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Flywheel Energy Storage Control Using SVPWM for Small Satellites Application

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Abstract : Searching for high power conversion efficiency and long lifetime are important goals when designing a power supply subsystem for satellite applications. To fulfill these goals, this paper presents a power supply subsystem for small satellites in which flywheel energy storage system is used as a secondary power source instead of chemical battery. In this paper, the model of flywheel energy storage system is introduced; a DC bus regulation control algorithm for charging and discharging of flywheel based on space vector pulse width modulation technique and motor current control is also introduced. Simulation results showed the operation of the flywheel for charging and discharging mode during illumination and shadowed period. The advantages of the proposed system are confirmed by the simulation results of the power supply system.

Keywords : small-satellites, flywheel energy storage system, space vector pulse width modulation, power conversion
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