

Duván Andrés Téllez Castro

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Research Interest

• Data-Driven control • Distributed control • Applied operator theory

Appointments

2021-Present **Research Associate**, *Clemson University*, Clemson SC, USA

Host: Umesh Vaidya

2015 **Lecturer**, *Universidad de la Salle*, Bogotá, Colombia

2014–2015 **Full-time Instructor**, *Universidad Manuela Beltran*, Bogotá, Colombia

2013–2014 **Graduate Research Assistant**, *Universidad de los Andes*, Bogotá, Colombia

Education

2022 **PhD in Electrical Engineering**, *Universidad Nacional de Colombia*, Bogotá, Colombia

Advisor: Eduardo Mojica

2014 **Master in Electronic and Computers Engineering**, *Universidad de los Andes*, Bogotá, Colombia

Advisor: Nicanor Quijano

2012 **Bachelor in Electronic and Telecommunications Engineering**, *Universidad Católica de Colombia*, Bogotá, Colombia

Publications [Google Scholar](#)

Journal papers (submitted)

- [28] Umesh Vaidya and Duvan Tellez-Castro. “Data-Driven Stochastic Optimal Control using Linear Transfer Operators”. Submitted to: *IEEE Transaction Automatic Control*, 2022, <https://arxiv.org/pdf/2202.01387.pdf>.
- [27] Vladimir Toro, Duvan Tellez-Castro, Eduardo Mojica-Nava, and Naly Rakoto-Ravalontsalama. “Data-Driven Distributed Voltage Control for Microgrids: A Koopman-based Approach”. Submitted to: *International Journal of Electrical Power and Energy Systems*, 2022, <https://arxiv.org/pdf/2208.13682.pdf>.
- [26] Miguel F Arevalo-Castiblanco, Pachon Jaime, Duvan Tellez-Castro, and Eduardo Mojica-Nava. “Cooperative Predictive Cruise Control: A Bargaining Game Approach”. Submitted to: *Control Theory and Technology*, 2022.
- [25] Camilo Garcia-Tenorio, Duvan Tellez-Castro, Eduardo Mojica-Nava, and Alain Vande Wouwer. “Evaluation of the Region of Attractions of Higher Dimensional Hyperbolic Systems using the Extended Dynamic Mode Decomposition”. Submitted to: *International Journal of Robust and Nonlinear Control*, 2022.

Journal papers (published)

