

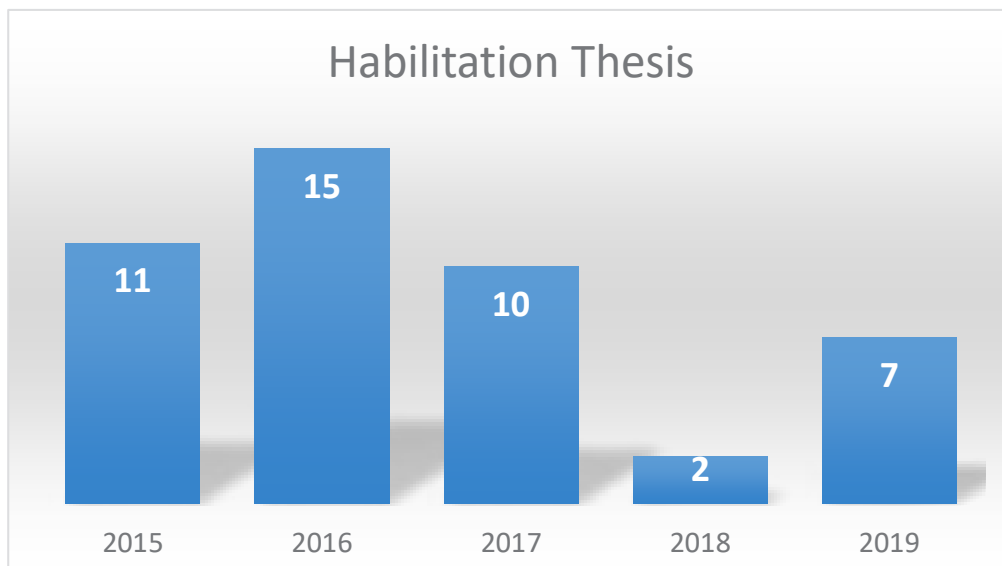
HABILITATION THESIS

EVOLUTION OF HABILITATION THESIS IN UPT 2015 - 2019

Habilitation (from Latin *habilis* "fit, proper, skillful") is the highest academic qualification a scholar can achieve by his or her own pursuit.

In this chapter we present the habilitation thesis supported by teachers from Politehnica University Timisoara, both at UPT and, also, at other universities.

The habilitation thesis are presented in chronological order, according to institution where they were sustained.



THE STAGING BUILT PROPERTY

Author: Ileana Maria KISILEWICZ

Abstract

The habilitation thesis reflects the topics and research areas covered after completing PhD studies, refined in terms of teaching experience and practical professional experience in the conservation of buildings field. Research, design and implementation of theories and conclusions both in professional practice and in the teaching activity took place mainly by overlapping several levels in an interdisciplinary approach.

The thesis topic is a favorite topic of those architects, planners and even restaurateurs which was constantly proposed by Charters of 20th and 21st century. For over 50 years in Europe discussion regarding The staging built property, represents a concept that translates a renewed vision on cultural property, it considered the heritage not only as preserved and contemplated but a dynamic reality, capable of carrying an active role in the contemporary world. This new approach on the past involved the sphere of artistic creation, reshaping the relationship between old and new: from a predetermined unique reality and sometimes from untouchable and unexpected side. Enabling us to discover that heritage building representing the past as a living material which became a creative stimulus of fruitful dialogue. Contemporary intervention being in direct contact with a historical context is daily practice in urban areas, rural areas and remote human settlements and therefore the intervention is practiced using the instruments of both fields: architecture and the visual arts.

The first chapter covers the most important scientific results obtained in the three main activities: research, design, practical and teaching – from the first books, chapters in edited volumes, visibility and academic impact achievement, outstanding results obtained as a result of large-scale projects of restoration as well as the results of comparative research on the work of Romanian and Italian architects in both countries, to the considerations on analytical research on restoring surfaces of architecture and efficiency of applying the provisions of urban characteristics of interventions in protected construction areas of Bucharest in the first decade of the 21st century.



The second chapter summarizes a selection of restoration projects, experiences of direct restoration of stone as reference material concerns-improvement of about 21 years, and the successful design project for exhibition in 2014 at the Venice Architecture Biennale.

