Vinicius Mariano Gonçalves

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Short Bio

34 years old. Control and Automation Engineer with a Ph.D. degree in Electrical Engineering. Experience working with research, programming (teaching and practice), and technological development. I worked for 6 years as a tenured assistant professor at a federal university in Brazil, in which I taught several technology-related courses (please see **Employment experience** below).

I have theoretical and practical experience in a range of subjects: robotics, control, optimization, and programming. This experience is corroborated with publications in top journals of these fields, as my **Research** section below will show. I also have experience, working with the private sector, in different industrial processes like logistics, iron-making, and power transmission/distribution. In these I was the main developer of several applications in a range of languages, please see my **Personal projects** and **Projects with the private sector** section below.

Education

University of Montpellier, France
Pos-Doc in Robotics   *March 2015-July 2015*
Developing algorithms and mathematical formalisms for optimized robot motion. Research is still ongoing with researchers at Laboratoire d'Informatique, de Robotique et de Microélectronique de Montpellier (LIRMM).

Federal University of Minas Gerais, Brazil and Université d'Angers, France
Ph.D. Degree in Electrical Engineering   *2011–2014*
Developing algorithms and mathematical formalisms for solving a class of synchronization problems. Research is still ongoing with researchers at Université d'Angers. One year of internship at Université d'Angers, France. Advisor: Prof. C. A. Maia, Co-Advisor: Prof. L. Hardouin.

Federal University of Minas Gerais, Brazil
Bachelor Degree in Control and Automation Engineering   *2006–2011*

I do not have a master degree because in Brazil students who already have shown scientific maturity at the end of their undergrad degree (with journal publications, for instance) are allowed to skip the 2 years of master degree.

Employment experience

UFMG (Federal University of Minas Gerais) - Brazil
Tenured assistant Professor   *September 2016-February 2022*

Working at the Electric Engineering Department, teaching robotics, optimization and discrete event systems in undergrad courses. Advising undergrad, master and Ph.D students. Conducting research (see below). Administrative responsibilities. Working as a technological consultant for private companies (see below). UFMG is the largest university of the state of Minas Gerais. Taught:

• *Electrical Circuit Lab*: taught basic electrical circuit theory for System and Automation engineering undergraduates.

• *Circuit Analysis*: taught transient/steady-state passive linear circuit theory for Automation and Aerospacial engineering undergraduates

• *Operational Research*: taught linear programming (also integer and mixed-integer) theory and modeling for System, Electrical and Automation engineering undergraduates.

• *Discrete-Event Systems*: taught Petri-Nets/Automata theory and practice for System, Electrical, and Automation engineering undergraduates.

• *Robotic Manipulators*: taught introduction to robotic manipulators (kinematics, dynamics and control) for System, Electrical and Automation engineering undergraduates.

○
CEFET (Federal Center for Tech. Education of Minas Gerais) - Brazil
Adjunct Professor   *August 2015-March 2016*

Working at the Computer Science Department, Taught:

• *Object-Oriented Programming*: taught basic concepts of OOP for Mechanical Engineering undergraduates (JAVA language).

• *Introduction to Programming*: taught basic concepts of programming, data structures and algorithms for Electrical Engineering undergraduates (C++ language).

• *Operational Research II*: taught linear programming (also integer and mixed-integer) theory and modeling for Production Engineering undergraduates.

○
Gerdau Steel Mill - Brazil
Automation Technical Advisor   *August 2014-November 2014*

I was responsible for developing C#, Java software and working for improving the thermal control of blast furnaces. Technical Advisor was a "trust position" above Automation Engineer in the technical hierarchy of Gerdau.

○
Gerdau Steel Mill- Brazil
Automation Engineer   *February 2012- July 2013*

I was responsible for developing C#, Java and Matlab software and working with relational databases for improving process performance at coke ovens.

Skills

○ Experience (theoretical, practical, teaching) with **Control, Robotics, Optimization and Discrete Event Systems.**
○ Problem solving-skills due to more than ten years of years of research and professional experience.
○ Advanced **Java, Matlab**, **Python** and **C#** skills due to professional and teaching experience.
○ Intermediate **Javascript, SQL** and **ASP.NET** experience.
○ Highly interested in working with new technologies and also on the development of these technologies.
○ Native Portuguese.
○ Advanced English.
○ Basic French.

