

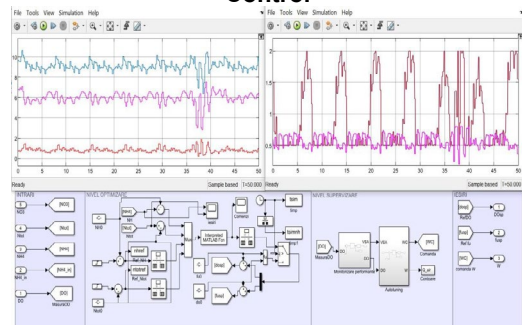
INDUSTRIAL PROCESSES CONTROL SYSTEMS AND INSTRUMENTATION

Contact details

Name	Industrial Processes Control Systems and Instrumentation
Acronym	IPCSI
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Wastewater Treatment Plant Monitoring and Control



Wastewater Treatment Plant Monitoring and Optimization

Areas of expertise

Industrial processes control systems.

Performance evaluation of industrial processes, design, implementation and analysis of automatic systems for the control of process parameters.

Advanced automatic control strategies: advanced control structures, advanced control algorithms.

Embeddedsystems-microcontrollers, data acquisition interfaces, industrial communications.

Team

Prof. Dr. Eng. Ioan Nascu, SI.Dr. Eng. Ruben Crisan, SI. Dr. Eng. Gabriel Harja, Conf. Dr. Eng. Ioana Nascu, SI. Dr. Eng. Isabela Birs, PhD students: Assist. Drd. Eng. Mihai Stanese, Drd. Eng. Bianca Todorean, Drd. Eng. Vasile Dan, Drd. Eng. Cristina Grecu, Drd. Eng. Tudor Plugaru.

Representative projects

ASCOS - Sistem avansat de supervizare si control pentru optimizarea functionarii statiilor de epurare ape uzate, PN-III-P2-2.1-PED-2021-1147, <https://ascos.weebly.com/>

SOMCEB - Development and validation of a multi-variable control system for the biological stage of wastewater treatment plants, PN-III-P2-2.1-CI-2018-1212, <https://somceb.wixsite.com/proiect>

SMEOPA -System for monitoring the efficiency and optimizing the aeration process for activated sludge wastewater treatment plants, PN-III-P2-2.1-CI-2017-0202, <https://smeopa2.wixsite.com/proiect>

CASEAU - "Strategii de conducere bazate pe tehnici de control avansat pentru optimizarea performantelor statiilor de epurare a apelor uzate si reducerea consumurilor energetice", PCCA 2013, Contract no. 274/2014, Caseau.wix.com/proiect

MULTIBAR, "Automatic modules for drinkable water using advanced oxidation processes and biofilter (multiple barriers)", PNII Innovation, 12DPST/20.08.2013, http://www.icpebn.ro/site_ro/cercetare/multibar/index.html (2013-2016)

TEHNOPUR, "Obtaining ultrapure water plant from primary sources", 2008-2010, INNOVATION Contract no. 177/2008, http://www.icpebn.ro/site_ro/cercetare/tehnopur/index.html (2008-2010)

Significant results

The most representative publications of the past 5 years:

1. Nascu, I, Diangelakis, NA, Muñoz, SG, Pistikopoulos, EN, Advanced model predictive control strategies for evaporation processes in the pharmaceutical industries, Computers & Chemical Engineering, Volume 173, DOI 10.1016/j.compchemeng.2023.108212
2. Ioana Naşcu, D. Sebastia-Saez, Tao Chen, Ioan Naşcu, Wenli Du, Global sensitivity analysis for a perfusion bioreactor based on CFD modelling, Computers & Chemical Engineering, Vol. 163, July 2022, 107829, Impact Factor: 4.13
3. Isabela Birs, Cristina Muresan, Dana Copot, Ioan Nascu, Clara Ionescu, Event-based fractional order control, Journal of Advanced Research, Volume 25, September 2020, Pages 191-203, <https://doi.org/10.1016/j.jare.2020.06.024>
4. Isabela Birs, Cristina Muresan, Dana Copot, Ioan Nascu, Clara Ionescu, Identification For Control Of Suspended Objects In Non-Newtonian Fluids, Fractional Calculus and Applied Analysis, Volume 22, Number 5 (2020), ISSN(Print) 1311-0454, (Electronic)ISSN 1314-2224,
5. Isabela Roxana Birs, Cristina Muresan, Ioan Nascu, Clara Ionescu, A Survey of Recent Advances in Fractional Order Control for Time Delay Systems, IEEE Access PP (99):1-1, March 2019, DOI: 10.1109/ACCESS.2019.2902567
6. T. Plugaru, Ioana Naşcu, Ioan Nascu, Model Predictive Control for A Three Phase PMSM Machine, 2025 29th International Conference on System Theory, Control and Computing (ICSTCC), 09-11 October 2025, Cluj-Napoca, Romania, DOI: 10.1109/ICSTCC 66753.2025.11240378
7. Ioana Naşcu, Wenli Du, Ioan Naşcu, "Aeration Optimization and Control for Wastewater Treatment Processes", 33rd European Symposium on Computer Aided Process Engineering (ESCAPE33), Athens, Greece, 18-21 June 2023, Computer Aided Chemical Engineering, Vol 52, pp 1637-1642, ISSN 1570-7946, DOI 10.1016/B978-0-443-15274-0.50260
8. Ioana Naşcu, Nikolaos A. Diangelakis, Yan-Shu Huang, Zoltan K. Nagy, Isabela Birs, Ioan Naşcu, "Multiparametric Model Predictive Control Strategies for a Rotary Tablet Press in Pharmaceutical Industry", 2023 IEEE Conference on Systems, Man, And Cybernetics, Oahu, USA, 1-4 Oct 2023
9. Ioana Naşcu, Wenli Du, Ioan Naşcu, "An Auto-tuning method for aeration control in activated sludge wastewater treatment processes ", IEEE 2022 International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME 2022), Male, 16-18 nov.2022
10. Dan V., Harja G., Nascu I., Advanced Rubik's Cube Algorithmic Solver, 2021 7th International Conference on Automation, Robotics and Applications (ICARA), 4-6 Feb. 2021, Prague, DOI: 10.1109/ICARA51699.2021.9376564, Electronic ISBN:978-1-6654-0469-3
11. I Birs, CI Muresan, R Both, I Nascu, A real life implementation of fractional order event based PI control, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 21-23 May 2020, Cluj-Napoca, Romania, DOI: 10.1109/AQTR49680.2020.9129933
12. Harja G., Nascu I., Advanced control for nitrogen removal of an intermittently operated ASWWTP, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 21-23 May 2020, Cluj-Napoca, Romania, DOI: 10.1109/AQTR49680.2020.9129992
13. Mihai Stanese, Mircea Susca, Vlad Mihaly, Ioan Nascu, Design and Control of a Self-Balancing Robot, Automation, Quality and Testing, Robotics(AQTR), ISBN:978-1-7281-7166-1, IEEE,2020, <https://ieeexplore.ieee.org/abstract/document/9129935>
14. I Birs, CI Muresan, R Both, I Nascu, Fractional Order Internal Model Control Strategies for a Submerged Nanorobot, 2020 International SAUPEC/RobMech/PRASA Conference, DOI: 10.1109/SAUPEC/RobMech/PRASA 48453.2020.9040977
15. Birs, I; Muresan, C; Copot, D; Nascu, I; Ionescu, C: Design and Practical Implementation of a Fractional Order Proportional Integral Controller (FOPI) for a Poorly Damped Fractional Order Process with Time Delay, 2019 IEEE 7th International Conference On Control, Mechatronics And Automation (ICCMA 2019) Pages: 56-61 WOS:000543726100010
16. Ioana Nascu, Ioan Nascu, Wen-Li Du, Sai Gu, Predictive Control for Continuous Stirred Tank Reactors, 2019 International Conference on Informatics, Control and Robotics (ICICR 2019) ISBN:978-1-60595-633-6, DEStech Trans on Engineering and Technology Research, ISSN: 2475-885X, DOI 10.12783/dtetr/icicr2019/30554
17. Muresan C., Birs I., Prodan O., Nascu I., De Keyser R., Approximation Methods for FO-IMC Controllers for Time Delay Systems, 2nd International Conference on Electrical Engineering and Green Energy (CEEGE 2019), Rome, Italy, Edited by Bevrani, H.; E3S Web of Conferences, Volume 115, id.01003, DOI: 10.1051/e3sconf/201911501003
18. Harja G., Nascu I., Control of an Activated Sludge Wastewater Treatment Process based on a Calibrated and Modified BSM1 Model, 20th International Carpathian Control Conference, 26-29 May, 2019, Kraków - Wieliczka, Poland

Patents:

"Parameters scheduling method for PID controllers", no. VI/112, September, 30, 2013

The offer addressed to the economic environment

Research & development	Modeling and simulation of processes with applications especially in chemical and biochemical processes. Advanced control strategies in biochemical processes. Advanced control strategies with applications in medicine.
Consulting	Evaluation and optimization of automatic control systems. Implementation of control systems using advanced control strategies

Training	Industrial process control systems. Complex industrial processes modeling and simulation. Sensors and instrumentation. PLC configuration and programming. Advanced control algorithms (model based predictive control, adaptive control).
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