Habilitation thesis summary

Contributions and research directions in the field of modeling and simulation of analog electrical circuits

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The habilitation thesis entitled "Contributions and research directions in the field of modeling and simulation of analog electrical circuits" presents in a succinct and documented manner the main original scientific results that I obtained after the award of the doctorate by Order of the Minister of Education, Research, Youth and Sports no. 3492 of 23.03.2010, in the field of Electrical Engineering, the evolution of the academic, professional and scientific career, within the Department of Electrical Engineering of the Faculty of Electrical Engineering, National University of Science and Technology Politehnica Bucharest (formerly Politehnica University of Bucharest), as well as the main directions of its development, significant scientific achievements, and the ability to coordinate research teams.

The thesis comprises eight chapters, the first presenting the academic activity, academic career and main teaching responsibilities, the teaching materials developed, the guidance of students in their bachelor's and dissertation papers, and in the student scientific communication sessions. The second chapter presents the professional activity, the activity in committees and elements of recognition of professional activity, participation in admission and promotion exams, and administrative and managerial activities. The third chapter presents the research field in which the candidate's research falls, the research themes developed and the research projects in which I participated as a director or member of the research team. Also, in this chapter the results of scientific and research activity are presented: books and chapters in national and international books, articles published in WoS and BDI indexed journals, in volumes with ISBN or ISSN, elements of recognition of scientific and research activity. The latter include citations in ISI or BDI indexed journals, participation in international commissions/committees, membership in professional/scientific structures, and in organizing committees of scientific events. The chapter continues with the presentation of research topics carried out before the award of the doctoral degree, some of which were continued after the award of the doctoral degree. In the following four chapters (chapter four to chapter seven) there is a detailed presentation of the scientific research activities, insisting on the research topics developed and the studies carried out after the award of the doctoral degree. These can be grouped into four themes, the first being a new algorithm for calculating simplified symbolic expressions of the poles and zeros of electrical circuits. The second theme refers to the applications of these expressions in the analysis and design of analog circuits. The third theme

contains frequency domain models for the analysis of nonlinear devices, and the last one refers to the efficient simulation of large electrical networks. Each topic is developed in a separate chapter accompanied by conclusions and a selective bibliography. The results presented in these chapters are due to research and teaching activities spanning a period of 21 years (15 years since the award of the PhD) in the field of electrical engineering. From a publishing point of view, I am co-author of 5 books or chapters in textbooks or monographs with ISBN, 36 articles in ISI indexed journals and conference proceedings, 25 articles in journals and conference proceedings indexed in other international databases. From a research point of view, I participated in the implementation of 9 projects, of which 3 as director (2 funded by UEFISCDI and one funded by UPB), and member of the research team in an international and 5 national projects.

In the eighth chapter, the evolution and development plan of the professional career and that of scientific and didactic research is presented, as well as the main directions that I have in mind with future doctoral students in the previously described topics. Also, the didactic capacities and performances obtained and those desired to be obtained are briefly presented. At the same time, the capacity for training and coordinating young research teams, the generation of research topics and the awareness of the scientific responsibility that the activity of leading students within the cycle of doctoral university studies involves is expressed.