GRAPHICAL METHODS FOR DEPICTING PRISMATIC CLOSED HELICAL SURFACES (PZVP)

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Annotation. *The article proposes geometric and mathematical models of PVVP, allows the method of constructing a torus grid to perform images of a given model according to given parameters, and finds characteristic key determinants that enable the fundamental component of architectural shaping in CAD.*

Keywords: *closed helical surface, enclosing torus, prismatic, open torus, torus with a pinhole, sphere, parallels, meridians, cell, right hand, left hand, natural size. characteristic elements of the drawing, closed curve.*

One of the most important directions in the development of scientific research in the field of natural and technical sciences is the expansion of theoretical and applied research, in particular, applied mathematics, machine science and machine parts, aimed at improving and effectively using material resources in the national economy.

A significant acceleration in the development of mechanical engineering is facilitated by the creation of more efficient technologies that reduce the consumption of materials and energy intensity. One of the main characteristics of machines is: performance, efficiency (COP), weight, overall dimensions and cost. It is especially important, without changing the mass, overall dimensions and cost of machines, to increase productivity and efficiency several times. These characteristics can be achieved by designing some parts according to given parameters using closed helical surfaces instead of the existing cylindrical and conical surfaces.

Relevant for applied geometry is the applied problem of a graph - an analytical description of closed helical surfaces under given conditions.

When performing design work in which PVVP are used, it is necessary to know the rules for the graphic execution of these surfaces. On the basis of their stage-by-stage implementation, the geometry of the stage-by-stage production of their three-dimensional models from various materials is determined.

We list those characteristic determinants, in the presence of which the graphical execution of the VIZ is possible:

1. Number κ = P/m, κ- the ratio of the number of parallels P to the number of meridians m, which make it possible to obtain an image of the edge (or edges) of the VEP on the surface of the enclosing torus;
2. Type of ZVP: right or left;
3. VIZ type: petal, prismatic or other form of meridional section;

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4. The type of the enclosing torus into which the PVVP fits: an open torus, a torus with a pinhole, or a sphere.

Let us dwell on examples in which specific arithmetic quantities appear in the generalized formulation of the problem condition for the graphical construction of the VEP.

In Fig.1. A drawing of the left-hand PVPP is given (with *κ=4/1*), inscribed in an open torus (for which D =55мм; d=30мм.). This PVVP has one edge and one grain.

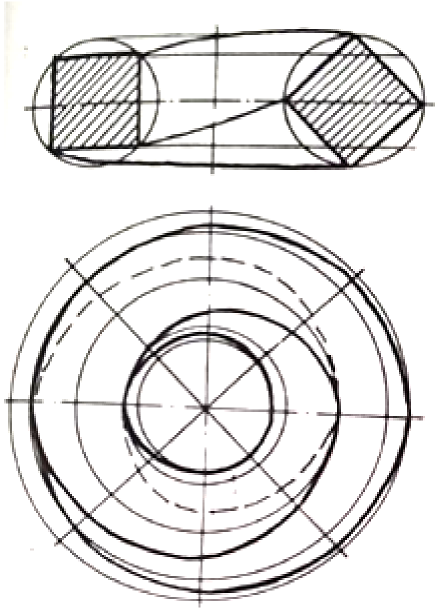

Fig 1.

The algorithm for the process of depicting this surface in a drawing, consisting, for example, of frontal and horizontal projections, can be written as follows:

Draw a torus according to the given dimensions. In this case, the most traditional position of the torus in relation to the main direction of orthogonal projection is taken to be that when the axis is horizontal.

We build a grid consisting of P parallels and m meridians (P =4, m=1), choose one of the meridians of the torus, and divide it into 3 equal parts, draw parallels through each division mark. Of course, such a grid does not allow obtaining the exact edges of the VEP, so the number k is multiplied by another number. In Fig.1. accepted m=8, as a result $K_1=3\cdot 8/1\cdot 8=24/8$. So we are dealing with a trading grid consisting of 24 parallels and 8 meridians. In this case, we begin the construction of the meridian and parallel from a common point, which it is desirable to place on the characteristic elements of the drawing.

3. In the projection, in which the equator of the torus is depicted in full size, the VVP edge is depicted as a successive row of diagonals of trading grid cells. As you know, there are two such diagonals. Then, if the diagonal on the visible part of the torus goes from the large circle to the small ones, then this will be the link of the edge of the ZVP of the right move. For our example, we choose this option. If the movement started from point A, and the desired PVVP has only one edge, then it ends after three revolutions at the same point. Considering this fact and checking its correctness performed on the drawing, we will obtain a horizontal projection of the VZP rib.

4. We find the frontal projection of each working vertex of the trading grid, and then, by connecting them in series, we get the frontal projection of the RBVP edge.

