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Gradient Descend for Setting Up a Look-Up Table of Series Motor Four Quadrants Drive DC Chopper in Parallel Mode

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Abstract:

A series motor has two weaknesses which are overrun when running under load or the drastic speed drop when loaded. The parallel mode allows the series motor to overcome the condition motor speed drop when loaded. For maintaining the torque at its optimum, the field current needs to be controlled. This paper describes the gradient descend method to set up the look-up table of the DC series motor field current for the operation in parallel mode of a new series motor four quadrants DC chopper used for electric car (EC) traction. Matlab/Simulink software is used to test the FQDC chopper and the control algorithm. The result indicates that the gradient descend method is capable of finding the optimum field current to produce the look-up table for parallel mode operation. Matlab/Simulink is also used to establish the system under study, and the results indicate that the proposed gradient descend technique is capable for setting up the look-up table.