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THE STRUCTURAL SYNTHESIS OF ELEKTROHYDRAULIC MECHATRONIC MODULES BASED ON ASSIGNMENT PROBLEM

Mechatronic devices, which integrate electric, electronic, hydraulic units and sensors in one construction module for performing precise linear or rotary motions, are important parts of military and civil equipment.

Designing process of mechatronic electrohydraulic modules, as with any process of machine building designing, have two main parts: structural synthesis and parametric synthesis plus optimisation. Problems of parametric synthesis and parametric optimisation of machines and mechanisms were researched and resolved in many directions. Structural synthesis of engineering systems is the most difficult problem which usually can't solved without human creativity. This fact can be explained by dificaltyes of formalisation problems of structural syntesys. But a lot of subsidiary instruments of structural synthesis are created now, such as graphs and bond graphs theory, genetic programing etc. Listed methods are used for structural synthesis of hydroulic, electrohydraulic and pneumatic systems.

Assignment problems are used widely for resolving economic, logistical and military applications, but capabilities of this problems for engineering are insufficiently studied.

The report present approaches for using assignment problem for structural synthesis mechatronic modules. The process of structural synthesis begins with creation of table which consist desirable functions of mechatronic modules and proposed electric, electronic, hydraulic units and sensors for performing this functions. The facts of using or not using this elements for provision desirable functions are instrumental binary variables. Optimality criterion there can be cost of mechatronic module, its quality and other criterions.