Cláudio Gomes

▬▬▬ Key Academic Skills at a Glance

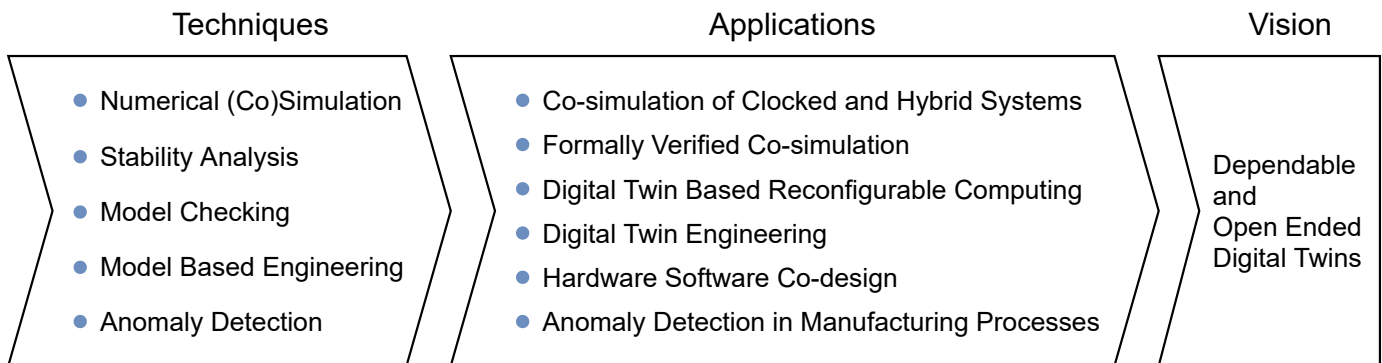|	
Researcher	○ Participated in 24 journal and 40 conference publications (peer reviewed).
	○ Google H-Index is 22, ResearchGate score is 944, and most cited paper has 494 citations. 1879 new citations since 2020.
	○ Awarded a Research Foundation Flanders (FWO) Scholarship.
Collaborator	○ 30 international collaborations (applied mathematics, formal methods), universities (Aarhus, Carnegie Mellon, KU Leuven, UCLouvain, McGill, KTH, Manchester), and companies (Boeing, Novo Nordisk, Vestas, Lego, Technicon, Flanders Make, Virtual Vehicle Research Center, fortiss, and Bosch).
Leader	○ Official co-supervisor of 6 PhD Students in the domains of modelling and simulation, manufacturing, anomaly detection, and machine learning.
Teacher	○ Assisting practical lectures since 2nd year of BSc (12 semesters).
	○ Assistant Professor since 2022.
Learner	○ Contributed to surveys in new fields (e.g., [21, 24, 65]).
	○ Applied knowledge from other fields to problems on own field (e.g., [60]).
	○ Co-authored contributions outside own field (e.g., [57, 51]).
Speaker	○ Delivered +30 presentations to international audiences, 7 of which were invited, at universities such as TU Graz, UCLouvain, research institutes such as IFP Energie Nouvelles, and companies such as Siemens, Boeing Research&Technology Europe, and Novo Nordisk.
Community Assistant	○ Took part in the program committee of 3 conferences (Springsim, RIVF, ANNSIM), chair of the CPS Track in the ANNSIM conference 2021 and 2022 editions, and co-organizer of 2 editions of CoSimCPS workshop.
	○ Part of FMI Standard Steering committee.
	○ Reviewed 15 papers in the past 3 years for journals such as SIMULATION, Sensors and Actuators, SoSym, and SIMPAT.

Employment

01/2022 – Present   **Assistant Professor**, *Aarhus University*, Aarhus, Middle Jutland, Denmark
Supervision, teaching, and conducting research with a focus on co-simulation, digital twin engineering, and machine learning for digital twins.

01/2020 – 01/2022   **Postdoctoral Researcher**, *Aarhus University*, Aarhus, Middle Jutland, Denmark
Supervision and research with a focus on co-simulation, digital twin engineering, and machine learning for digital twins.

11/2019 – 12/2019   **Visiting Researcher**, *Carnegie Mellon University*, Greater Pittsburgh Area
Collaborated with Prof. Andre Platzer and Stefan Mitsch on runtime monitoring of co-simulations.

03/2015 – 09/2019   **FWO Fellow Phd Student**, *University of Antwerp*, Antwerp Area, Belgium
Pursued a Ph.D. in Computer Science with a focus on co-simulation.

07/2013 – 01/2015   **Software Engineer**, *Altitude Software*, Lisbon
Worked as a Front and Backend engineer on a real-time web application for telephony scripts and customer relations, specified by a Domain Specific Language.

09/2011 – 01/2013   **Assistant Lecturer**, *NOVA School of Science and Technology*, Almada
Taught practical (lab) classes involving C and Octave programming languages.

10/2009 – 07/2012   **Researcher in the SOLAR group**, *NOVA School of Science and Technology*, Almada
Participated in research focused on the methodology for prototype transformations and transformational semantics in a control system specification language.

Education

01/03/2015– 31/12/2019   **PhD**, *University of Antwerp*, Property Preservation in Co-simulation, Antwerp, Belgium
Supervisor: Prof. Hans Vangheluwe.

01/09/2011– 22/11/2013   **MSc and BSc degree, Mark: *18 (out of 20, honors)***, *New University of Lisbon*, A Framework for Efficient Model Transformations, Lisbon, Portugal
Supervisor: Prof. Vasco Amaral.

Scientific Focus Areas

Techniques	Applications	Vision
• Numerical (Co)Simulation • Stability Analysis • Model Checking • Model Based Engineering • Anomaly Detection	• Co-simulation of Clocked and Hybrid Systems • Formally Verified Co-simulation • Digital Twin Based Reconfigurable Computing • Digital Twin Engineering • Hardware Software Co-design • Anomaly Detection in Manufacturing Processes	Dependable and Open Ended Digital Twins

Project, Grants & Awards (Selected)

01/2024   **ROBOSAPIENS: Robotic Self Adaptation in Novel Environments**, *Horizon Europe CL4 RIA Project (Budget: 4M€, 7 Partners, AU part 1.2M€)*, Aarhus, Denmark
Role: co-coordinator, digital twin safety expert.

23/05/2023   **Runner Up Best Paper Award at ANNSIM Conference**, Ontario, Canada

11/2021   **DIGIT-BENCH: DIGItal Twin for large-scale test BENCHes for the wind industry (AU part 2.6 MDKK)**, *EUDP*, Aarhus, Denmark
Role: PI on AU-ECE side, supervision of postdoc and phd students, and DT engineering expert.

