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A FEW COMMENTS ABOUT THE VISIBILITY IN PICTORIAL DRAWINGS

Results of a Rw bundle projecting are usually described by a picture drawn on the surface of a drawing paper contained in a projection π plane of the Rw projecting. Such a drawing is usually interpreted as a vision of a mapped Γ object observed by a spectator on the background of the Rw projecting when looking from center S of a central projecting or in line with the direction of a parallel projecting. Such an interpretation needs defining in geometrical terms a phenomenon that is imminent for an eye perception of visibility and the lack of it for particular parts of the watched - projected object Γ. In known to me papers dedicated to the theory of graphical representations the phenomenon of visibility is decided based on the intuition of the creator or the reader of the mapping. In some situations such an approach may lead to wrong conclusions, and those in turn result in a wrong interpretation of contents of an analyzed drawing.

The comments contained in this paper aim at adding geometrical precision to the rules of deciding the visibility in pictorial drawings in particular. Such drawings should be read by intuition, however, their constructions/designs should fully respect geometrical rules used in common methods of mapping, including the rules to account for the visibility.

One needs to admit that a visual observation can be characterized not only by its direction, but by its sense. Therefore, an analysis of the results of such an observation based on relations happening in the Rw bundled projecting requires to orient all straight projecting lines not contained in a so-called vanish plane ζ of this projecting. The orientation of those lines is done such that for each of the analyzed straight lines e.g. t_i, point $t_i \cap \pi$ is ahead of point $t_i \cap \rho$, where ρ is a plane containing the surface of the drawing paper not used to reflect the results of the Rw projecting.

Also, we assume that the mapped figure Γ is limited and closed and also that when Rw is a central projecting, its center S is a point located on the opposite side of the projecting plane π than the plane ρ, and the figure Γ is included together with the projecting plane π in one and the same half-space with a ζ, border.

Under such assumptions each of the inseparable with Γ object t_i straight lines t_i projecting in the Rw projection intersects the object Γ in the Φ_i linear figure which is limited and closed, in which

you can recognize the first point W_i and the last point N_i. The point W_i is then called a visible point of the Γ object.

In order to name in a figure Φ_i its points W_i and N_i, one needs to recognize their sequence in the projecting straight line t_i, which can be done only with additional information about their respective locations, and this information is contained outside of their projects.

That proves that such pieces of information can be identified:

- when the representation of the object Γ is done using a one-projection perspective, from a respective location of the elements of the images of the planes α_i, β_i, where α_i, β_i are parallel planes containing specific straight lines co-defining images of the first and the last point of the figure $\Phi_i = \Gamma \cap t_i$; more precisely in a detailed drawing the background trace of a plane α_i passing through the first point W_i of the figure Φ_i is located between a background trace of plane β_i and a united projecting of a coincidence trace of planes α_i, β_i,
- when the representation of the object Γ is done using the applied perspective, from a auxiliary projecting of figure Φ_i with the orientation of reference lines between the basic and auxiliary projectings “from the basic line to the horizon line”; more precisely, in the drawing in question, the auxiliary projecting of the first visible point W_i of the figure Φ_i is the first point of the auxiliary projecting of this figure contained in the oriented reference straight line.

The described above method of determining visibility can be applied to axonometric drawings. To do that in this method one needs to treat as an auxiliary projecting the compound effect of the rectangular projecting, e.g. on a plane of axes x, y, and the basic projecting, and orient reference straight lines between the auxiliary and basic projectings in line with the basic projection of the axis z.