Call for Papers

IEEE Journal of Emerging and Selected Topics in Power Electronics

Special Issue on Integrated Control and Modulation for Electric Drives

Scheduled Publication Time: June 2022

Green energies and electric mobility are considered exciting solutions to help reduce the emissions of greenhouse gases into the atmosphere. This scenario has significantly promoted the use of electric drives, and as a consequence, higher technical requirements are assumed as mandatory. Focusing on the required high-performance electric drives, the direct control of power converters and the use of integrated modulators, namely, control techniques that avoid the pulse-width modulation stage, can be considered an attractive alternative to the conventional linear controllers. For example, Model Predictive Control (MPC) presents inherent flexibility in the definition of control objectives, while Direct Torque Control (DTC) provides a fast dynamic response. Unfortunately, unacceptable harmonic distortion can appear in the system if single control action is applied per control cycle. This scenario promotes a higher current ripple in three-phase electric drives when a control scheme using a standard integrated modulator is implemented. The situation is even worse when multiphase drives are used since several orthogonal subspaces need to be regulated with a single control action. In addition, the characteristic low value of the equivalent impedance of the secondary subspaces may lead to enormous harmonic currents. With the previous scenario in mind, although the dynamic response is very fast in direct controllers (control scheme based on integrated modulators), these control strategies could be discarded due to their high harmonic distortion. Fortunately, the abovementioned disadvantage of direct control strategies can be mitigated by using enhanced integrated modulators, for example, using multi-vector solutions as control actions. On the other hand, as these control techniques' performance is founded on the nature of the available voltage vectors, the use of some specific electric drives, such as symmetrical six-phase machines, can allow taking advantage of their desirable skills.

This special issue will present and encourage the dissemination of new research achievements within the scope of design and experimental testing of new modulation strategies for direct controllers applied to power electronic converters in electric motor drive systems. Computer/HIL simulation results will be also welcome, but experimental validation is mandatory. Topics of interest of this special issue may include:

- Modulation strategies for the direct controllers in electric drive systems.
- Theoretical study of voltage vector production in power electronic converters.
- Application of direct control in power electronic converters
- Comparison of MPC with other direct control techniques
- Design of direct controls for different electric machines topologies.

All manuscripts must be submitted through Manuscript Central at http://mc.manuscriptcentral.com/jestpe-ieee. Submissions must be clearly marked "**Special Issue on Integrated Control and Modulation for Electric Drives**" on the cover page. When uploading your paper, please select your manuscript type "Special Issue." Refer to http://www.pels.org for general information about electronic submission through Manuscript Central. Manuscripts submitted for the special issue will be reviewed separately and will be handled by the guest editorial board noted below.

Deadline for Submission of Manuscript: 30th November, 2021

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Proposed Timeline:

- September 1st, 2021 – Call for Papers to IEEE JESTPE Editorial Office and Newsletter
- November 30th, 2021 – Manuscripts Submission Deadline
- January 30th, 2021 – Final Acceptance Notification
- April 30th, 2022 – Manuscripts Forwarded to IEEE for Publication
- June, 2022 – Special Issue Appears in IEEE JESTPE