Disciplina: DYNAMICS OF CONTROLLED SYSTEMS

DCS	4 Créditos
Ementa:	Physics-based multivariable control design for real-time, command-driven and disturbance-driven systems. Emphasis on application to practical issues in multi-axis precision motion control, power electronics current and voltage control, motor drive torque and flux control. Nonlinear state feedback design based on active manipulation of physical properties. Observed-based estimation methodologies for accurate, wide bandwidth sensor replacement. Inherent parameter sensitivity and bandwidth properties of Luenberger- and Gopinath-style observer topologies. Disturbance estimation and disturbance input decoupling design via observers. Practical model reference adaptive control design methodologies.
Bibliografia:	Lorenz, R. D. (2007), Self-sensing as an integration focus for motor drives and power devices, in 'Electrical Machines and Systems, 2007. ICEMS. International Conference on', pp. 386-391. Briz, F.; Degner, M. W. & Lorenz, R. D. (2002), Generalization of linear control tools for complex vectors, in 'IFAC Conf., 2002. Proceedings of'. Schmidt, P. B. & Lorenz, R. D. (1990), Design principles and implementation of acceleration feedback to improve performance of DC drives, in 'Industry Applications Society Annual Meeting, 1990., Conference Record of the 1990 IEEE', pp. 422-427 vol.1. Lorenz, R. D. & Schmidt, P. B. (1989), Combining drives of differing bandwidths to meet process objectives, in 'Proc. of the Controls Engineering Conf.,' 1989. Lorenz, R. D. & Lawson, D. B. (1990), 'Flux and torque decoupling control for field-weakened operation of field-oriented induction machines', IEEE Transactions on Industry Applications 26(2), 290-295. Lorenz, R. D. (2008), The emerging role of dead-beat, direct torque and flux control in the future of induction machine drives, in 'Optimization of Electrical and Electronic Equipment, 2008. OPTIM 2008. 11th International Conference on', pp. XIX-XXVII. Wolf, C. M. & Lorenz, R. D. (2011), 'Using the Motor Drive as a Sensor to Extract Spatially Dependent Information for Motion Control Applications', IEEE Transactions on Industry Applications 47(3), 1344-1351. Hafez, B.; Abdel-Khalik, A. S.; Massoud, A. M.; Ahmed, S. & Lorenz, R. D. (2014), 'Single-Sensor-Based Three-Phase Permanent-Magnet Synchronous Motor Drive System with Luenberger Observers for Motor Line Current Reconstruction', IEEE Transactions on Industry Applications 50(4), 2602-2613. Wang, Y.; Tobayashi, S. & Lorenz, R. D. (2013), Deadbeat-direct torque and flux control on low switching frequency induction machine drives using the enhanced flux observer and torque model, in 'Energy Conversion Congress and Exposition (ECCE), 2013 IEEE', pp. 1786-1793. Jansen, P. L. & Lorenz, R. D. (1994), 'A physically insightful approach to the design and accuracy assessment of flux observers for field-oriented induction machine drives', IEEE Transactions on Industry Applications 30(1), 101-110.

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