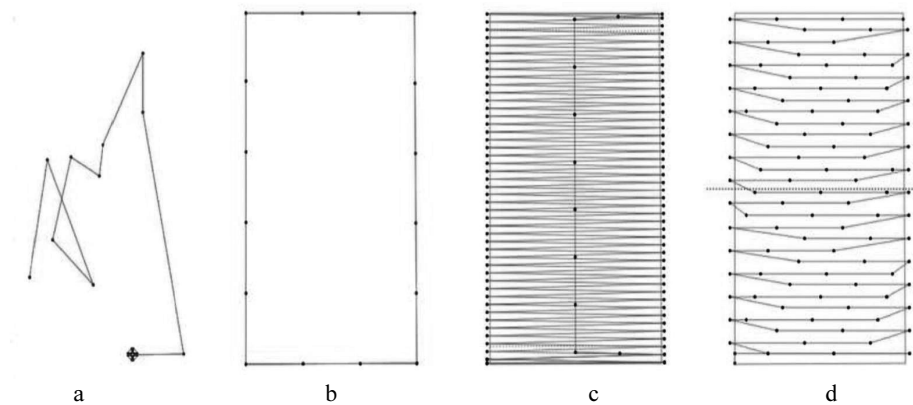


Fig. 5. Stitch types classification (M. Belova): a – hand stitch, b – run stitch, c – satin, d – tatami

In his article [1] M. Belova suggests to classify machine embroidery stitches as four basic types (Fig. 5): manual stitch, run/walk stitch, satin (possible titles: smooth surface, column stitch, satin stitch, satin path, etc.) and tatami (possible titles: filling, step, fill, complex fill, ceeding stitch).

Famous in the west digitizer H. Hart Momsen in his research [15] suggest classifying embroidery stitches (stitch objects) into two types: simple and satin stitch (glad'). Unlike M. Belova, H. Hart Momsen believes that hand stitching is a simple stitch in which all the stitches are defined according the location and length by the programmer, not governed by the software, so may not be considered typical. Fill is also not considered

an independent stitch: it is seen as a constellation of many straight stitches.

RESULTS AND DISCUSSION

Types stitches of machine embroidery. Universal classification

As of today there is a lot of embroidery software: Pe-design, Urfinus, Ces_2000, Eos3, Embird Studio, Wilcom ES, Tajima DG / ML by Pulse Ambassador and others [19, 23-25]. Thus, one of the most versatile machine embroidery editors at present is considered Wilcom ES (Head Office – Sydney, Australia). The authors-developers of the program [7] classify all machine stitches into two types: outlines and fill (Fig. 6).

