

CURRICULUM VITAE

Personal information:

Date of birth: 19/11/1973
Nationality: Slovak
Current resident status:

Place of birth: Kosice - Saca, Slovak Republic
Marital status: single
permanent resident of Canada and Slovak Republic

Education and degrees:

- 10/1997 – 03/2000 Technical University of Kosice (Slovak Republic), Faculty BERG, Department of Applied Informatics and Process Control, *Discipline:* Industrial Process Control and Control Engineering, *Scientific Degree:* Philosophiae Doctor – Ph.D. *Thesis:* Fractional Calculus in Control Theory, March 2000. *Key courses:* Automation Control Theory; Applied Mathematics; Industrial Process Control; Design of Information and Control Systems.
- 09/1992 – 06/1997 Technical University of Kosice (Slovak Republic), Faculty BERG, Department of Management and Control Engineering, *Discipline:* Industrial process control engineering (raw material extraction and processing), *Specialization:* Technological management, *Degree:* Master - Engineer - Ing., June 1997. (State examination) *Key courses:* Industrial Process Control; Mathematical modeling, Simulation, and Optimization of Processes and Systems; Direct Control; Programming languages; Production logistics; Data Analysis;
- 09/1988 – 06/1992 Secondary Vocational School in Kosice - Saca (Slovak Republic), *Discipline:* Electrician, *Specialization:* Industrial automation, Vocational training in US Steel, Inc., Kosice (Slovak Republic)
- 09/1980 – 06/1988 Primary School in Poproc (Slovak Republic)

Professional work experience:

- 09/2002 – 07/2003 **Electronic - technician**, John's Electronics, LTD., Chilliwack, B.C. *Duties and responsibilities:* satellite antennas and receivers installing, electrical equipments repairing (CD, TV, Receiver, Amp). [*Part time*]
- 06/2002 – 07/2003 **Web programmer**, Steve's Electronic Services, Abbotsford, B.C. *Duties and responsibilities:* web site design and programming (CSS, HTML, PDF), PIC microcontrollers devices programming (BASIC). [*Contracting*]

- 04/2000 – 05/2002 **Assistant professor**, Department of Applied Informatics and Process Control, Technical University of Kosice (Slovak Republic),
Duties and responsibilities: Solving of engineering grant projects, researching, publishing, supervising graduate students, lecturing of: Programming language C, Control theory, Informatics, Internet technology. [*Full time*]
- 10/1997 – 03/2000 **Internal Ph.D. study**, Department of Applied Informatics and Process Control, Technical University of Kosice (Slovak Republic),
Duties and responsibilities: Solving of engineering grant projects, researching, publishing, lecturing of: Programming language C, Optimization of processes and systems, Control theory, Informatics.
- 08/1997 – 09/1997 **Research worker**, Department of Management and Control Engineering, Technical University of Kosice (Slovak Republic),
Duties and responsibilities: Solving of engineering grant projects, researching, lecturing of: Programming language C, Optimization of processes and systems, Economics-mathematical methods. [*Full time*]
- 08/1997 – 05/2002 **Process control engineer/programmer**, US Steel, Inc. Kosice (Slovak Republic), *Duties and responsibilities*: Mathematical model and control system of blast furnace No. 3; Control of speed of turboexhausters for agglomeration belt; Small amount gas flow meter. [*Contracting*]
- 09/1998 - 05/2002 **SW engineer and programmer**, NTS, LTD. Kosice (Slovak Republic)
Duties and responsibilities: SW developing (C++, Turbo Pascal), HW repairing, networking, web designing and programming. [*Part time*]

Professional interests:

- Scientific research in:
 - Control theory (process and robust control, stabilization, industrial automation, PLC),
 - Mathematical modeling (fractional calculus, numerical analysis, data visualization),
 - Optimization (optimal and robust controllers, optimal control systems, algorithms),
 - Deterministic chaos (control and modeling of chaotic dynamical systems, fractals),
 - Information technologies (programming languages, Internet applications, web design).
- Published works:
 - 1 book, 1 book chapter, 2 textbooks,
 - 17 papers in scientific journals and 35 articles in conference proceedings,
 - More than 35 scientific citations (15 records in SCI database),
 - 10 presentations at the conferences and invited lectures at the universities.
- Solved engineering grant projects:
 - Grant VEGA from Slovak Grant Agency for Science (*Methods, Algorithms and Means for Mathematical Modeling, Analysis and Synthesis of Control Systems of Technological Objects and Processes*), No. 1/7098/20. [50%]
 - Grant from Austrian Institute for Central and Eastern Europe (*Fractional - Order Dynamical Systems and Controllers: Discrete and Frequency-Domain Mathematical Models and Algorithms*). [25%]

