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PERSPECTIVE DETERMINATOR METHOD

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ABSTRACT
The article is devoted to the method of determining the prospects on the subject of "Descriptive geometry" for university students in the classroom. The proposed method for studying descriptive geometry using an integrated approach makes it possible to reduce the amount of study time for solving promising graphic problems.

Keywords: *object that gives the plane of the picture, creative approach, variability, teaching methodology, fundamental, perspective, building, perspective of a point, perspective of a straight line, perspective of a plane.*

АННОТАЦИЯ
Статья посвящена методике определения перспективности по предмету «Начертательная геометрия» для студентов вузов на занятиях. Предлагаемый метод изучения начертательной геометрии с использованием комплексного подхода позволяет сократить объем учебного времени для решения перспективных графических задач.

Ключевые слова: *объект, задающий плоскость рисунка, творческий подход, вариативность, методика обучения, фундаментальный, перспектива, построение, перспектива точки, перспектива прямой линии, перспектива плоскости.*

INTRODUCTION

Each projected building must be drawn in perspective. According to the perspective, one can correctly judge the external appearance, the proportions and the ratio of the volumes of individual elements, the expected visual perception of the designed object. For building the perspectives of the main volumes of the structure, you can use the method based on the use of the determinant of perspectives, which gives the plane of the picture the properties of an independent space.

Let us explain this definition. Each specific position of the point of view in space corresponds to a single perspective image of the object in the picture. The continuous movement of this point causes a continuous transformation of one perspective into another on the plane of the sky. Thus, the plane of the sky is the

bearer of an innumerable set of perspectives of a given object, corresponding to an innumerable set of positions of the point of view in space.

In order to select the desired perspective from this set, it is necessary to build those graphic elements on the plane of the picture, the position and appearance of which will not depend on the position of the point of view in space. Such elements are called graphic invariants of continuous transformations of one perspective into another. These invariants form on the plane of the picture graphic constructions common to the whole set of perspectives, called determinants of perspectives, i.e. form a determinant of images.

DISCUSSION AND RESULTS

Consider the construction of the perspectives of the main geometric figures - points, lines and planes - using the determinants of their perspectives.

Let's agree that the point of view moves along the main ray.

The frontal plane of projections will be taken as the plane of the picture, in front of which we will place the depicted figures.

Point perspective. If the point of view S moves away from the original point A (A1, A2) and the picture plane, occupying a number of successive positions S1, S2, S3 ... S∞ on the main ray, then the perspective of point A moves along the plane of the sky, also occupying a number of sequential positions A1, A2, A3 ... A2 on a rectilinear trajectory a '(Fig. 1).
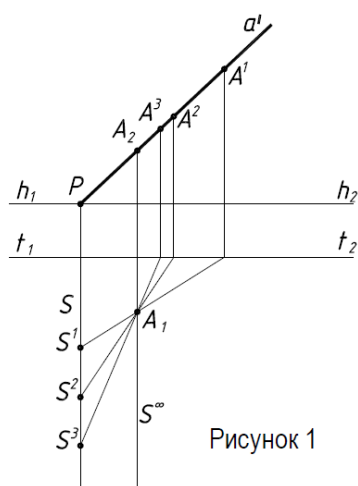

Fig.1. Rectilinear trajectory.

Line a ′ is a graphical invariant of transformation of perspectives of point A, because its position in the picture does not depend on the point of view. On the plane of the picture, it passes through two fixed points - the main point of the picture P and the frontal projection A2 as the perspective of point A from the infinitely distant

center. The same straight line is the determinant of the perspectives of point A, since any point of it can be taken as the perspective of point A.

