INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: A Numerical and Experimental Investigation of the Mitigation of Unbalanced Magnetic Pull in a Bridge Configured Induction Machine

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SHORT ABSTRACT

An eccentric rotor position produces unbalance in the field and generates a net radial force called unbalance magnetic pull (UMP). The magnitude and direction of this UMP mainly depends on the degree and type of the eccentricity. This UMP can severely degrade the performance of the machine, causing noises and vibrations. A built-in force actuator has been used to generate an additional force on the rotor for controlling the vibrations. The present work proposes a specialized winding scheme called Bridge-Configured Winding (BCW) which is a single set of winding which can be able eliminates the drawback of the dual set of winding. The main objective of this present work is to develop an experimental rig set up for an active vibration control in a three phase, four pole induction machine. The UMP occurs in the induction machine mainly due to the distortion in the air gap magnetic field. So, it is important to maintain the uniform flux density distribution in the air gap.

- In order to achieve this, a bridge configured stator winding has been incorporated in a 37 kW three phase induction machine. This special kind of bridge configured stator winding provides an external, isolated power source apart from the main supply source which will be able to mitigate the UMP. This work aims to control the rotor vibration passively as well as actively.
- To demonstrate the active vibration control of the rotor, a controller has been developed. The controller can provide the three phase isolated power supply to the system as an external source. The experimental results will be compared with the numerical results.