- Grant VEGA form Slovak Grant Agency for Science (*Development of Mathematical Models for Design of Effective Technologies and Control of Raw Material Processing*), No. 1/7099/20. [25%]
- Scientific-technical project, No. 3002, *Internal report*, Technical University of Kosice.
- Co-operation with industry (e.g.):
 - US Steel, Inc. Kosice, Slovak Republic, (former VSZ, a.s.).
- Programming languages and other software/hardware/devices abilities:
 - MS DOS, MS Windows 9x/ME/XP, MS Windows NT, QNX, Unix, Linux, Novell,
 - PASCAL, C/C++, BASIC, HTML, XML, CSS, PHP3, JavaScript, Delphi, MySQL,
 - MS Office (Word, Excel, Project, PowerPoint, Outlook, Visio, Front Page), LaTeX/TeX,
 - MatLab + Simulink, Maple, Automation Studio, PIC Basic, Adobe Software,
 - Internet (Explorer, Netscape, Opera), FTP, E-MAIL (POP3, SMTP, IMAP),
 - Protocols (TCP/IP, IPX/SPX, RS 232, RS 422, IEEE 488, ISDN, LAN Net.),
 - Interface cards (PCL, LAN, I/O, A/V), modems, HDD, motherboard, processor, etc.,
 - PLC, probes, AD/DA, sensors, servos, thermocouples, flow and pressure meters, etc.

Professional affiliations:

- Slovak Society for Applied Cybernetics and Informatics (SSAKI)- *member*: (1997 – 2002);
- Committee for International Carpathian Control Conference (ICCC) – *member*: (1999 – 2002);
- International Federation of Automatic Control (IFAC) – *reviewer*: (since 2001);

Teaching capabilities:

- Major courses taught: "Programming language C", "Control theory (mathematical modeling and control of dynamical systems)", "Informatics", "Internet technology", "Optimization of processes and systems (linear and non-linear continuous methods)", "Economics-mathematical methods".
- Courses can be given: "Mathematical modeling and simulation", "Design of control systems", "Operating systems", "Programming in real-time systems", "Optimal and robust control".
- Claim: any courses related to control theory, signal processing, mathematical modeling, simulation, applied mathematics, computer programming, operating systems, etc. can be given.

Language abilities:

- Slovak (native), Czech (well), English (well), Russian (beginner), Polish (beginner).

Theses:

- Ivo Petras: *Fractional Calculus in Control Theory*, Ph.D. Thesis, Department of Informatics and Process Control, Faculty BERG, Technical University of Kosice, November 1999.
- Ivo Petras: *Parameters Design for Fractional Order Controllers*, M.Sc. Dissertation, Department of Management and Control Engineering, Faculty BERG, Technical University of Kosice, June 1997.

Research visits:

- Institute of Automation in Leoben, Austria: Nov. 2000, May 2001, May 2002 (invited lecture).

List of publications

- **Book:**

1. Petras, I., Podlubny, I., O'Leary, P., Dorcak, L., Vinagre, B.M.: *Analog Realizations of Fractional Order Controllers*, TU Kosice, 2003, p.84, ISBN 80-7099-627-7.

- **Book chapter:**

1. Petras, I., Chen, Y.Q., Vinagre, B.M.: *Robust stability test for interval fractional order linear systems*. In: V. Blondel and A. Megretski Eds. *Sixty open problems in the mathematics of systems and control*, Princeton University Press, 2003. (in press, to appear in Fall 2003)

- **Textbooks:**

1. Petras, I.: *Automation control theory*, Elfa, Kosice, 2001, p.52, ISBN 80-88964-92-X.
2. Horovcak, P., Petras, I. : *Programming language C - (exercises and solved examples)*, FBERG TU Kosice, 2002, ISBN 80 -7099-760-5.

