

# **A LATERAL ROTOR DYNAMIC CALCULATION METHOD FOR ASYNCHRONOUS MACHINES CONSIDERING ELECTROMAGNETIC FORCES BY ANALYZING THE CALCULATED ROTOR ORBIT**

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## **ABSTRACT**

In asynchronous motors several kinds of excitations exist, that cause vibrations. In addition to the mechanical excitations, such as unbalance, there are also occur electromagnetic forces, caused by rotor eccentricities, which cause vibrations. This paper focuses on the influence of electromagnetic forces on the shaft vibrations in asynchronous machines. The coherence between magnetic forces and the orbit of the rotor is shown. Therefore a theoretical method is presented, which describes the influence of the orbit on the damping of the eccentric magnetic fields in the air gap and therefore the influence on the magnetic forces. Based on the theoretical results a practicable method is shown, how to calculate natural rotor frequencies, the limit of rotor stability and forced vibrations in respect of electromagnetic forces in an asynchronous machine by analyzing the calculated rotor orbit.

**Keywords:** Rotor dynamic, shaft vibrations, asynchronous machine, magnetic pull, rotor eccentricity