

Dynamic analysis of six-bar mechanical using MATLAB

ABSTRACT

Linkages are perhaps the most fundamental class of machines that humans employ to turn thought into action. From the first lever and fulcrum, to the most complex shutter mechanism, linkages translate one type of motion into another. When a 4-bar linkage cannot create required motions, one typically resorts to a 6-bar linkage. Within most 6-bar linkages, one can find what is essentially an input stage and out output stage; thus, the simple linear input becomes a complex input to the second stage thereby producing an even more interesting output. This paper analyses the dynamical behaviour of a six-bar linkage used in mechanical presses for metal forming such as deep drawing. The motion of the six-bar linkage is studied by kinematic analysis developing an analytical method. Furthermore, using an iterative method and Newton's principle, the joint forces and drive moment are evaluated considering joint frictions. Mechanism includes both rotational and sliding joints. The simulation results obtained with a MATLAB program are validated by comparing the theoretical values of the input moment with the ones obtained from the conservation of energy law.

Keywords: 6-bar linkage, mechanism, MATLAB