CURRICULUM VITAE

Name:

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Date and place of birth:

20. 04. 1972, Lom, Bulgaria

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Education:

Technical University of Sofia,
MSc in Electronics and Automation, 1996
MSc Thesis "Interval Algorithms for Adaptation"

Scientific degrees:

PhD, Technical University of Sofia, 2004, thesis "Numerical methods for Analysis and Synthesis of Robust Control Systems"

<u>Summary of the Thesis work</u>:

The main goal was to develop new, fast and numericaly reliable software for design of robust control algorithms in state-space. The numerical properties of the algorithms for H_∞ design and μ synthesis were investigated and the factors affecting the accuracy of the results were explored.

As a result, new package for robust control systems design was drawn up. It consists of both FORTRAN 77/95 solvers and MATLAB interface (mex) files. It is included in the free (open source) library SLICOT, developed by the leading European specialists in Control Theory under the EU project NICONET (http://www.icm.tu-bs.de/NICONET).

My contribution to the library are several programs for H_∞ design via different methods, a program for μ synthesis via DK iterations and a bunch of supporting programs, along with an interface to MATLAB, which allows these solvers to be directly invoked in its user friendly environment. The control algorithms synthesized this way are suitable for both continuous and discrete systems in presence of parametric uncertainty and can be directly implemented in all modern PLCs and control computers.

Working positions:

- <u>Institute for Nuclear Research and Nuclear Energy – Sofia, Research Engineer (2003 - 2005)</u>.

The main goal of my work there was to develop and apply a software for simulation of positron annihilation in metal crystals for the purpose of the non-destructive defectoscopy of nuclear reactors' bodies. I took participation in the development of a set of programs in FORTRAN 77, MATLAB and C++ for modeling of metal crystal structures and electron layers via solving quantum mechanics equations, simulation of positron annihilation in the crystal and the lifetime of the positron in the crystal, which is used for evaluation of the number and type of crystal defects. A number of numerical tests were made and the results compared with real experimental data.

- <u>Technical University of Sofia, Associate Professor (2005 –)</u>

My teaching activities at present include the following courses:

- *Optimization and Decision Making (Co-leading the course)*. The aim of the course is to make the students acquainted with the classical methods for optimization, as well with the modern methods in optimization in Control Theory like genetic algorithms, linear matrix inequalities and others.
- *Robust and Optimal Control (Co-leading the course)*. The students are introduced to the identification, modelling, analysing and synthesis of control algorithms (especially μ synthesis) for complex systems with parametric and non-structured uncertainties in the model.
- *Engineering Computer Science 1 (MATLAB and LabVIEW). (Co-leading the course).* Introduction to the using these software instruments.
- *Programming and Mathematical Modelling Approaches. (Co-leading the course).* Introduction to the using of MATLAB as an instrument for mathematical modelling.
- *Cyber Physical System for control and data processing of engineering and medical applications (Co-leading the course).* In my part, special attention on the general control algorithms and optimization methods (genetic and evolution algorithms, neural networks and et.al.) is paid.

I also took participation in the past in the laboratory exercises in the following courses:
- *Design of Multi Input Multi Output (MIMO) controllers*. The aim of the course is to introduce the students to the methods of analysis and synthesis of algorithms for control of MIMO systems, particularly H_2 and H_∞ synthesis.
- *Introduction in programming in C*.
- *Control Theory part 2*. Introduction to the Control Theory.

Along with the teaching activities, my main scientific interests continue to be in the field of robust control algorithms design and developing MATLAB software. In accordance with my work I also took participation in an exchange program in Germany to get acquainted with Simatic series PLCs by Siemens.

- As a part time job, I used to work as an Assembler programmer for Microchip PIC16/17/18 processors in the Bulgarian small enterprise ELO, specialised in the development of low-cost automation systems.

There I took participation in the development of the following products:
- own stand-alone programmator for PIC16 processors (system software in assembler)
- system for remote control of electric consumption for home users via public GSM network (system software in assembler)
- own small PLC (system software in assembler)
- programs for spectra processing, in collaboration with Institute of Electronics – Sofia (software in MATLAB)
- own set of units for ultrasound, magnetometric and thermoelectric defectoscopy of metallic materials (including the computer interface to the unit and analyzing program in MATLAB), in collaboration with Institute of Mechanics - Sofia.

- In 2008 I joined a project at the University of Latvia under Marie Curie FP6 program, Contract number MTKD-CT-2004-014228, named "Laser manipulation of stochastic molecular processes", as a researcher and programmer.

My participation in this project finished in January 2009. My responsibility was to develop software in LabView for detection system for optical imaging of excited atoms and molecules, which includes tasks such data acquisition and processing.

- In 2012 the work was continued under the project 285912/1.2.2012-31.7.2015 „Unlocking and Boosting Research Potential for Photonics in Latvia Towards Effective Integration in the European Research Area", Marie Curie FP7 Program.
- In 2015 I worked for two months in Novosibirsk, Institute for Semi-conductors Physics, Russian Academy of Sciences under the EU FP7 International Research Staff Exchange Scheme project COLIMA, Coherent manipulation of light and matter via interferences of laser-dressed states, Contract PIRSES-GA-2009-247475

- In 2018 I worked for a month as an invited lecturer in the Novosibirsk State University in the field of Control Theory applications in physics.
- I took participation in the software application of machine learning and artificial intelligence methods in the field of automatic diagnosis of skin conditions and diseases using the optical biopsy method under project No. BG-RRP-2.004-0005. Different skin conditions were examined and a bunch of biochemical indicators for recognizing them was obtained. Specialized medical hardware and software was developed and is being clinically tested.

Participation in Professional Organisations:
Automation and Control Engineers Union – Bulgaria

Languages:
Bulgarian (native)
Russian (good)
English (good)
German (basic)