THE BASIS IS THE BASIC OF A MOBILE INDUSTRIAL ROBOT CHARACTERISTICS AND FORM OF SPATIAL STRUCTURE

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This article examines the geometric characteristic of the working zone of the robot - the size of the working zone of the robot, the cross-sectional surface, linear, angular dimensions or their set, the complexity of the movement of industrial robots.

Keywords; robot, working zone, volume, cross-sectional surface, linear, angular dimensions, base coordinates, executor mechanism, kinematic chain, displacement device.

A number of its characteristics are involved in the process, whether industrial robots are complex in the technological process or in the implementation of a simple spatial manipulation operation. As the main characteristics of industrial robots, the following are obtained:

The working space of the robot is the space that can be located in the motion of the acting mechanism of the robot.

The working zone of the robot is the space that can be located in the movement of the capture device of the robot.

The geometric characteristic of the working zone of the robot is the size of the working zone of the robot, the cross - sectional surface, linear, angular dimensions or their set.

The system of base coordinates of the robot - the coordinate system of the robot in relation to the issuance of geomtric behavioratics of the working zone.

The number of excitable levels of the robot is the set of the number of degrees ERK the kinematic chain of the robot's executor mechanism in relation to the base coordinates and the number of ERK levels of the displacement device.

The degree of mobility of the robot between poses is the degree of mobility of the robot using the moving device or the path traveled by the robot.

The degree of mobility of the acting mechanism of industrial robots is the degree of mobility of the robotic acting mechanism using the displacement of the capture device.

The degree of mobility of the acting mechanism when receiving the target is the degree of mobility of the robotic acting mechanism using the purpose of the capture device.

Industrial robots with zvenos of six or more are considered a complex technical system. Therefore, six or less zvenos on the real construction of industrial robots participate in the technological process. The lower the number of zvenos, the simpler the control of the robot. To industrial robots, which are much simpler, the number of zvenos will be up to three. Given the complexity of the movement of industrial robots, it can be divided into the following types:

- Global-the basis is characteristic of moving robots, and the movement of the robot base increases the space of motion;
- typical of regional-transport robots, the movement of zvenos ensures that the material in the capture device moves point continuously;
- local-the robot delimits the movement of the zvenos, the position directs to increase accuracy,

that is, to correctly pick up the capture device for the target.

Let's determine the mobility, maneuverability, service angle of industrial robots using the example of a three-zvenoli robot. The appearance of the robot is shown in Figure 1.

Combinations are the initials of the Latin alphabet A, V, S, etc.G. is defined by. And the kinematic pair is 0/1, 1/2 and H.G. is described in the form of.

The mobility of industrial robots is equal to the number of uniformly determining variable generalized coordinates of the position of the capture device in space:

$$W = 6n - \sum_{i-1}^{5}(6-i)\cdot p_i .$$

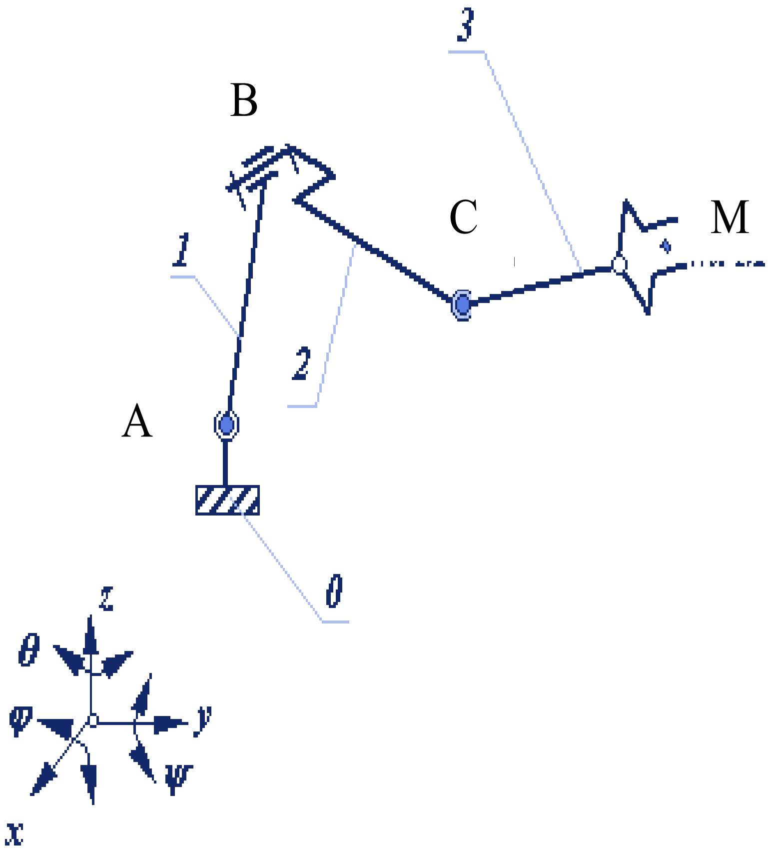

Figure 1. Overview of three series of industrial robots.

