

Rodrigo A. González

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Personal Information

Full name: Rodrigo Alejandro González Vidal
Date of birth: 24th of September of 1992
Place of birth: Viña del Mar, Chile
Citizenship: Chilean
Professional Degree: Ingeniero Civil Electrónico (Electronics Engineer)

Research Interests

- Identification of continuous-time stochastic dynamical systems
- Finite sample analysis of system identification methods
- Non-parametric system identification
- Control over Networks

Education

- **KTH Royal Institute of Technology** Stockholm, Sweden
Ph.D. student, Division of Decision and Control Systems 2017 - 2022 (Projected)
 - Supervisor: Prof. Cristian R. Rojas
- **KTH Royal Institute of Technology** Stockholm, Sweden
Licenciate of Electrical Engineering 2017 - 2020
 - Title: *Consistency and Efficiency in Continuous-time System Identification*
 - Supervisor: Prof. Cristian R. Rojas.
 - Opponent: Prof. Hugues Garnier (Université de Lorraine, Nancy, France)
 - Completed: June 2020
- **Universidad Técnica Federico Santa María** Valparaíso, Chile
Master of Science of Electronic Engineering (Major: Automatic Control) 2015 - 2016
 - Title: *Imposition of Causality and Passivity in Spectral Analysis* (in Spanish).
 - Supervisor: Prof. Ricardo A. Rojas
 - Committee: Ph.D. Ricardo A. Rojas (UTFSM, Chile), Ph.D. Cristian R. Rojas (KTH, Sweden), Ph.Dc. Patricio E. Valenzuela (KTH, Sweden), Ph.D. Daniel Sbárbaro (U. Concepción, Chile)
 - Completed: November 2016
- **Universidad Técnica Federico Santa María** Valparaíso, Chile
Electronics Engineering Degree (6-year degree) 2011 - 2016
 - Supervisor: Prof. Ricardo A. Rojas
 - GPA: 92% (Maximum: 100%). Ranking: 1st out of 70 students
 - Completed: November 2016

Courses

- **Ph.D. Courses taken at KTH, Sweden:**

- FJL3380, Theoretical Foundations of Machine Learning (Spring 2019)
- FEL3311, Distributed Optimization (Spring 2019)
- FAK3127, The Sustainable Scientist (Spring 2019)
- FEL3202, Data Driven Modeling - Extended Course (Spring 2019)
- FEL3370, Mathematical Method in Signals, Systems and Control (Spring 2019)
- FAK3014, Theory and Methodology of Science (Spring 2019)
- FEM3200, Optimal Filtering (Autumn 2018)
- FEM3220, Matrix Algebra (Spring 2018)
- FDS3103, Introduction to Scientific Writing (Spring 2018)
- FSF3862, Nonlinear Systems, Analysis and Control (Spring 2018)
- FLH3000, Basic Communication and Teaching (Spring 2018)
- FEL3210, Multivariable Feedback Control Systems (Autumn 2017)
- FEF3301, Computational Game Theory (Autumn 2017)

- **MSc./Ph.D. Courses taken at UTFSM, Chile:**

- MAT235, Functional Analysis (attended lectures Semester 2017-1)
- MAT379, Optimization and Control (attended lectures Semester 2017-1)
- MAT263, Probability Theory and Stochastic Processes (attended lectures Semester 2016-1)
- MAT226, Measure Theory (attended lectures Semester 2015-2)
- MAT235, Complex Variables (Semester 2015-2)
- IPD476, Multivariable Control (Semester 2015-2)
- MAT225, Real Analysis (Semester 2015-1)
- IPD469, Models for Control (Semester 2015-1)
- IPD462, Advanced Design of Control Systems (Semester 2015-1)
- IPD468, System Dynamics (Semester 2014-2)
- IPD460, Information Theory (Semester 2014-2)
- IPD431, Probability and Random Processes (Semester 2014-1)
- IPD410, Mathematical Methods in Automatic Control (Semester 2013-2)

- **Coursera courses taken (with certificate):**

- Number Theory and Cryptography (UC San Diego)
- The Science of Well-Being (Yale)
- Psychological First Aid (John Hopkins University)
- Learning How to Learn: Powerful mental tools to help you master tough subjects (McMaster University)
- Write Professional Emails in English (Georgia Institute of Technology)