Chapter three covers academic and teaching achievements justifying academic experience gained, the ability to lead research, ability to work in extensive interdisciplinary teams, experience of teaching in different faculties, the ability to guide students and young researchers.

The full thesis at:

http://www.upt.ro/Informatii_teze-de-abilitare-sustinite_285_ro.html

Habilitation Commission

Prof.univ.dr.arh. - Cristian DUMITRESCU

Politehnica University Timișoara

Prof.univ.dr.arh. – Augustin IOAN

University of Architecture and Urbanism “Ion Mincu” București

Prof.univ.dr.arh. – Virgil POP

Politehnica University Cluj Napoca

RESEARCH AND CONTRIBUTIONS IN THE FIELD OF USING AND PRODUCTION OF ELECTRICITY

Author: Sorin Ioan DEACONU

Abstract

The habilitation thesis contains the following chapters: motivation, research directions, achievements, the scientific, professional and academic development plan, and finally the bibliography chapter. The first chapter, motivation, summarizes the didactic and research activity, the results obtained the cooperation with other universities and the expressed desire to continue the research in the field of electrical engineering at a higher level by obtaining the certificate of habilitation. In the second chapter the main directions of research are presented: industrial applications of AC electric drives, compensation of reactive energy and superior harmonics to strongly deforming electric consumers, axial electric drive systems for hybrid and electric vehicles, and energy conversion for adjustable wind or hydro applications. For each of the research directions listed, the main achievements are presented. The chapter of scientific, professional and academic achievements presents the activities carried out within each research direction and the main results obtained in a more detailed fashion.

The Research Direction on Industrial Applications of Variable Speed AC Drives is divided into four subchapters which present concerns regarding the reduction of the active electric energy consumption by using the variable speed, the controlled start of the electric drive systems, the production of electric power with variable asynchronous generators and the artificial load testing of the rotating electric machines. Among the great energy consumers we find the pumping and ventilation systems. Automating these systems and increasing their energy efficiency can be done with PLCs, static frequency converters, communication and data transmission systems. Applying different solutions in practice is a challenge for an engineer but also for a researcher in the field of machine systems and electric drives. Proposed and practiced applications are presented, but some of them are applied even after a long time because of the important investment effort required.

Another direction of research, detailed in six subchapters, is represented by axial synchronous machines (with an stator, two permanent magnets rotors and a single inverter for vector control of the both rotors speed) intended for electric hybrids or pure electric



vehicle applications. Constructive topology, circuit model, optimal design, control methods, and quasi 3D-FEM analysis were presented for validation of analytical data on machine torque developed. A new family of electric machines is proposed to improve the radial and axial dimensions, with high torque density and high efficiency. The torque capability of the machine with concentrated fractional stator windings and surface permanent magnets has been demonstrated. The last research direction approached in the habilitation thesis has as theme the theoretical and experimental study of the adjustable electric generators for wind or hydro applications.

Fifteen subchapters were presented for the homopolar and homo-heteropolar reactive synchronous generators with stator excitation and for the dual stator windings induction generator with the cage rotor.

The full thesis at:

http://www.upt.ro/img/files/2018-2019/doctorat/abilitare/Deaconu-Sorin/Rezumat_abilitare_Sorin_Deaconu_en.pdf

Habilitation Commission

Prof.univ.dr.ing. Vasile ȚOPA

Technical University of Cluj-Napoca

Prof.univ.dr.ing. Sorin Dan GRIGORESCU

University POLITEHNICA of Bucharest

Prof.univ.dr.ing. Sorin MUȘUROI

Politehnica University Timișoara

CONTRIBUTIONS TO DEVELOPMENT OF OPTICAL DESIGN IN MECHATRONIC APPLICATIONS

Author: Corina-Mihaela GRUESCU

Abstract

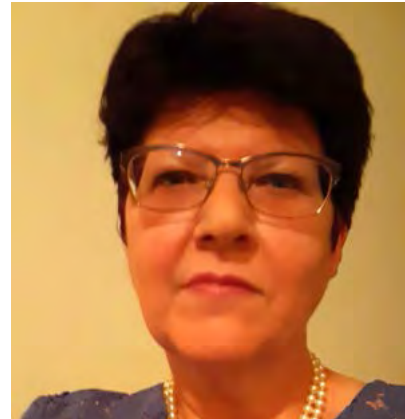
The first chapter, Basic optical design. Glass choice, offers a solution to the problem of choosing the suitable sorts of glass by means of stating mathematical criteria implemented in software application. The practical solutions, including aspheric surface use, provided by the application lead to high image quality for large apertures.

