Complete Atlas For Mechanically Constrained Double 3R Chains

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Abstract

In this paper, a new methodology is applied to a mechanically constrain planar parallel robot formed by double 3R chains. This will transform the considered system to 8-bar mechanism. Graphical technique is introduced to enumerate all possible graphs. Then a new structural code is used to detect isomorphism and locked chains. Finally, reverse transformation is applied to construct 8-bar linkages from their corresponding graphs. As a result, a new complete atlas for 8-bar linkages is introduced for the first time, which consists of 39 linkages for independent link connections and 30 linkages for dependent link connections. Two, three and four fixed pivots are included in the proposed atlas. All enumerated linkages are compared with their corresponding kinematic chains introduced by Tsai.

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