



OPTIMDRUG RESEARCH PROJECT

Dissemination of results - published papers:

1. A.R. Ynineb, D. Copot, E. Yumuk, R. De Keyser, H. Farbakhsh, G. Ben Othman, C. Muresan, I. Birs, S. Ladaci, M. Neckebroek, C.M. Ionescu (2025), Pharmacokinetic modelling during long term anesthesia: minimizing the gap, *Journal of Advanced Research*, doi: 10.1016/j.jare.2025.06.047 (**ISI Q1, impact factor 13.0**)
2. P.A. Pintea, E. Dulf (2024), Modelling Nonlinear Systems For Drug Administration Via Koopman Operator, *International Conference on Mathematical Analysis and Applications in Science and Engineering*, June 20-22, Porto, Portugalia (conferință internațională, lucrarea urmează să fie publicată în editura Springer)
3. P.A. Pintea, E. Dulf (2024), Weight Matrix Syntheses Using the Controllability Gramian for LQR Anaesthesia Control, *IEEE International Conference on Automation, Quality and Testing, Robotics - AQTR 2024*, May 16-18, 2024, Cluj-Napoca, Romania, pp. 1-6, doi: 10.1109/AQTR61889.2024.10554112. (**ISI Proceedings**, WOS:001253157800012)
4. P.A. Pintea, E. H. Dulf, C.I. Muresan, C.M. Ionescu (2024), Inducing Anaesthesia via Exact Feedback Linearization control, *4th IFAC Conference on Advances in Proportional-Integral-Derivative Control (PID 2024)*, June 12-14, Almería, Spain, vol. 58 (7), pp.246-251, doi: [10.1016/j.ifacol.2024.08.069](https://doi.org/10.1016/j.ifacol.2024.08.069) (**ISI Proceedings**, WOS:001302114600042)
5. E. Hegedus, M.D. Mihai, I.R. Birs, H. Farbakhsh, E. Yumuk, D. Copot, E.H. Dulf, R. De Keyser, C.M. Ionescu, C.I. Muresan (2024), Analysis and Preliminary Results of a Feedback-Feedforward Controller for Depth of Anesthesia, *4th IFAC Conference on Advances in Proportional-Integral-Derivative Control (PID 2024)*, June 12-14, Almería, Spain, vol. 58 (7), pp.216-221, doi: [10.1016/j.ifacol.2024.08.037](https://doi.org/10.1016/j.ifacol.2024.08.037) (**ISI Proceedings**, WOS:001302114600037)
6. M.D. Mihai, I.R. Birs, E. Hegedus, D. Copot, M. Neckebroek, R. De Keyser, C.M. Ionescu, C.I. Muresan (2024), First-Hand Design of a Fractional order PID for Controlling the Depth of Hypnosis during Induction, *4th IFAC Conference on Advances in Proportional-Integral-Derivative Control (PID 2024)*, June 12-14, Almería, Spain, vol. 58 (7), pp.186-191, doi: [10.1016/j.ifacol.2024.08.032](https://doi.org/10.1016/j.ifacol.2024.08.032) (**ISI Proceedings**, WOS:001302114600032)
7. A.R. Ynineb, M.D. Mihai, E. Yumuk, H. Farbakhsh, G. Ben Othman, R. De Keyser, C.I. Muresan, I.R. Birs, D. Copot, C. M. Ionescu (2024), Fractional Order PID Control of Propofol Dosage and Optimization in Lean and Obese Patients, *4th IFAC Conference on Advances in Proportional-Integral-Derivative Control (PID 2024)*, June 12-14, Almería, Spain, vol. 58 (7), pp. 228-233, doi: [10.1016/j.ifacol.2024.08.039](https://doi.org/10.1016/j.ifacol.2024.08.039) (**ISI Proceedings**, WOS:001302114600039)
8. E. Hegedus, M.D. Mihai, I.R. Birs, H. Farbakhsh, E. Yumuk, D. Copot, R. De Keyser, C.M. Ionescu, C.I. Muresan (2024), A Decoupled Fractional Order Control Strategy to Increase Patient Safety During Anesthesia-Hemodynamic Interactions, *22nd European Control Conference*, June 25-28, Stockholm, Sweden, pp. 3039-3044, doi: 10.23919/ECC64448.2024.10591046 (**ISI Proceedings**, WOS:001290216502129)



