English annotation

INTERCONNECTIONS BETWEEN OF COMPONENTS OF TECHNOLOGICAL INTERACTION OF INDUSTRIAL ROBOTS' GRIPPERS WITH AN OBJECTS OF MANIPYLATION

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The structure and content of technological interaction (TI) of industrial robots' grippers with objects of manipulation (OM) as one of the components of a systematic approach to automated synthesis (AS) of robotic mechanical assembly technologies (RMAT) are reviewed. TI in the context of the AS of RMAT is considered as interaction of industrial robot's (IR) gripper (Gr) with the OM of any physical origination (for example, mechanical contact) and type (for example, supporting, containing Gr) and as the process of their implementation, taking into account technological driven movements of robotic technology kit (RTK) which has a certain kind and technological purpose (content) too.

Thus the tasks of geometric content, as well as the direct and inverse tasks of kinematics and dynamics are solved.

The essence of vector-projective, geometrically-power and trajectory-dynamic tasks of TI as the part of RMAT are described.

The complex of causal relationship between the components of TI are graphically illustrated. Thus each two technology successive working positions (WP) of flexible manufacturing system (FMS) are analyzed. For each of them the set (C) of points of the Gr final pole position are defined when unloading a one WP of the analyzed pair WP and loaded the other of the analyzed pair WR. This so-called linear service options which are within the vector-projection components of TI. For every point C with some discrete is searched the corresponding set of points D.

For each pairs of points C and D of each WP of the analyzed pair WR there are performed the smoothing of the trajectory by means of using the different splines - linear, cubic and Akima spline. This is done for the GR's pole. The next step is the correction of the obtained trajectories for technological robotic kit through the use of heuristic algorithm which was developed for building without collision trajectory spaces. The ultimate trajectory is chosen by the criterion of maximum speed or minimum power consumption. These actions are performed on the parametric and on the criteria level in the implementation of previously proposed the three-level strategy of AS RMAT.

The basis of computational procedures is a function of automated synthesis (FAS) RMAT.

The content and the sequence of automated calculation of TI are presented in the form of developed formalisms that are the interconnections between of components of TI of industrial robots' grippers with an objects of manipulation.

These links are considered and implemented in the software system of AS RMAT that developed in Zhytomyr State Technological University, Ukraine.