Structural Synthesis and Enumeration of Epicyclic Gear Mechanisms Up To 12-Links Using Acyclic Graph Method

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Abstract

In this paper, a new approach for graphical enumeration of epicyclic gear mechanisms is presented using the concept of acyclic graph. A new graphical code has been introduced to specify the priorities of all vertices of associated displacement graph. This graphical code is used to identify open graph, redundant links and isomorphic graphs. A computer program has been developed for automatic enumeration of displacement graphs as well as automatic detection of isomorphic graphs and open graphs and graphs with a redundant link without using adjacency matrices. This simplified methodology has been applied for the enumeration of epicyclic gear mechanisms with up to 12-links having up to 9 coaxial links. An atlas for 11 and 12-link mechanisms has been constructed using the proposed methodology.

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