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DC Drive Electric Car Utilizing Series Motor and Four Quadrants Drive DC Chopper Parameter Determination from General Design Requirements

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Abstract:

The general requirement of a DC drive electric car (EC) is to carry a maximum load of 850–1300 kg. The expected maximum speed of the EC is about 110–120 km/h, and the acceleration is for 60 km/h in less than 10 s. This paper is to study how to determine specific requirements such as motor kilowatt power, gear ratio, maximum motor torque, battery voltage, maximum current, etc. The DC drive an electric car (EC) using a series motor and four quadrants DC chopper (FQDC) to meet the earlier mentioned general requirements. A vehicle dynamic mathematical equation has been used to assist in finding the parameters. A simulation model of this vehicle dynamics equation using MATLAB/Simulink software is developed to study, investigate, and obtain the specific requirements earlier mentioned. Once the specific parameters have been determining, it is tested with the complete electric vehicle model to test the conditions. It concluded that the design requirements parameters and

the FQDC could represent using a vehicle dynamics mathematical model, and it can perform all requirements for the DC drive EC.