- Work Smarter, Not Harder: Time Management for Personal & Professional Productivity (UCI Division of Continuing Education)

Research Experience

- **Ph.D. student** Stockholm, Sweden
Division of Decision and Control Systems, KTH Oct. 2017 - 2022 (Projected)
 - Under the supervision of Prof. Cristian R. Rojas.
- **Visitor** Newcastle, NSW, Australia
School of Electrical Engineering and Computing, University of Newcastle Nov. 2019 - Dec. 2019
 - 5-week research visit to the group of Asoc. Prof. James Welsh
 - Funded by the Complex Dynamic Systems and Control (CDSC) Scholarship.
- **Reviewer** Stockholm, Sweden
IEEE-IFAC 2017 -
 - Reviewer for IFAC Automatica Journal, Elsevier Signal Processing Journal, IEEE Control Systems Letters, IFAC World Congress, IFAC Symposium on System Identification.
- **Research Assistant** Valparaíso, Chile
Department of Electronics, UTFSM Feb. 2017 - Sept. 2017
 - Hired by Project FONDECYT 1161241, ‘Optimal estimation and control over communication channels subject to data loss’
 - Under the supervision of Prof. Francisco Vargas
 - Output: One conference paper (ECC2018), two journal papers (TAC and L-CSS).
- **Visitor** Stockholm, Sweden
Division of Decision and Control Systems, KTH Mar. 2016
 - 2-week research visit to the System Identification Group of KTH, invited by Prof. Cristian Rojas.
- **Research Intern** Berlin, Germany
Control Systems Group, TU Berlin Jan. 2016 - Feb. 2016
 - 8-week internship
 - Funded by CONICYT’s ‘Scholarship for short internships abroad’.

Teaching and Supervision Experience

- **Teaching Assistant** KTH, Sweden
EL2820 ‘Modelling of Dynamical Systems’ (Masters Course) Autumns 2018-2021
- **Supervisor of Bachelor Theses projects** KTH, Sweden
Bachelor Thesis Course, Electrical Engineering Program Springs 2018-2020
 - Project 2020: ‘Stock Market Prediction with Deep Learning’ by Kiar Fatah and Tariq Nazar.
 - Project 2019: ‘Evaluating LASSO and ARIMA algorithms for financial forecasting’, by Oskar Erlandsson and Andrej Wilczek.
 - Project 2018: ‘Evaluating different algorithms for detecting change-points in time series’, by Henrik Eriksson and Victor Löfgren.

- **Supervisor of MSc. Theses** KTH, Sweden
Master Program in System, Control and Robotics 2018-2021
 - Thesis 2021: ‘Current Control and Modelling of an Inspiration Valve’ by Astrid Lindstedt (with Getinge).
 - Thesis 2021: ‘System Identification of continuous-time systems with quantized output data using indirect inference’ by Frida Persson.
 - Thesis 2020: ‘Inertial Domain Transfer using Generative Adversarial Networks’ by Saieshwar Radhakrishnan (with Scania)
 - Thesis 2020: ‘Adaptive Model Predictive Control for Reference Tracking Vehicle Motion’ by Sven Grenholm (with Transrail)
 - Thesis 2019: ‘Online maximum capacity estimation of a propulsion battery on heavy duty vehicles’, by Nikolaos Karavalakis (with Scania)
 - Thesis 2018: ‘Hydraulic Closed Loop Control’, by Maria Elfving (with Volvo)
- **Teaching Assistant** Department of Electronics, UTFSM, Chile
ELO-370 ‘Automatic Control II’(Digital Control) 2nd Semester 2016
- **Teaching Assistant** Department of Electronics, UTFSM, Chile
ELO-104 ‘Linear Systems Analysis’ (four times) 2015 - 2016
- **Teaching Assistant** Department of Mathematics, UTFSM, Chile
MAT-024 ‘Multivariable Integration and PDEs’ 2nd Semester 2015
- **Teaching Assistant** Department of Mathematics, UTFSM, Chile
MAT-023 ‘Multivariable Differential Calculus and ODEs’ 1st Semester 2014
- **Teaching Assistant** Department of Physics, UTFSM, Chile
FIS-120 ‘Electromagnetism’ 2nd Semester 2013
- **Teaching Assistant** Department of Mathematics, UTFSM, Chile
MAT-021 ‘Algebra and Elementary Calculus’ 1st Semester 2013
- **Teaching Assistant** Department of Mathematics, UTFSM, Chile
MAT-022 ‘Linear Algebra and Single Variable Integration’ (twice) 2nd Semester 2012-2013

