



Identifiant de la contribution : 208

Type : non spécifié

”DYN1#3 - Numerical analysis of the dynamic behavior of rotor shafts in permanent magnet synchronous machines”

mardi 11 juillet 2023 14:40 (20)

In order to design permanent magnets synchronous machines as quiet as possible, we propose a predictive magneto-mechanical vibration model. This model allows for describing the dynamics of the system under operating conditions by including a strong magneto-mechanical coupling between the electromagnetic forces and the dynamics of the motor shaft. The Maxwell pressures are calculated analytically using the subdomain method, while the rotor dynamics are based on a 1D beam model. The coupling between these two physical phenomena is solved using time integration. This numerical study aims first at highlighting the strong coupling regimes and their influence on the harmonic content of the displacement. The second objective is concerned with the study of the influence of static eccentricity on the spectral content of the dynamic response.

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Classification par session : Survishno 4 / Dynamic modelling 1