Universitatea Transilvania din Brașov

Interdisciplinary Doctoral School

ADMISSION TO DOCTORAL STUDIES Session September 2022

Field of doctoral studies: Systems Engineering
Doctoral supervisor: Prof. MOLDOVEANU Florin Dumitru, PhD

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *Variable Structure Control*
Content / Main aspects to be considered - Theory of Sliding Mode Control; Conventional Sliding Modes and Observers; Higher-order Sliding Mode Controllers; Case Study.
Recommended bibliography: 1. Hung, J.Y., Gao, W., Hung, J.C. *Variable Structure Control: A Survey*, IEEE Transactions on Industrial Electronics, Vol. 40, No. 1, February 1993, pp. 2-22. 2. Edwards, Ch., Spurgeon, S.K. *Sliding Mode Control. Theory and Applications*, Taylor & Francis, London, 1998. 3. Utkin, V., Guldner, J., Shi, J. *Sliding Mode Control in Electromechanical Systems*, Taylor & Francis, London, 1999. 4. Shtessel, Y., Edwards, Ch., Fridman, L., Levant, A. *Sliding Mode Control and Observation*, Control Engineering, Birkhauser Verlag, Springer, 2014.
Prerequisites / Remarks: consistent knowledge of advanced mathematics, systems theory, control engineering.

TOPIC 2: *Control Structures for AC Machines Electrical Drives*
Content / Main aspects to be considered - Three Phase Induction Machines; Mathematical Models of Electric Machines; Induction Machine Drive Systems; Case Study.
Recommended bibliography: 1. Kelemen, A., Imecs, M. *Field-oriented Control of AC Machines*, Romanian Academy Publishing House, Bucharest, Romania, 1989. 2. Kazmierkowski, M.P., Tunia, H. *Automatic Control of Converter-Fed Drives*, Vol. 46, 1st Ed., Elsevier Science, USA, 1994. 3. Utkin, V., Guldner, J., Shi, J. *Sliding Mode Control in Electromechanical Systems*, Taylor & Francis, London, 1999. 4. De Doncker, R., Pulle, D.W.J., Veltman, A. *Advanced Electrical Drives: Analysis*,

Modeling, *Control*, Springer, 2011.
Prerequisites / Remarks: consistent knowledge of advanced mathematics, electrical drives, control engineering.

TOPIC 3: *Discrete Event Dynamic Systems*
Content / Main aspects to be considered - Discrete State Event Driven Dynamic Systems; Models and Techniques for Approaching the Discrete Event Systems; Analysis of Behavioral and Structural Properties; Synthesis Techniques; Case Study.
Recommended bibliography: 1. Antsaklis, P.J., Moody, J.O. *Supervisory Control of Discrete Event Systems Using Petri Nets*, Kluwer Academic Publishers, 1998. 2. Păstrăvanu, O., Matcovschi, M., Mahulea, C. *Applications of Petri Nets in Studying Discrete Event Systems*, Gh. Asachi Publishing House, Iasi, Romania, 2002 (in Romanian). 3. David, R., Alla, H. *Discrete, Continuous, and Hybrid Petri Nets*, Springer, Berlin, 2005. 4. Cassandras, C., Lafortune, S. *Introduction to Discrete Event Systems*, 2nd Ed., Springer, London, 2010.
Prerequisites / Remarks: consistent knowledge of advanced mathematics, systems theory, control engineering.

Doctoral supervisor,

Prof. MOLDOVEANU Florin Dumitru, PhD

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Coordinator of the field of doctoral studies,

Prof. MOLDOVEANU Florin Dumitru, PhD

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