The second chapter refers to Optical engineering applied in laser machining. The first paragraph develops Optics optimization in laser spot radius minimization. The research provided original solutions for the expander and focusing objective (both diffraction limited). The second paragraph is dedicated to Experimental optimization of process parameters in laser cutting of polycarbonate gears. Fractional factorial experiments plans stated by Taguchi method and a specialized software proved to be quick, economic (only 40 samples needed for optimizing six parameters in two levels and one interaction) and very efficient.

The third chapter develops some aspects regarding the Document digitization. Two paragraphs are dedicated to Digitization Equipment and Techniques in Retrieval of Mechanism and Machine Science Resources and Interactive animation production by means of advanced image processing.

Design and assembling of the scanning equipment as well as the capturing, stocking and managing raw image files software were developed as original contributions. Beside documents, the library also displays physical demonstration models and mechanism descriptions. The physical working models of the mechanisms are digitally recorded as a sequence of images. With further handling steps, these image sequences are composed to interactive animations, available on DMG-Lib internet portal or downloaded as video files for local use.

The fourth chapter develops several applications, which implement Optical engineering in medical investigation. The first paragraph describes the Modeling of human spinal column and evaluation of



spinal deformities. A large number of numerical parameters were suggested for the description of the column's shape. A special software – INBIRE – was developed to work with the imaging system InSpeck.

The second paragraph covers the subject Experimental method for evaluation of spinal column deformation, based on data acquired with a system of accelerometers and advanced image processing. The goal of the study is to develop a method to record the Cobb angles variation, which should serve to the evaluation of the efficiency of the therapy exercises.

The full thesis at:

http://www.upt.ro/img/files/2018-2019/doctorat/abilitare/Gruescu_Corina/Corina_Gruescu_Rezumata_abilitare_en.pdf

Habilitation Commission

Prof. dr. ing. Dan Silviu MÂNDRU

Technical University of Cluj-Napoca

Prof. dr. ing. Cătălin ALEXANDRU

Transilvania University of Brașov

Prof. dr. ing. Ioan DOROFTEI

Technical University "Gheorghe Asachi" of Iasi

RESEARCH ON THE ANALYSIS AND OPTIMIZATION OF OPERATING REGIMES OF POWER TRANSMISSION AND DISTRIBUTION NETWORKS

Author: Adrian PANĂ

Abstract

Both the didactic component of the candidate and its research activities took place in two closely related areas, namely the electrical transport and distribution networks and the power quality, fields of major importance belonging to an integrating domain - electrical power engineering. The most important results of the candidate's research work, obtained on the research topics defined as representative, were grouped into four thematic areas of major importance, as follows:

1. Transfiguration of electrical distribution networks.
2. Balancing the loads of electrical distribution networks by unbalanced reactive shunt compensation.
3. Evaluation of impedance unbalance in three-phase electrical networks and their effects.
4. Evaluation of harmonic impedances in harmonic polluted electrical networks and their effects.

The study of the harmonic impedance has an important weight in the research activity, being oriented towards:

- Using the harmonic impedance of the network in the study of capacitive shunt compensation in the presence of non-sinusoidal regime.
- Analytical and numerical determination of the harmonic impedance seen in the buses of an electrical distribution network.
- Analytical and numerical determination of harmonic impedance seen in the sections of a three-phase line.
- Experimental determination of the harmonic impedance seen in the buses of an electrical network.

Another component of the author's research activity is the participation in solving over 20 research grants won in national competitions, research contracts or consultancy with energy companies or training grants, out of which six he was the project director:

- 7 research/ consultancy contracts with a value of at least 2000 € - out of which 3 was the project director;
- 6 national grants/projects won by competition - out of which 2 was project director.



