PM DM
MinebeaMitsumi Group

Bachelor and master theses topics for TUKE

MinebeaMitsumi
Passion to Create Value through Difference

Drive topics

1. Development of PMSM FOC based drive control unit/electronics capable of:
   - S1, S2, S3, S10 modes (extendable to others according to EN60034-1)
   - speed regulation, torque control, position control
   - Bus communication (Bus type will be provided by PMDM) for slave or P2P master/slave
   - embedded programming using C language
   - can be setup as a collaborative task
2. Multi-axis (multi-drive) system with central control unit
   - *requires results from the topic 1*
   - bus master functionality for internal motor network combined with slave node function towards external network
   - Multi-drive motion control
   - Multi-drive motion programming within the central control unit
   - embedded programming using C language
   - can be setup as a collaborative task

Test topics

3. Automated EMC testing concept
   - flowchart based test procedure input (i.e. using standard test blocks out of the test library)
   - automated test bench with changeable test setup
   - monitoring and logging of the results, upload into the database system
   - programming using scripting languages or NI LabView
   - can be setup as a collaborative task
4. Agile development in the multi-project test management
   - selection of the best suitable existing method (e.g. DSDM, Scrum, CCXP et cetera) for multi-project test management in the agile development
   - description of the proposed testing process including task planning, prioritising, progress control and task reporting
   - test run of the proposed method within the collaborative team
   - can be setup as a collaborative task

HW&SW topics

5. motor EMC vs commutation type effects analysis
   - comparison of the different commutation types regarding the best EMC result
   - current flank shapes testing and systematic effects analysis on EMC
   - influence of variable carrier/commutation frequency on EMC, applying frequency sweeping to the current
   - summarising and building of dependencies
6. motor acoustics vs commutation type effects analysis
   - comparison of the different commutation types regarding the best acoustic result (lowest possible noise)
   - current flank shapes testing and systematic effects analysis on acoustics
   - influence of variable carrier/commutation frequency on acoustics, applying frequency sweeping to the current
   - summarising and building of dependencies

PM DM
MinebeaMitsumi Group

Thank you !

MinebeaMitsumi
Passion to Create Value through Difference