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Resource optimization with systemic design of robotized technological equipment

Sergiy Kovalevskyy[1] and Olena Kovalevska[2]
[1]Donbass State Engineering Academy, Ukraine
[2]National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Ukraine

Global economic processes demonstrate a trend in the growth of technological flexibility of production processes. We have shown that the objective function of the implementation of production processes is a synthesis of factors characteristic of robotic innovative production systems. A list of these components is presented, depending on the purpose of innovative systems, such as repair production, robotic production systems in hard-to-reach areas, including marine and ocean areas, systems for ensuring the survival of space settlements with extremely limited resources. We put forward a hypothesis about the consistency of the amount of resources and justified the provision on the development of information resources due to the increase in the level of controllability of energy resources with a reduction in material resources. For this purpose, the use of parallel structure mechanisms and identification models of work areas of robotic technological systems with algorithms of intelligent computation is recommended. A method for optimizing the mechanisms of a parallel structure based on the mathematical apparatus of incidence matrices is proposed. To determine the exact coordinates of their working area in real time, algorithms are proposed based on cascaded neural networks and deep calculations. As diagnostic information sources, it is proposed to use acoustic spectra of natural oscillations of identification objects while minimizing the error of reconstructed spectra. Completion of the developments presented by us for their systemic application and achievement of synergistic effect is the proposal for reconfiguring production systems, which is achieved on the basis of assembling of technological equipment and technological tools in the process of technological preparation of production and at the end of manufacturing of products - their dismantling for the next production cycle.

kovalevskii@i.ua

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