11/2021	**Demonstration of Lifetime Extension (DLTE) Concept (AU part 1.5 MDKK)**, *EUDP*, Aarhus, Denmark Role: PI on AU-ECE side, supervision of postdoc and phd students, and co-simulation expert.
10/2020	**UPSIM Unleash Potentials in SIMulation ITEA 3 Project (Budget 19.7M€, 6MDKK AU)**, Aarhus, Denmark Role: state of the art in co-simulation and simulation governance work packages.
09/2020	**MADE FAST (Budget: 300MDKK, 15.6MDKK AU, 7 companies with AU)**, Aarhus, Denmark Role: Co-supervision in Part Projects 3.01, 3.06, 4.07, 4.08, 4.09, 4.10.
06/2020	**Digit Brain Innovation Action (Budget: 8M€, 3.3MDKK AU), 36 Partners**, Aarhus, Denmark Role: Revising AU experiments.
10/10/2019	**FWO Travel Grant to Carnegie Mellon University**, Pittsburgh, United States
31/07/2019	**Best Paper Award at SIMULTECH conference**, Prague, Czech Republic
07/10/2016	**2nd Place ACM Student Research Competition**, Saint-malo, France
01/01/2016	**FWO PhD Fellowship**, *Scholarship for 4 years, full time researcher*, Antwerp
22/11/2013	**Merit Student**, *2nd highest grade of CS MSc*, Lisbon, Portugal

Stays

09/04/2024	**Computer Science Department, Chongqing University, China**, *Digital Twin Engineering*, 2 weeks, Host: Prof. Zhiming Liu
11/11/2019	**Computer Science Department, Carnegie Mellon University, Pittsburgh, United States**, *Co-simulation Monitoring*, 5 weeks, Host: Prof. André Platzer
06/06/2018	**TU Graz, Austria**, *Co-simulation Collaboration*, 1 week, Host: Georg Engel (Senior Researcher)
01/03/2018	**Engineering Department, Aarhus University, Denmark**, *Verification of Co-simulation Methods*, 1 week, Host: Prof. Peter Gorm Larsen
05/10/2017	**Department of Computer Science, Manchester University, UK**, *Delayed Events in Co-simulation*, 1 week, Host: Prof. Eva Navarro-López
14/09/2017	**Applied Mathematics Department, Université Catholique de Louvain, Belgium**, *Stable Adaptive Co-simulation with Switched Systems*, 1 week, Host: Prof. Raphaël Jungers
05/09/2016	**Fortiss GmbH, Germany**, *Model Transformation Engine Optimization*, 1 week, Host: Levi Lúcio (Senior Researcher)
11/03/2016	**Engineering Department, Aarhus University, Denmark**, *Co-simulation Survey Preparation*, 1 week, Host: Prof. Peter Gorm Larsen

Selected Industrial Collaborations / R&D Projects

1/2024–Now	**PAL Robotics, Fraunhofer Institute for Factory Operation and Automation IFF, Simula Research Lab, and Danish Technological Institute**, *Safety in self adaptive robotics*, Aarhus, Denmark Partners in robosapiens project.
1/2024–Now	**Fibo Intercon**, *Industrial PhD*, Aarhus, Denmark Digital twinning concrete mixer
1/2024–Now	**Fraunhofer Institute for Factory Operation and Automation IFF**, *Safety in self adaptive robotics*, Aarhus, Denmark Partner in robosapiens project.

| 1/2020– Now | **Synopsys, ESI ITI GmbH, Robert Bosch GmbH, Dassault Systemes, dSPACE GmbH, AVL List GmbH, TLK-Thermo GmbH, Altair**, *FMI Standardization Committee*, Aarhus, Denmark |
| | Designing version 3.0 of the FMU standard. Joint publications: [47, 45, 30],[18]. |

10/2021– Now   **ScubaTx Ltd.**, *Organ preservation digital twins*, Aarhus, Denmark
Joint publications: [28].

10/2021– Now   **R&D Test Systems A/S**, *Hybrid testing digital twins*, Aarhus, Denmark
Joint publications: [9],[25].

10/2022– 12/2024   **FORCE Technology A/S**, *Hybrid testing digital twins*, Aarhus, Denmark
Part of DLTE project.

10/2020– 10/2023   **Novo Nordisk**, *Anomaly Detection for Manufacturing Processes*, Aarhus, Denmark
Application of state of the art anomaly detection methods to the production of dose pens. Joint publications: [35].

10/2020– 10/2023   **Lego**, *Anomaly Detection for Machining Processes*, Aarhus, Denmark
Joint publications: [43].

10/2020– 10/2023   **Vestas**, *Enabling Mobile Manufacturing*, Aarhus, Denmark
Joint publications: [10].

10/2020– 10/2023   **Technicon**, *Automated Configuration of Robot Manufacturing Cells*, Aarhus, Denmark
Joint publications: [49, 37, 36].

08/2019– 10/2019   **Boeing Research and Technology Europe**, *Hint-Based Configuration of Co-simulations*, Madrid, Spain
Joint publications: [55, 48].

09/2016   **Fortiss GmbH**, *Model Transformation Engine Optimization*, Munich, Germany
Joint publications: [64].

Ongoing Applications for Funding

01/2025   **TWIN-GROW**, *Danida*, Aarhus, Denmark
Role: PI;
Status: `Submitted`.

11/2024   **SAILING**, *Horizon Doctoral Network, 8 partners*, Aarhus, Denmark
Role: PI;
Status: `Submitted`.

11/2024   **EngDT**, *Horizon Doctoral Network, 8 partners (Budget: ≈4.3M€, AU Part: ≈0.6M€)*, Aarhus, Denmark
Role: PI and WPLead;
Status: `Submitted`.

10/2024   **ESPECIALS**, *COST Action*, Aarhus, Denmark
Role: PI;
Status: `Submitted`.

03/2024   **VECTRON**, *Horizon Europe*, Aarhus, Denmark
Role: PI;
Status: `Rejected`.

02/2024   **Alapple**, *Danida*, Aarhus, Denmark
Role: PI;
Status: `Rejected`.

01/2024   **ROBOSAPIENS: Robotic Self Adaptation in Novel Environments**, *Horizon Europe CL4 RIA Project (Budget: ≈4M€, ≈7 Partners, AU part 8.1 MDKK)*, Aarhus, Denmark
Role: coordinating, preparing state of the art and work packages for AU;
Status: `Accepted`.

07/2024 **DTCore**, *Poul Due Jensen Foundation personal project grant to Prof. Peter Gorm Larsen (Budget AU: ≈15MDKK)*, Aarhus, Denmark
Role: co-PI;
Status: `Accepted`.

12/2023 **Omen**, *Application for New Centers of Excellence*, Aarhus, Denmark
Role: co-PI;
Status: `Rejected`.

10/2023 **DART**, *UArtic (Budget: ≈389 KNOK)*, Aarhus, Denmark
Role: PI;
Status: `Accepted`.

10/2023 **WindExcel**, *Horizon Europe*, Aarhus, Denmark
Role: PI and WPLead;
Status: `Rejected`.

04/2023 **ACCME**, *DFF Thematic*, Aarhus, Denmark
Role: PI;
Status: `Rejected`.

04/2023 **PROMOTE**, *Novo Foundation*, Aarhus, Denmark
Role: PI;
Status: `Rejected`.