Other working experience

- **Volunteer in the organizing crew of SYSID’18** Stockholm, Sweden
KTH Royal institute of Technology 2018
 - In charge of solving technical issues and support during the IFAC Symposium on System Identification (SYSID’18), held in Stockholm.
- **Report Assistant** Valparaíso, Chile
Department of Electronics, UTFSM 2016
 - Report assistant and member of the committee of the accreditation process of the Master of Science degree in Electronic Engineering.
 - After 1 year of work, we obtained 2 extra years of accreditation of the program (from 6 to 8).
- **Vicepresident of the Student Union** Valparaíso, Chile
Department of Electronics, UTFSM 2015
 - Vicepresident of the association of all ~650 students of Electronic and Telematic Engineering of the UTFSM. The position lasts one year.

- **Summer intern** Ventanas, Chile
Codelco, Ventanas division *Jan. 2015 - March. 2015*
 – Summer intern for 8 weeks in the Refinement section of Codelco (National Corporation of Copper).
- **Summer intern** Santiago, Chile
Honeywell Chile S.A. *Jan. 2014 - March. 2014*
 – Summer intern for 8 weeks in Honeywell Chile S.A., Advanced Process Control Area.
- **PSU practice test corrector** Valparaíso, Chile
Admission team, UTFSM *2011 - 2016*
 – In charge of the validation and listing of format and mathematical errors of the PSU (National University Selection Test) practice tests of the UTFSM.
 – Over 30 practice exams validated.

Merits and Awards

- **Recipient of the ‘Esfuerzo es Progreso’ award** Valparaíso, Chile
UTFSM *2019*
 – Testamentary donation/award given to the best Electronic Engineering student of UTFSM graduated in 2016.
- **Recipient of Complex Dynamic Systems and Control (CDSC) Scholarship** Newcastle, Australia
University of Newcastle, Australia *2019*
 – Research scholarship of AUD \$5000 for visiting the University of Newcastle during November 2019.
- **Recipient of grant by The Ericsson Research Foundation** Stockholm, Sweden
Ericsson *2019*
 – Grant of 10000 SEK to attend the 2019 Summer School of High Dimensional Probability and Algorithms, held in Paris, France, July 1-5th.
- **Recipient of the ‘Marcos Orrego Puelma’ award** Santiago, Chile
Institute of Engineers of Chile *2017*
 – Award given to the best Engineering student of UTFSM graduated in 2016 (among ~1000 students).
- **Recipient of the ‘Mejor titulado Ing. Civil Electrónica promoción 2016’ award** Valparaíso, Chile
School of Engineers of Chile *2017*
 – Distinction given to the best Electronic Engineer of UTFSM graduated in 2016, in recognition of his academic performance and his conditions of leadership and participation.
- **Recipient of the Distinción Académica ‘Federico Santa María’** Valparaíso, Chile
UTFSM *2016*
 – Award given to the best student of Electronics Engineering graduated in 2016.
- **Outstanding student of Master studies in Electronic Engineering** Valparaíso, Chile
UTFSM *2016*
 – Award given to the best student of Master of Science of Electronic Engineering graduated in 2016.
- **Recipient of the CONICYT ‘Scholarship for Master studies in Chile’** Santiago, Chile
CONICYT *2015-2016*
 – National scholarship given to approximately 250 students of Chile per year to economically support their MSc. studies in a Chilean university.

