

Embedded Runge-Kutta Methods for the Numerical Solution of an Integrated Model Including Converter, Nonlinear Inductance and Current Control Loop

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Abstract

This paper discusses the use of Embedded Runge-Kutta Methods for the time-domain simulation of a model of a converter connected to a nonlinear inductor. A pulse-width modulation (PWM) current controller is considered. Features of embedded Runge-Kutta methods for the numerical solution of this model are discussed. It is shown that step size control and the use of interpolators can lead to savings in computational time compared to a traditional one-step β -scheme. Practical results include the simulation of a single-phase PWM current-control of a switched reluctance motor.