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## Abstract:

DC motors are exceptionally eminent in various applications where speed is the foremost aspect such as industrial applications, robot manipulators and home appliances. The supreme advantage of dc motors is having the control over speed. For a DC motor, there are many systems to signify the machine behavior with good accuracy. In order to maximize the efficiency of the DC motor with an appreciable speed control, it is essential to trail the optimized field current for various operating point with the help of a field controller. This paper contains the proposal of designing a speed controller named Multi Input and Multi Output Optimal Regulator, which holds better performance, zero overshooting and reduced steady state error forth. The paper also deals with efficiency maximization overture for DC motor. State space model of DC motor is constructed, which in turn used for designing the proposed controller. Using the MATLAB/SIMULINK contrivance, all the simulations are verified and this puts into evidence that the proposed controller is simple, reliable and robust.

**Keywords:** Separately Excited DC Motor, Speed Control, Field Current Control, Optimal Regulator, Efficiency Maximization.