The perspective is straight. The perspective of the line segment AB, parallel to the picture, can be viewed as a line connecting the perspectives A 'and B' of its ends. Therefore, we draw straight lines a 'and b' through the main point P and projections A2 and B2 as geometric places of all perspectives of the end points A and B (Fig. 2, a, b).
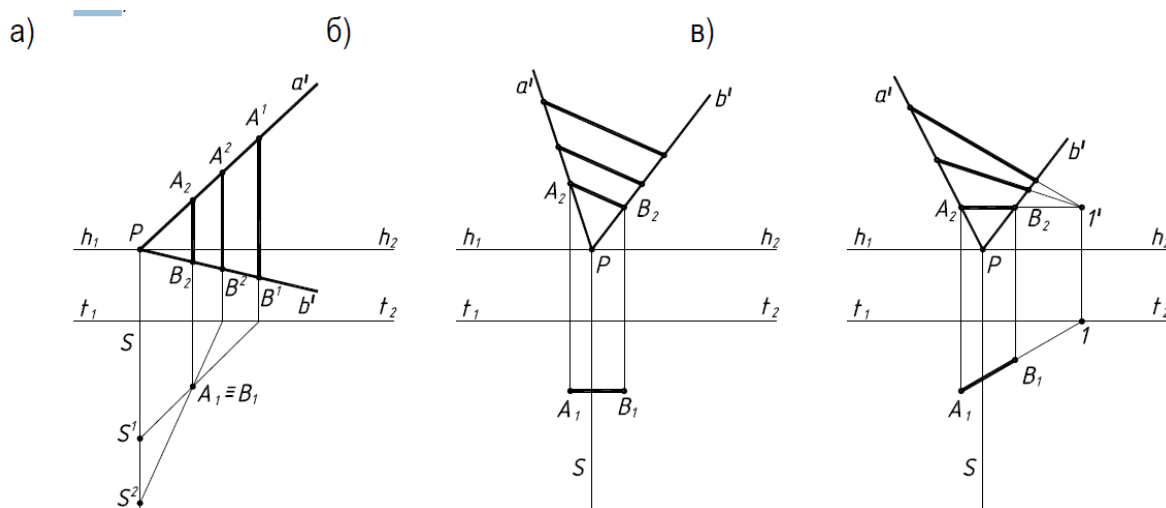

Fig.2.

These straight lines constitute the perspective and limit the section of the plane of the sky as the area of existence of all the perspectives of the segment AB. Since the given segment is parallel to the picture, i.e. intersects with it at an infinitely distant point, then any segment drawn in the constructed compartment parallel to the A2 B2 projection is the desired perspective.

To construct the perspective of a segment not parallel to the picture, it is necessary, as before, to draw straight lines a 'and b' and determine its picture trace (Fig. 2, c). Point 1 'coincides with its perspective, and its position in the picture does not depend on the position of the point of view in space. The determinant of the perspectives of a given segment is composed of lines a 'and b' and its picture trace 1 '. Any line segment drawn through point 1 'within the limits of the compartment limited by them will be the perspective of the specified segment.

Perspective plane. In most cases, the image is subject to flat figures, which can be considered as closed broken lines. The links of these broken lines are line segments, the construction of the perspectives of which was discussed above.

The picture traces of all the displayed planes will be located on one straight line - the picture trail 1 ′ 2 ′ of this plane. The position of this line in the picture does not depend on the position of the point of view in space, and therefore, together with the

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straight lines a ', b', c ', d', it forms a determinant of the perspectives of a given plane (Fig. 3).

So, the determinant of perspectives allows you to build any perspective of a given object without resorting to the operation of central projection of this object onto the plane of the picture.
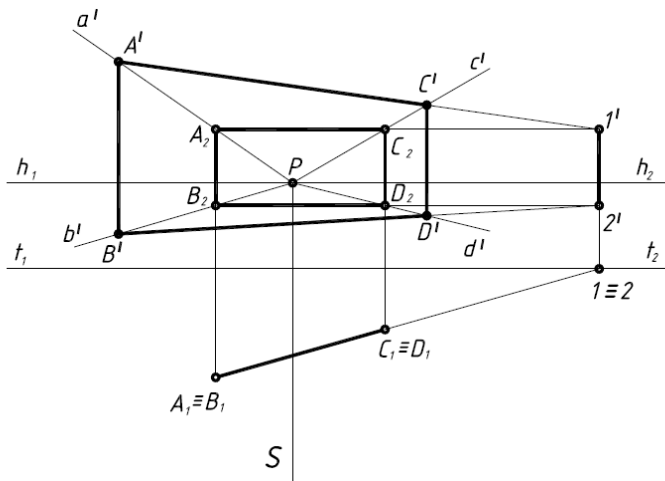
Let's consider an example of constructing a building perspective using the perspective determiner method (Fig. 4).