Personal projects

- I am the main developer of **uaibot**, a Python, web-based open source robotic simulator. I used this for teaching purposes and also for quick testing of the robotic algorithms I developed during my research. The library integrates Python for the back-end computations and Javascript for the 3D visualisation (using threejs) . See https://github.com/viniciusmgn/uaibot_vinicius.

Projects with the private sector

In Brazil, I work also as a private consultant in the field of optimization. All the following projects started in 2019.

- **Optimization of sensor placement on energy distribution networks (finished)**
  Project with ENERGISA SA (energy distribution company) and CONCERT SA (technology development company). Main researcher and developer.
  Development of a software that uses optimization techniques (submodularity, matroid theory) to select the best position to place a limited number of sensors on the nodes of an electrical network to improve fault detection. Developed in Javascript.
- **Optimization of placement of cargo on ships (finished)**
  Project with USIMINAS SA (Steel Mill company). Main researcher and developer.
  Development of a software that optimizes the cargo placement on ships. Uses heuristics to generate a planning of placement of steel coils minimizing space, under few seconds. Back-end developed in C# and front-end in Asp.net.
- **Optimization of blast furnace melting bed (finished)**
  Project with APERAM (Steel Mill company). Advisor of the developer.
  Development of a software that optimizes the amount of resources (metallic charge and fluxes) that should be inputed on the blast furnace in order to have a proper operation.
- **Multi-objective optimization of the tracing of transmission lines (finished)**
  Project with TAESA (energy transmission company). Main researcher and developer.
  Development of a software that provides the Pareto-optimal tracing of transmission lines, given a set of objective functions. This is information is useful for transmission lines companies to decide whether or not they should accept a government bid, given the proposed conditions.

Other experiences

- IROS 2019 and 2020 associate editor.
- International research missions:
  - University of Montpellier/France (July 2017) working on robotic control using optimization.
  - University of Angers/France (February 2019) working on discrete event system control. Taught a mini-course on basic robotic control to undergraduates.

International contacts

Please contact the following researchers for more information about me:

- **Prof. Laurent Hardouin:** (laurent.hardouin@univ-angers.fr.) Full Professor at University of Angers, France. Was my co-advisor in my PHD. Works with me in the subject of discrete event systems. Referenced in my papers as HARDOUIN L.

- **Prof. Philippe Fraisse:** (philippe.fraisse@lirmm.fr) Full Professor at University of Montpellier, France. Works with me in the subject of control/robotics. I was his associated editor in IROS 2019/2020. Referenced in my papers as FRAISSE P.

○ **Prof. Guilherme Pereira:** (guilherme.pereira@mail.wvu.edu) Associate Professor at Department of Mechanical and Aerospace Engineering West Virginia University, United States. Works with me in the subject of control/robotics. Referenced in my papers as PEREIRA. G. A. S.

Students:

Master completed:

○ Marcelo Xavier Reis Souza: *Construction of a simulator for validation of control techniques in Timed Event Graphs (translated from portuguese).* **2015-2017**. Advisor.

○ Neemias Silva Monteiro: *Location of mobile robots in topological environments using hidden Markov models (translated from portuguese).* **2017-2019**. Co-advisor.

○ Adriano Martins da Costa Rezende: *Multi-Robot Systems Coordination (translated from portuguese).* **2017-2019**. Co-advisor.

○ Alcy Dias Rodrigues: *Optimization of the blast furnace melting bed (translated from portuguese).* **2018-2020**. Advisor.

○ Wilson Salomão Felix Junior: *Reinforcement learning techniques applied in robotic control (placeholder name).* **2020-2022**. Advisor.

Master ongoing:

○ Reynaldo Mateus Gago: *Robotized painting of walls (placeholder name).* **2020-Ongoing**. Advisor.

Phd completed:

○ Alan Mendes Marotta: *Modeling and Synthesis of Systems to Timed Discrete Events: Application to the Coordination of Urban Transport Systems.* **2017-2020**. Co-advisor.
○ Adriano Martins da Costa Rezende: *Vector field based guidance and control strategies for robot navigation.* **2019-2022**. Co-advisor.

Phd ongoing:

○ Neemias Silva Monteiro: *Reinforcement learning techniques applied in robotic control (placeholder name).* **2020-Ongoing**. Advisor.

Undergrad students completed as advisor:

○ Tiago Miranda: *Image-based tracking of persons using robotic manipulators (translated from portuguese).* **2022**. Electric Engineering.

