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ATTITUDE CONTROL AND VIBRATION SUPPRESSION OF SPACECRAFT WITH NOVEL CMG  
BASED MECHANISM ACTUATORS**Abstract**

CMG-based mechanism actuators are superior actuators for agile maneuvering, and mission needs high precision. High torque amplitude and angular momentum capacity are the main features of CMGBM actuators compared to other actuators. There are two different types of CMGBM actuators on the bearing of the rotor. The first one is the conventional type with the mechanical bearing, and the second type is high technology with magnetic bearing. The Novel type of CMGBM has several advantages like frictionless, high-speed rotor, clean environment, long lifetime, and low vibration compared to mechanical type. This paper analysis novel CMGBM actuators consists of the 3D magnetically suspended wheel, magnetically suspended CMG, and reaction sphere actuators for maneuvering and vibration suspension of agile spacecraft. A comparative study between these actuators is performed based on the attitude control simulation of spacecraft. The performance of maneuvers, agility, accuracy, and vibration suppression have been compared.