INTEGRATIVE OF DRAWING GEOMETRY APPROACHES

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Annotation: This article provides information about the goal tasks of drawing geometry, the branch of geometry that studies the methods of depicting spatial figures on a plane and solving spatial problems using them.

Keywords: drawing geometry, geometry, spatial figures, plane, representation, spatial problems, projection

INTRODUCTION

Graphical geometry is a branch of geometry that studies the methods of representing spatial figures on a plane and using them to solve spatial problems. schismatic geometry gradually emerged in the practical activity of mankind; it is used in the design of buildings and machines, in the visual arts and in other fields. Central Asian architects also used geometric shapes in the design of dome buildings and bridges. Nowadays, the methods of schematic geometry are widely used in the construction of buildings and structures of various geometric shapes.

There are two ways to represent spatial figures on a plane: central projection and parallel projection. For example, photographs of objects and shadows of objects on a plane from light rays are central projections. An image made by the central projection method is called perspective. The actual shape and dimensions of the figure cannot be determined in the perspective image. In parallel projection or central projection, the projection center 5 is assumed to be infinitely far away. In parallel projection, the exact direction of the projecting straight lines must be given. An example of parallel projection is the appearance of shadows of objects from the light of the Sun or Moon.

Projecting figures at right angles to two mutually perpendicular planes is called orthogonal projection. Sometimes a plane (profile plane) perpendicular to both the horizontal and frontal planes is used to perfect the drawing. Drawings are easily made by means of orthogonal projections, the dimensions (length, width, height) of the object depicted in the orthogonal projection (isometry) can be determined directly (Fig. 2). But such a drawing does not give a clear idea of the product. It is difficult to visualize the spatial forms of complex figures from it. Therefore, the image of the object made on the basis of orthogonal projection with its axonometric projection is often used in engineering construction works, the so-called numbered projections method. In this case, the points are projected orthogonally to the plane of projections, and numbers representing the position of the point in the plane - heights are placed next to the projection. To make this plot clear, a height line is drawn through points of equal height. If it is necessary to depict

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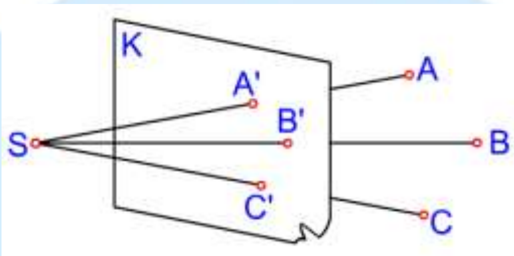
the earth's surface (relief) in a drawing, a horizontal projection plane is used. In this case, the lines are called horizontal. Depending on the shape and location of the horizontals, it is possible to form an idea about the depicted part of the earth's surface. This method of describing the surface using a system of horizontals is called a topographic method (Fig. 3). Drawing geometry methods are widely used in architecture, visual arts, engineering and other fields.

Drawing geometry differs from other geometries in its main method of representation, and it is inextricably linked with mathematical sciences and is considered one of the general engineering sciences. It expands the student's spatial imagination with the help of its imaging methods. Ability to create images and read pre-made images, and help solve various engineering problems in practice. With the laws and rules of geometry, drawing can depict not only existing things, but also imagined things.All engineering structures, machines, machine parts, medical devices, etc. are built according to the drawings.

Occasional items are produced. All known geometric properties of shapes can be determined from the information obtained from their drawings. That is why drawings of objects can be called flat geometric models that reflect their geometric properties.

It is known that the properties of a geometric shape can be checked by analytical and graphical methods. Based on the graphic model of the figures, they are presented in an analytical way, and vice versa, the methods of making their drawings from the analytical view of the figures can also be seen in drawing geometry. Only graphical representation of the objects to be designed does not satisfy the requirements of modern production. Therefore, analytical methods are used together with graphic methods when making drawings.

Filling Euclidean space with special elements.Projection theory. K te in space given the size and the point C that does not lie in it, as well as the points A, B, C (Fig. 1). We connect point C and point A by a straight line. Let's assume that the straight line SA intersects the plane K at the point A'



(1-Fig)

This process is called projection, which is Latin for "to reflect" or "to depict." S is the center of projection, and SA is called the projecting beam. Point A' is the central projection of point A in space on plane K, and plane K is called the plane of projections.

