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CONSTRUCTION METHODOLOGY OF CROSS-LINE AND 2-ORDER ALGEBRAIC LINES BASED ON PREVIOUSLY GIVEN GEOMETRICAL CONDITIONS

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Drawing is a problem that does not fall from the agenda of the formation and development of spatial imagination and thinking in students in the teaching of geometrics, drawing and computer graphics. The urgency of this problem is further exacerbated by the advent of computer graphics, that is, the advent of new problems.

Any details, objects, machines and constructions that are related to the construction will be associated with spatial imagination and creative thinking, that is, with the creation of innovation.

When called a spatial imagination in the engineering graph, it is understood that, in principle, the mutual spatial relations of geometrical objects - their size, shape, occupying place and movement-are brought to the eye with an idea.

Engineering thinking is the ability to transfer it to a "plane" where it is possible to use existing tools to solve a problem that has arisen. In simple terms, this is modeling. For example, for the construction of a surface that meets certain requirements, its outlines and drawings are drawn. It is replaced with the help of various geometric transformations, until it acquires the desired shape. After the surface acquires the final form, its calculation of endurance to static and aerodynamic loads is carried out.

This means that algebraic curve line and surface construction play an important role in the development of spatial imagination and creative thinking of students, the formation of creative abilities and skills.

It is known that when constructing new curved lines and surfaces, mainly a knimatic method is used. First of all, the shape of the curved line forming the surface is determined.

Methods of transferring a curve from given specific points are found , passing it through these points is the design of this same curve. Such issues are one of the urgent problems that require spatial imagination and creative thinking.

For example, under such a condition, the curved line, which is the fabricator of the surface, is passed through certain points, based on the requirements of the constructor. For this, an algebraic line is selected, which can be passed through these points.

Curved lines are used in various fields of Science and technology. They are divided into legal and lawless curves. Legal curved lines are divided into algebraic and transcendent curved lines.

The main characteristic of the algebraic curve is its order, that is, the degree and K tushunch concepts of the algebraic equation that determines it. The quadratic equation represents the second-order curve lines, while the higher-order equations represent the higher-order curve lines.

The order of algebraic curve lines is equal to the degree of the equation that expresses it. And his class will be equal to the number of attempts made from the point taken outside the line to the curved line. The order of the spatial algebraic curve is equal to the maximum number of points formed by its intersection with the optionally obtained plane. And the class of the space curve is equal to the maximum intersection points with it of the plane passing through the straight line obtained outside it and the number of attempt planes passing through the straight line.

Algebraic curves include circles, ellipses, parabola and Hyperbola. When constructing a certain surface, we take an ellipse of one of the algebraic curved lines and construct it based on the previously given geometrical conditions.

There is also the proyektiv method of constructing second order curved lines on the basis of the previously given geometrical conditions based on the compatibility theory. Proyektiv compatibility is a private case of multi-value compatibility, it is called 1-1 value compatibility. Somehow you get given a set of two points. Such compatibility is called proyektiv compatibility if one point of the first set of points corresponds to one point of the second set of points, and vice versa if one point of the second set of points corresponds to one point of the first set of points.

For example,

1-method. Five of the contours of the shell surface: be given two bases, the top and two intermediate points (Figure 1, a)).

Five points in the given desired sequence are marked with the letters O1, O2, M, M1 and M2 (figure 1, b)). The line MM1 and MM2 mark the lines m1 and m2, while the corresponding points on them P=O2M2XO2M2 can be found using the handle of straight lines centered at the point. According to the algorithm described above at the intersection of straight lines O1 (m1) and O2 (m2), the required amount of points of a curved line is built. The picture shows the construction of only one I point.