○ Marina Roncalle Aires Rosa: *Allocation of fault detection sensors in networks electricity distribution (translated from portuguese).* **2021**. System Engineering.

○ Rodrigo Lima de Araujo: *Fault Location in the Distribution Network of Electric Energy using techniques of Machine Learning (translated from portuguese).* **2020**. Control and Automation Engineering.

○ Victor Emanuel Brito: *Simulation of a mining process using Petri Nets (translated from portuguese).* **2019**. System Engineering.

○ Victor Prudente: *Optimization of the Elaboration of the Steel Sheet Stowage Plan (translated from portuguese).* **2019**. Production Engineering.

○ William Thales Édipo de Souza Pereira: *Optimization of power cut and reconnection services performed by electric utilities. (translated from portuguese).* **2019**. System Engineering.

○ Alan Wilckay Junior: *Scheduling Hostel Rooms in a Time Window. (translated from portuguese).* **2018**.

System Engineering.

- Arthur Kajimoto: *TCP / IP Communication for Controlling a Simulator for Discrete Events Systems. (translated from portuguese)*. **2018**. Control and Automation Engineering.

- Wilson Salomão Félix Junior: *Kinematic control of robots with constraints. (translated from portuguese)*. **2017**. Control and Automation Engineering.

- Felipe de Oliveira Silveira: *Application of the A * algorithm to obtain the optimal scheduling of activities of a Discrete Event System. (translated from portuguese)*. **2017**. Control and Automation Engineering.

- Igor Villafort: *Application of the Mixed Integer Linear Programming Technique to a Sequencing and Route Planning Problem. (translated from portuguese)*. **2017**. Control and Automation Engineering.

- Richard Sobreiro: *Optimizing a Distribution Process. (translated from portuguese)*. **2017**. Control and Automation Engineering.

Research Experience

On *Robotics*, my research is focused on the control of robots (manipulators, humanoids, unmanned air-vehicles). I research control frameworks based on optimization techniques (quadratic programming, linear programming, dynamical programming, etc...) to guarantee safe and quick completion of robotic tasks. This research effort is shared with researchers with *LIRMM Laboratory* at *Université of Montpellier, France* and *West Virginia University, United States*.

On *Discrete-Event Systems* (D.E.S), my research is focused on the control, modeling, and analysis of *Timed Event Graphs* (TEG), a subclass of Petri Nets. The timing behavior of these can be written using the *Max-Plus Algebra* (or *Tropical Algebra*), so the research also naturally focus on the mathematical and algorithmic aspects of this algebra. This research effort is shared with researchers at *Université d'Angers, France*.

Please note that I have papers on important journals (as *IEEE Transactions on Robotics*, *Automatica* and *IEEE Transactions on Automatic Control*) and conferences (as ICRA, IROS and CDC).

Publications on journals:

- **[J15]** REZENDE. A. M. C; MIRANDA. V. R. F; REZECK P. A. F; AZPÚRUA H. ; SANTOS E; R; S; **GONÇALVES V. M.** ; MACHARET; D. G ; FREITAS G. M. *An integrated solution for an autonomous drone racing in indoor environments*. Intelligent Service Robotics. **September 2021**. DOI: http://dx.doi.org/10.1007/s11370-021-00385-4

- **[J14]** REZENDE. A. M. C; **GONÇALVES V. M.** ; PIMENTA C. A. *Constructive time-varying vector fields for robot navigation*. IEEE Transactions on Robotics. **July 2021**. DOI: https://doi.org/10.1109/TRO.2021.3093674

- **[J13]** **GONÇALVES V. M.** . *Max-plus approximation for reinforcement learning*. Automatica. v. 129, 109623, **July 2021**. DOI: https://doi.org/10.1016/j.automatica.2021.109623

- **[J12]** **GONÇALVES V. M.** ; BOLONHEZ E. M. B.; CAMPOS. G. M. E; SATHLER L. H. *Transmission line routing optimization using rapid random trees*. Electric Power Systems Research. v. 194, 107096, **May 2021**. DOI: https://doi.org/10.1016/j.epsr.2021.107096

- **[J11]** REZENDE. A. M. C ; PIMENTA C. A. ; **GONÇALVES V. M.** . *Safe coordination of robots in cyclic paths*. ISA Transactions. v. 109, p. 126-140, **March 2021**. DOI: https://doi.org/10.1016/j.isatra.2020.09.019

