

Tudor-Bogdan AIRIMITOAI

Curriculum Vitæ

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Education

- 28 June '12 **PhD in Automatic Control, Gipsa-lab, University of Grenoble, France. Co-directorship of thesis with the University “Politehnica” of Bucharest, Romania.**
Title: *Robust Design and Tuning of Active Vibration Control Systems.*
- 23 Sept. '08 **Engineer Diploma (Bac+5).** Faculty of Automatica Control and Computers Engineering, University “Politehnica” of Bucharest, Romania. System’s Engineering specialization.

Professional Experience

- Oct '14 – today **Associate Professor**, University of Bordeaux, France.
- Dec '12 – Apr '14 **Post-doc**, Inria, Rennes, France.
- Oct – Nov 2012 **Research engineer**, laboratories LIPhy and GIPSA-lab, University of Grenoble, France.
- May – June 2012 **Research engineer**, Paulstra SNC (Vibrachoc Dep.) and INP Grenoble Entreprise SA, France.

Teaching experience

Dynamic systems identification (MSc., 2nd year), since 2014.
Digital control systems (MSc., 1st year), since 2019.
Automatic control systems (BSc., 3rd year), since 2019.
Applied classes on system’s theory, control of aeronautical systems, Labview, and others.
Supervision of projects on the design, construction and control of unmanned aerial vehicles.

Fields of Research Interest

Adaptive regulation; Active noise and vibration control; Flat dynamic systems characterisation; Unmanned aerial vehicles; Predictive maintenance with neural networks based models.

Activities within my scientific community

- Co-organiser of a Benchmark on Adaptive Regulation and an invited session at ECC'13
- Reviewer for journals (most often): Control Engineering Practice, Journal of Vibration and Control, Automatica, Journal of The Franklin Institute, IEEE Trans. on Control Systems Technology, and others
- Reviewer for conferences: ECC, IFAC WC, CDC, ACC, ALCOSP, MathMod, and others

Software programs that I’ve designed

MIRCOD (Model Identification and Robust Controller Design) can be used for:

- open-loop discrete-time model identification
- closed-loop discrete-time model identification
- robust digital RST controller design (using sensitivity functions shaping)
- controller-order reduction

Awards

- Best PhD award from Club EEA, France, April, 2013
- Best PhD award from GdR MACS, France, April, 2013

Languages

Romanian Native
French Fluent in reading, writing, and speaking
English Fluent in reading, writing, and speaking
German Conversational (TestDAF certificate since 2008)

Ph.D. Students advising

- Evgeny Shulga, *Development of optimal anticipative control laws for powertrain* (April 2019 – today)
- Rim Rammal, *Development of methods for the characterization of flat integer or fractional systems: application to path planning and fault detection of thermal systems* (October 2017 – today)
- Raúl Antonio Mélenlez Márquez, *Active noise control in the presence of uncertain and time-varying disturbances*, University of Grenoble, France, defended on 23rd of May 2019
- Asma Achnib, *Development of the CRONE control with robust anticipative effect*, University of Bordeaux, France, defended on 25th of April 2019

Publications

Books

- [B1] Landau, I.D., Airimitoiaie, T.-B., Castellanos-Silva, A., Constantinescu, A. (2017). Adaptive and Robust Active Vibration Control-Methodology and Tests, Springer Verlag, Advances in Industrial Control series, 2017.

Book chapters

- [Ch1] Achnib, A., Airimitoiaie, T.-B., Abrashov, S., Lanusse, P., and Aoun, M. (2017). Performances and robustness of GPC controller in an anticipative context, in: Systems, Automation, and Control, chapter , De Gruyter Oldenbourg, N. DERBEL and F. DERBEL and O. KANOUN (edts.), 249–266, 2019.

