

# **Project Report on** **Flywheel Energy Storage System with Magnetic Levitation Bearing**

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**Major project report submitted for the partial fulfillment of the requirement for the  
VIII semester B.E Mechanical Engineering**



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## ABSTRACT

A Flywheel Energy Storage System (FESS) uses a high speed spinning mass (rotor) to store kinetic energy. The energy is input or output by a dual-direction motor/generator. To maintain it at a high efficiency, the flywheel works with Permanent Magnetic Bearings (PMB). Permanent magnetic bearings utilize magnetic force to support rotor's rotating shaft without mechanical friction. It also makes the rotor more dynamically controllable.

A prototype of FESS with PMBs was developed. Dynamical model is obtained and analyzed for the rotor-bearing system. PMB's parameters are obtained by parameter identification, influence of the magnetic force on the nutation and procession of the flywheel rotor. Experiment has been undertaken. The flywheel has steadily past through its flexible critical speed and reached to the rotating speed of 800RPM. Energy stored in flywheel is (as per theory) 0.7859J. Discharge duration is around 3minutes.