05/2022– **LakeTwin: Adaptive Lake Ecosystem Management through Digital Twin**, *DFF Research Project*
07/2022 *1 (Thematic)*, Aarhus, Denmark
Role: PI;
Status: `Rejected`.

11/2021 **DIGIT-BENCH: DIGItal Twin for large-scale test BENCHes for the wind industry (AU part 2.6 MDKK)**, *EUDP*, Aarhus, Denmark
Role: Co-PI, preparing state of the art and work packages for AU;
Status: `Accepted`.

11/2021 **Demonstration of Lifetime Extension (DLTE) Concept (AU part 1.5 MDKK)**, *EUDP*, Aarhus, Denmark
Role: Co-PI;
Status: `Accepted`.

11/2021 **DILIGENT: Digital Twin Engineering for a Resilient Future**, *MSCA Doctoral Network (Budget: ≈4M€, ≈8 Partners)*, Aarhus, Denmark
Role: coordinating, preparing state of the art and work packages for AU;
Status: `Rejected`.

05/2021 **DiTToLA: Digital Twin for Tool Life Assessment**, *DFF*, Aarhus, Denmark
Role: preparing state of the art and work packages for digital twin;
Status: `Rejected`.

05/2021 **AI-rPET: Data-assisted tools for thermoforming of recycled PET in food packaging**, *DFF*, Aarhus, Denmark
Role: preparing state of the art and work packages for digital twin;
Status: `Rejected`.

09/2020 – **MADE FAST (Budget: 300MDKK, 15.6MDKK AU, 7 companies with AU)**, Aarhus, Denmark
06/2024 Role: Edition Part Projects 3.01, 3.06, 4.07, 4.08, 4.09, 4.10;
Status: `Accepted`.

09/2020 **Wear Mitigation in Hydraulic Systems using Digital Twin**, *DFF*, Aarhus, Denmark
Role: preparing state of the art and work packages for digital twin;
Status: `Rejected` .

10/2020 – **UPSIM Unleash Potentials in SIMulation ITEA 3 Project (Budget 19.7M€, 6MDKK AU)**, Aarhus,
09/2023 Denmark
Role: preparing state of the art in co-simulation and simulation governance work packages;
Status: `Accepted` .

06/2020 – **Digit Brain Innovation Action (Budget: 8M€, 3.3MDKK AU), 36 Partners**, Aarhus, Denmark
12/2023 Role: Revising AU experiments;
Status: `Accepted` .

10/2019 **DiT-MaP: Digital Twins for Manufacturing Processes Villum Foundation**, Aarhus, Denmark
Role: preparing state of the art in digital twins;
Status: `Rejected` .

03/2019 **PULSE: Perpetual Learning for cyber-physical Systems of Systems H2020**, Aarhus, Denmark
Role: revising state of the art in co-simulation;
Status: `Rejected` .

Teaching

2025 – Now **Engineering Digital Twins**, *Assistant professor*, Aarhus, Denmark
Tasks: Preparing and delivering lectures on engineering digital twins
Program: MsC.

2023 – Now **Data Structures and Algorithms**, *Assistant professor*, Aarhus, Denmark
Tasks: Preparing and delivering lectures on data structures and algorithms
Program: BsC and BEng.

2023 **Programming and Modelling**, *Assistant professor*, Aarhus, Denmark
Tasks: Preparing and delivering lectures on programming and modelling
Program: MsC.

Spring 2022 **Software Design**, *Assistant professor*, Aarhus, Denmark
Tasks: Preparing and delivering lectures on software architecture and design patterns
Program: BsC.

Spring 2022 **Systems Engineering**, *Teaching assistant with Associate Prof. Stefan Hallerstede on model based*
/ Spring *systems engineering with co-simulation*, Aarhus, Denmark
2021 / Tasks: Delivering practical lecture, tutorial on using the INTO-CPS application, and preparing questionnaires.
Spring 2020 Program: MSc in Computer Engineering.

Fall 2019 / **Modelling of Software-Intensive Systems**, *Teaching assistant with Prof. Hans Vangheluwe on causal*
Fall 2018 / *block diagrams*, Antwerp, Belgium
Fall 2017 / Tasks: Preparing course exercises and exam questions on Petri Nets and Simulink Block Diagrams, and correction
Fall 2016 / of exams and assignments.
Fall 2015 Program: MSc in Computer Science.

Fall 2018 / **Model Driven Engineering**, *Teaching assistant with Prof. Hans Vangheluwe on Domain Specific Lan-*
Fall 2017 *guages and Model Transformations*, Antwerp, Belgium
Tasks: Responsible for the practical part of the course: determining lab assignments and projects, delivering
practical lectures, formulating and correcting part of the exam.
Program: MSc in Computer Science.

Fall 2013 / **Domain Specific Languages**, *Teaching assistant on Domain Specific Languages with Prof. Vasco*
Fall 2012 *Amaral*, Lisbon, Portugal
Tasks: Helping with lab assignments and projects, delivering practical lectures, correcting part of the exam and
assignments.
Program: MSc in Computer Science.

Spring 2012 / Spring 2011	**Formal languages and automata theory**, *Teaching assistant on Automata, Grammars, and Regular Expressions with Prof. Vasco Amaral*, Lisbon, Portugal Tasks: Helping with lab assignments and projects, delivering practical lectures, correcting part of the exam and assignments. Program: BSc in Computer Science Engineering.
Fall 2010	**Introduction to Programming in C**, *Teaching assistant preparing and correcting exercises for students from physics and mathematics BSc with Prof. Artur Miguel Dias*, Lisbon, Portugal Tasks: Helping with lab assignments and projects, delivering practical lectures and recapping theory, and correcting part of the exam and assignments. Program: BSc in Computer Science Engineering.

Research Leadership

Program Committees	**Springsim, RIVF, ANNSIM, EDTConf, Isola, conferences.**
Conference Organization	**CPS Track in the ANNSIM conference 2021 and 2022 editions, co-organizer of 3 editions of CoSimCPS workshop, SETSS workshop, Isola Conference track chair, Engineering digital twins conference organizing committee.**
Editor	**Guest editor for the SIMULATION journal, special issues on Digital Twins and dependability.**
Reviews	**Reviewer for 8 different journals in the past 2 years.**

Supervision

Post Docs	**2 Ongoing**
PhD Students	**4 Completed, 2 Ongoing**
MSc Students	**8 Completed, 1 Ongoing**
BSc Students	**4 Completed**

