DEVELOPMENT of EXPERIMENTAL-GEOMETRICAL of APPROACH FOR MECHANICAL PICTURES of THE STRESS STATE of DETAILS

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***Summary*. The geometrical design of mechanical pictures of the tense state of details is examined on the basis of information, got an experimental polarization-optical method.**

***Keywords:* geometric modeling, image interpolation and extrapolation, the experimental method, the picture of stress state.**

Formulation of the problem. In recent years, it is actual research to develop new approaches to solve the problems of geometrical modeling of objects and processes of different physical nature. The development of such methods applied geometry enables a unified approach to solving problems of synthesis and optimization of geometrical models of various phenomena and processes. This work is devoted to the geometric modeling of mechanical media paintings stress-strain state of parts and assemblies.

It is known that for imaging the distribution of stresses in the mechanics, there are many different experimental techniques, such as polarization-optical method or the method of photoelasticity is a leader. This method is based on the property of most transparent isotropic materials (glass, celluloid, gelatin, plastics) under the action of mechanical load becomes optically anisotropic. The disadvantages of this method is the difficulty of implementing a model of an optically sensitive material, the need for special equipment (polariscope, polarization-projection installations, etc..), And is constantly rising cost of such studies [1].

In turn, the geometric method of image interpolation and extrapolation can quickly process visual information and determine as intermediate and subsequent painting of nature phenomena [2,3].

Therefore, it suggested to combine the experimental polarization-optical method with the geometrical method of image interpolation and extrapolation to obtain pictures of the stress-strain state.

Analysis of recent research. Geometric formulation of the problem of the method of image interpolation and extrapolation is to describe the

contours of the front of the family as a graphic interpretation of phenomena in space and time. In [2-4] considered shaping geometries various processes based on the theory of parallel surfaces. The task of preparing the intermediates and the subsequent phases of the outer contour of the fire [3,4]. However, the inner content of the circuit is not considered.

Formation of the purposes of the article. Based on the existing image stress-strain state of the plate obtained by the experimental polarization-optical methods to simulate the missing paintings stress the geometrical method of image interpolation and extrapolation.

Main part. The developed method of experimental study of geometric models of mechanical stress state of pieces of paintings includes the following sequence of actions [5]:

Step 1. Selection of the research received polarization-optical method, with the following properties:

- The external borders of the circuit does not change and is constant;
- Change in the picture image occurs in the inner region contour.

Step 2: Encoding mechanical image information:

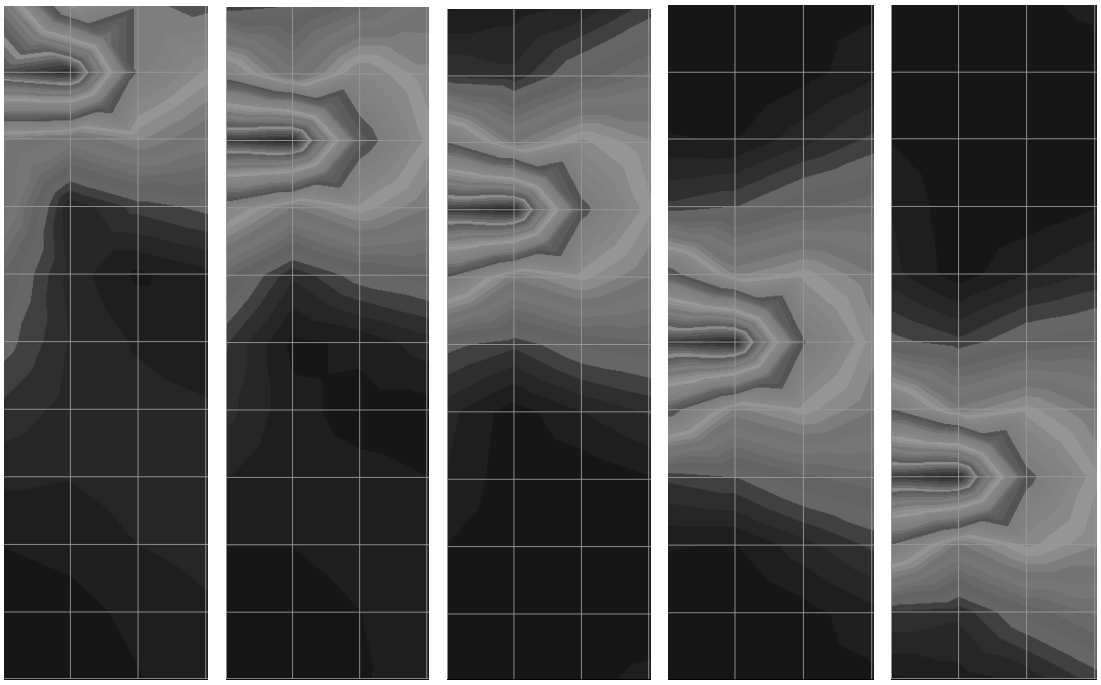
- Cleaning of the image (Photoshop and CorelDraw);
- Digitized paintings intense condition of details (the program g3data);
- Drawing up a single logical circuit using the equation R-functions on the basis of the algorithm Rvachova (Maple).