Refereed Journal Publications

- [J1] Airimitoiaie, T.-B., Landau, I.D., Melendez, R., and Dugard, L., "Algorithms for Adaptive Feedforward Noise Attenuation—A Unified Approach and Experimental Evaluation", *IEEE Transactions on Control Systems Technology*, (), 2020 (early access).
- [J2] Achnib, A., Airimitoiaie, T.-B., Lanusse, P., Abrashov, S., Aoun, M., and Chetoui, M., "Discrete-time robust control with an anticipative action for preview systems", *Journal of Dynamic Systems, Measurement, and Control*, 141(3): , 2019.
- [J3] Landau, I.D., Meléndez, R., Airimitoiaie, T.-B., and Dugard, L., "Beyond the delay barrier in adaptive feedforward active noise control using Youla–Kučera parametrization", *Journal of Sound and Vibration*, 455(): 339-358, 2019.
- [J4] Airimitoiaie, T.-B. and Landau, I.D., "Combined adaptive feedback and feedforward compensation for active vibration control using Youla–Kučera parametrization", *Journal of Sound and Vibration*, 434(): 422 - 441, 2018.
- [J5] Airimitoiaie, T.-B. and Landau, I.D., "Robust and Adaptive Active Vibration Control Using an Inertial Actuator", *IEEE Transactions on Industrial Electronics*, 63(10): 6482-6489, 2016.
doi:10.1109/TIE.2016.2548438
- [J6] Landau, I.D., Airimitoiaie, T.-B., and Castellanos Silva, A., "Adaptive attenuation of unknown and time-varying narrow band and broadband disturbances", *International Journal of Adaptive Control and Signal Processing*, 29(11): 1367–1390, 2015.
doi:10.1002/acs.2547
- [J7] Landau, I.D., Airimitoiaie, T.-B., Castellanos Silva, A., and Alma, M., "Adaptive active vibration isolation – A control perspective", *MATEC Web of Conferences*, 20(): 04001, 2015.
doi:10.1051/mateconf/20152004001
- [J8] Airimitoiaie, T.-B. and Landau, I.D. (2014). Indirect adaptive attenuation of multiple narrow-band disturbances applied to active vibration control, *IEEE Transactions on Control Systems Technology*, 22(9): 761-769.
doi:10.1109/TCST.2013.2257782
- [J9] Airimitoiaie, T.-B., Castellanos Silva, A., and Landau, I.D. (2013). Indirect adaptive regulation of time varying narrow-band disturbances applied to a benchmark problem, *European Journal of Control*, 19(4): 313-325.
doi:10.1016/j.ejcon.2013.05.011
- [J10] Castellanos Silva, A., Landau, I.D., and Airimitoiaie, T.-B. (2013). Direct adaptive rejection of unknown time-varying narrow band disturbances applied to a benchmark problem, *European Journal of Control*, 19(4): 326-336.
doi:10.1016/j.ejcon.2013.05.012
- [J11] Landau, I.D., Castellanos Silva, A., Airimitoiaie, T.-B., Buche, G., and Noé, M. (2013). Benchmark on adaptive regulation - rejection of unknown/time-varying multiple narrow band disturbances, *European Journal of Control*, 19(4): 237:252.
doi:10.1016/j.ejcon.2013.05.007

- [J12] Airimitoiaie, T.-B. and Landau, I.D. (2013). Improving adaptive feedforward vibration compensation by using “Integral + Proportional” adaptation, *Automatica*, Technical communique, 49(5): 1501-1505.
doi:10.1016/j.automatica.2013.01.025
- [J13] Landau, I.D., Airimitoiaie, T.-B., and Alma, M. (2013). IIR Youla-Kučera parametrized adaptive feedforward compensators for active vibration control with mechanical coupling, *IEEE Transactions on Control Systems Technology*, 21(3) : 765-779.
doi:10.1109/TCST.2012.2194714
- [J14] Landau, I.D., Airimitoiaie, T.-B., and Alma, M. (2012). A Youla-Kučera parametrized adaptive feedforward compensator for active vibration control with mechanical coupling, *Automatica*, Brief paper, 48(9): 2152-2158.
doi:10.1016/j.automatica.2012.05.066
- [J15] Alma, M., Landau, I.D., and Airimitoiaie, T.-B. (2012). Adaptive feedforward compensation algorithms for AVC systems in the presence of a feedback controller, *Automatica*, Technical communique, 48(5): 982-985.
doi:10.1016/j.automatica.2012.02.015
- [J16] Landau, I.D., Alma, M., and Airimitoiaie, T.-B. (2011). Adaptive feedforward compensation algorithms for active vibration control with mechanical coupling, *Automatica*, 47(10): 2185-2196.
doi:10.1016/j.automatica.2011.08.015