Preliminary operations are performed on the plan and facade. The direction of the main ray is chosen in the plan, the base of the picture K is drawn perpendicular to it (the further K is from the object and point of view, the larger the perspective will be). Then the planes of the depicted faces are extended until they intersect with the picture and the bases $10 \equiv 20$, $30 \equiv 40$, $50 \equiv 60$ of the picture traces of these planes are marked.

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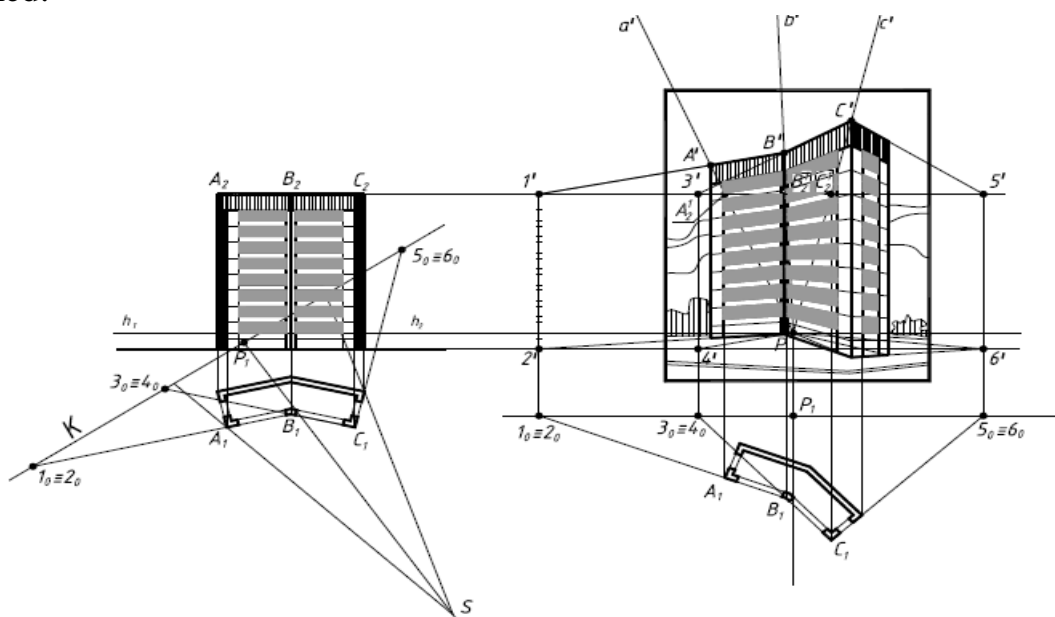
Preliminary constructions on the picture are performed - to create an independent plane model of space, it is necessary to attach a perspective determinant to the picture plane.

Without changing the relative position of the building plan and the base K, by plane-parallel movement, the latter is located horizontally in a free space of the drawing and the moved building plan is drawn. Continuing the main ray S to the intersection with the horizon line h1 h2, the main point of the picture P is constructed.

The main point P and the constructed orthogonal projections A11, B11, C11 of the original points will determine the straight lines a ', b', c '..., which, together with the picture traces of the face planes, will form the desired determinant of perspectives.

Further, the perspective of the main volumes is built. Drawing a straight line through point 1 ′ under the desired angle, the perspective of the straight line AB is set. Further constructions are performed as building a closed polyline perspective, using the previously constructed perspective determiner.

Then, on the perspective of the main volumes, using graphical constructions, the perspectives of the parts are built (or completed).

CONCLUSION

The use of this method for an architect working on the creation of an object will allow at any stage of design to create a model of an object that clearly shows its shape, size and proportions, to identify and eliminate compositional imperfections.

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