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ANALYSIS OF ACCURACY FACTORS OF INDUSTRIAL MANIPULATORS

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Study is focused on accuracy industry sectors applying the manipulators. Some general characteristics needed to be provided in order to improve the quality of production are investigated.

Introduction. The development of human industrial activity implies the continuous improvement of the quality of products. Improving quality, in turn, requires the use of more complex technological operations, building longer technological chains, and improving the quality of the used technological equipment. This trend is visible in such industries as microelectronics and microsurgery. Special attention in such activities is paid to the size of objects with which it is necessary to perform a particular technological operation and the importance of improving the accuracy of this processing. Other global industrial areas, such as engineering and construction, do not stand aside. Although the dimensions of the details are much greater than the crystals of the micro schemes, tolerances for the manufacturing of parts can be comparable with semiconductor equipment. The ability of small tolerances determines the technological equipment for processing, subsequent assembly, and final quality control of the product. These manufacturing requirements strongly affect the final accuracy of the positioning of the working bodies of the actuators. Usage of manipulation robots reduces the risk of manufacturing defects or death in the operating room. This is due to the greater accuracy of robot operations compared to manual processing. However, there remains the prospect of a reduction of the tolerances in processing robots of products. Therefore, a qualitative and quantitative assessment of accuracy criteria that need to be improved, as well as consideration of ways to increase the accuracy of industrial robots, is of scientific interest.

Main part. In this study, the typical designs of manipulators and their applications are investigated, their classification is given. The main characteristics that affect the operation conditions of manipulators and determine the scope of a particular robot are identified. Test methods established for robots to determine their accuracy characteristics are defined. The main indicators characterizing the quality of manufactured products are considered for several industries requiring the largest number of certification tests for robots. Explored modern methods of improving the accuracy characteristics of robots and identified the most effective of them.

Conclusions. Landmarks for improving accuracy of the designed manipulators were identified. The main reasons for the occurrence of positioning errors by manipulators are examined, and possible solutions are investigated.

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