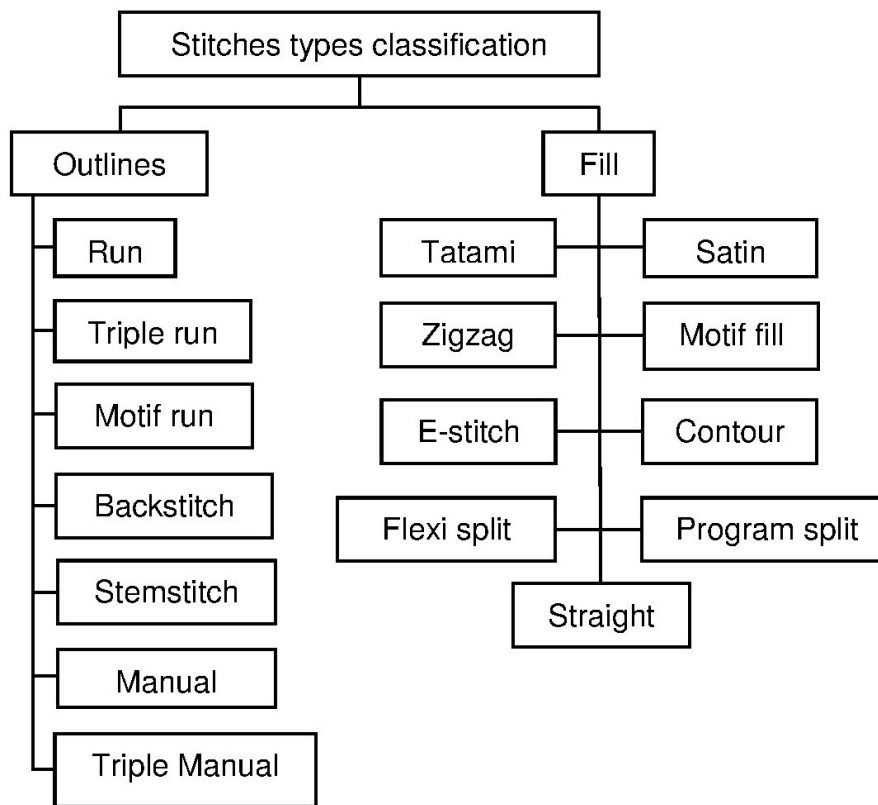


Fig. 6. Stitch types classification of Wilcom ES editor

Traditionally, there believed to be only three types of machine embroidery: a simple stitch (Run), satin (glad') and fill (Fill) [1]. Each of them should be studied separately further.

Run (simple stitch, stitch, straight stitch, running stitch; walk stitch) – number of single stitches along the line. Needle punctures occur in sequential order (Fig. 2a, 7). Almost each of the reviewed classifications have this type of stitch. Its properties are fully set out in the given research [3].



Fig. 7. Simple stitch (Run)

If with a simple stitch almost everything is simple, with the following types of embroidery stitches there might occur some complications. For example, satin (satin stitch, column stitch, satin stitch, satin path, steal,

etc.) is considered by D. Chernenko [3] a tight zigzag (Fig. 2b). S. Fedorov [7] notes that the name "Satin" is derived from the name of a particularly smooth fabric weave. Like fabric, "Satin" stitches smoothly fill some element of embroidery from one edge to another edge of the form (fig. 8a). Zigzag stitches are similar with "Satin", but unlike this one, every stitch is done with an inclination towards the base (Fig. 8b).

Thus, we can conclude that satin and zigzag are the different types of stitches for embroidery picture, but similar in its properties such as width, filling, density, angle of the stitches etc. All considered classification denote such type of stitch as "satin", except "Epsima, NPP" (Fig. 4), wherein the satin is determined a "glad'" instead. M. Belova [1] believes that "satin" and "glad'" are different names of the same type. D. Chernenko [3] (Fig. 2) considers "satin" and "glad'" different types of embroidery stitches. If we carefully analyze the picture of binding (Fig. 2c), it is similar to the type of "zigzag" (Fig. 8b).

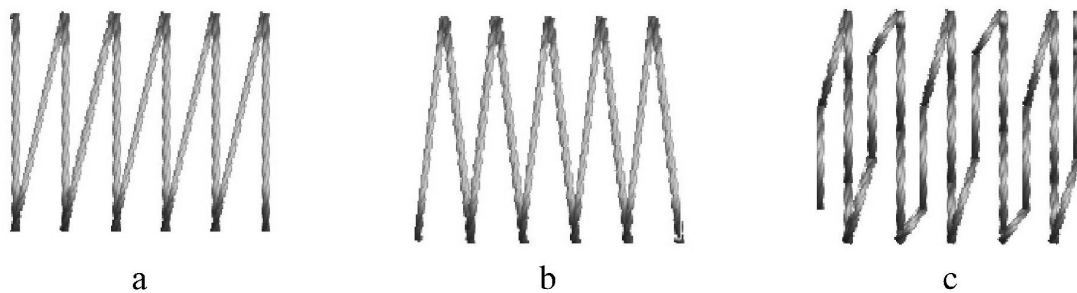


Fig. 8. Basic embroidery stitches that fill the form of the object: a – satin; b – zigzag; c – tatami

The same picture is the type of stitch called "satin" (Fig. 5c) in classification by M. Belova. Yet it should be noted that in the research [3] "glad'" was selected as one of the three types proposed by the author for the experimental filling from (Fig. 9).