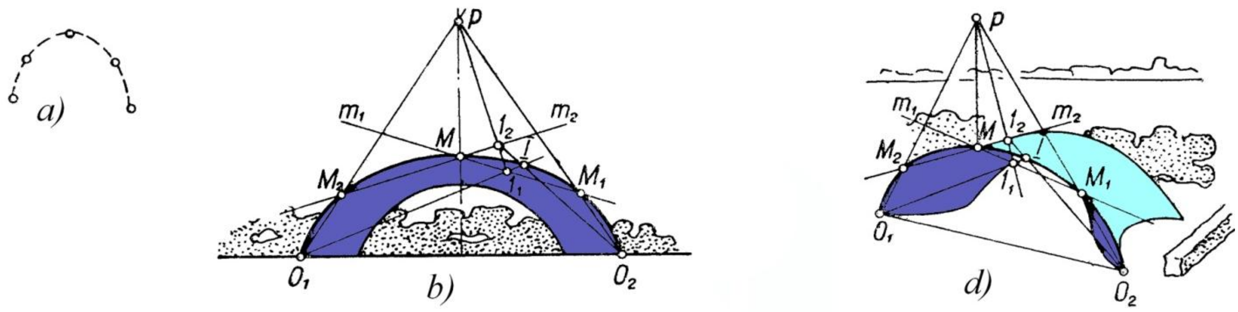

Figure 1

It should be noted that the obtained contour is constructed according to the points of the curve by five points apparati is maintained in the desired parallel or central projection of the Shell: in the plan, in the side facade, in the axonometry and in the perspective. This makes it possible to complete the precise construction of the curve when desired of the specified projections. For example, it is sufficient to construct the points A1, O2, M, M1 and M2 given in the perspective (Figure 1, d)), so that then it will be possible to take the lines P and m2 and build a curve line on them in the perspective without taking any other points on the orthogonal projection.

The points mentioned are also valid for all five subsequent methods, so the construction of the curve is considered only in one projection.

2-method. If in the first method it is possible to approach the points O1 and M2, and O2 and M1, and O1 and M2, respectively, the curvature will be equal to t1 and t2 on the edge, and we will have the second way to give the curve.

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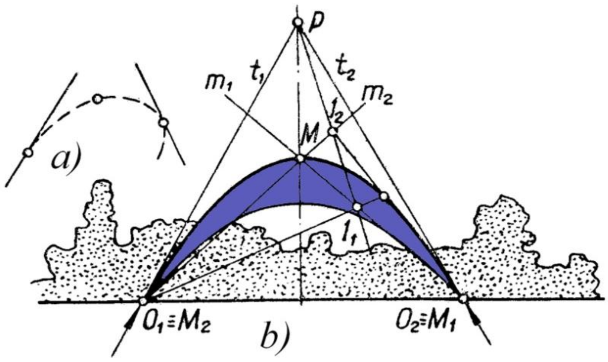

Figure 2

Such a method is often threeraydi in practice. O1 and O2 at the base points (Figure 2, a), b)) whether the curved line of the shell contour is known the directions of t1 and t2 attempts, for example, with the direction of the base reactions, the upper point of M will be known.

According to the condition of the attempt, O1≡M2 and O2≡M1. the M1 (MM1) series passes through the O2 point, while the m2 (MM2) series passes through the O1 point. Center P=t1Xt2. The picture shows the construction of one I=O111XO212 point.

3-method. In this method, it is necessary to approach a pair of points of one O1 and M2, they will be on the edge t1 try (Figure 3, a), b))). Also known is the second intermediate point O2 Upper point M and intermediate M1.

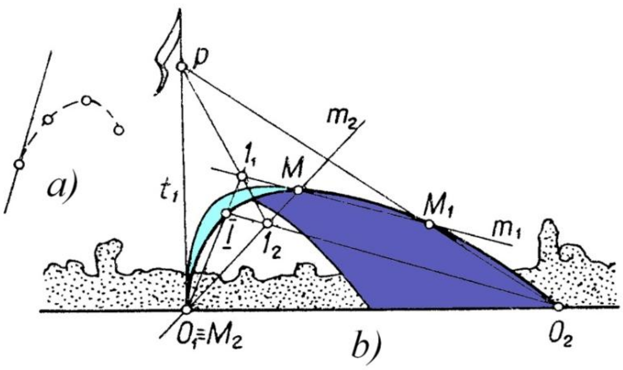

Figure 3

This data shows the M1 (M1M) and m1 (M2M) rows and P=t1XM1O2 find the center and find the desired point of the I contour you are looking for as in the previous methods allows to build.

Methods 4-5 and 6 require additional devices to obtain five O1, O2, M1, M2 and M marking points. In method 4 (Figure 4, b)) t3 it is necessary to find the point M of the curve in the attempt, in Method 5 (Figure 5, b)) t2 in the attempt it is necessary to find the point M in two O2=M and t3 attempts, in the last method (Figure 6, b)) three O1≡M1 O2≡M1 and

When performing such construction, all three methods are brought to the 2-th method.

The necessary constructions are based on the private cases of the Brianshon theorem.

1-theorem. In the triangles described in the 2-order curve, the dependent-counterclockwise sides pass through a single Q (Brianson point) of straight lines connecting the anchor points (Figure 4, d)).

