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PhD Thesis:
Method for Energy Intensity Analysis of Manipulation and Transportation Processes

Abstract

This paper presents the methodology of analysing energy consumption in manipulation and transportation systems. Using this developed method, the energy intensity of all factors having influence on the energy consumption in the electric drives of the investigated machine are determined. The results of the performed analysis are the basis for determining strategies for reducing electrical energy consumption. The procedure of the analysis – and the generation of its results – has been performed in such a way, that the selection of the proper activities is made methodologically, in accordance with the adopted strategy. For the purposes of verifying the developed technique, the industrial robot has been chosen as the research plant and, subsequently, its numerical and analytical model, with its control system, has been developed. By the use of the developed model, the numerical research of the energy intensity of the selected process has been performed. Based on the obtained results and the developed methodology, the rudimental activities were selected, used for determining the energy-efficient form of the machine's work. The obtained results have been verified by the practical research.