OPTIMDRUG RESEARCH PROJECT

9. E.T. Hegedüs, I.R. Birs, C.M. Ionescu, C.I. Muresan (2024), A novel decentralized-decoupled fractional order control strategy for complete anesthesia-hemodynamic stabilization in patients undergoing surgical procedures, *Fractal and Fractional*, 8, 623. <https://doi.org/10.3390/fractalfract8110623> (**ISI Q1, impact factor 3.3**)
10. P. A. Pintea, E. H. Dulf (2024), Disturbance modelling in Anaesthesia Control using Regression Models based on Gauss Processes, *2024 IEEE 22nd Jubilee International Symposium on Intelligent Systems and Informatics (SISY), Pula, Croatia*, pp. 000411-000414, doi: 10.1109/SISY62279.2024.10737550 (IEEE, în curs de indexare)
11. C.M. Ionescu, R. De Keyser, D. Copot, E. Yumuk, I.R. Birs, E. Hegedus, C.I. Muresan, M. Neckebroek (2024), Minimizing Epistemic Uncertainty for Predictive Control of General Anesthesia, *2th IFAC Symposium on Biological and Medical Systems*, IFAC-PapersOnLine, Vol. 58(24), pp. 490-495, <https://doi.org/10.1016/j.ifacol.2024.11.086>. (**ISI Proceedings**, WOS:001359709100085)
12. E. T. Hegedus, M.D. Mihai, G. Ben Othman, D. Copot, I.R. Birs, C.I. Muresan (2024), Comparative analysis for the maintenance phase of depth of anesthesia: decentralized or decoupled?, *The International Conference on Electrical, Computer, Communications and Mechatronics Engineering*, 4-6 November 2024, Male, Maldives, pp. 01-06, doi: 10.1109/ICECCME62383.2024.10797115. (IEEE, în curs de indexare)
13. T. Popescu, N. Badau, M. Mihai, E. Hegedus, I. Birs, D. Copot, E. H. Dulf, C.I. Muresan (2024), Advancing Anesthesia Education: Training on Modeling and Control for Enhanced Patient Care, *4th Workshop on Internet Based Control Education*, IFAC-PapersOnLine, Vol. 58(26), pp. 152-157, <https://doi.org/10.1016/j.ifacol.2024.10.287> (**ISI Proceedings**, WOS: 001354678800027)
14. E.-H. Dulf, P. A. Pintea, C. I. Muresan (2024), Anesthesia Control using Fractional Order Controller, *The IEEE 18th International Conference on Control, Automation, Robotics and Vision (ICARCV 2024)*, 12-15 December 2024, Dubai UAE, pp. 1178-1181, doi: 10.1109/ICARCV63323.2024.10821592 (**ISI Proceedings**, WOS:001435120000188)
15. M. D. Marcian, I. Birs, E. Hegedus, A. Ynineb, D. Copot, R. De Keyserb, C.M. Ionescu, S. Ladaci, C.I. Muresan, M. Neckebroek (2025), Online and Personalised Control of the Depth of Hypnosis during Induction using Fractional order PID, *Journal of Advanced Research*, <https://doi.org/10.1016/j.jare.2025.03.05> (**ISI Q1, impact factor 13**)
16. E. Hegedus, A. Maxim, M. Mihai, I.R. Birs, N. Badau, C.I. Muresan (2025), Multivariable control in general anesthesia: A comparative study of model predictive control and fractional order control, *IEEE 12th International Joint Conference on Cybernetics and Computational Cybernetics, Cyber-Medical Systems (ICCC 2025)*, April 9-11 2025, Seychelle Islands, pp. 27-32, doi: 10.1109/ICCC64928.2025.10999109 (**ISI Proceedings**, WOS:001510286600005)
17. R. De Keyser, I. R. Birs, C. I. Muresan (2025), A practical closed loop transfer function estimation method to enable better control performance, *International Conference on Control, Decision and Information Technologies*, 15-18 iulie 2025, Split, Croatia, prezentat (IEEE, în curs de indexare)
18. C. I. Muresan, M. D. Mihai, E. Hegedus, N. Badau, I. R. Birs, R. De Keyser (2025), A Robust Fractional Order PI Controller for Time Constant Variations, *Fractional Calculus and Applied Analysis*, în recenzie (**ISI Q1**)