2-theorem. 2-a straight line connecting the non-uniform edges in the quadrilateral, depicted around the weighed curved line, and the fifth edge with the point of the dependent-countercurrent attempt, passes through a single Q Point (Figure 4, d)).

3-theorem. 2-a straight line connecting straight lines and attempt points connecting the opposite sides of the stand-alone in the quadrangle depicted around the regular curved line passes through a single Q Point (Figure 6, d)).

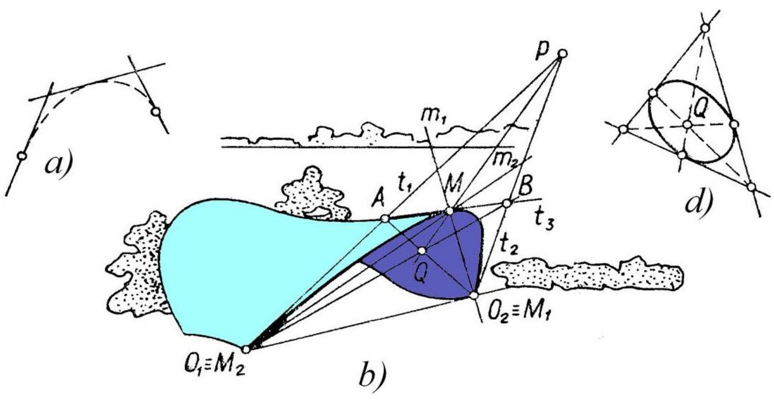

Figure 4

4-method. The 2-order curve of the contour of the shell (O1≡M2 and O2≡M1) with base points and the sitters in them (t1, t2) as well as the horizontal siren (t3 given (picture 4, a)).

MCt3 is determined on the basis of Point 1-theorem. t1, t2, t3 triangles Q Brianson point AO2 and BO2 are found at the intersection of straight lines, Point M=PQXt3.

5-method. Figure 5, a) at (t1t2t3t4t5) given five. In it it is necessary to write the contour of the building plan in the form of an 2-ordinal curved line (ellins).

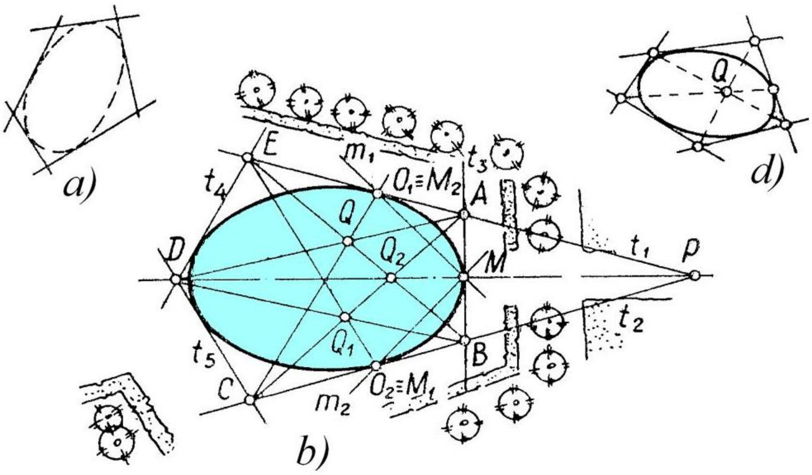

Figure 5

3-support the theorem, we find O1≡M2, O1≡M2 and M attempt points in t1t2 and t3 attempts. O1≡M2=t1XQC, Bunda Brianson point Q=BEXAD; O2≡M1=t2XQ1E, bunda Brianson point Q1=ACXBD, M=t3XQ2D, bunda Brianson point Q2=ACtXBD. We find the lines m1 (M1M) and m1 (M2M) and P=t1Xt2 in the five-point game that marks the center. The task is listed in the 2-th method.

2-an orderly curve can be given only with the help of points and attempts. Other sizes can also be selected as the required five parameters. We list some of them: giving the size of the arrows (2a and 2b) - 1 parameter; direction and position of the Arrow-2 parameter; giving the center in the Arrow – 3 parameter and sh.the G. the five selected parameters mark a single curve. For example, to give the center (three parameters of the state) on the arrow, as well as the dimensions of the arrows 2a and 2b of the Ellipse (two parameters of the form) determines the single curve.

6-method. Figure 6, A) the curve line of the shell contour (O1≡M2) is given by the base points and the urinals in them (t1, t2, t3 and t4).

