PhD subject	Advanced fault tolerant Field Oriented Control of dual three-phase PMSM drives with harmonic suppression for high reliability applications
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Areas of expertise	Electrical engineering, Control theory
Summary	Multiphase machines have gained special relevance in recent times for their use in applications where reliability and power segmentation are the main interest. This thesis focuses on the modelling and the development of control techniques of the dual-three phase synchronous machine, in normal and degraded mode. The study revolves first around a significant adverse phenomenon, which is the emergence of unwanted current harmonics when powered by voltage source inverters. Mathematical modeling of the electrical machine allows us to precisely explain the origin of these currents, in order to seek solutions to minimize their amplitude via inverter control strategies. The work focuses also on safety via the development of fault tolerant control methods. The study addresses the challenges posed by system faults – such as open-phase, short-circuit, and sensor failures- by proposing fault diagnosis mechanisms and reconfiguration techniques to ensure continued and safe machine operation. All the developed strategies are validated by simulation and through a real time implementation on an experimental test bench.