



**UNSW**  
SYDNEY

# Removing the Need for Sensors in Permanent-Magnet Synchronous Machines

**The sensorless control of permanent-magnet machines over their full speed range, including zero speed.**

## Competitive advantage

- Several state-of-the-art techniques that are leading contributors to the sensorless control of permanent-magnet synchronous motors (PMSM)
- Recent perfection of a new current derivative-based sensorless-control technique for the PMSM
- The first to develop a fast, online technique for estimating all electrical parameters of the PMSM, paving the way for monitoring the health of permanent magnets in the rotor of the machine, without requiring any sensors in the rotor

## Impact

- Many modern electric drives require sensorless drive capability in order to avoid using any sensor in the rotor and to improve the reliability of the drive. The estimation of the rotor position and speed without using shaft sensors saves cost and improves the reliability of variable-speed drive systems

## Successful applications

- Sensorless control techniques from zero to full speed for PM motor drives
- Development of PWM-based sensorless control and high-speed Interior PM machines

## Capabilities and facilities

- Simulation platforms (Matlab-Simulink, PSIM), FPGA and DSP systems with high-performance signal acquisition, estimation and switch gate-drive interfaces
- Several machine drive se

## More Information

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