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The word projection comes from the Latin meaning "to throw forward", and we think of it as a plane image of an object. The process of creating the central projection of point A on the plane K can be expressed using symbols as follows:

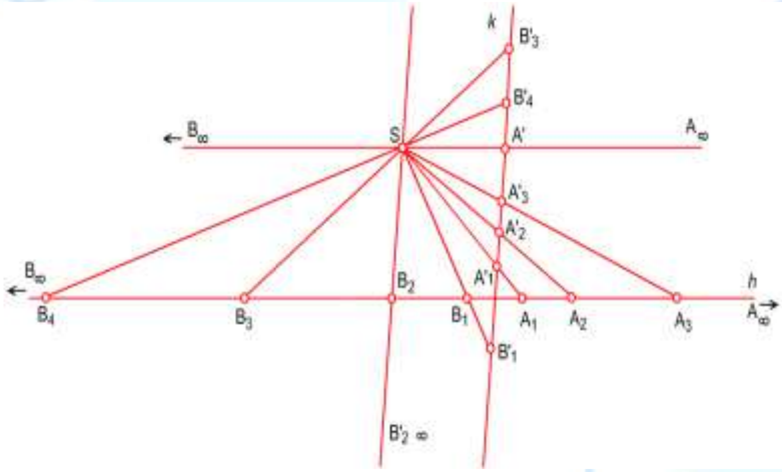
SA ∩ K ® A'

that is, the projecting ray SA intersects with the plane of projections K and the projection of point A forms point A'. The central projections of points B and C are also made using the same method, i.e

SB ∩ K ® B'

SC ∩ K ® C'

Filling Euclidean space with special elements. Let the intersecting lines h, k and point S not lying on the plane be given (Fig. 2).



(2-Fig)

Let S be the center of projection, let k be the straight line of projections, and let h be the projected straight line. We connect the selected points A1, A2, A3 with the center of projection S on the straight line h. The projecting rays SA1, SA2, SA3 intersect with the straight line k of the projections, and the central projections of these points form A1', A2', A3'. So, for each point projection on the straight line of k projections, there corresponds exactly one point on the straight line h and vice versa. If we move the point A infinitely far along the straight line h in the direction A1, A2, A3 and mark it with A∞, its projection can be made as follows.

We call the point A∞ a characteristic point of the straight line h, and to create its projection, we pass the center of projection S parallel to h and mark its point of intersection with k as A∞'. Thus, the point A∞ belongs to two straight lines at the same time, i.e. to h and SA∞ drawn parallel to it from the point S. All points except A∞ on a straight line h are called its normal or eigenpoints. Now, choosing a point B1 on the straight line h, we create its central projection B1' on k. If we pass the projecting ray SB2 through the next selected point B2, it remains parallel to k, that is, it intersects with the straight line k at a special point, i.e. SB2Çk ® B2'∞.

The central projections on k of the points B3, B4, ... selected on the straight line h are located above A∞', and as the points move away from B1 along h, their projections get closer to A∞' from top to bottom, i.e. . If we move the point B infinitely away in this direction and take it as B∞, we need to draw a parallel from S to h to make its projection. The straight line SB∞ coincides with SA∞. So, the projection of B∞ overlaps with B∞' and A∞': B'∞ º A∞'.

Hence, the straight line h has a unique eigenpoint because it is projected by a single ray. If there were two of them, they were the two projection beams used to project them. Thus, each straight line in the Euclidean space corresponds to one unique (infinitely spaced) point. From this we can conclude that parallel straight lines have one common characteristic point. Now we can say that two straight lines lying in a plane always intersect. They can intersect at specific or non-specific points.

Lines passing through a point in a plane and belonging to the plane are called straight lines. If the point where the straight lines intersect is located at the characteristic point, it is called a set of straight lines with a characteristic center (Fig. 3, a). Let us cut this bundle of straight lines with center S by the straight line λ. Let the stack cut straight lines at points 1, 2, 3. Assuming that these straight lines from S are continuous elastic bands. Let's move the center S infinitely away in a certain direction. In this case, straight lines S1, S2, S3, ... remain parallel to each other (Fig. 3, b). As a result, we will have a set of straight lines with an arbitrary center. A set of straight lines that pass through a point in space is called a straight line. If it is located at an arbitrary point, it is called a bundle of parallel straight lines with an arbitrary center.

CONCLUSION. We know that every straight line in a plane has one singular point. What line does this set of singular points form? Each straight line intersects the straight line formed by this set at a bitwise point. Since the set of singular points belonging to infinitely many straight lines lying in a plane forms a singular straight line, it is known that a straight line in a plane intersects the straight line at only one point . Therefore, the plane will have one unique straight line. Mutually parallel planes intersect on one unique straight line to form a set of planes.

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