

RESEARCH-BASED MODELING, SIMULATION AND INTELLIGENT TECHNIQUES IN ELECTRICAL ENGINEERING

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Abstract

The habilitation thesis is divided into three parts. After a brief introduction, presented in chapter 1, Chapter 2 presents the results of the candidate research with specific references to publications. Chapter 3 presents a proposal for the development of the candidate future academic career.

Chapter 2 contains technical presentation of the research results and it is also structured into four parts. The first part contains an overview of the research activities after receiving by the candidate the PhD title. The second part of the technical presentation contains a presentation of the candidate research contributions in the field of modelling, simulation and control of some processes from electrical engineering. This area of research is a continuation of the research conducted by the candidate after obtaining her PhD degree. The candidate has studied the modelling of the electric arc in the arc furnace installation. The first paragraph presents some new electric arc models which candidate has studied. All simulations accomplished with these models are compared with experimental measurements. Based on these simulations, solutions for active power control and for positioning the electrodes were proposed. Many of the presented papers in this paragraph are the result of a project obtained after a competition, project on which the candidate was the project manager.

The third part of the technical presentation contains the candidate contribution in artificial intelligence field applied in Electrical Engineering. At the beginning, some of the results of modelling the electric arc using neural networks are presented, these being continuing her PhD research. Then, a neuro-fuzzy system used to predict the current in the electric arc is presented. This is followed by the presentation of some researches regarding the implementation of systems based on fuzzy logic using digital signal processors. In this part, the candidate contribution to the programming of signal processors in a system based on fuzzy logic, was presented, research implemented with the use of a TMS 320 series signal processor. There are two such systems to which the candidate has contributed, particularly to the fuzzy system programming. One of



the applications was implemented as a result of a research contract with an economic agent.

The fourth part summarizes some of the results obtained by the candidate as a member of a team that investigated the implementation of educational software systems. The team of which the candidate was member has implemented a series of practical educational systems that are used by the students as learning support. Those systems were implemented mostly in Java and can be included in an e-learning platform as a laboratory or course applications.

The last chapter, the third one, summarizes the candidate personal contributions and establishes a future development plan for the candidate.

The full abstract at:

http://www.upt.ro/img/files/2015-2016/doctorat/abilitare/panoiu/Abstract_teza_MPanoiu.pdf

Habilitation Commission

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