- [24] Bhagyashree Umathe, Duvan Tellez-Castro, and Umesh Vaidya. “Reachability Analysis using Spectrum of Koopman Operator”. In: *IEEE Control Systems Letters* (2022).
- [23] Duvan Tellez-Castro, Camilo Garcia-Tenorio, Eduardo Mojica-Nava, Jorge Sofrony, and Alain Vande Wouwer. “Data-Driven Predictive Control of Interconnected Systems using the Koopman Operator”. In: *Actuators* 11.6 (2022), p. 151.
- [22] Miguel F Arevalo-Castiblanco, Duvan Tellez-Castro, and Eduardo Mojica-Nava. “Indirect adaptive synchronization for a heterogeneous multiagent network”. In: *International Journal of Adaptive Control and Signal Processing* 36.6 (2022), pp. 1326–1339.
- [21] Miguel F Arevalo-Castiblanco, Duvan Tellez-Castro, Jorge Sofrony, and Eduardo Mojica-Nava. “Adaptive synchronization of heterogeneous multi-agent systems: A free observer approach”. In: *Systems & Control Letters* 146 (2020), p. 104804.
- [20] L. García, J. Barreiro-Gomez, E. Escobar, D. Téllez, N. Quijano, and C. Ocampo-Martinez. “Modeling and real-time control of urban drainage systems: A review”. In: *Advances in Water Resources* 85 (2015), pp. 120–132.
- [19] Eduardo Mojica-Nava, Jimmy Salgado, Duvan Tellez, and Alvaro Lopez. “Optimal control of switching topology networks”. In: *Mathematical Problems in Engineering* 2014 (2014), pp. 1–9.
- [Refereed Conference Proceedings](#)
- [18] Alexander Krolicki, Duvan Tellez-Castro, and Umesh Vaidya. “Nonlinear Dual-Mode Model Predictive Control using Koopman Eigenfunctions”. In: *2022 61th IEEE Conference on Decision and Control (CDC)[to appear] 2022*.
- [17] Duvan Tellez-Castro, Fadi Abdeljawad, and Umesh Vaidya. “Control-Oriented Modeling using Koopman Operator: An application to the Cahn-Hilliard Coarsening Problem”. In: *IFAC-PapersOnLine (MECC) [to appear]*.
- [16] Vladimir Toro, Duvan Tellez-Castro, Eduardo Mojica-Nava, and Naly Rakoto-Ravalontsalama. “Distributed Koopman-Based Control of Improved Swing Equation”. In: *IFAC-PapersOnLine (NecSys)*. Vol. 55. 13. Elsevier, 2022, pp. 97–102.
- [15] Hongzhe Yu, Joseph Moyalan, Duvan Tellez-Castro, Umesh Vaidya, and Yongxin Chen. “Convex optimal control synthesis under safety constraints”. In: *2021 60th IEEE Conference on Decision and Control (CDC)*. IEEE. 2021, pp. 4615–4621.
- [14] Vladimir Toro, Duvan Tellez-Castro, Eduardo Mojica-Nava, and Naly Rakoto-Ravalontsalama. “Data-Driven Voltage Secondary Control for Microgrids”. In: *2021 IEEE 5th Colombian Conference on Automatic Control (CCAC)*. IEEE. 2021, pp. 180–185.
- [13] JA Rodriguez-Gil, MF Arevalo-Castiblanco, D Tellez-Castro, and E Mojica-Nava. “A Distributed Iterative LQR Approach for a Cart-Pole Network Synchronization”. In: *2021 IEEE 5th Colombian Conference on Automatic Control (CCAC)*. IEEE. 2021, pp. 151–156.
- [12] Fabian Salazar-Caceres, Duvan Tellez-Castro, and Eduardo Mojica-Nava. “Data-Driven Synchronization of Coupled Heterogeneous Oscillators”. In: *2021 IEEE 5th Colombian Conference on Automatic Control (CCAC)*. IEEE. 2021, pp. 222–227.

- [11] GA Cardona, D Tellez-Castro, J Calderon, and E Mojica-Nava. “Adaptive Multi-Quadrotor Control for Cooperative Transportation of a Cable-Suspended Load”. In: *2021 European Control Conference (ECC)*. IEEE. 2021, pp. 696–701.
- [10] GA Cardona, M Arevalo-Castiblanco, D Tellez-Castro, J Calderon, and E Mojica-Nava. “Robust adaptive synchronization of interconnected heterogeneous quadrotors transporting a cable-suspended load”. In: *2021 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE. 2021, pp. 31–37.
- [9] MF Arevalo-Castiblanco, D Tellez-Castro, E Mojica-Nava, and J Sofrony. “Adaptive Distributed Control for Large-Scale Systems with Unknown Interconnection”. In: *IFAC-PapersOnLine, World Congress of the IFAC*. Vol. 53. 2. Elsevier, 2020, pp. 8738–8743.
- [8] Miguel F Arevalo-Castiblanco, Duvan Tellez-Castro, Gustavo Andres Cardona, and Eduardo Mojica-Nava. “An Adaptive Optimal Control Modification with Input Uncertainty for Unknown Heterogeneous Agents Synchronization”. In: *proceedings of IEEE Conference on Decision and Control (CDC)*. Nice, France, 2019.
- [7] GA Cardona, D Tellez-Castro, and E Mojica-Nava. “Cooperative transportation of a cable-suspended load by multiple quadrotors”. In: *IFAC-PapersOnLine (NecSys)*. Vol. 52. 20. Elsevier, 2019, pp. 145–150.
- [6] F Galarza-Jimenez, D Tellez-Castro, J Sofrony, and E Mojica-Nava. “Cooperative Output Regulation for Multi-Agent Systems with EDMD Leader Approximation”. In: *IFAC-PapersOnLine (NecSys)*. Vol. 52. 20. Elsevier, 2019, pp. 91–96.
- [5] Camilo Garcia-Tenorio, Duvan Tellez-Castro, Eduardo Mojica-Nava, and Alain Vande Wouwer. “Analysis of a Class of Hyperbolic Systems Via Data-Driven Koopman Operator”. In: *proceedings of 23rd International Conference on System Theory, Control and Computing*. Sinaia, Romania, 2019.
- [4] Claudia Caro-Ruiz, Duvan Tellez-Castro, and Eduardo Mojica-Nava. “Self-Organization in Networks: A Data-Driven Koopman Approach”. In: *proceedings of 3rd IEEE Colombian Conference Automatic Control (CCAC)*. Cartagena, Colombia, 2017.
- [3] Fabian Salazar-Caceres, Duvan Tellez-Castro, and Eduardo Mojica-Nava. “Consensus for Multi-agent Nonlinear Systems : A Carleman Approximation Approach”. In: *proceedings of 3rd IEEE Colombian Conference Automatic Control (CCAC)*. Cartagena, Colombia, 2017.
- [2] Duvan Tellez-Castro, Nicanor Quijano, and Eduardo Mojica-Nava. “Decentralized control for urban drainage systems via moving horizon observer”. In: *IEEE Conference on Control Applications (CCA)*. IEEE, 2016, pp. 717–722.
- [1] Luis García, Eduardo Escobar, Julián Barreiro, Nicanor Quijano, Carlos Ocampo-Martínez, and Duván Téllez. “On the modeling and real-time control of urban drainage systems: A survey”. In: *11th International Conference on Hydroinformatics*. 2014, pp. 1–8.

