Optimization of Interval Time of Two Stage Commutation Method for the Reduction of Vibration and Acoustic Noise in SR Motors

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Abstract: This paper describes an investigation into the limitation and improvement of the two-stage commutation method to minimize stator vibration and acoustic noise in SRM. The study shows the interval time between two stages of commutation process should be optimized to reduce the stator vibration more effectively without affecting the performance of the SRD. Several particular principles for optimization of interval time of two-stage commutation method for restrain overall vibration in SRM are outlined. Experimental results based on a laboratory prototype demonstrate the effectiveness of the proposed principles. Index Terms: Switched reluctance motor, optimization, vibration, mode shape, resonant frequency