Dissemination – Outdated

09/2022	**DICO Workshop, Aarhus, Denmark**, *Co-simulation and It's Role in Digital Twin*
06/2022	**ECCOMAS Conference, Oslo, Norway**, *Co-simulation and It's Role in Digital Twin Engineering*
05/2022	**Driving IT Aarhus 2022, Aarhus, Denmark**, *Introduction to Digital Twin Engineering*, Host: IDA IT
06/2021	**Novo Nordisk, Denmark**, *Introduction to the Functional Mockup Interface Standard*, Host: Thomas Algot Søllested, Project Manager
10/2019	**Siemens, Belgium**, *Tutorial on co-simulation*, Host: Dr. Stefan Dutre, Senior Product Manager
08/2019	**Boeing Research and Technology Europe, Madrid**, *Hint-based Configuration of Co-simulations*, Host: Dr. Alejandro Torres Gámiz, Systems Modeling and Simulation Engineer
20/06/2018	**Austrian Institute for Sustainable Technologies, Graz, Austria**, *Introduction to Co-simulation*, Host: Dr. Georg Engel, Senior Researcher
19/06/2018	**TU Graz, Austria**, *Introduction to Co-simulation*, Host: Dr. Gerald Schweiger, Head of Intelligent Systems Lab
5/09/2017	**CoSim-CPS Workshop, Trento, Italy**, *Keynote: Co-simulation, State of the Art*, Host: Prof. Cinzia Bernardeschi, Dr. Paolo Masci, and Prof. Peter Gorm Larsen, Co-organizers of the workshop.

13/04/2018	**Carnegie Mellon University, Pittsburgh, USA**, *Co-simulation: State of the Art*, Host: Prof. David Garlan, Associate Dean for Master's Programs in the School of Computer Science
1/03/2017	**IFP Energies Nouvelles, Paris, France**, *Input Approximations in Co-simulation*, Host: Dr. Laurent Duval, Researcher and Data science project manager
17/08/2016	**Université Catholique de Louvain, Louvain-la-Neuve, Belgium**, *Stable Optimization of Co-simulation: a Switched Systems Approach*, Host: Prof. Raphaël Jungers, Department of Applied Mathematics
22/03/2016	**MPM4CPS Training, Tallinn, Estonia**, *Model-based Multi-disciplinary Co-simulation*, Host: Hans Vangheluwe, head of the MSDL research group

Community Building – Outdated

Scientific Event Organization

07/12/2021	**Co-Chair**, *5th Workshop on Formal Co-Simulation of Cyber-Physical Systems*, Virtual
22/07/2021	**Co-Chair**, *Annual Modeling and Simulation Conference*, Virtual
14/09/2020	**Co-Chair**, *4th Workshop on Formal Co-Simulation of Cyber-Physical Systems*, Virtual
22/07/2020	**Chair**, *CPS Track of Summersim Conference*, Virtual
16/09/2019	**Co-Chair**, *3rd Workshop on Formal Co-Simulation of Cyber-Physical Systems*, Oslo, Norway

Program Committee Activities

2021	**CPS Track – Annual Modeling and Simulation Conference**
2016/2018 /2019/2020	**TMS/DEVS Track – Spring simulation conference Multi-Conference**
2020	**CPS Track – Summer Simulation Conference**
2021	**ACM Conference on Principles of Advanced Discrete Simulation**
2019	**JuliaCon**
2019	**Workshop on Modeling and Simulation of Software-Intensive Systems**
2018	**Workshop on Distributed Estimation and Control in Networked Systems**
2018/2019 /2020	**Workshop on Formal Co-Simulation of Cyber-Physical Systems**
2016	**Winter Simulation Conference**
2016	**IEEE RIVF International Conference on Computing and Communication Technologies: Research, Innovation, and Vision for the Future**

Journal Reviewing Activities

2021	**Simulation: Transactions of the Society for Modeling and Simulation**
2021	**Sensors and Actuators A: Physical**
2018/2019 /2020/2021	**International Journal on Software and Systems Modeling**
2019/2021	**Parallel Computing**
2018/2020	**Machine Theory and Practice journal**
2018/2019	**Simulation Modelling Practice and Theory journal**

2018	**Oil & Gas Science and Technology journal**
2017	**Engineering with Computers journal**

Professional Experience

22/11/2013–01/02/2015	**Software developer**, *Altitude Software*, Lisbon
	Front and Backend engineer of a real-time web application for telephony scripts and customer relations, specified by a Domain Specific Language.

Languages

Portuguese	Native
English	Professional working proficiency
Danish	Intermediate

Publications

Peer Reviewed Journals

[1] Prasad Talasila, **Cláudio Gomes**, Lars B Vosteen, Hannes Iven, Martin Leucker, Santiago Gil, Peter H Mikkelsen, Eduard Kamburjan, and Peter G Larsen. Composable digital twins on Digital Twin as a Service platform. *SIMULATION*, page 00375497241298653, December 2024.

[2] Santiago Gil, Bentley J Oakes, **Cláudio Gomes**, Mirgita Frasheri, and Peter G Larsen. Toward a systematic reporting framework for Digital Twins: A cooperative robotics case study. *SIMULATION*, page 00375497241261406, August 2024.

[3] F. Nordtorp, E. E. Baş, **Cláudio Gomes**, and G. Abbiati. A Hybrid Testing Framework for Wind Turbine Mechanical Components. *Journal of Physics: Conference Series*, 2767(5):052046, June 2024.

[4] Simon Thrane Hansen, Casper Thule, **Cláudio Gomes**, Kenneth Guldbrandt Lausdahl, Frederik Palludan Madsen, Giuseppe Abbiati, and Peter Gorm Larsen. Co-simulation at different levels of expertise with Maestro2. *Journal of Systems and Software*, 209:111905, March 2024.

[5] Santiago Gil, Peter H. Mikkelsen, **Cláudio Gomes**, and Peter G. Larsen. Survey on open-source digital twin frameworks–A case study approach. *Software: Practice and Experience*, page spe.3305, January 2024.

[6] Peter G. Larsen, Shaukat Ali, Roland Behrens, Ana Cavalcanti, **Cláudio Gomes**, Guoyuan Li, Paul De Meulenaere, Mikkel L. Olsen, Nikolaos Passalis, Thomas Peyrucain, Jesús Tapia, Anastasios Tefas, and Houxiang Zhang. Robotic safe adaptation in unprecedented situations: The RoboSAPIENS project. *Research Directions: Cyber-Physical Systems*, 2:e4, 2024.

[7] Valdemar Tang, **Cláudio Gomes**, and Daniel E. Lucani. Precision on Demand: Propositional Logic for Event-Trigger Threshold Regulation. *IEEE Internet of Things Journal*, pages 1–1, 2024.

[8] Till Böttjer, Daniella Tola, Fatemeh Kakavandi, Christian R. Wewer, Devarajan Ramanujan, **Cláudio Gomes**, Peter G. Larsen, and Alexandros Iosifidis. A review of unit level digital twin applications in the manufacturing industry. *CIRP Journal of Manufacturing Science and Technology*, 45:162–189, October 2023.

[9] Giuseppe Abbiati, Ecem E. Baş, **Cláudio Gomes**, and Peter Gorm Larsen. Hybrid fire testing using FMI-based co-simulation. *Fire Safety Journal*, 139:103832, August 2023.

