

Singularity analysis of planar 8-bar lever mechanism using screw theory

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Abstract: As a complexity of robotic application increases, new demands for lighter and quicker mechanism arise. The planar 8-bar lever mechanism under consideration can be viewed as one alternative solution to conventional mechanisms. Singularities are critical configurations in which a mechanism (it does not matter either a planar or spatial mechanism) loses its stiffness and gains or loses some degree of freedom (DOF). These configurations can be found using analytical, numerical or geometrical approaches. Most research works are focused on parallel manipulators, although it is important for planar mechanisms especially for multi-bar linkages because of their complex structure. In this paper we have described the novel approach to identifying the singularities of the planar 8-bar lever mechanism based on the inverse matrix of the Plucker coordinates of mechanism's joints.

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