The maneuverability of industrial robots while fixing the capture device is as follows:

$M = W - 6.$

In increasing the accuracy of positioning the movement of industrial robots, the concept of service angle is introduced. The service is viewed in three-dimensional space, and the number of degrees erkli can be 6, 7 and more. The reason is that it is necessary not only to lower the capture device to a given point, but also to direct it to the desired point. The service angle is determined as follows: $\psi = \dfrac{f_A}{l_A}$,

here $f_A -$ the final row is the spherical surface surface of the gripping device.

$l_A -$ grip device length.

Relative magnitude $k_\psi = \frac{\psi}{4\pi}$ the service coefficient is called.

Number of mobility of three-row industrial robots
$W = 6 \cdot 3 - (3 \cdot 2 + 5 \cdot 1) = 18 - 11 = 7.$

Maneuverability $M = 7 - 6 = 1.$

Let's assume, $l_1, l_2, l_3 -$ rows length, to be comfortable $l_1 \geq l_2 + l_3$, $l_2 \geq l_3$ let it be. Let the gripping device stand at the point in space.

The maximum distance relative to the base coordinate system of the basis
$|x|_{max} = l_1 + l_2 + l_3.$

While the minimum distance is $|x|_{min} = l_1 - l_2 - l_3.$

As you know, the service coefficient $0 \leq k_\psi \leq 1$ will. To determine the full service zone, work is carried out as follows:

$k\psi = 1$ when the territory:

First territory

$$l_1 + l_2 - l_3 \geq |x| \geq l_1 - l_2 + l_3.$$

Second territory

$$l_1 + l_2 + l_3 \geq |x| \geq l_1 + l_2 - l_3.$$

Comparison for him

$$l_3^2 + |x|^2 - (l_1 + l_2)^2 = 2|x| l_3 \cos\psi.$$

Last night

$$l_1 - l_2 + l_3 \geq |x| \geq l_1 - l_2 - l_3.$$

This is a comparison for the territory

$$l_3^2 + |x|^2 - (l_1 - l_2)^2 = -2|x| l_3 \cos\psi.$$

$$f_A = 2\pi l_3^2 (1 - \cos\psi).$$

Service coefficient for the second period

$$k_\psi = \frac{(l_1 + l_2)^2 - (|x| - l_3)^2}{4|x| l_3}.$$

Service coefficient for the last period

$$k_\psi = \frac{(|x| + l_3)^2 - (l_1 - l_2)^2}{4|x| l_3}.$$

The graph of the service coefficient is given in Figure 2.

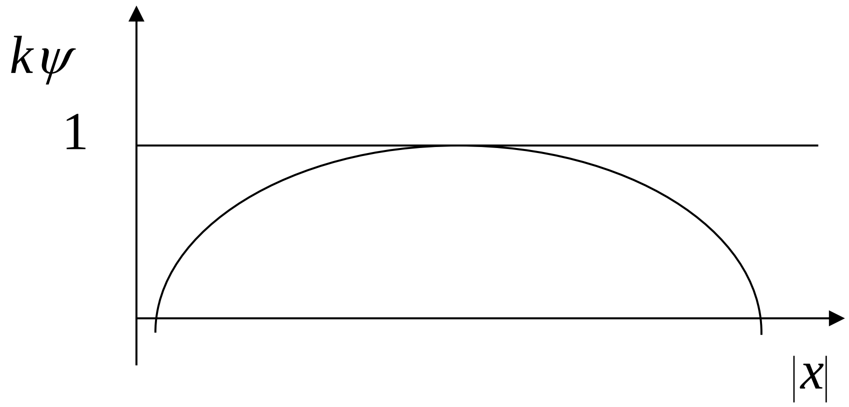

Figure 2. Graph of the service coefficient.

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