[10] Zahra Kazemi, Jonas Kjaer Rask, **Cláudio Gomes**, Emre Yildiz, and Peter Gorm Larsen. Movable factory—A systematic literature review of concepts, requirements, applications, and gaps. *Journal of Manufacturing Systems*, 69:189–207, August 2023.

[11] Qamar Alfalouji, Thomas Schranz, Basak Falay, Sandra Wilfling, Johannes Exenberger, Thorsten Mattausch, **Cláudio Gomes**, and Gerald Schweiger. Co-simulation for buildings and smart energy systems — A taxonomic review. *Simulation Modelling Practice and Theory*, 126:102770, July 2023.

[12] Sergiy Bogomolov, **Cláudio Gomes**, Carlos Isasa, Sadegh Soudjani, Paulius Stankaitis, and Thomas Wright. Reachability Analysis of FMI Models Using Data-Driven Dynamic Sensitivity. *SIMULATION*, page 00375497241261409, 2023.

[13] Mirgita Frasheri, Henrik Ejersbo, Casper Thule, **Cláudio Gomes**, Jakob Levisen Kvistgaard, Peter Gorm Larsen, and Lukas Esterle. Addressing Time Discrepancy between Digital and Physical Twins. *Robotics and Autonomous Systems*, 161(March 2023, 104347):104347, 2023.

[14] Fatemeh Kakavandi, **Cláudio Gomes**, Roger De Reus, Jeppe Badstue, Jakob Langdal Jensen, Peter Gorm Larsen, and Alexandros Iosifidis. Towards Developing a Digital Twin for a Manufacturing Pilot Line: An Industrial Case Study. In *Digital Twin Driven Intelligent Systems and Emerging Metaverse*, pages 39–64. Springer Nature Singapore, Singapore, 2023.

[15] Farshid Naseri, Santiago Gil, Corneliu Barbu, Erdal Cetkin, Gulsah Yarimca, Anders Jensen, Peter Gorm Larsen, and **Cláudio Gomes**. Digital Twin of Electric Vehicle Battery Systems: Comprehensive Review of the Use Cases, Requirements, and Platforms. *Renewable and Sustainable Energy Reviews*, 179:113280, 2023.

[16] Randy Paredis, **Cláudio Gomes**, and Hans Vangheluwe. A Family of Digital T Workflows and Architectures: Exploring Two Cases. *Innovative Intelligent Industrial Production and Logistics*, 1855:93–109, 2023.

[17] Simon Thrane Hansen, Casper Thule, **Cláudio Gomes**, Jaco van de Pol, Maurizio Palmieri, Emin Oguz Inci, Frederik Madsen, Jesús Alfonso, José Ángel Castellanos, and José Manuel Rodriguez. Verification and synthesis of co-simulation algorithms subject to algebraic loops and adaptive steps. *International Journal on Software Tools for Technology Transfer*, 24(6):999–1024, December 2022.

[18] Simon Thrane Hansen, **Cláudio Gomes**, Masoud Najafi, Torsten Sommer, Matthias Blesken, Irina Zacharias, Oliver Kotte, Pierre R. Mai, Klaus Schuch, Karl Wernersson, Christian Bertsch, Torsten Blochwitz, and Andreas Junghanns. The FMI 3.0 Standard Interface for Clocked and Scheduled Simulations. *Electronics*, 11(21):3635, November 2022.

[19] Christian Møldrup Legaard, Thomas Schranz, Gerald Schweiger, Ján Drgoňa, Basak Falay, **Cláudio Gomes**, Alexandros Iosifidis, Mahdi Abkar, and Peter Gorm Larsen. Constructing Neural Network-Based Models for Simulating Dynamical Systems. *ACM Computing Surveys*, page 3567591, 2021.

[20] Bentley James Oakes, **Cláudio Gomes**, Franz Rudolf Holzinger, Martin Benedikt, Joachim Denil, and Hans Vangheluwe. Hint-Based Configuration of Co-simulations with Algebraic Loops. *Simulation and Modeling Methodologies, Technologies and Applications*, 1260:1–28, 2021.

[21] Gerald Schweiger, **Cláudio Gomes**, Georg Engel, Irene Hafner, Josef-Peter Schoeggl, Alfred Posch, and Thierry Nouidui. An empirical survey on co-simulation: Promising standards, challenges and research needs. *Simulation Modelling Practice and Theory*, 95:148–163, 2019.

[22] Casper Thule, Kenneth Lausdahl, **Cláudio Gomes**, Gerd Meisl, and Peter Gorm Larsen. Maestro: The INTO-CPS Co-simulation Framework. *Simulation Modelling Practice and Theory*, 92(April):45–61, 2019.

[23] **Cláudio Gomes**, Bart Meyers, Joachim Denil, Casper Thule, Kenneth Lausdahl, Hans Vangheluwe, and Paul De Meulenaere. Semantic Adaptation for FMI Co-simulation with Hierarchical Simulators. *SIMULATION*, 95(3):1–29, 2018.

[24] **Cláudio Gomes**, Casper Thule, David Broman, Peter Gorm Larsen, and Hans Vangheluwe. Co-simulation: A Survey. *ACM Computing Surveys*, 51(3):49:1–49:33, 2018.

Peer Reviewed Conferences

[25] Bentley Oakes, **Cláudio Gomes**, Eduard Kamburjan, Giuseppe Abbiati, Elif Ecem Bas, and Sebastian Engelsgaard. Towards Ontological Service-Driven Engineering of Digital Twins. In *Proceedings of the ACM/IEEE 27th International Conference on Model Driven Engineering Languages and Systems*, MOD-ELS Companion '24, pages 464–469, New York, NY, USA, October 2024. Association for Computing Machinery.

[26] Morten Haahr Kristensen, Alberto Bonizzi, **Cláudio Gomes**, Simon Thrane Hansen, Carlos Isasa, Hannes Iven, Eduard Kamburjan, Peter Gorm Larsen, Martin Leucker, Prasad Talasila, Valdemar Trøjgård Tang, Stefano Tonetta, Lars B. Vosteen, and Thomas Wright. Runtime Verification of Autonomous Systems Utilizing Digital Twins as a Service. In *2024 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C)*, pages 121–127, September 2024.

[27] Istvan David, Guodong Shao, **Cláudio Gomes**, Dawn M. Tilbury, and Bassam Zarkout. Interoperability of Digital Twins: Challenges, Success Factors, and Future Research Directions. In *Leveraging Applications of Formal Methods, Verification and Validation: Tools and Trends*, volume 15223, pages 27–46, Crete, Greece, 2024. Springer Nature Switzerland.

[28] Aaron John Buhagiar, Rikke Fanøe Christensen, Peter Gorm Larsen, Leo Freitas, William E Scott, and **Cláudio Ângelo Gonçalves Gomes**. Understanding pancreas-machine interactions during preservation: A mathematical approach. In *Transplantation*, volume 107, pages 34–35, October 2023.