- **Papers in scientific journals:**

1. Petras, I., Dorcak, L.: *Fractional-Order Control Systems: Modelling and Simulation*, Preprint for journal of the FCAA. (accepted for publication, to appear in Fall 2003).
2. Petras, I., Hypiuseva, M.: *Design of fractional - order controllers via H_∞ norm minimisation*, Selected Topics in Modeling and Control, vol. 3, 2002, pp. 50 – 54.
3. Petras, I.: *Control of fractional-order Chua's system*, J. Electrical Engineering, vol. 53, no. 7-8, 2002, pp. 219 - 222.
4. Podlubny, I., Petras, I., Vinagre, B.M., O'Leary, P., Dorcak, L.: *Analogue Realization of Fractional-Order Controllers*. Nonlinear Dynamics, International Journal of Nonlinear Dynamics and Chaos in Engineering Systems, Kluwer Academic Publishers, (Guest Editor: Prof. J. Tenreiro Machado), vol. 29, no. 1 - 4, July – Sept., 2002, pp. 281-296.
5. Vinagre, B. M, Petras, I., Podlubny, I., Chen, Y.Q.: *Using Fractional Order Adjustment Rules and Fractional Order Reference Models in Model-Reference Adaptive Control*. Nonlinear Dynamics, International Journal of Nonlinear Dynamics and Chaos in Engineering Systems, Kluwer Academic Publishers, (Guest Editor: Prof. J. Tenreiro Machado), vol. 29, no. 1 - 4, July - September, 2002, pp. 269-279.

6. Petras, I., Vinagre, B. M.: *Practical application of digital fractional-order controller to temperature control*, Acta Montanistica Slovaca, Kosice, (accepted for publication), 2003.
7. Petras, I., Horovcak, P., Terpak, J.: *Control of DC motor speed with using of fractional order controllers*, EnvirAutom (journal), vol.6, no. 1, 2001, Kosice, pp. 135-141, (in Slovak).
8. Kostial, I., Nemcovsky, P., Dorcak, L., Terpak, J., Petras, I., Rogal, M., Halmo, M.: *Real time blast furnace modeling*, Metallurgy, vol. 40, no. 3, 2001, pp. 147-150.
9. Terpak, J., Dorcak, L., Kostial, I., Petras, I.: *Three-dimensional model of blast furnace process*, AT&P Journal, vol. 8, 2001, Bratislava, pp. 50 – 51, (in Slovak).
10. Terpak, J., Dorcak, L., Petras, I., Kostial, I.: *Monitoring and predicting model of blast furnace process*, EnvirAutom, vol. 5, no. 2, 2000, Kosice, pp. 140 – 145, (in Slovak).
11. Petras, I., Dorcak, L.: *Parameters design methods for fractional order controllers*, EnvirAutom, vol. 5, no. 1, 2000, Kosice, pp. 32 – 41, (in Slovak).
12. Petras, I.: *The fractional - order controllers: Methods for their synthesis and application*, J. Electrical Engineering, vol. 50, no. 9 - 10, 1999, pp. 284 - 288.
13. Petras, I., Dorcak, L.: *The frequency method for stability investigation of fractional control systems*, SACTA journal, vol. 2, no. 1 - 2, 1999, Link Hills, pp.75 - 85.
14. Petras, I., Dorcak, L.: *Some possibilities for realization of fractional order controller*, EnvirAutom (journal), vol. 4, no.1, 1999, pp. 83 – 90, (in Slovak).
15. Petras, I., Dorcak, L., Kostial, I.: *Modeling of fractional - order control circuit*, EnvirAutom (journal), vol. 3, no. 1 - 2, 1998, Kosice, pp. 68 – 71, (in Slovak).
16. Petras, I., Dorcak, L., Kostial, I.: *Control quality enhancement by fractional-order controllers*, Acta Montanistica Slovaca, vol. 2, 1998, Kosice, pp. 143 - 148.
17. Petras, I., Dorcak, L., Kostial, I.: *Methods for application of fractional - order controllers*, AT&P Journal, vol. 4,1998, Bratislava, pp. 59 – 60, (in Slovak).

- **Papers in scientific conference proceedings:**

1. Petras, I., Grega, S., Dorcak, L.: *Digital fractional order controllers realized by PIC microprocessor: Experimental results*, In: Proceedings of the ICCC'2003 conference, High Tatras, May 26-29, 2003, pp. 873 - 876.
2. Dorcak, L., Petras, I., Terpak, J., Zborovjan, M.: *Comparison of the methods of discrete approximation of the fractional-order operator*, In: Proceedings of the ICCC'2003 conference, High Tatras, May 26-29, 2003, pp. 851 - 856.

