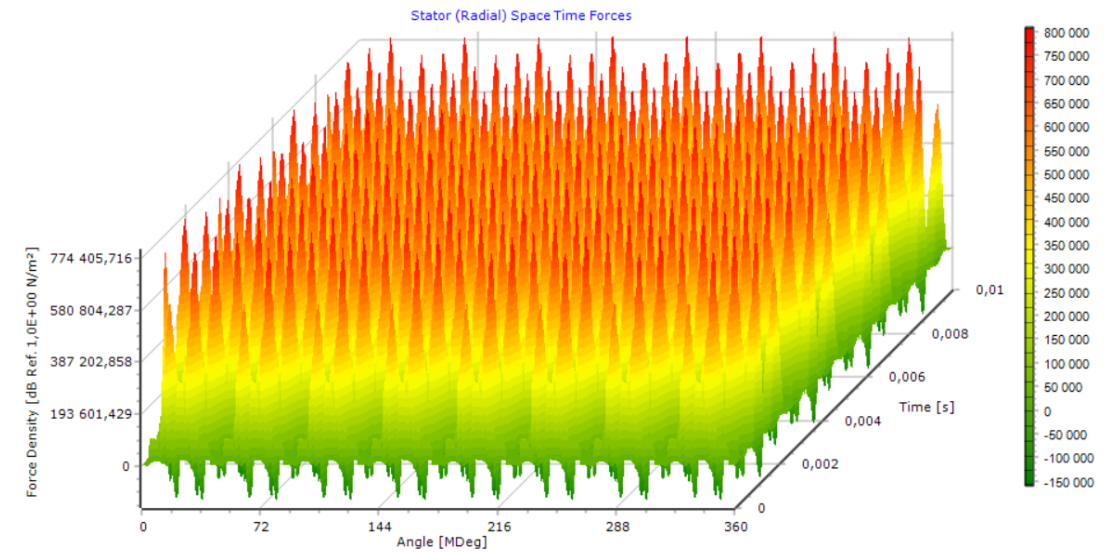
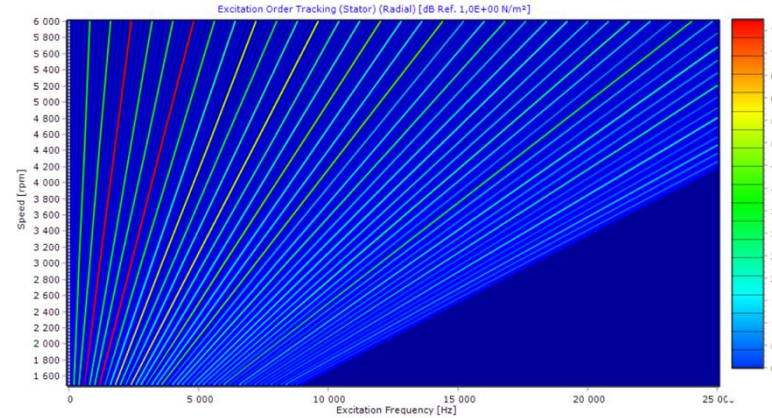
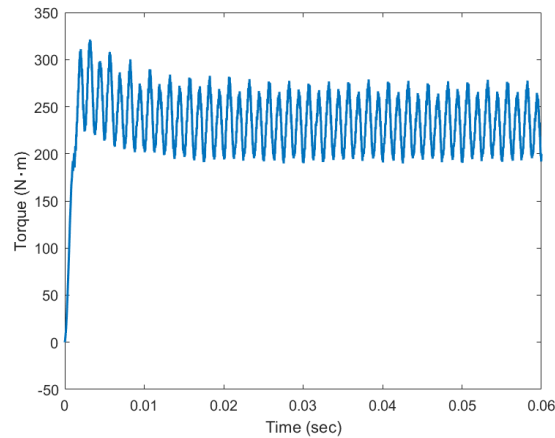


Modelling and control of a PMSM accounting for 'positions harmonics'



Background:

'Position harmonics' which cause ripple and noise, are neglected in conventional PMSM control structures. At low speed there is a possibility for reducing these effects by injecting harmonics instead of skewing which will reduce the performance. However, in an early stage, a fast and accurate model is under investigation to replace the time-consuming simulation using switched voltage patterns. Finally, increase the torque by using overmodulation schemes, however, the expense of the ripple and noise need to be considered.

The Goal of the Project:

- Model an electrical machine with position harmonics using a circuit based model and look-up tables.
- Mitigate torque ripple as well as sound-producing tooth forces using harmonic current injection, and determine the consequence on loss and space harmonics when utilizing harmonic current injection as well as overmodulation
- Verify the theory results in a measurement rig
- Increase knowledge at both the academic as well as industrial partners
- Increase the cooperation between Chalmers, Alstom, Volvo Cars, Aurobay
- Bringing a PhD student to the doctoral degree