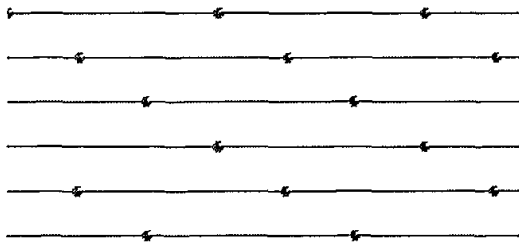


Fig. 9. Glad' by the classification of D. Chernenko [3]

If we compare Fig. 2c and Fig. 9, they are completely different patterns. "Glad'" in Figure 9 is similar to "tatami" (Fig. 8c), not only by the picture, but also in their characteristics. So "glad'" in the classification by D. Chernenko stays uncertain.

The last type of traditional classification – a "fill", is completely filled with stitches, veiled form. This is quite successfully shown in [7]. In this classification, the category of "fill" contains satin, zigzag, tatami and others (Fig. 6) in their characteristics.

CONCLUSIONS

1. So as you can see, the presented classification types of embroidery stitches there are not even two identical ones.

2. The analyzed classifications are formed by the basis of specific embroidery software editors tools, but today there is no uniformity machine embroidery, uniform classification of embroidery stitches types.

3. The most complete, in our opinion, is the classification based on Wilcom ES editor.

4. This classification is based on the completed type of stitch fillings that deliver the basic artistic composition elements – contours, lines and marks.

5. With such approach, there may be considered geometrical and visual features of completed stitch fillings.

REFERENCES

1. **Belova M., 2012.:** Four whale types of stitches. [Electronic resource]. Link: [http:// embroidery-digitizing.ru](http://embroidery-digitizing.ru).
2. **Chernenko D., 2004.:** New technologies of machine embroidery [Electronic resource] // Iгла. – Dubna. Link: [http:// www.applique.ru / article2.htm](http://www.applique.ru/article2.htm).
3. **Chernenko D.A., 2006.:** systematization of the design parameters of the automated embroidery and modeling of the deformation of the system "cloth-embroidery": dis. na soisk. nauch. stepeni kand. tekhn. nauk: spets.17.00.064 "Industrial art and design" / Orel State Technical University. – Orel, 120.
4. **Chernomoret's A., 1987.:** Embroidery in a modern suit. K.: Reklama, 104. (in Ukrainian).
5. **Deyneka I., Mychko A., 2010.:** Protective factors of textile materials for special designation clothes // Commission of motorization and power industry in agriculture. **Teka** / Lublin university of technology. – Lublin. – 98-102.
6. **Deyneka I., Mychko A., Ripka G., 2012.:** Identification of vegetable origin fibers for children's clothes // Commission of motorization and power industry in agriculture. **Teka** / Lublin university of technology. – Lublin. – 98-102.
7. **Fedorov S., 2013.:** Software package for creating and editing Machine Embroidery Designs "Wilcom ES" / Sergiy Fedorov. / [Electronic resource]. Link: [http:// embroidery.ru](http://embroidery.ru).