3. Podlubny, I., Petras, I., Vinagre B. M., Chen, Y.Q., O'Leary, P., Dorcak. L.: *Realization of fractional order controllers*, In: Proceedings of the ICCC'2003 conference, High Tatras, May 26-29, 2003, pp. 877 - 880.
4. Dorcak, L., Petras, I., Terpak, J.: *Algorithms for solving of fractional-order models in state space*, In: Proceedings of the Informatics and Algorithms'2002 Conference, Presov, September 12 - 13, 2002, pp. 124 - 129, ISBN 80-88941-21-0, (in Slovak).
5. Terpak, J., Dorcak, L., Petras, I.: *Algorithms for exhausting control of sintering belt*, In: Proceedings of the Informatics and Algorithms'2002 Conference, Presov, September 12 - 13, 2002, pp. 252 - 256, ISBN 80-88941-21-0, (in Slovak).
6. Vinagre, B.M., Petras, I., Podlubny, I., Chen, Y.Q.: *Stability of fractional-order model reference adaptive control*, In: MTNS'2002, August 12 - 16, 2002, Notre Dame, USA. pp. 118 – 121.
7. Petras, I., Chen, Y.Q, Vinagre, B.M.: *Robust stability test for interval fractional order linear system*, In: MTNS'2002, August 12 - 16, 2002, Notre Dame, USA, pp.115 –117.
8. Petras, I., Vinagre, B. M., Dorcak, L., Feliu, V.: *Fractional Digital Control of a Heat Solid: Experimental Results*, Proceedings of the ICCC'2002, Malenovice, Czech Republic, May 27 - 30, 2002, pp. 365 – 370, ISBN 80-248-0089-6.
9. Terpak, J., Dorcak, J., Kostial, I., Petras, I.: *Mathematical model of the theoretical temperature of the blast furnace*, Proceedings of the ICCC'2002, Malenovice, Czech Republic, May 27 - 30, 2002, pp. 167 – 172, ISBN 80-248-0089-6.
10. Dorcak, L., Petras, I., Kostial, I., Terpak, J.: *Fractional-order state space models*, Proc. of the ICCC'2002, Malenovice, Czech Republic, May 27-30, pp. 193–198, ISBN 80-248-0089-6.
11. Dorcak, L., Terpak, J., Kostial, I., Petras, I.: *Control of speed of turboexhausters for agglomeration belt*, Proceedings of the ICCC'2002, Malenovice, Czech Republic, May 27 - 30, 2002, pp. 335 – 340, ISBN 80-248-0089-6.
12. Petras, I., Chen, Y.Q., Vinagre, B. M.: *A Robust Stability Test Procedure for a Class of Uncertain LTI Fractional-Order Systems*, Proceedings of the ICCC'2002, Malenovice, Czech Republic, May 27 - 30, 2002, pp. 247 - 252, ISBN 80-248-0089-6.
13. Petras, I., Dorcak, L., Terpak, J., Kostial, I.: *Fractional-order control systems*, In: Proceedings of the 3rd DAAAM Workshop "Intelligent Manufacturing Systems", 29th November 2001, pp. 61-62.

14. Vinagre, B. M., Petras, I., Merchan P., Dorcak, L.: *Two digital realizations of fractional controllers: Application to temperature control of a solid*, Proceedings of the ECC'2001, September 4-7, Seminario de Vilar, Porto, Portugal, pp.1764 - 1767.
15. Petras, I., Podlubny, I., O'Leary P., Dorcak, L.: *Analogue fractional-order controllers: Realization, tuning and implementation*, In: Proc. of ICC'2001, May 22 - 25, Krynica, Poland, pp. 9 - 14, ISBN 83-91340-07-4.
16. Dorcak, L., Petras I., Kostial, I., Terpak, J.: *State-space controller design for the fractional-order regulated system*, In: Proc. of ICC'2001, May 22 - 25, Krynica, Poland, pp. 15 – 20.
17. Petras, I., Grega, S.: *Digital fractional-order controllers: A possible hardware realization*, In: Proceedings of ICC'2001, May 22-25, Krynica, Poland, pp.217 - 222, ISBN 83-91340-07-4.
18. Petras, I., Hysiusova, M.: *Design of fractional - order controllers via H_∞ norm minimisation*, In: Proc. of IFAC conference, Control Systems Design, June 18 - 20, 2000, Bratislava, Slovak Republic, pp. 454 - 457, ISBN: 0-08-043546-7.
19. Kostial, I., Nemcovsky, P., Rogal, M., Terpak, J., Dorcak, L., Petras, I. : *Blast furnace process control*, In: Proc. of IFAC Workshop, Future trends in Autom. in Mineral and Metal Processing, August 22-24, 2000, Finland, pp. 263 - 268, ISBN: 0-08-043622-6.
20. Petras, I., Dorcak, L.: *Modelling and simulation of discrete fractional order control systems*, In: Proc. of Informatics and Algorithms'2000 conference, Presov, September 7- 8, 2000, pp.152 - 155, (in Slovak), ISBN 80-88941-13-X.
21. Petras, I.: *Feedback control of chaotic fractional-order Chua's system*, In: Proc. of ICC'2000, May 23-26, High Tatras, Slovak Rep., pp. 471-474, ISBN 80-7099-510-6.
22. Petras, I., Dorcak, L., Kostial, I.: *The modelling and analysis of fractional-order control systems in discrete domain*, In: Proc. of ICC'2000, May 23 - 26, 2000, High Tatras, Slovak Republic, pp. 257 - 260, ISBN 80-7099-510-6.
23. Petras, I., Dorcak, L., O'Leary, P., Vinagre, B. M., Podlubny, I.: *The modelling and analysis of fractional-order control systems in frequency domain*, In: Proc. of ICC'2000, May 23-26, High Tatras, Slovak Rep., pp.261-264, ISBN 80-7099-510-6.
24. Dorcak, L., Petras, I., Kostial, I.: *The modelling and analysis of fractional-order regulated systems in the state space*, In: Proc. of ICC'2000, May 23 - 26, 2000, High Tatras, Slovak Republic, pp. 185 - 188, ISBN 80-7099-510-6.