The results of the candidate's research activity have been brought to the attention of national and international academic and scientific community, through articles published in journals or conferences proceedings. For the period covered by the habilitation thesis, the candidate has published 81 articles, out of which 36 articles he is the first author or main author. The most important are:

- 4 in journals ISI indexed;
- 2 in journals indexed in other international data bases (IDB);
- 19 to ISI international conferences;
- 5 to IDB international conferences.

The full thesis at:

http://www.upt.ro/img/files/2018-2019/doctorat/abilitare/Pana-Adrian/Adrian_Pana_Rezumat_abilitare_en.pdf

Habilitation Commission

Prof.dr.ing. Mihai GAVRILAȘ

Technical University „Gheorghe. Asachi” of Iași

Prof.dr.ing. Constantin BULAC,

Politehnica University of Bucharest

Prof.dr.ing. Ștefan KILYENI,

Politehnica University Timișoara

ENTREPRENEURSHIP, EDUCATION AND SUSTAINABLE MANAGEMENT

Author: Matei TĂMĂȘILĂ

Abstract

This habilitation thesis reveals the capabilities and didactic and research performance of the candidate, developed after the public defending of the PhD thesis until now. The habilitation thesis focuses mainly on those achievements that attest to the author's ability to conduct scientific research activities in Engineering and Management with applications in Entrepreneurship, Education and Sustainable Management.

The present thesis is structured on three major and topical directions in the literature: Entrepreneurship and entrepreneurship education; Microeconomic and macroeconomic influences at national and global level; Education and Sustainable Development.

The first direction presents the concept of entrepreneurship, its importance and its associated imperatives. Systematizing the main researches on entrepreneurial theories represents a first step, a first attempt to authorize the attempts to understand the mechanism, the capabilities and resources needed for its support and development. There are a number of studies on focused economies, transition economies and innovation-focused economies. At the same time, facilitators, and actors for entrepreneurship: national, regional and global are presented.

As the educational approach is currently centered on the student, the research addresses the directions, objectives and motivating factors of the student-centered university education. Assessing the competitiveness of higher education is an important component of entrepreneurial education. A number of conditions are identified for increasing the competitiveness of Romanian higher education. Secondly the work addresses to the attitude of active knowledge and its impact on entrepreneurial activity in Europe. Various literature reviews, assessments of entrepreneurial activity in Europe are presented. At the same time, an analysis of the business incubator in Romania is carried out with details, benefits, implications and developed opportunities.



The next direction addressed in the thesis is assessments and analyzes of micro- and macroeconomic influences. These influences are directly tangential to the entrepreneurial domain. These influences help leaders and entrepreneurs in developing and conducting business activities, providing them with milestones in developing sustainable strategies.

The third direction addressed in this thesis is education and sustainable development. Sustainability is an intense direction addressed at national and international level. From the perspective of entrepreneurship, sustainable development is a challenge that most entrepreneurs are addressing. The research also addresses the importance of education in sustainable development. Closely related to education are business activities related to renewable energies, waste collection, loss reduction and other related approaches.

The second part of the habilitation thesis shows the development perspectives. These perspectives are presented in the three directions: didactic, research and administrative.

The full thesis at:

http://www.upt.ro/img/files/2018-2019/doctorat/abilitare/Tamasila_Matei/Matei_Tamasila_Rezumat_Abilitare_en.pdf

Habilitation Commission

Prof.univ.dr.ing. Anca DRĂGHICI -

Politehnică University Timișoara

Prof.univ.dr.ing. Laura BACALI

Technical University of Cluj-Napoca

Prof.univ.dr.ing. Lucian Ionel CIOCA

"Lucian Blaga" University of Sibiu

LAYERED LDPC DECODING ARCHITECTURES: BRIDGING THE GAP FROM ALGORITHMS TO IMPLEMENTATIONS

Author: Oana AMARICĂI-BONCALO

Abstract

This thesis presents the research and academic achievements during the 2014–2019 period. Modern communication and storage standards require efficient Forward Error Correction (FEC). Due to their excellent error correction capability, Quasi-Cyclic Low-Density Parity-check codes (QC-LDPC) are a class of codes employed in wireless standards, digital video broadcasting, and non-volatile semiconductor memories.