- **Recipient of the CONICYT ‘Scholarship for short internships abroad’** Santiago, Chile
CONICYT 2015
 – National scholarship given to approximately 60 students of Chile per year to afford a short internship in a university abroad.
- **1st place in the Honor list** Valparaíso, Chile
UTFSM 2014 and 2015
 – Honor given to the student with the best academical performance of all the University (among ~10000 students).
- **2nd place in the Honor list** Valparaíso, Chile
UTFSM 2013 and 2016
 – Honor given to the student with the second best academical performance of all the University (among ~10000 students).
- **Recipient of the Academic Merit of the Electronics Department Award** Valparaíso, Chile
Department of Electronics, UTFSM 2012-2017
 – Award given to all the students of the Electronics Department with average academic qualifications of over 80 out of 100 (95th percentile approximately).
 – Award won six consecutive times (all the times possible).
- **Recipient of the ‘Premio al Mérito Académico UTFSM’** Valparaíso, Chile
UTFSM 2012-2016
 – Award given to the two students with highest academic qualifications of all their generation in the University (around 1000 students per generation).
 – Award won five consecutive times (all the times possible).
- **‘Puntaje Nacional’ Scholarship** Valparaíso, Chile
UTFSM 2011-2016
 – Full undergraduate and postgraduate scholarship given to the student with perfect score in any PSU test (National University Selection Test) of 2010.
- **Highest PSU score of the UTFSM in 2011** Valparaíso, Chile
UTFSM 2011
 – Honor given to the student with highest average PSU (National University Selection Test) score who entered the UTFSM in 2011.
- **Perfect PSU score in Mathematics** Valparaíso, Chile
Ministry of Education of Chile 2010
 – Honor given to the student with perfect score in the PSU (National University Selection Test) of Mathematics of 2010.

Skills

- **Computer Skills:** MATLAB (advanced), L^AT_EX(advanced), Python (Intermediate), HTML (Basic).
- **Languages:** Spanish (native), English (native), Swedish (basic).
- Hold a Chilean driver’s license (B).

Publications

Journal papers

- [J6] **Rodrigo A. González**, Cristian R. Rojas, Siqi Pan and James S. Welsh. “Consistent identification of continuous-time systems under multisine input signal excitation”. *Automatica*, Article 109859, 2021.
- [J5] Siqi Pan, James S. Welsh, **Rodrigo A. González** and Cristian R. Rojas. “Efficiency Analysis of the Simplified Refined Instrumental Variable Method for Continuous-time Systems”. *Automatica*, Article 109196, 2020.
- [J4] Siqi Pan, **Rodrigo A. González**, James S. Welsh and Cristian R. Rojas. “Consistency Analysis of the Simplified Refined Instrumental Variable Method for Continuous-time Systems”. *Automatica*, Article 108767, 2020.
- [J3] Francisco J. Vargas and **Rodrigo A. González**. “On the existence of a stabilizing solution of Modified Algebraic Riccati Equations in terms of standard Algebraic Riccati Equations and Linear Matrix Inequalities”. In *IEEE Control Systems Letters*, 4(1): 91-96, 2019.
- [J2] **Rodrigo A. González**, Francisco J. Vargas and Jie Chen. “Necessary and sufficient conditions for mean square stabilization over MIMO SNR-Constrained channels with colored and spatially correlated additive noises”. In *IEEE Transactions on Automatic Control*, 64(11): 4825-4832. 2019.
- [J1] **Rodrigo A. González**, Patricio E. Valenzuela, Cristian R. Rojas and Ricardo A. Rojas. “Optimal enforcement of causality in non-parametric transfer function estimation”. In *IEEE Control Systems Letters*, 1(2): 268-273, 2017.

Conference papers

- [C8] **Rodrigo A. González**, Cristian R. Rojas, Siqi Pan and James S. Welsh. “The SRIVC algorithm for continuous-time system identification with arbitrary input excitation in open and closed loop”. *60th IEEE Conference on Decision and Control*, pages 3004-3009, 2021.
- [C7] **Rodrigo A. González**, Cristian R. Rojas and Håkan Hjalmarsson. “Non-causal regularized least-squares for continuous-time system identification with band-limited input excitations”. *60th IEEE Conference on Decision and Control*, pages 114-119, 2021.
- [C6] **Rodrigo A. González** and Cristian R. Rojas. “A finite-sample deviation bound for stable autoregressive processes”. In *Proceedings of the 2nd Conference on Learning for Dynamics and Control (LADC)*, Berkeley, USA, pages 191-200, 2020.
- [C5] **Rodrigo A. González**, James S. Welsh and Cristian R. Rojas. “Enforcing stability through ellipsoidal inner approximations in the indirect approach for continuous-time system identification”. In *Proceedings of the 21st IFAC World Congress (IFAC'2020)*, Berlin, Germany, pages 566-571, 2020.
- [C4] **Rodrigo A. González** and Cristian R. Rojas. “Finite sample deviation and variance bounds for first order autoregressive processes”. In *Proceedings of the 45th International Conference on Acoustics, Speech, and Signal Processing (ICASSP'20)*, Barcelona, Spain, pages 5380-5384, 2020.
- [C3] **Rodrigo A. González**, James S. Welsh and Cristian R. Rojas. “An asymptotically optimal indirect approach to continuous-time system identification”. In *Proceedings of the 57th IEEE Conference on Decision and Control (CDC'18)*, Miami Beach, FL, USA, pages 638-643, 2018.
- [C2] **Rodrigo A. González** and Cristian R. Rojas. “A fully Bayesian approach to kernel-based regularization for impulse response estimation”. In *Proceedings of the 18th IFAC Symposium on System Identification (SYSID'18)*, Stockholm, Sweden, pages 186-191, 2018.

