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QUALITY ASSESSMENT OF FORCE TRANSMISSION IN COMPLEX MECHANISMS USING THE STRUCTURAL GROUPS METHOD

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Abstract

The quality of force transmission in mechanisms is a fundamental chapter in the design of any type of mechanism and mainly consists in establishing numerical indices for the quantitative evaluation of the quality of force transmission in mechanisms. In the purpose to develop the scientific idea of the paper, it has been chosen a mechanism equipping an automatic line or a robotized system from a various applications series (food industry, agriculture, forestry, services etc.), wherever a transportation system is required to serve an automatic process. The advantages of using these mechanisms are significant in two directions: productivity and efficiency increasing and environment preserving. The results of such research have an impact on the energy efficiency of mechanisms, on improving their practical application quality by reducing the effects of forces (noise, vibrations, shocks), and on enhancing the safety of individuals as well as the environment where these mechanisms operate. The paper deals with complex mechanisms from the perspective of force transmission, using a specific mechanism as an example. For this purpose, the structural groups procedure is used, which has been performed by the authors in a series of previous papers. It concludes that the diagram showing the evolution of force transmission indices, associated with the structural groups of the mechanism, properly reflects its behavior. This diagram illustrates how the designer can intervene to ensure favorable operation. The analyzed mechanism also includes a 033-type structural group, which is the most complex of the usual planar groups. In relation to this group, the paper presents two applications of digital graphics that complement the analytical solutions for better understanding the problem.

Key words: complex mechanism, force transmission, quality

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