

МАТЕМАТИЧЕСКОЕ И КОМПЬЮТЕРНОЕ МОДЕЛИРОВАНИЕ СИСТЕМ

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MATHEMATICAL MODEL OF THE FLAT PROBLEM OF THE ALLOWANCE DISTRIBUTION

Рассматривается плоская проблема распределения припуска. Предлагается и обсуждается алгоритм компьютерного расчета припуска в условиях поточечного задания контуров заготовки и изделия.

The allowance is the layer of the material $\delta = \delta(c)$ that is removed from the workpiece in the finishing for getting the template (Fig. 1). The allowance distribution is the process of the placing of the template on the workpiece in the best possible way [1, 2].

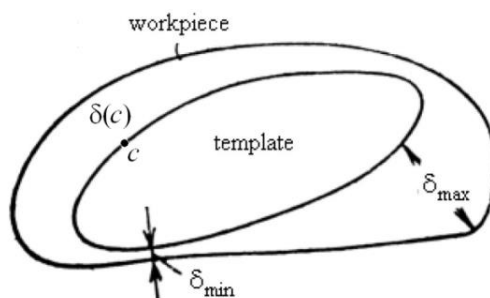


Fig. 1 – The workpiece and the template in the problem of the allowance distribution

The non-uniformity of the allowance can be defined as the following scalar regression function:

$$Q = Q(x, y, \varphi) = \max_c \delta(c, x, y, \varphi) - \min_c \delta(c, x, y, \varphi) = \delta_{\max} - \delta_{\min}, \quad (1)$$

where x is the abscissa, y is the ordinate of the mass center of the template, and φ is the rotation angle of the template relative the axis x . The function (1) is unknown and must be estimated by allowance measurements. The

problem of the optimal allowance distribution consists of minimize the function $Q(x, y, \varphi)$ (1) on the variables x, y, φ .

In the report, the algorithm of the allowance calculation in the case of the pointwise defined outlines of the workpiece and the template is proposed and discussed.

References

1 Rastrigin, L. A. Systems of extremal control / L. A. Rastrigin. – Moscow : Nauka, 1974. – 632 p. In Russian.

2 Lapteva, E. N. Automated system of large-size complex profile hardware allowance distribution technological process control (in screw-propellers manufacture): auto abstract of the thesis to the PhD degree of the technical sciences / E. N. Lapteva. – Moscow : RUDN University, 2004. – 16 p. In Russian.