This fact prompted the research direction we have pursued during the last 5 years, mainly the study of QC-LDPC decoder architecture trade-offs and optimizations. More specifically, within the framework of the project DIAMOND - Message Passing Iterative Decoders based on Imprecise Arithmetic for Multi-Objective Power-Area Delay Optimization -, in collaboration with researchers from CEA-LETI Grenoble (dr. Valentin Savin), and ENSEA Cergy-Pontoise (prof. David Declercq), we have tried to exploit the advantages of implementing imprecise operations in Low-Density Parity-Check (LDPC) decoder architectures, in order to optimize the cost/area/power consumption. The original project goals – to develop hardware architectures that use imprecise arithmetic – have been largely expanded due to the very favorable research results. The contributions presented in this thesis closely follow the DIAMOND project.

A key contribution of this related to the data hazards due to the late update effect caused by memory access time and pipeline. Furthermore, if implementation-wise, the message memory uses banks made of Static Random Access Memory (SRAM) blocks, the access patterns according to the code graph also introduce data conflicts.

We approached this problem from two directions (1) A set of offline algorithms has been proposed such that an almost optimum message memory mapping and access scheduling that avoid RAW hazards is generated. (2) Architecture aware code design for application where the LDPC code is not fixed. The proposed algorithm builds on



a well known construction algorithm - Progressive Edge Growth (PEG). The proposed architecture aware PEG (AL-PEG) extends the original PEG by adding new constraints related to pipeline and message memory mapping.

The full thesis at:

http://www.upt.ro/Informatii_teze-de-abilitare-sustinite_285_ro.html

Habilitation Commission

Prof. dr. ing. Adina Magda Florea

University Politehnica Bucharest

Prof. dr. ing. Sergiu Nedevschi

Technical University of Cluj-Napoca

Prof. dr. ing. Mircea Popa

Politehnica University Timișoara

DEPOSITION AND REMELTING METHODS OF CORROSION AND WEAR RESISTANT COATINGS

Author: Ion-Dragoș UȚU

Abstract

The habilitation thesis entitled “Deposition and remelting methods of corrosion and wear resistant coatings” presents a synthesis of the main research results obtained by the candidate during the years 2005–2019 in the field of Materials Science and Engineering. The work approaches as the main direction of the research, the processing and characterization of the functional layers resistant to corrosion and wear by using modern techniques specific to surface engineering.

The thesis is structured in two parts and three distinct chapters, the first part being regarding the main scientific, professional and academic contributions, and the second part, presenting the evolution of the career and the perspectives of personal development. There are presented the main problems that arise in the components of the installations and equipment that work in the industrial field. During operation, they are subjected to corrosion and wear phenomena that can lead to their premature degradation. To improve the functional characteristics and increase the operating life of these components various deposition techniques (thermal spraying, laser cladding and weld deposition) and different categories of coatings are proposed.

It is highlighted the effect of surface irradiation with concentrated energy sources (laser, electron beam, WIG melting) on the microstructural and morphological characteristics of the thermally sprayed coatings. These materials, depending on the deposition process and the granulation of the depositing feedstock, have a non-homogeneous structure, with a certain degree of internal oxidation and porosity which can sometimes produce phenomena of spallation and delamination of the coating from the substrate. By using local treatments, the surface layer can be completely or partially remelted. In general, the purpose of applying these treatments is to improve surface characteristics by increasing wear, erosion and corrosion resistance.



In the last part of the habilitation thesis, the plans for the evolution and development of the professional career are presented.

The full thesis at:

http://www.upt.ro/img/files/2019-2020/doctorat/abilitare/UTU_Ion-Dragos/Rezumat_abilitare_Utu_Dragos_en.pdf

Habilitation Commission

Prof. dr.ing. Liviu Marșavina

Politehnica University Timisoara

Prof. dr.ing. Mircea Horia Țierean

Transilvania University of Brasov

Prof. dr.ing. Corneliu Munteanu

Technical University “Gheorghe Asachi” of Iasi