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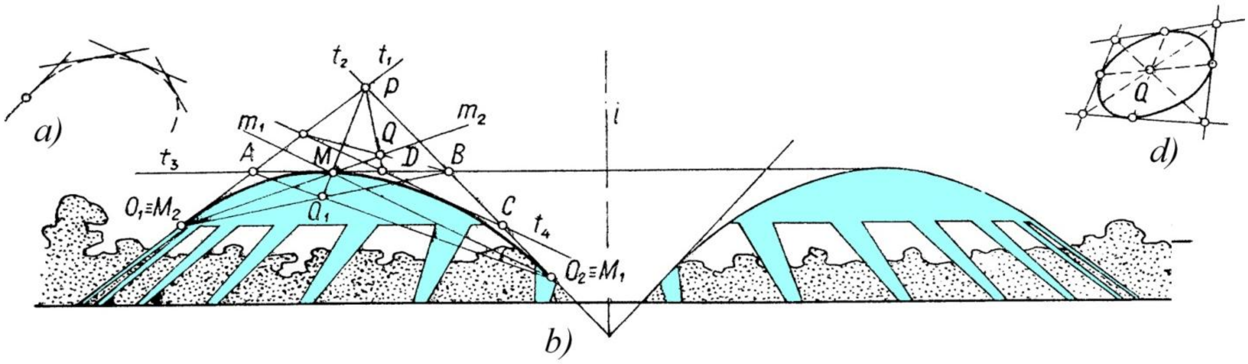

Figure 6

The upper part of the shell is obtained by rotating the 2-order curve around the vertical axis, and the 4-order surface is counted. Urinating cones are I common axis revolutions. In the cross-section, T1 and t2 are given to common urinals, they are considered to be cones-edged. One of them is given the Q1≡M2 attempt point in t1. Also known are the horizontal and T3 deviation lines T4, which try to cross the intersection curve.

In order to build the sought-after curve, it is necessary to find the M point in the T3 attempt and Q1≡M2 in t1.

According to the 2-theorem, t1t2t3t4t5 diagonals in a quadrilateral intersect at The Point Q Brianson. the M point sought in the T3 urinary is determined at the intersection of the straight lines O1QXt3. According to 1-th theorem, the point Brianshon in the Triangle t1t2t3 is found in Q1=BO1XPM, then the sought point O2=M1=AQ1Xt2. Then M1 (M1M) and m1 (M2M) rows and P=t1Xt2 Center are built. The task is listed in the 2-th method.

Consider the algorithm for building a parabola on the given a and B points and the corresponding tA and tB attempts on them (Figure 7). At the intersection of the continuation of the trials, we connect the point T with the points A and B, forming an ABT triangle. We build the TD meridian of the same triangle and choose the Point C in the middle of it. DT we give a handle of straight lines centered at Point B of a straight line and an infinitely long Q∞ point. We determine the compatibility of one value between the handles of the beam by dividing the CD and AD cuts into equal parts in the same amount. The resulting points are numbered from A to D and from D to S (1,2,... and 11,21,...). As a result of the intersection of the corresponding straight lines of the same handles, we get AC parabola ARC points.

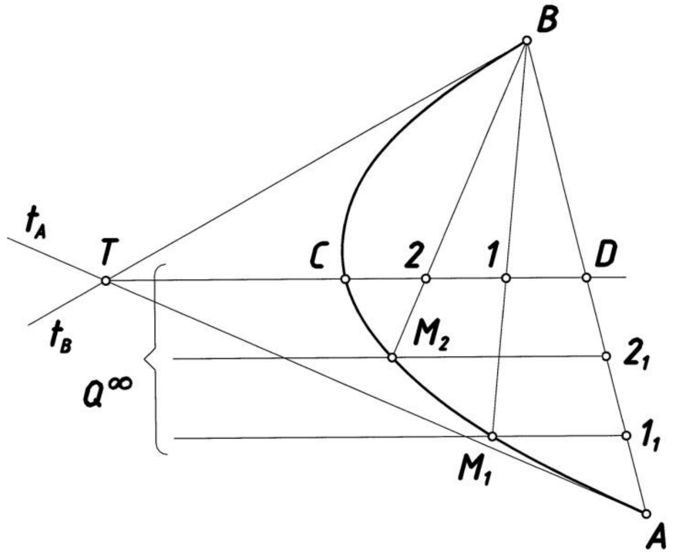

Figure 6

We knit the CB arc by dividing the DB incision from B to D and building the handles of the beams centered in Q∞ and A. It is possible to construct any of the second-order curve lines on given points and attempts using an engineering disremenant-based algorithm.

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