Step 3: Imaginary interpolation and extrapolation paintings stress state details.

- The preparation of intermediates and subsequent images stressful effects on the basis of extrapolation vector (Maple).

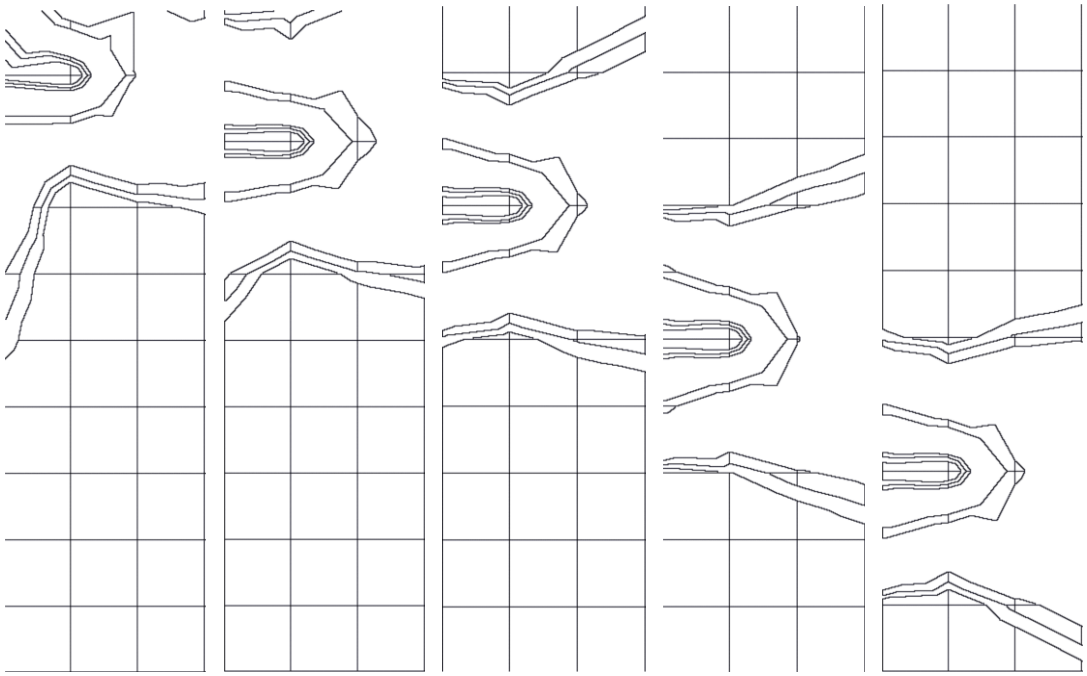
Fig. 1 shows the mechanical circuit received intense polarization optical method. Fig. 2 shows a similar circuit, but after the encoding of the image. Equation (1) reflects the process of extrapolation of vector contours of the stress state of the plate.

$$F_{N+1}(x,y) \equiv F_N(x,y) + (t_{N+1} - t_N)\left(\sum_{i=1}^{N-1} i^k (F_{i+1}(x,y) - F_i(x,y)) \Big/ \sum_{i=1}^{N-1} i^k (t_{i+1} - t_i) \right) = 0 . \quad (1)$$



2 3 4 6 8

Fig. 1. Pictures tense contours plate obtained with polarization-optical method.



2 3 4 6 8

Fig. 2. The image information encoding mechanical plate based on R-functions.

Conclusions. Thus, the development of experimental and geometric approach made it possible to extend the scope of the method of image interpolation and extrapolation, and solve problems of mechanics experimental methods applied geometry.

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