SRI RAMAKRISHNA INSTITUTE OF TECHNOLOGY

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FOUR QUADRANT OPERATION AND SPEED CONTROL OF BLDC MOTOR FOR AN AUTOMOTIVE APPLICATION

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SYNOPSIS

Brushless Direct Current (BLDC) Motors are gaining higher priority in industrial automation, computers, aerospace, military, household appliances and traction applications because of their high efficiency, high power density and low maintenance cost. This makes the control of a BLDC motor in all four quadrants very vital. To control a BLDC drive, it is generally required to measure the speed and position of rotor by using the hall sensors. In this project, an attempt is made to study the four quadrant operation of a BLDC motor in a real time automotive application. BLDC Motors are being used in electric vehicles due to their high efficiency and robustness. In this project, an emphasis is also made on the regenerative braking operation in such applications. BLDC motor requires a complex control to cope with the reversal of energy flow during transition from motoring to regenerative braking and this braking operation can be enhanced using a flywheel mechanism. This would conserve more energy that could be fed back to a battery storage system. This energy can further be used in an electric vehicle during the failure of the main supply, thus extending the driving range of the vehicle. Further, speed control based on user inputs is another aspect of the project which is implemented using the feedback from a simple IR sensor module.