Refereed International Conference Publications

- [C1] Airimitoiaie, T.-B., Lanusse, P., and Achnib, A., ”Robust Anticipative Controller Design with Application to A High Dynamic Engine Testbed”, 21th World Congress of the International Federation of Automatic Control, Jul, 2020.
- [C2] Rammal, R., Airimitoiaie, T.-B., Cazaurang, F., Lévine, J., and Melchior, P., ”On the Choice of Multiple Flat Outputs for Fault Detection and Isolation of a Flat System”, 21th World Congress of the International Federation of Automatic Control, Jul, 2020.
- [C3] Rammal, R., Airimitoiaie, T.-B., Melchior, P., Cazaurang, F., ”Unimodular Completion for Computation of Fractionally Flat Outputs for Linear Fractionally Flat Systems”, 21th World Congress of the International Federation of Automatic Control, Jul, 2020.
- [C4] Shulga, E., Lanusse, P., Airimitoiaie, T.-B., Maurel, S., and Trutet, A., ”Preview control of engine intake manifold pressure”, 28th Mediterranean Conference on Control and Automation, Sep, 2020.
- [C5] Airimitoiaie, T.-B., Farges, C., Lavigne, L., and Cazaurang, F., ”Convertible delta-wing aircraft for teaching and research”, 21st IFAC Symposium on Automatic Control in Aerospace ACA 2019, Aug, 2019.
- [C6] Landau, I.D., Airimitoiaie, T.-B., Meléndez, R., and Dugard, L., ”Why one should use Youla–Kučera parametrization in adaptive feedforward noise attenuation?”, 58th IEEE Conference on Decision and Control (CDC 2019), Dec, 2019, Article de conférence accepté le 19 juillet 2019.
- [C7] Achnib, A., Airimitoiaie, T.-B., Lanusse, P., Guefrachi, A., Aoun, M. and Chetoui, M., ”Anticipative Robust Design Applied to a Water Level Control System”, 2018 17th European Control Conference (ECC), Jun, 2018.
- [C8] Airimitoiaie, T.-B., Prieto Aguilar, G., Lavigne, L., Farges, C., Cazaurang, F., ”Convertible Aircraft Dynamic Modelling and Flatness Analysis”, 9th Vienna International Conference on Mathematical Modelling, Feb, 2018.
- [C9] Abrashov, S., Airimitoiaie, T.-B., Lanusse, P., Aioun, F., Malti, R., Moreau, X., and Guillemard, F., ”Model Predictive Control Tuning: Methods and Issues. Application to steering wheel position control”, 20th IFAC World Congress, Jul, 2017.
- [C10] Airimitoiaie, T.-B., Lavigne, L., Cohen, K., Farges, C., Cazaurang, F., ”Model Identification and control of a Convertible Aircraft (MICA)”, 42nd Dayton-Cincinnati Aerospace Sciences Symposium, Mar, 2017.
- [C11] Achnib, A., Airimitoiaie, T.-B., Abrashov, S., and Lanusse, P., ”Generalized predictive controller performances in an anticipative context”, In: 2017 14th International Multi-Conference on Systems, Signals Devices (SSD), March, 2017.
- [C12] Airimitoiaie, T.-B. and Landau, I.D., ”Attenuation of Vibrational Interference - Robust and Adaptive Approaches”, In: Proceedings of the 15th annual European Control Conference, June, 2016.
- [C13] Airimitoiaie, T.-B. and Collewet, C. (2014). Indirect adaptive control of unknown diffusion equation, In: *Proceedings of the 7th AIAA Flow Control Conference*, Atlanta, Georgia, USA.
- [C14] Airimitoiaie, T.-B. and Collewet, C. (2014). Improving robust stability by increasing the number of controlled degrees of freedom, In: *Proceedings of the 7th AIAA Flow Control Conference*, Atlanta, Georgia, USA.