25. Petras, I., Dorcak, L.: Frequency characteristics of control system with fractional order delay, In: Proc. of Informatics and Algorithms'99 conference, Presov, September 9-10, 1999, pp.164 - 167, (in Slovak), ISBN 80-88941-05-9.
26. Petras, I., Dorcak, L., Kostial, I., Kostur, K.: *Simulation of fractional - order control circuit*, In: Proc. of MOSIS'99, vol. 2, April 27 - 29, 1999, Roznov pod Radhostem, Czech Republic, pp. 213 – 218, (in Slovak).
27. Petras, I.: *The fractional - order controllers: Methods for their synthesis and application*, (Proceedings of abstracts), In: SCAM'99, April 24, 1999, Bratislava.
28. Petras, I., Dorcak, L., Kostial, I.: *Fractional-order methods in control theory*, In: Proc. of Process Control' 99 conference, May 31-June 3, Tatranske Matliare, pp.6-10, (in Slovak), ISBN 80-227-1228-0.
29. Petras, I., Dorcak, L., Kostial, I.: *A comparison of the integer and the fractional order controllers on the laboratory object*, In: Proceedings of ICAMC98/ASRTP'98, September 8-12, Tatranske Matliare, pp. 451-454, (in Slovak), ISBN 80-7099-367-7.
30. Dorcak, L., Petras, I., Kostial, I.: *Algorithms for calculation of stability and damping measure of the fractional order control systems*, In: Proc. of ICAMC'98/ASRTP'98, September 8 - 12, Tatranske Matliare, 1998, pp. 243 - 246, ISBN 80-7099-367-7.
31. Petras, I., Stremen, M.: *Small amount gas flow meter*, In: Proceedings of ICAMC'98/ASRTP'98, September 8 - 12, Tatranske Matliare, pp. 314 - 317, (in Slovak).
32. Terpak, J., Dorcak, L., Petras, I., Kostial, I., Nemcovsky, P.: *Mathematical model of gas convection in the blast furnace bath*, In: Proc. of ICAMC'98/ASRTP'98, September 8-12, Tatranske Matliare, pp. 251-254, (in Slovak), ISBN 80-7099-367-7.
33. Kostial, I., Nemcovsky, P., Dorcak, L., Terpak, J., Petras, I.: *Blast furnace control model*, In: Proc. of ICAMC'98/ASRTP'98, Sept. 8 - 12, Tatranske Matliare, pp.501 - 504, (in Slovak).
34. Petras, I., Dorcak, L., Kostial, I.: *Control algorithm for fractional controlled systems*, In: Proc. of Informatics and Algorithms'98 conference, Presov, September 3 - 4, 1998, pp. 202 – 206, (in Slovak), ISBN 80-967593-8-8.
35. Petras, I., Dorcak, L., Kostial, I.: *Design of fractional - order controllers with given stability and dumping measures*, In: Proc. of 9th International BERG Conf., Kosice, Slovak Republic, Sept. 2-5, 1997, pp. 116-119, (in Slovak), ISBN 80-88896-08-8.

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References:

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