INDUSTRIAL PROCESSES CONTROL SYSTEMS AND INSTRUMENTATION

Contact details

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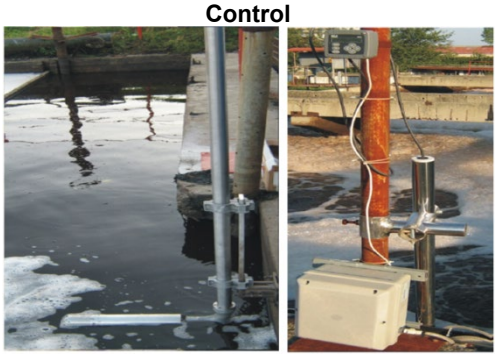
Wastewater Treatment Plant Monitoring and Control



Control of the **dissolved oxygen** concentration in a wastewater treatment plant

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, Sl.Dr. Eng. Ruben Crisan, Assist. Dr. Eng. Tudor Buzdugan, Sl. Dr. Eng. Gabriel Harja, Sl. Dr. Eng. Ioana Nascu, Assist. Dr. Eng.Isabela Birs, PhD students: Assist. Drd. Eng. Mihai Stanese, Drd. Eng. Bianca Toderean, Drd. Eng. Vasile Dan

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. Ioana Nașcu, D.Sebastia-Saez, Tao Chen, Ioan Nașcu, 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
2. 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
3. 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,

4. 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
5. 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
6. Covaci R., Harja G., Nascu I., Autonomous Maze Solving Robot, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 21-23 May 2020, Cluj-Napoca, Romania, DOI: 10.1109/AQTR49680.2020.9129943
7. 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
8. 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
9. 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
10. 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
11. 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
12. 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
13. 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
14. 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
15. Ioan Naşcu, Hierarchical predictive control of Wastewater Treatment Plants, MATEC Web of Conferences, Vol 210, art.no.02002 (2018)
16. Ioana Naşcu, Ioan Naşcu, Improving Activated Sludge Wastewater Treatment Process Efficiency Using Predictive Control, Advances in Technology Innovation(AITI), Vol.3 No.2 2018, pp 59-69, ISSN 2415-0436
17. Birs I., Muresan C., Nascu I., Folea S., Ionescu C., Experimental results of fractional order PI controller designed for second order plus dead time (SOPDT) processes, 2018 15th International Conference on Control, Automation, Robotics and Vision (ICARCV), IEEE, Electronic ISBN: 978-1-5386-9582-1
18. Ioana Naşcu, Ioan Naşcu, Multilevel predictive control system for an activated sludge wastewater treatment process, 5th Int.Conf. on Mathematics and Computers in Sciences and Industry- MCSI2018,Corfu Island, Greece, August 25-27, 2018
19. Crisan, Ruben; Harja, Gabriel; Nascu, Ioan; et al., Hierarchical Control System for Energy Savings in Wastewater Treatment Plant, 21st IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR THETA) Location: Cluj Napoca, ROMANIA Date: MAY 24-26, 2018 Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018
20. Dragan, Paul; Stanese, Mihai; Nascu, Ioan, Camera-based liquid level measurement using the refractive properties of the medium, 21st IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR THETA) Location: Cluj Napoca, ROMANIA Date: MAY 24-26, 2018 Book Series: IEEE International Conference on Automation Quality and Testing Robotics Published: 2018

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).

Last updated: January 2023