# STRUCTURAL SYNTHESIS AND MODELING OF KINEMATIC CHAINS AND MECHANISMS

## SYNOPSISIS OF THE THESIS

Development of the methods for generating distinct mechanisms derived from a given family of the kinematic chains has been persuaded by a number of researchers in the past as the distinct kinematic structures provide distinct performance characteristics. A new method is proposed to identify the distinct mechanisms derived from a given kinematic chain in the thesis. The kinematic chains and their derived mechanisms are represented in the form of an extended adjacency matrix [EA] using graph theoretic approach. Two structural invariants derived from the eigen spectrum of the [EA] matrix are the sum of absolute eigen values EAΣ and maximum absolute eigen value EAmax. These invariants are used as the composite identification number of a kinematic chain and mechanism and are tested to identify the all-distinct mechanisms derived from the family of 1-F kinematic chains up to 10 links. The identification of distinct kinematic chains and their mechanisms is necessary to select the best possible mechanism for the specified task at the conceptual stage of design.

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