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Analysis of Brushless DC Motor with Trapezoidal Back EMF Using Matlab

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Abstract : The dynamic characteristics such as speed and torque as well as voltages and currents of pwm brushless DC motor inverter are analyzed with a MATLAB model. The contribution of external load torque and friction torque is monitored. The switching function technique is adopted for the current control of the embedded three phase inverter that drives the brushless DC motor.In switching functions the power conversions circuits can be modeled according to their functions rather than circuit topologies. Therefore, it can achieve simplification of the overall power conversion functions. The trapezoidal type (back emf) is used in the model as ithas lower switching loss compared with sinusoidal type (back emf). Results show reliable time analysis for speed, torque, phase and line voltages and currents and the effect of current commutation is clearly observed.

Keywords : BLDC motor, brushless dc motors, pwm inverter, DC motor control, trapezoidal back emf, ripple torque in brushless DC motor
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