[29] Prasad Talasila, **Cláudio Gomes**, Peter Høgh Mikkelsen, Santiago Gil Arboleda, Eduard Kamburjan, and Peter Gorm Larsen. Digital Twin as a Service (DTaaS): A Platform for Digital Twin Developers and Users. In *2023 IEEE Smart World Congress (SWC)*, pages 1–8, Portsmouth, United Kingdom, June 2023. IEEE.

[30] Simon Thrane Hansen, **Cláudio Gomes**, and Zahra Kazemi. Synthesizing Orchestration Algorithms for FMI 3.0. In *2023 Annual Modeling and Simulation Conference*, pages 184–195, Ontario, Canada, 2023.

[31] Emin Oguz Inci, **Cláudio Gomes**, Jan Croes, and Wim Desmet. Error Estimators for Adaptive Scheduling Algorithm for Serial Co-simulation. In *Annual Modelling and Simulation Conference*, pages 73–83, Ontario, Canada, 2023.

[32] Bentley Oakes, **Cláudio Gomes**, Peter Gorm Larsen, Joachim Denil, Julien DeAntoni, João Cambeiro, and John Fitzgerald. Examining Model Qualities and Their Impact on Digital Twins. In *Annual Modelling and Simulation Conference*, pages 220–232, Ontario, Canada, 2023.

[33] Lukas Esterle, Henrik Ejersbo, Mirgita Frasheri, **Cláudio Gomes**, Hugo Daniel Macedo, and Peter Gorm Larsen. Digital Twins for Autonomous Intelligent Systems: From Development to Deployment. In *2022 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C)*, pages 53–54, CA, USA, September 2022. IEEE.

[34] Hao Feng, **Cláudio Gomes**, Santiago Gil, Peter H. Mikkelsen, Daniella Tola, Peter Gorm Larsen, and Michael Sandberg. Integration Of The Mape-K Loop In Digital Twins. In *2022 Annual Modeling and Simulation Conference (ANNSIM)*, pages 102–113, San Diego, CA, USA, July 2022. IEEE.

[35] Fatemeh Kakavandi, Roger De Reus, **Cláudio Gomes**, Negar Heidari, Alexandros Iosifidis, and Peter Gorm Larsen. Product Quality Control in Assembly Machine under Data Restricted Settings. In *2022 IEEE 20th International Conference on Industrial Informatics (INDIN)*, pages 735–741, Perth, Australia, July 2022. IEEE.

[36] Emil Madsen, Daniella Tola, Carlos Hansen, **Cláudio Gomes**, and Peter Gorm Larsen. AURT: A Tool for Dynamics Calibration of Robot Manipulators. In *2022 IEEE/SICE International Symposium on System Integration (SII)*, pages 190–195, Narvik, Norway, January 2022. IEEE.

[37] Daniella Tola, Emil Madsen, **Cláudio Gomes**, Lukas Esterle, Christian Schlette, Casper Hansen, and Peter Gorm Larsen. Towards Easy Robot System Integration: Challenges and Future Directions. In *2022*

IEEE/SICE International Symposium on System Integration (SII), pages 77–82, Narvik, Norway, January 2022. IEEE.

[38] Tomas Kulik, **Cláudio Gomes**, Hugo Daniel Macedo, Stefan Hallerstede, and Peter Gorm Larsen. Towards Secure Digital Twins. In Tiziana Margaria and Bernhard Steffen, editors, *Leveraging Applications of Formal Methods, Verification and Validation. Practice*, volume 13704, pages 159–176, Cham, 2022. Springer Nature Switzerland.

[39] Thomas Wright, **Cláudio Gomes**, and Jim Woodcock. Formally Verified Self-adaptation of an Incubator Digital Twin. In *Leveraging Applications of Formal Methods, Verification and Validation. Practice*, volume 13704, pages 89–109, Cham, 2022. Springer Nature Switzerland.

[40] Hao Feng, **Cláudio Gomes**, Casper Thule, Kenneth Lausdahl, Alexandros Iosifidis, and Peter Gorm Larsen. Introduction to Digital Twin Engineering. In *2021 Annual Modeling and Simulation Conference (ANNSIM)*, pages 1–12, Fairfax, VA, USA, July 2021. IEEE.

[41] Simon Thrane Hansen, **Cláudio Gomes**, Peter Gorm Larsen, and Jaco Van de Pol. Synthesizing Co-Simulation Algorithms with Step Negotiation and Algebraic Loop Handling. In *2021 Annual Modeling and Simulation Conference (ANNSIM)*, pages 1–12, Fairfax, VA, USA, July 2021. IEEE.

[42] Emin Oguz Inci, Jan Croes, Wim Desmet, **Cláudio Gomes**, Casper Thule, Kenneth Lausdahl, and Peter Gorm Larsen. The Effect and Selection of Solution Sequence in Co-Simulation. In *2021 Annual Modeling and Simulation Conference (ANNSIM)*, pages 1–12, Fairfax, VA, USA, July 2021. IEEE.

[43] Till Böttjer, Georg Ørnskov Rønsch, **Cláudio Gomes**, Devarajan Ramanujan, Alexandros Iosifidis, and Peter Gorm Larsen. Data-Driven Identification of Remaining Useful Life for Plastic Injection Moulds. In *Towards Sustainable Customization: Bridging Smart Products and Manufacturing Systems*, pages 431–439, Cham, 2021. Springer International Publishing.

[44] **Cláudio Gomes**, Giuseppe Abbiati, and Peter Gorm Larsen. Seismic Hybrid Testing using FMI-based Co-Simulation. In *Proceedings of the 14th International Modelica Conference*, online, 2021. Linköping University Electronic Press, Linköpings Universitet.

[45] **Cláudio Gomes**, Masoud Najafi, Torsten Sommer, Matthias Blesken, Irina Zacharias, Oliver Kotte, Pierre Mai, Klaus Schuch, Karl Wernersson, Christian Bertsch, Torsten Blochwitz, and Andreas Junghanns. The FMI 3.0 Standard Interface for Clocked and Scheduled Simulations. In *Proceedings of the 14th International Modelica Conference*, online, 2021. Linköping University Electronic Press, Linköpings Universitet.

[46] Simon Thrane Hansen, **Cláudio Gomes**, Maurizio Palmieri, Casper Thule, Jaco van de Pol, and Jim Woodcock. Verification of Co-simulation Algorithms Subject to Algebraic Loops and Adaptive Steps. In Alberto Lluch Lafuente and Anastasia Mavridou, editors, *Formal Methods for Industrial Critical Systems*, volume 12863, pages 3–20, Cham, 2021. Springer International Publishing.

[47] Andreas Junghanns, Torsten Blochwitz, Christian Bertsch, Torsten Sommer, Karl Wernersson, Andreas Pillekeit, Irina Zacharias, Matthias Blesken, Pierre Mai, Klaus Schuch, Christian Schulze, **Cláudio Gomes**, and Masoud Najafi. The Functional Mock-up Interface 3.0 - New Features Enabling New Applications. In *Proceedings of the 14th International Modelica Conference*, online, 2021. Linköping University Electronic Press, Linköpings Universitet.

