ESI Group
Symbiose 2
10, avenue Aristide Briand
92220 Bagneux
France

T. +33 (0)1 41 73 58 00
F. +33 (0)1 46 87 72 02

info@esi-group.com
esi-group.com

Electromagnetic and NVH Analysis of PMSM with Eccentricity and Rotor Magnetization Variations

Abstract:
Among the most promising motors in electric vehicles, is one can mention permanent magnet synchronous motors due to their high torque density and efficiency. The presented paper is devoted to detailed electromagnetic investigations of permanent magnet synchronous motor (PMSM), accounting for specific rotor eccentricity and uneven magnetization impacts. That is why the series of simulations are performed in 90 HP interior PMSM to investigate the impact of the variation of radial force regarding healthy, static, dynamic, and mixed eccentricities. Besides, the influence of uneven magnetization due to manufacturing, demagnetization, and magnet deterioration is discussed. The following sections then describe noise, vibration, and harshness (NVH) and sound power analysis, along with collaborative work, focusing on PMSM behavior subject to different operating conditions.

Speakers:
- **Sumeet Singh, PhD EM Works, Canada**
- **Rabah Hadjit, PhD ESI Group, USA**
- **Mario Felice, virsolTech Engineering Consulting, USA**