8. Handbook of embroidery editor "Orgins", Softfoundry International Pte Ltd, 2001.
9. Handbook of embroidery editor "PE-DESIGN", Brother UK Ltd, 2001.
10. **Kozhnina G., 2006.:** Laser comes into the world of embroidery // Tailoring industry. - № 2 – 50-52.
11. **Lamb J.M., 2002.:** You can digitize [Text] / Hirsch International Corp. embroidery seminars. – New-York, 4-6.
12. **Materials from the site Ltd. "Epsima, NVP", 2014.:** Zhytomyr. [Electronic recourse]. Link: <http://epsima.com>.
13. **Materials from the web site Needle work-Russia, 2014.:** [Electronic resource]. Link: <http://www.needlework.ru>.
14. **Materials from the web site of "Zigzag", 2014.:** [Electronic resource]. Link: <http://www.embroiders.ru>.
15. **Momsen H. Hart., 2009.:** The building blocks of embroidery / Printwear magazine. [Electronic recourse]. Link: <http://printwearmag.com/article/building-blocks-embroidery>.
16. **Proskurnin Yu. I., 2001.:** Handbook of embroidery editir "Urfm-Juse" / "Dzhusoft" – Sergiev Posad, – 177.
17. **Proskurnin Yu. I., 2014:** Materials from the web site "Dzhusoft". Link: <http://www.jusoft.ru>.
18. **Proskurnin Yu. I., 2012.:** Software package for creating and editing Machine Embroidery Designs "Urfinus-professional" / User Guide for managing embroidery machines Happy & Velles, - Ltd. "Dzhusoft". – Sergiev Posad. – 177. (in Russian).
19. **Ripka G., Deyneka I., Mychko A., 2012.:** Modern software for automatization of machine embroidery process / Problems of light and food industry in Ukraine. – Kherson: Khers. NTU – № 2 (20) – 73-76. (in Russian).
20. **Ripka G., Mychko A., 2010.:** Urgent issues of industrial computer embroidery // Current problems of the development of light and food industry: herald of reports on the International scientific conference of youth and students, Nov 3-4 2010. – Luhansk.: EUNU, 2010. – 148. (in Russian).
21. **Ripka G., Mychko A., 2011.:** Analysis of ways of creating the competitive embroidery // Visnyk of EUNU. – 2011. – №1 (155). Part 1. – 193-198. (in Russian).
22. **Ripka G., Mychko A., 2011.:** Technical aspect of machine embroidery / Current problems of the development of light and food industry: visnyk of reports on the II International scientific-practical conference of youth and students, Nov. 29-30, 2011 p. – Luhansk.: East Ukraine Volodymyr Dahl National University. – 82-83. (in Russian).
23. **Ripka G., Mychko A., 2012.:** Characteristics of computer embroidery stitch filling / Problems of light and food industry in Ukraine: reports to the international scientific conference., Oct. 29-31, 2012 r., Kherson. – 109-111. (in Ukrainian).
24. **Ripka G., Mychko A., 2012.:** Computer component of machine embroidery // Current problems of the development of light and food industry: visnyk of reports on the III International scientific conference of youth and students, Sept. 21, 2012. – Luhansk.: EUNU, 2012. – 84-85. (in Russian).
25. **Ripka G., Mykhailova., Mychko A., 2010.:** Automated embroidery in the system of art // Visnyk of EUNU. – 2010. – №1 (143). – 261-266. (in Russian).
26. **Shapovalov V., Nezhinskiy Y., 2010.:** The development and applying of flexible technical facilities is effective way of agriculturay production technology // Commission of motorization and power industry in agriculture. **Teka** - Lublin. – 157-161.
27. **Tikhomirov V.L., 2002.:** Editing embroidery GR3. / User guide embroidery machine "Lika-5". – Ltd. "SysTech".
28. **Williams E., 2001.:** Outlines and edgings [Text] / Elisabeth Williams // Eurostitsch Magazine. – 2001. – vol. 9, no. 50. – 36-37.
29. **Williams E., 2001.:** Stitch saving [Text] / Elisabeth Williams // Eurostitsch Magazine. – 2001. – vol. 9, no. 48. – 41-42.

АНАЛИЗ КЛАССИФИКАЦИИ ТИПОВ СТЕЖКОВ МАШИННОЙ ВЫШИВКИ

Галина Репка, Анатолий Мычко, Инесса Дейнека

Аннотация. В статье рассмотрены вопросы проблем отсутствия единой терминологии машинной компьютерной вышивки несмотря на возросший интерес к этой отрасли швейной промышленности, а также существующие классификации типов вышивальных стежков, которые основываются на базе конкретных программных инструментов редакторов машинной вышивки. В ходе исследования было установлено, что одним из наиболее универсальных редакторов машинной вышивки на сегодняшний день по праву является Wilcom ES. Установлены основные типы машинной компьютерной вышивки.
Ключевые слова: машинная компьютерная вышивка, типы стежков, классификация.