World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

Two Spherical Three Degrees of Freedom Parallel Robots 3-RCC and 3-RRS Static Analysis

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Abstract : The main purpose of this study is static analysis of two three-degree of freedom parallel mechanisms: 3-RCC and 3-RRS. Geometry of these mechanisms is expressed and static equilibrium equations are derived for the whole chains. For these mechanisms due to the equal number of equations and unknowns, the solution is as same as 3-RCC mechanism. Mathematical software is used to solve the equations. In order to prove the results obtained from solving the equations of mechanisms, their CAD model has been simulated and their static is analysed in ADAMS software. Due to symmetrical geometry of the mechanisms, the force and external torque acting on the end-effecter have been considered asymmetric to prove the generality of the solution method. Finally, the results of both softwares, for both mechanisms are extracted and compared as graphs. The good achieved comparison between the results indicates the accuracy of the analysis.

Keywords : robotic, static analysis, 3-RCC, 3-RRS
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020

Open Science Index, Mathematical and Computational Sciences Vol:14, No:12, 2020 publications.waset.org/abstracts/24128/pdf