- [C15] Landau, I.D. and Airimitoiaie, T.-B. (2014). A General Adaptive Feedforward Compensation Algorithm for Active Vibration Control with Mechanical Coupling and Local Feedback. In : *Proceedings of the 22nd Mediterranean Conference on Control and Automation (MED)*, June 16-19, Palermo, Italy.
- [C16] Airimitoiaie, T.-B., Castelanos Silva, A., and Landau, I.D. (2013). Direct and indirect adaptive regulation strategies for rejection of time varying narrow band disturbances applied to a benchmark problem, In: *Proceedings of the 12th European Control Conference*, July 17-19, Zürich, Switzerland (invited session).
- [C17] Landau, I., Airimitoiaie, T.-B., Castelanos Silva, A., and Buche, G. (2013). An active vibration control system as a benchmark on adaptive regulation, In: *Proceedings of the 12th European Control Conference*, July 17-19, Zürich, Switzerland (invited session).
- [C18] Airimitoiaie, T.-B. and Landau, I. (2013). An indirect adaptive scheme for attenuation of multiple narrow-band disturbances: stability analysis, In: *Proceedings of the 11th IFAC International Workshop on Adaptation and Learning in Control and Signal Processing*, July 3-5, Caen, France.
- [C19] Landau, I. and Airimitoiaie, T.-B. (2013). An Indirect Adaptive Feedback Attenuation Strategy for Active Vibration Control. In: *Proceedings of the 21st Mediterranean Conference on Control and Automation (MED)*, June 25-28, Crete, Greece.
- [C20] Landau, I. and Airimitoiaie, T.-B. (2012). Improving adaptive feedforward vibration compensation by using integral + proportional adaptation, In: *Proceedings of the 51st IEEE Conference on Decision and Control*, December 10-13, Maui, Hawaii.
- [C21] Landau, I., Airimitoiaie, T.-B., and Alma, M. (2011). An IIR Youla-Kučera parametrized adaptive feedforward compensator for active vibration control with mechanical coupling. In: *Proceedings of the 50th IEEE Conference on Decision and Control*, December 12-15, Atlanta, USA.
- [C22] Alma, M., Landau, I., Martinez, J., and Airimitoiaie, T.-B. (2011). Hybrid adaptive feedforward-feedback compensation algorithms for active vibration control systems. In: *Proceedings of the 50th IEEE Conference on Decision and Control and European Control Conference*, December 12-15, Atlanta, USA.
- [C23] Landau, I., Airimitoiaie, T.-B., and Alma, M. (2011). A Youla-Kučera parametrized adaptive feedforward compensator for active vibration control. In: *Proceedings of the 18th IFAC World Congress*, Milan, Italy.
- [C24] Landau, I., Airimitoiaie, T.-B., and Alma, M. (2011). Comparison of two approaches for adaptive feedforward compensation in active vibration control with mechanical coupling. In: *Proceedings of the 19th Mediterranean Conference on Control and Automation (MED)*, pages 207-212, Corfu, Greece.
- [C25] Airimitoiaie, T.-B., Landau, I., Dugard, L., and Popescu, D. (2011). Identification of mechanical structures in the presence of narrow band disturbances - application to an active suspension. In: *Proceedings of the 19th Mediterranean Conference on Control and Automation (MED)*, pages 904-909, Corfu, Greece.

Symposium publications

- [S1] Airimitoiaie, T.-B., Lavigne, L., Farges, C., Cohen, K. and Cazaurang, F., "Model identification and control of a convertible aircraft", At: 42nd Dayton-Cincinnati Aerospace Sciences Symposium, 2017.

Refereed National Conference Publications (in french)

- [Cf1] Airimitoiaie, T.-B., Landau, I.D., "Atténuation active des interférences vibrationnelles – Méthodologie et évaluation expérimentale", In: 5ième Colloque Francophone d'Analyse Vibratoire Expérimentale, Novembre, 2016.
- [Cf2] Airimitoiaie, T.-B., Landau, I.D., Dugard, L., Alma, M., Castellanos-Silva, A., Buche, G., and Noé, M. (2013). Algorithme de commande par action anticipatrice adaptative et contre-réaction fixe pour le contrôle actif de vibrations en présence de couplage mécanique interne. In: *Journées Démonstrateurs*, 12-13 June, Angers, France.
- [Cf3] Castellanos-Silva, A., Airimitoiaie, T.-B., Landau, I.D., Dugard, L., Buche, G., and Noé, M. (2013). Stratégies directes et indirectes de régulation adaptative du rejet de perturbations variables à bande étroite appliquées à un benchmark international. In: *Journées Démonstrateurs*, 12-13 June, Angers, France.