Awards and Scholarships

2016 **Student Travel Support**, *IEEE Multi-conference on Systems and Control, IEEE Control Systems Society (CSS)*, 2016

- 2016 **Doctoral Scholarship/Condonable Loan 727**, *National Department of Science and Innovation (MINCIENCIAS)*, Bogotá, Colombia
- 2009 **Partial Scholarship for Outstanding GPA**, *Universidad Católica de Colombia*, Bogotá, Colombia

Teaching and Mentoring

Instructor

- Control systems, UMB, 2015-1, 2015-2
- Digital control , UMB, 2014-2, 2015-1, 2015-2
- Control and sensory, Universidad de La Salle, 2015-1
- Signal analysis, Universidad de La Salle, 2015-2
- Circuits I, UMB, 2015-1, 2015-2
- Digital electronic I, UMB, 2015-1, 2015-2

Teaching Assistant:

- Control systems, Universidad de los Andes, 2012-2, 2013-1
- Digital electronic I, Universidad de los Andes, 2012-2, 2013-1

Students Advised

- Nestor Ivan Ospina (Co-Advised with Eduardo Mojica), Master Thesis: Multiagent Control of Autonomous Vehicles in Presence of Non-Cooperative Agents

Graduated Student Project Mentorship

- Miguel Arevalo, Project: Synchronization of heterogeneous agents for cooperative cruise control, 2019
- Gustavo Cardona, Project: Cooperative control transportation of a cable-suspended load by multiple quadrotors, 2019
- Jhojan Rodriguez, Project: Distributed MPC-MHE using ADMM for leader-follower systems, UNAL, 2021
- Fabian Salazar, Robust control using the Koopman operator for synchronization, 2021
- Vladimir Toro, Project: Distributed predictive control using Koopman operator applied to Microgrids, 2021

Invited Talks, Posters, and Abstracts

- 2018 **Stability Analysis of Interconnected Systems Using Koopman Operator Spectrum**, *International Congress of Mathematicians, Rio, Brazil*
Poster
- 2017 **Control-Oriented Modeling of Large-Scale Networked Systems: A DMD Approach**, *Latin American Conference on Complex Networks, Puebla, Mexico*
Abstract
- 2016 **Control descentralizado usando observadores de horizonte rodante**, *Jornada de Ingeniería, Universidad de Cundinamarca, Fusagasuga, Colombia*
Plenary

Professional Service

Reviewer

- IEEE Trans. on Aerospace and Electronic Systems, Automatica, Applied Energy
- Control Conferences (CDC, ACC, ECC, ICC, CCAC, CCTA, CNCA, NECSYS, MECC)

Organizer

- Symposium on Smart Grids, UMB, 2015

Additional Experience

2019 (Fall) **Visiting Scholar**, *Department of Mechanical Engineering, Clemson University, Clemson, SC, USA*

Host: Umesh Vaidya