- **[J10]** MAROTTA A. M. ; **GONÇALVES V. M.** ; MAIA C. A. *Tropical lexicographic optimization:*

synchronizing timed event graphs. Symmetry-Basel. v. 12, p. 1597-1614, **September 2020**. DOI: http://dx.doi.org/10.3390/sym12101597

o **[J9]** GONÇALVES V. M. ; MCLAUGHLIN R. ; PEREIRA. G. A. S. *Precise landing of autonomous aerial vehicles using vector fields*. IEEE Robotics and Automation Letters. v. 5 , p. 4337-4344, **July 2020**. DOI: https://doi.org/10.1109/LRA.2020.2994485

o **[J8]** GONÇALVES V. M. ; FRAISSE P. ; CROSNIER A. ; ADORNO B. V. *Stable-by-design kinematic control based on optimization*. IEEE Transactions on Robotics. v. 36, p. 644-656, **January 2020**. DOI: https://doi.org/10.1109/TRO.2019.2963665

o **[J7]** GONÇALVES V. M. ; MAIA C. A ; HARDOUIN L. *On max-plus linear dynamical system theory: the observation problem*. Automatica, v. 107, p. 103-111, **September 2019**. DOI: https://doi.org/10.1016/j.automatica.2019.05.026

o **[J6]** GONÇALVES V. M. ; MAIA C. A ; HARDOUIN L. *On max-plus linear dynamical system theory: the regulation problem*. Automatica, v. 75, p. 202-209, **January 2017**. DOI: http://dx.doi.org/10.1016/j.automatica.2016.09.019

o **[J5]** GONÇALVES V. M. ; MAIA C. A ; HARDOUIN L. *On the steady-state control of timed event graphs with firing date constraints*. IEEE Transactions on Automatic Control, v. 61, p. 2187-2202, **September 2016**. DOI: http://dx.doi.org/10.1109/tac.2015.2481798

o **[J4]** GONÇALVES V. M. ; FRAISSE P. ; CROSNIER A. ; ADORNO B. V. *Parsimonious kinematic control of highly redundant robots*. IEEE Robotics and Automation Letters, v. 1, p. 65-72, **December 2015**. DOI: http://dx.doi.org/10.1109/LRA.2015.2506259

o **[J3]** GONÇALVES V. M. ; MAIA C. A ; HARDOUIN L. *Weak dual residuations applied to tropical linear equations*. Linear Algebra and its Applications, v. 445, p. 69-84, **March 2014**. DOI: http://dx.doi.org/10.1016/j.laa.2013.10.044

o **[J2]** GONÇALVES V. M. ; MAIA C. A ; HARDOUIN L. *On tropical fractional linear programming*. Linear Algebra and its Applications, v. 459, p. 384-396, **October 2014**. DOI: http://dx.doi.org/10.1016/j.laa.2014.07.002

o **[J1]** GONÇALVES V. M. ; PIMENTA L. C. A ; MAIA C. A. ; CORREIA B. DUTRA ; PEREIRA G. A. S. *Vector fields for robot navigation along time-varying curves in n-dimensions*. IEEE Transactions on Robotics, v. 26, p. 647-659, **July 2010**. DOI: http://dx.doi.org/10.1109/TRO.2010.2053077

Publication on international conferences:

o **[I12]** PEREIRA L. A. A ; NUNES A. H. D ; REZENDE A. M. C ; **GONÇALVES V. M.** ; RAFFO G. V ; PIMENTA L. C. A. *Collision-free vector field guidance and MPC for a fixed-wing UAV*. 2021 IEEE International Conference on Robotics and Automation (ICRA).

o **[I11]** GONÇALVES V. M. ; FRAISSE P. ; CROSNIER A. ; ADORNO B. V. *Stable-by-design kinematic control based on optimization*. 2020 IEEE International Conference on Robotics and Automation (ICRA). DOI: https://doi.org/10.1109/TRO.2019.2963665 **Observation: this paper was published in IEEE Transactions on Robotics (see above), but was also invited for presentation in ICRA 2020.**

o **[I10]** REZENDE A. M. C ; **GONÇALVES V. M.** ; PIMENTA C. A *Robust quadcopter control with artificial vector fields*. 2020 IEEE International Conference on Robotics and Automation (ICRA). DOI:https://doi.org/10.1109/ICRA40945.2020.9196605