OPTIMDRUG RESEARCH PROJECT

19. Nicoleta Badau, Teodora Popescu, Marcian Mihai, Isabela Birs, Cristina Muresan, Personalized Control using Fractional Calculus for Patients Experiencing Surgical Stimuli, 29th International Conference on System Theory, Control and Computing, Cluj-Napoca, Romania, October 9-11, 2025, acceptat (IEEE, în curs de indexare)
20. Mihai, M.D.; Birs, I.R.; Badau, N.E.; Hegedus, E.T.; Ynineb, A.; Muresan, C.I. Personalised Fractional-Order Autotuner for the Maintenance Phase of Anaesthesia Using Sine-Tests. *Fractal Fract.* 2025, 9, 317. <https://doi.org/10.3390/fractalfract9050317> (ISI Q1, impact factor 3.3)
21. I. Birs, C. Rizel, M. Mihai, C. Muresan and R. De Keyser, Validation of a short relay test PID autotuner on a nonlinear process with stochastic disturbances, 2025 33rd Mediterranean Conference on Control and Automation (MED), Tangier, Morocco, 2025, pp. 305-310, doi: 10.1109/MED64031.2025.11073414, prezentat (IEEE, în curs de indexare)
22. A. C. Malița and C. I. Mureșan, Optimisation of Fractional Order Controllers using Genetic Algorithms for Bispectral Index Regulation, 2025 33rd Mediterranean Conference on Control and Automation (MED), Tangier, Morocco, 2025, pp. 126-131, doi: 10.1109/MED64031.2025.11073313, prezentat (IEEE, în curs de indexare)
23. A. M. Tudor and C. I. Muresan, Multi-objective genetic algorithm optimization applied on hemodynamic system control, 2025 33rd Mediterranean Conference on Control and Automation (MED), Tangier, Morocco, 2025, pp. 417-422, doi: 10.1109/MED64031.2025.11073231, prezentat (IEEE, în curs de indexare)
24. C. I. Muresan, M. D. Mihai, E. Hegedus, N. Badau, T. Popescu and I. R. Birs, "Robust Fractional Order Control of a Multivariable Hemodynamic System," 2025 33rd Mediterranean Conference on Control and Automation (MED), Tangier, Morocco, 2025, pp. 678-683, doi: 10.1109/MED64031.2025.11073354, prezentat (IEEE, în curs de indexare)
25. Malița, A.-C.; Muresan, C.I.; Duarte-Mermoud, M.A.; Ceballos Benavides, G. Adaptive Fractional Order Control for Bispectral Index Regulation During Anaesthesia. *Fractal Fract.* 2025, 9, 330. <https://doi.org/10.3390/fractalfract9060330> (ISI Q1, impact factor 3.3)
26. M. Mihai, I. Birs, E. Hegedus, C. I. Muresan, Multivariable Event-Based PID Algorithm for Anesthesia Control, 5th International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Zanzibar, 16-19 octombrie 2025, acceptat
27. E. Hegedus, I. Birs, M. Mihai, C. Muresan, Event-based fractional-order PI control for reduced computational load in decoupled Anesthesia-Hemodynamic systems, 5th International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Zanzibar, 16-19 octombrie 2025, acceptat
28. A. Berciu, L. Kovacs, E. Dulf, Hybrid Supervisory Control for Multi-Input General Anesthesia: Fuzzy PI vs. Rule-Based Control of Cardiac Output, IEEE International Conference on Systems, Man, and Cybernetics (SMC), Austria, 5-8 octombrie 2025, acceptat
29. I. Birs, M. Mihai, E. Hegedus, N. Badau, C. Muresan, Comparative Analysis of Hill-Based Interaction Models for Predicting BIS During General Anesthesia, 5th International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Zanzibar, 16-19 octombrie 2025, acceptat



OPTIMDRUG RESEARCH PROJECT

30. M.D. Mihai, R. De Keyser, I.R. Birs, C.M. Ionescu, C.I. Muresan (2025), A Novel Fractional-Order PID Autotuning Method with Robustness to Time Constant Variation, IEEE/CAA Journal of Automatica Sinica, în recenzie (**ISI Q1**)
31. N.E. Badau, T.M. Popescu, M. D. Mihai, I.R. R. Birs, C. I. Muresan (2025), A robust fractional order controller for biomedical applications, Fractal and Fractional, 9, 597, doi: 10.3390/fractalfract9090597 (**ISI Q1, impact factor 3.3**)
32. T.M. Popescu, N.E. Badau, A.M. Tudor, A.C. Malita, I. R. Birs, C.I. Muresan (2025), Preliminaries on Mean Arterial Pressure Regulation Using Closed Loop Norepinephrine Infusion, Fractal and Fractional , în recenzie (**ISI Q1**)
33. R. De Keyser, I.R. Birs, C.I. Muresan, C.M. Ionescu (2025), Revisiting the impulse response creates an improved PID autotuner, Scientific Reports, acceptat (**ISI Q1**)
34. E. Hegedüs, I. Birs, C. Ionescu, M. Mihai, C.I. Muresan, Event-Based Fractional Order Control for Multi-Drug Anesthesia Systems: Improved Performance with Computational Efficiency, Biomedical Signal Processing and Control, în recenzie (**ISI Q1**)

Special sessions organized:

1. C.M. Ionescu, A. Visioli, C.I. Muresan, Special session on “Drug dosing control in anesthesia”, *4th IFAC Conference on Advances in Proportional-Integral-Derivative Control (PID 2024)*, June 12-14, Almería, Spain
2. C.I. Muresan, D. Copot, E. Yumuk. M. Neckebroek, Special session on “Multi-Drug Control and Optimization”, *22nd European Control Conference*, June 25-28, Stockholm, Sweden