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5. We form a surface by drawing a common edge, which PVVP is a circle coinciding with the circumference of the torus axis. Distinguish visible and invisible sections of the projection of the rib. In Fig.2-4. drawings of left-hand prismatic VWPs are given, in which the enclosing torus is characterized as D=40 мм и d=20 мм. The following options are given: In Fig.1. κ = P/m=4/1; On fig. 2. κ = P/m = 4/2; In Fig.3. κ = P/m = 4/3; In Fig.4. г) κ = P/m = 4/4.

CONCLUSION

The paper considers the issues of geometric modeling of PVVP. In connection with the tasks set, the following results were obtained.

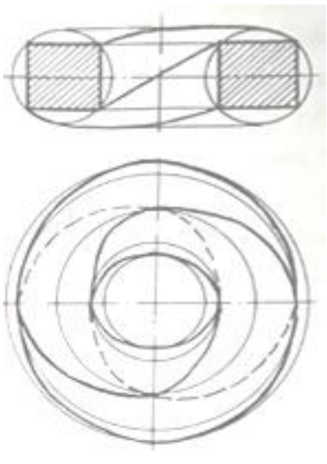

Fig 2.

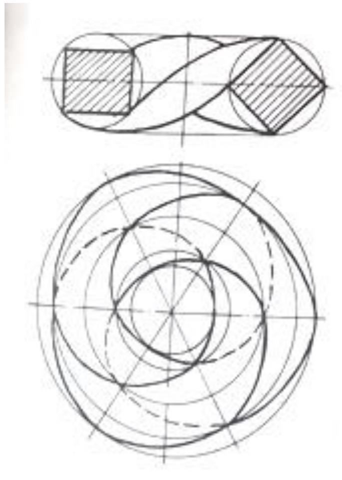

Fig.3.

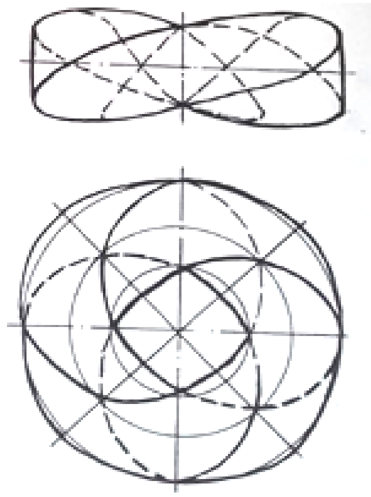

Fig.4.

1. Those characteristic determinants are listed, in the presence of which the possibility of graphical execution of the PVVP.
2. Based on the analysis of the methods of geometric constructions, the PVVP is proposed allowing one, two and tetrahedral models, whose meridian section is a square.
3. A universal toric grid is proposed for obtaining PVVP, which allows to accurately build drawings and models of PVVP.

REFERENCES:

1. Якунин В.И. Геометрическое основы систем автоматизированного проектирования технических поверхностей.-М:МАИ,1980
2. Мадумаров К.Х., Махкамов М. К. Графические способы изображения замкнутых винтовых поверхностей(ЗВП). Высшая школа. Научно-практический журнал. № 8/2015 г. Уфа.
3. Акбаров А.А. , Мадумаров К.Х. Об одном способе графического и математического образования лепестковых замкнутых винтовых поверхностей. Ташкент . ин - т инж. ж - д. трансп.-Ташкент,1989. 11 с -Деп. ВИНИТИ, №5651-В89.
4. Сердюк В. Е. Научная активность методов начертательной геометрии (на примере парадоксального листа Мёбиуса) Сумский фил. политех. института. – Сумы, - Деп. В ВИНИТИ 10.12.86.№2784.
5. Мадумаров К.Х., Шоназаров А. А. Винт ҳалқа сирти чизиқли сирт. Меъморчилик ва қурилиш муаммолари.,илмий-техник журнал. СамДАҚИ,2020. 4-сон.169-171 бетлар.

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https://www.gejournal.net/index.php/IJSSIR

5. Абдурахманов Ш.А. Мадумаров К. Х. К геометрии поверхностей гранями которых служат ленты Мёбиуса // Вопросы динамики и сооружений и надежности машин// Сб. докл. Конф. ТашПИ. Вып.4- Наманган. 1988. с.16-18.

6. Madumarov K. Kh.. Graphic Methods Of Image And Mathematical Description Of Lobe Closed Helical Surfaces. Nat. Volatiles & Essent. Oils, 2021; 8(4): 2686-2694.

7 . Madumarov K. Kh.. POSSIBILITIES OF USING THE APPROXIMATION OF HELICAL SURFACES IN CONSTRUCTION. International Engineering Journal For Research & Development Vol.6 ,Issue 5. www.iejrd.com.2022.

8. Tukhtakuziev A., Imamkulov Q.B., GaybullaevB. Sh., Madumarov K., Buzrukov Z.S, Turaev N.,S. Definition Optimal Values Of Device Parameters That Semi-Open Pomegranate Trees. Solid State Technology Volume: 63 Issue: 6 Publication Year: 2020.

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