- **[I9]** OLIVEIRA G. F.; CANDIDO, R. M. F. ; **GONÇALVES V. M.** ; MAIA C. A ; COTTENCEAU B. ; HARDOUIN L. *Discrete event system control in max-plus algebra : application to manufacturing systems.* 2020 Workshop on Discrete Event Systems (WODES). DOI:https://doi.org/10.1016/j.ifacol.2021.04.014

- **[I8]** REZENDE. A. M. C ; MIRANDA V. R ; MACHADO H. N ; CHIELLA A. C. B.; **GONÇALVES V. M.** ; FREITAS G. *Autonomous system for a racing quadcopter.* 2019 International Conference on Advanced Robotics (ICAR). DOI:https://doi.org/10.1109/ICAR46387.2019.8981660 **Observation: this article describes part of the control strategy that is being used by the XQUAD team on the AlphaPilot Challenge, proposed by the Lockheed Martin, and that was held in 2019 at the United States. Our university team, whose leader was my master student, is among the 9 teams classified worldwide and was the only one from Latin America that was able to.**

- **[I7]** REZENDE, A. M. C. ; **GONÇALVES V. M.** ; RAFFO, G. V. ; PIMENTA, L. C. A . *Robust fixed-wing UAV guidance with circulating artificial vector fields.* 2018 International Conference on Intelligent Robots and Systems (IROS). DOI: https://doi.org/10.1109/IROS.2018.8594371

- **[I6]** **GONÇALVES V. M.** ; FRAISSE P. ; CROSNIER A. ; ADORNO B. V. *Parsimonious kinematic control of highly redundant robots.* 2016 IEEE International Conference on Robotics and Automation (ICRA). DOI: https://doi.org/10.1109/ICAR46387.2019.8981660 **Observation: this paper was accepted for publication in Robotics and Automation Letters and also for presentation in ICRA 2016.**

- **[I5]** **GONÇALVES V. M.** ; MAIA C. A. ; HARDOUIN L. ; SHANG Y. *An observer for tropical linear event-invariant dynamical systems* 2014 IEEE Conference on Decision and Control (CDC). DOI: http://dx.doi.org/10.1109/CDC.2014.7040323

- **[I4]** **GONÇALVES V. M.** ; PIMENTA L. C. A. ; MAIA C. A. ; PEREIRA G. A. S. *Coordination of multiple fixed-wing UAVs traversing intersecting periodic paths.* 2013 IEEE International Conference on Robotics and Automation (ICRA). DOI: http://dx.doi.org/10.1109/ICRA.2013.6630672

- **[I3]** **GONÇALVES V. M.** ; MAIA C. A. ; HARDOUIN L. *On the solution of max-plus linear equations with application on the control of timed event graphs.* 2012 International Workshop on Discrete Event Systems (WODES). DOI: http://dx.doi.org/10.3182/20121003-3-MX-4033.00018

- **[I2]** **GONÇALVES V. M.** ; PIMENTA L. C. A ; PEREIRA G. A. S. ; MAIA C. A ; CORREIA B. DUTRA ; MICHAEL N. ; FINK J. ; KUMAR V. . *Circulation of curves using vector fields: actual robot experiments in 2D and 3D workspaces.* 2010 IEEE International Conference on Robotics and Automation (ICRA). DOI: http://dx.doi.org/10.1109/ROBOT.2010.5509581

- **[I1]** **GONÇALVES V. M.** ; PIMENTA L. C. A ; MAIA C. A ; PEREIRA G. A. S. . *Artificial vector fields for robot convergence and circulation of time-varying curves in n-dimensional spaces.* 2009 American Control Conference (ACC). DOI: http://dx.doi.org/10.1109/ACC.2009.5160350 **Observation: one of the four finalists of the Student Best Paper Award.**

Publication on Brazilian journals/conferences.

- **[N15]** FELIX JUNIOR W. S. ; MONTEIRO N. S. ; **GONÇALVES V. M.** . *Learning vector fields through persistent exploration for robot motion control.* 2021 Brazilian Symposium on Intelligent Automation (SBAI).

- **[N14]** MONTEIRO N. S. ; **GONÇALVES V. M.** ; MAIA C. A . *Motion planning of mobile robots in indoor topological environments using partially observable markov decision process.* IEEE Latin America

Transactions (Journal), 2020.

