Thrust Ripple Reduction of Linear Induction Motor with Direct Torque Control

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Abstract— This paper expresses a proposal of control method to reduce thrust ripple of linear induction motors (LIMs). Today, LIMs spread out in the field of transportation and an industrial field. For instance, they are used for a subway and a propulsive engine of an elevator. High efficiency control is demanded from these fields. An application of vector control in consideration of aspect asymmetry has been suggested. Vector control is originally complicated, and there are much adjustment points of parameters. In LIMs, a trigonometric function of $2\theta$ is left during a coefficient line of an equation of state on a movement axis. As a result, vector control of LIM has a more complicated control system than induction motor. So this study simplifies a control system by applying the direct torque control (DTC) and reduces the thrust ripple. Though, the basic DTC decides a voltage vector with hysteresis comparator, and ripple appears. This paper expresses a proposal of control method to reduce thrust ripple of LIMs, and this control method adopts the DTC having PI controllers.