- [C1] **Rodrigo A. González**, Francisco J. Vargas and Jie Chen. “Stabilization of MIMO systems over additive correlated noise channels subject to multiple SNR-constraints”. In *Proceedings of the 16th European Control Conference (ECC’18)*, Limassol, Cyprus, pages 1493-1498, 2018.

Submitted Journal papers

- [SJ3] **Rodrigo A. González**, Cristian R. Rojas, Siqi Pan and James S. Welsh. “Refined instrumental variable methods for unstable continuous-time systems in closed-loop”. *International Journal of Control*, 2021.
- [SJ2] **Rodrigo A. González**, Cristian R. Rojas, Siqi Pan and James S. Welsh. “Theoretical and practical aspects of the convergence of the SRIVC estimator for over-parameterized models”. *Automatica* (provisionally accepted), 2021.
- [SJ1] Siqi Pan, James S. Welsh, **Rodrigo A. González** and Cristian R. Rojas. “Consistency Analysis and Bias Elimination of the Instrumental Variable Based State Variable Filter Method”. *Automatica* (provisionally accepted), 2020.

Theses

- [T2] **Rodrigo A. González**, *Consistency and efficiency in continuous-time system identification*. Licentiate of Engineering Thesis, KTH Royal Institute of Technology, June 2020. Supervisor: Prof. Cristian R. Rojas.
- [T1] **Rodrigo A. González**, *Enforcement of Causality and Passivity in Spectral Analysis* (in Spanish). Master’s Thesis, Universidad Técnica Federico Santa María, Valparaíso, Chile, November 2016. Supervisors: Prof. Ricardo A. Rojas, Cristian R. Rojas and Patricio E. Valenzuela.

Books

- [B1] **Rodrigo A. González**, *Exercise Compendium of Linear Systems Analysis* (in Spanish). July 2019.

Others

- [P5] **Rodrigo A. González**, Cristian R. Rojas and Håkan Hjalmarsson. “Non-causal regularized least-squares for continuous-time system identification with band-limited input excitations”. Poster at the 2021 Workshop of the European Research Network on System Identification (ERNSI), September, online.
- [P4] **Rodrigo A. González**, James S. Welsh and Cristian R. Rojas. *An asymptotically optimal indirect approach to continuous-time system identification*. Internal seminar in the University of Newcastle, December 2019, Newcastle, New South Wales, Australia.
- [P3] **Rodrigo A. González**, Siqi Pan, Cristian R. Rojas and James S. Welsh. *Consistency of the Simplified Refined Instrumental Variable Method for Continuous-time Systems: Analysis and Design*. Poster at the 2019 Workshop of the European Research Network on System Identification (ERNSI), September, Maastricht, Netherlands.
- [P2] **Rodrigo A. González**, James S. Welsh and Cristian R. Rojas. *An asymptotically optimal indirect approach to continuous-time system identification*. Poster at the 2018 Workshop of the European Research Network on System Identification (ERNSI), September, Cambridge, U.K.
- [P1] **Rodrigo A. González** and Cristian R. Rojas. *An asymptotically optimal indirect approach to continuous-time system identification*. Presentation at the 2018 Swedish Control Conference (Reglermötet), June, Stockholm, Sweden.

Interests

- **Sports:** Running, Soccer, Basketball.
- **Music:** Guitar (acoustic, electric), Bass (fretted and fretless), Keyboards.
- **Other interests:** Chess, reading.