- **[N13]** MONTEIRO N. S. ; MAIA C. A; **GONÇALVES V. M.** . *Geração de trajetórias ótimas para o robô não holonômico usando programação dinâmica diferencial (Generation of optimal trajectories for the non-holonomic robot using differential dynamic programming)*. 2019 Brazilian Conference on Dynamic Control and Applications (DINCON).

- **[N12]** RODRIGUES A. D. ; SOUZA T. W. ; SALDANHA R. R. ; **GONÇALVES V. M.** . *Modelagem e otimização do leito de fusão do alto forno na Aperam (Modeling and optimization of the blast furnace melting bed at Aperam)*. 2019 Brazilian Symposium on Intelligent Automation (SBAI).

- **[N11]** REZENDE A. M. C. ; MACHADO H. ; MIRANDA V. ; CHIELLA A. ; **GONÇALVES V. M.** ; FREITAS G. *Planejamento de trajetória, localização e controle aplicados a um quadrirrotor autônomo de corrida (Path planning, location and control applied to an autonomous racing quadrotor)*. 2019 Brazilian Symposium on Intelligent Automation (SBAI).

- **[N10]** FRAGA G. C. ; **GONÇALVES V. M.** ; BOAVENTURA W. *Avaliação do impacto da taxa de amostragem na Localização de faltas em linhas de transmissão baseada Em ondas viajantes (Evaluation of the impact of the sampling rate on the location of faults in transmission lines based on traveling waves)*. 2019 Brazilian Symposium on Intelligent Automation (SBAI).

- **[N9]** MONTEIRO N. S. ; **GONÇALVES V. M.** ; MAIA C. A . *Controle de um robô móvel em um galpão de estoque utilizando processo de decisão de markov parcialmente observável. (Control of a mobile robot in a warehouse using a partially observable markov decision process)*. 2019 Brazilian Symposium on Intelligent Automation (SBAI).

- **[N8]** MONTEIRO N. S. ; **GONÇALVES V. M.** ; MAIA C. A . *Estimação da localização de um robô não holonômico Utilizando modelo oculto de markov (HMM) e o filtro de Kalman estendido (EKF) (Estimation of the location of a non-holonomic robot using hidden Markov model (HMM) and extended Kalman filter (EKF))*. 2019 Brazilian Symposium on Intelligent Automation (SBAI).

- **[N7]** FELIX JUNIOR W. S. ; **GONÇALVES V. M.** . *Formalismo para resolução de tarefas em robótica utilizando otimização (Formalism for the resolution of robotic tasks using optimization)*. 2018 Brazilian Conference on Automation (CBA).

- **[N6]** SOUZA M. X. R. ; **GONÇALVES V. M.** . *Técnicas de causalização de controladores max-plus: validação em um simulador (Causalisation techniques for max-plus controllers: validation on a simulator)*. 2018 Brazilian Conference on Automation (CBA).

- **[N5]** PEREIRA G A S ; **GONÇALVES V. M.** ; REZENDE G. D. *Pouso de veículos aéreos utilizando campos vetoriais e visão computacional (Landing of aerial vehicles using vector fields and computer vision)*. 2018 Brazilian Conference on Automation (CBA).

- **[N4]** LISBOA A. C. ; PIMENTA L. C. A ; RAFFO G. V. ; **GONÇALVES V. M.** .*Controle de VANT de asa fixa com campos vetoriais arbitrários (Control of fixed-wing UAVs using arbitrary vector fields)*. 2018 Brazilian Conference on Automation (CBA).

- **[N3]** NUNES M. ; C. A. MAIA ; **GONÇALVES V. M.** ; PENA, P. . *Modelagem, análise temporal e controle de sistemas dinâmicos max-plus linear: aplicação em um sistema de manufatura didático (Modeling, temporal analysis of dynamic max-plus systems: application on a didactic manufacture system)*. 2017 Brazilian Symposium on Intelligent Automation (SBAI).

- **[N2]** **GONÇALVES V. M.** ; MAIA, C. A. ; HARDOUIN, LAURENT . *Avanços na teoria de controle para sistemas lineares na álgebra tropical (Advances on the theory of control of linear systems in the tropical*

algebra). 2014 Brazilian Conference on Automation (CBA).

○ **[N1] GONÇALVES V. M.** ; PIMENTA L. C. A. ; MAIA, C. A. ; PEREIRA, G. A. S. . *Navegação de rbôs móveis utilizando ciclos limite determinados por meio de curvas implícitas (Navigation of robots using implicit curves).* Controle & Automação (Journal), 2010.