[48] Bentley James Oakes, **Cláudio Gomes**, Franz Rudolf Holzinger, Martin Benedikt, Joachim Denil, and Hans Vangheluwe. Hint-Based Configuration of Co-simulations with Algebraic Loops. *Simulation and Modeling Methodologies, Technologies and Applications*, 1260:1–28, 2021.

[49] Daniella Tola, **Cláudio Gomes**, Carl Schultz, Christian Schlette, Casper Hansen, and Lukas Esterle. RoboCIM: Towards a Domain Model for Industrial Robot System Configurators despite Tribal Knowledge. In *5th International Joint Conference on Rules and Reasoning*, Leuven, Belgium, 2021.

[50] Jim Woodcock, **Cláudio Gomes**, Hugo Daniel Macedo, and Peter Gorm Larsen. Uncertainty Quantification and Runtime Monitoring Using Environment-Aware Digital Twins. In *Leveraging Applications of Formal Methods, Verification and Validation: Tools and Trends*, volume 12479 of *Lecture Notes in Computer Science*, pages 72–87. Springer International Publishing, 2021.

[51] Benoît Legat, **Cláudio Gomes**, Paschalis Karalis, Raphaël M. Jungers, Eva M. Navarro-López, and Hans Vangheluwe. Stability of Planar Switched Systems under Delayed Event Detection. *arXiv:2102.10390 [cs, eess]*, September 2020.

[52] **Cláudio Gomes**, Casper Thule, Levi Lúcio, Hans Vangheluwe, and Peter Gorm Larsen. Generation of Co-simulation Algorithms Subject to Simulator Contracts. In Javier Camara and Martin Steffen, editors, *Software Engineering and Formal Methods*, volume 12226 of *Lecture Notes in Computer Science*, pages 34–49, Oslo, Norway, 2020. Springer International Publishing.

[53] Christian Møldrup Legaard, **Cláudio Gomes**, Peter Gorm Larsen, and Frederik F. Foldager. Rapid Prototyping of Self-Adaptive-Systems using Python Functional Mockup Units. In *Proceedings of the 2020 Summer Simulation Conference*, SummerSim '20, pages 1–12, Virtual Event, Spain, 2020. Society for Computer Simulation International, San Diego, CA, United States.

[54] Casper Thule, **Cláudio Gomes**, and Kenneth Lausdahl. Formally Verified FMI Enabled Data Broker: RabbitMQ FMU. In *Proceedings of the 2020 Summer Simulation Conference*, SummerSim '20, pages Pages 1–12, Virtual event, 2020. Society for Computer Simulation International.

[55] **Cláudio Gomes**, Bentley James Oakes, Mehrdad Moradi, Alejandro Torres Gamiz, Juan Carlos Mendo, Stefan Dutre, Joachim Denil, and Hans Vangheluwe. HintCO - Hint-Based Configuration of Co-Simulations. In *International Conference on Simulation and Modeling Methodologies, Technologies and Applications*, pages 57–68, Prague, Czech Republic, 2019.

[56] Mehrdad Moradi, **Cláudio Gomes**, Bentley James Oakes, and Joachim Denil. Optimizing Fault Injection in FMI Co-simulation. In *Proceedings of the 2019 Summer Simulation Conference*, page 12, Berlin, Germany, 2019. Society for Computer Simulation International.

[57] **Cláudio Gomes**, Benoît Legat, Raphaël Jungers, and Hans Vangheluwe. Minimally Constrained Stable Switched Systems and Application to Co-simulation. In *IEEE Conference on Decision and Control*, pages 5676–5681, Miami Beach, FL, USA, 2018.

[58] **Cláudio Gomes**, Casper Thule, Julien DeAntoni, Peter Gorm Larsen, and Hans Vangheluwe. Co-simulation: The Past, Future, and Open Challenges. In *Symposium On Leveraging Applications of Formal Methods, Verification and Validation*, volume 11246 of *Lecture Notes in Computer Science*, Limassol, Cyprus, 2018. Springer Verlag.

[59] Gerald Schweiger, **Cláudio Gomes**, Georg Engel, Irene Hafner, Josef Schoeggl, Alfred Posch, and Thierry Nouidui. Functional Mock-up Interface: An empirical survey identifies research challenges and current barriers. In *Proceedings of the American Modelica Conference*, pages 138–146, Cambridge, MA, USA, 2018. Linköping University Electronic Press, Linköpings Universitet.

[60] **Cláudio Gomes**, Benoît Legat, Raphaël M. Jungers, and Hans Vangheluwe. Stable Adaptive Co-simulation: A Switched Systems Approach. In *IUTAM Symposium on Co-Simulation and Solver Coupling*, volume 35, pages 81–97, Darmstadt, Germany, 2017. Springer, Cham.

[61] **Cláudio Gomes**, Yentl Van Tendeloo, Joachim Denil, Paul De Meulenaere, and Hans Vangheluwe. Hybrid System Modelling and Simulation with Dirac Deltas. In *Proceedings of the Symposium on Theory of Modeling & Simulation: DEVS Integrative M&S Symposium*, page Article No. 7, Virginia Beach, Virginia, USA, 2017. Society for Computer Simulation International.

[62] Sadaf Mustafiz, **Cláudio Gomes**, Bruno Barroca, and Hans Vangheluwe. Modular Design of Hybrid Languages by Explicit Modeling of Semantic Adaptation. In *Proceedings of the Symposium on Theory*

of *Modeling & Simulation: DEVS Integrative M&S Symposium*, pages 29:1–29:8, Pasadena, California, April 2016. IEEE.

[63] David P. Y. Lawrence, **Cláudio Gomes**, Joachim Denil, Hans Vangheluwe, and Didier Buchs. Coupling Petri nets with Deterministic Formalisms Using Co-simulation. In *Symposium on Theory of Modeling & Simulation: DEVS Integrative M&S Symposium*, pages 6:1–6:8, Pasadena, CA, USA, 2016.

[64] Levi Lúcio, Bentley James Oakes, **Cláudio Gomes**, Gehan Selim, Juergen Dingel, James R. Cordy, and Hans Vangheluwe. SyVOLT: Full Model Transformation Verification Using Contracts. In *8th International Conference on Model Driven Engineering Languages and Systems - Demo*, pages 6019–635, Ottawa, Canada, September 2015. Springer International Publishing.

[65] **Cláudio Gomes**, Bruno Barroca, and Vasco Amaral. Classification of Model Transformation Tools: Pattern Matching Techniques. In Juergen Dingel, Wolfram Schulte, Isidro Ramos, Silvia Abrahão, and Emilio Insfran, editors, *Model-Driven Engineering Languages and Systems*, volume 8767 of *Lecture Notes in Computer Science*. Springer International Publishing, 2014.

