J Aeronaut Aerospace Eng 2018, Volume 7
DOI: 10.4172/2168-9792-C3-029

6th International Conference and Exhibition on
Mechanical & Aerospace Engineering
November 07-08, 2018 | Atlanta, USA

Dynamic analysis of electrohydraulic cable driven parallel robots

Zemichael Amare
Hefei University of Technology, China

Dynamic analysis is required for achieving higher efficiency of Cable Driven Parallel Robots (CDPRs). This paper presents the dynamic analysis of the CDPRs using the Lagrange's method, taking cable's mass and elasticity into account. The Lagrange's equations of motion are derived and evaluated for the generalized coordinates of the system. The dynamic motion of the parallel robot is expressed by the generalized forces and generalized coordinates to completely specify the configuration of the whole mechanical system as well as every component of the system. The cables are modeled to control and design the motion of each part of the rigid body. The elasticity is determined using the optimal cable's tensions and lengths. Numerical simulations are performed to obtain the dynamic motion of the CDPRs. The effect of cable's mass on the elasticity of the cable is also investigated. These examples illustrate that the general motion of the rigid body is superior described in terms of a set of independent coordinates. The results indicate that a better speed of the end-effector can be achieved by adding the linear and rotational motions of the electrohydraulic cylinder actuators into the traditional CDPRs.

zechea@yahoo.com

Notes: