

Abstract

In the present study, Gough-Stewart Manipulator is adopted which is considered the famous type of the parallel robots whereas this type of robot has many applications in different branches, such as in flight simulation, manufacturing process and in the medical surgery.

The setup of this kind of robot consists of upper plate moving platform, lower plate fixed platform and six extensible legs with six sliding prismatic joints. There are six universal joints that connect the lower part of the legs with fixed platform and six spherical joints that connect the upper part of the legs with the moving platform.

In the present work, it is focused on the effect of the frictional forces and moments that generated in all robot joints on the dynamic analysis of the robot where it was used mathematical model contains two types of friction i.e.(Coulomb and viscous friction) and through this work, it is taken into account the study of kinematics analysis (inverse kinematics and forward kinematics) to evaluate the robot lengths and the position and the orientation of the moving platform and it has been derived a mathematical modeling to evaluate the reaction forces that developed in all the robot joints.

The principle of the virtual work is applied to evaluate the forces that generated by the actuators in two cases i.e.(with and without friction) and it found that from the results that the values of the actuators forces in presence of friction is more about (20%) than without friction.

MATLAB software is used for programing the equations and getting the results.