Peer Reviewed Workshops

[66] Hao Feng, **Cláudio Gomes**, Michael Sandberg, Hugo Daniel Macedo, and Peter Gorm Larsen. Under What Conditions Does a Digital Shadow Track a Periodic Linear Physical System? In *Software Engineering and Formal Methods. SEFM 2021 Collocated Workshops*, volume 13230, pages 143–155, Cham, 2022. Springer International Publishing.

[67] Lukas Esterle, **Cláudio Gomes**, Mirgita Frasheri, Henrik Ejersbo, Sven Tomforde, and Peter G. Larsen. Digital twins for collaboration and self-integration. In *2021 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C)*, pages 172–177, DC, USA, September 2021. IEEE.

[68] Hao Feng, **Cláudio Gomes**, Casper Thule, Kenneth Lausdahl, Michael Sandberg, and Peter Gorm Larsen. The Incubator Case Study for Digital Twin Engineering. Technical report, Aarhus University, Department of Engineering, February 2021.

[69] Simon Thrane Hansen, Casper Thule, and **Cláudio Gomes**. An FMI-Based initialization plugin for INTO-CPS maestro 2. In Loek Cleophas and Mieke Massink, editors, *Software Engineering and Formal Methods. SEFM 2020 Collocated Workshops*, pages 295–310, Virtual event, 2021. Springer International Publishing.

[70] Randy Paredis, **Cláudio Gomes**, and Hans Vangheluwe. Towards a Family of Digital Model/Shadow/Twin Workflows and Architectures. In *Proceedings of the 2nd International Conference on Innovative Intelligent Industrial Production and Logistics*, pages 174–182, Online Streaming, 2021. SCITEPRESS - Science and Technology Publications.

[71] **Cláudio Gomes**, Joachim Denil, and Hans Vangheluwe. Causal-Block Diagrams: A Family of Languages for Causal Modelling of Cyber-Physical Systems. In Paulo Carreira, Vasco Amaral, and Hans Vangheluwe, editors, *Foundations of Multi-Paradigm Modelling for Cyber-Physical Systems*, pages 97–125. Springer International Publishing, Cham, 2020.

[72] Peter Gorm Larsen, Hugo Daniel Macedo, **Cláudio Gomes**, Lukas Esterle, Casper Thule, John Fitzgerald, and Kenneth Pierce. Collaborative Modelling and Co-simulation in Engineering and Computing Curricula. In *Frontiers in Software Engineering Education*, volume 12271 of *Lecture Notes in Computer Science*, pages 196–213, Cham, 2020. Springer International Publishing.

[73] Casper Thule, Maurizio Palmieri, **Cláudio Gomes**, Kenneth Lausdahl, Hugo Daniel Macedo, Nick Battle, and Peter Gorm Larsen. Towards Reuse of Synchronization Algorithms in Co-simulation Frameworks. In *Software Engineering and Formal Methods*, volume 12226 of *Lecture Notes in Computer Science*, pages 50–66, Oslo, Norway, 2020. Springer International Publishing.

[74] **Cláudio Gomes** and Hans Vangheluwe. PhysicalSysModelsTutorial2019. https://sites.google.com/view/physicalsysmodelstutorial2019/home, 2019.

[75] **Cláudio Gomes**, Casper Thule, Kenneth Lausdahl, Peter Gorm Larsen, and Hans Vangheluwe. Stabilization Technique in INTO-CPS. In *2nd Workshop on Formal Co-Simulation of Cyber-Physical Systems*, volume 11176, Toulouse, France, 2018. Springer, Cham.

[76] Gerald Schweiger, Georg Engel, Josef Schoeggl, Irene Hafner, **Cláudio Gomes**, and Thierry Nouidui. Co-Simulation - an Empirical Survey: Applications, Recent Developments and Future Challenges. In *Proceedings of the MATHMOD 2018*, pages 125–126, Vienna, Austria, 2018. ARGESIM Publisher Vienna.

[77] Casper Thule, **Cláudio Gomes**, Julien Deantoni, Peter Gorm Larsen, Jörg Brauer, and Hans Vangheluwe. Towards Verification of Hybrid Co-simulation Algorithms. In *Workshop on Formal Co-Simulation of Cyber-Physical Systems*, Toulouse, France, 2018. Springer, Cham.

[78] **Cláudio Gomes**, Paschalis Karalis, Eva M. Navarro-López, and Hans Vangheluwe. Approximated Stability Analysis of Bi-modal Hybrid Co-simulation Scenarios. In *1st Workshop on Formal Co-Simulation of Cyber-Physical Systems*, pages 345–360, Trento, Italy, 2017. Springer, Cham.

Teaching Materials/Monographs/Book Chapters/Popular Science

[79] Margaret L. Loper, Tuncer Ören, **Cláudio Gomes**, Valdemar Vicente Graciano Neto, and Ernest H. Page. Infrastructure. In Tuncer Ören, Bernard P. Zeigler, and Andreas Tolk, editors, *Body of Knowledge for Modeling and Simulation*, pages 149–165. Springer International Publishing, Cham, 2023.

[80] Hao Feng, **Cláudio Gomes**, Michael Sandberg, Casper Thule, Kenneth Lausdahl, and Peter Gorm Larsen. Developing a Physical and Digital Twin: A Process Model. In *2021 ACM/IEEE International Conference on Model Driven Engineering Languages and Systems Companion (MODELS-C)*, Fukuoka, Japan, 2021. IEEE.

[81] **Cláudio Gomes**, Romain Franceschini, Nick Battle, Casper Thule, Kenneth Lausdahl, Hans Vangheluwe, and Peter Gorm Larsen. Application of Model-Based Testing to Dynamic Evaluation of Functional Mockup Units. In *Proceedings of the American Modelica Conference*, pages 149–158, Boulder, Colorado, USA, 2020. Linköping University Electronic Press, Linköpings Universitet.

[82] **Cláudio Gomes**. *Property Preservation in Co-Simulation*. PhD thesis, University of Antwerp, Antwerp, Belgium, 2019.

[83] **Cláudio Gomes**, Casper Thule, Peter Gorm Larsen, Joachim Denil, and Hans Vangheluwe. Co-simulation of Continuous Systems: A Tutorial. Technical Report arXiv:1809.08463, University of Antwerp, Belgium, 2018.

[84] Gerald Schweiger, **Cláudio Gomes**, Irene Hafner, George Engel, Thierry Stephane Nouidui, Niki Popper, and Josef-Peter Schoggl. Co-simulation: Leveraging the Potential of Urban Energy System Simulation. *EuroHeat&Power*, 15(I-II):13–16, 2018.

[85] **Cláudio Gomes**, Casper Thule, David Broman, Peter Gorm Larsen, and Hans Vangheluwe. Co-simulation: State of the art. Technical report, University of Antwerp, February 2017.

[86] **Cláudio Gomes**, Yentl Van Tendeloo, Joachim Denil, Paul De Meulenaere, and Hans Vangheluwe. Hybrid System Modelling and Simulation with Dirac Deltas. Technical report, University of Antwerp, Antwerp, February 2017.