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PROFESSIONAL PROFILE

My research focuses on the development and implementation of monitoring and diagnostic systems to detect and locate faults in large-scale industrial processes. Particularly, networks of distribution and transport of fluids. For the design of these systems I use automatic control techniques, artificial intelligence and signal processing. Simultaneously, I work on the development and implementation of IoT systems to harvest data that help manage smart water networks.

EDUCATION

PhD IN AUTOMATIC CONTROL

INP Grenoble - Université de Grenoble || Grenoble, France
10/2007 - 01/2011

MSc IN AUTOMATIC CONTROL

Centro Nacional de Investigación y Desarrollo Tecnológico || Cuernavaca, Morelos, Mexico
09/2002 - 01/2005

BACHELOR OF ELECTRONIC ENGINEERING

Instituto Tecnológico de Veracruz || Veracruz, Veracruz, Mexico
08/1997 - 07/2002

WORK EXPERIENCE

ASSOCIATE PROFESSOR

Instituto de Ingeniería - Universidad Nacional Autónoma de México
(01/04/ 2019 – present)

CONACYT RESEARCH FELLOW

CONACYT @ Instituto de Ingeniería - Universidad Nacional Autónoma de México
(01/10/2014 – 31/03/ 2019)

LECTURER

Facultad de Ingeniería - Universidad Nacional Autónoma de México
(01/08/2013 – present)

POSTDOCTORAL RESEARCHER IIUNAM & DGAPA

Instituto de Ingeniería - Universidad Nacional Autónoma de México
(01/08 2011 – 30/09/2014)

ATTACHÉE TEMPORAIRE D'ENSEIGNEMENT ET DE RECHERCHE (ATER)

École d'Ingénieurs pour L'énergie, L'eau et L'environnement – INP Grenoble || Grenoble || 2010 – 2011

WORK EXPERIENCE CONTINUATION

ENGINEER OF NONDESTRUCTIVE TESTING FOR PIPELINES

Técnicos Istmeños || Ciudad del Carmen || 2006 – 2007

ENGINEER OF QUALITY TESTING

Continental Temic || Cuautla || 2005 – 2006

INSTRUCTOR

Universidad Autónoma del Estado de Morelos || Cuernavaca || 2003 – 2005

AWARD, FELLOWSHIPS AND GRANTS

(2022) National University Distinction for Young Academics (Candidate) (Mexico)

(2012-present) Member of the National System of Researchers Level 1 (Mexico)

(2007-2010) PhD Fellowship: CONACYT and French Government

(2004) 2nd place in the National Creativity Competition with the project: 'Nonlinear observers for the monitoring of distillation columns'.

(2002-2004) Scholarship holder of CONACYT

(1997-2000) Scholarship holder of PRONABE (Mexican Scholarship for Undergraduates)

IMPACT FACTOR (Citations and Other Statistics)

Google Scholar Citations: 1134

Google Scholar h-index: 18

Google Scholar i10-index: 31

PERSONAL INFORMATION

Birthplace: Veracruz, Mexico.

Birthdate: 02/04/1980.

Marital status: Married.

Children: 5-Year-Old Twins

Languages: Spanish, French and English.

RESEARCH PROJECTS (PROJECT LEADER)

(2021-2022) **Control and automation of a buoy for monitoring oceanographic variables**, funded by UNAM-DGAPA, Mexico.

(2018-2022) **Diagnostic and Monitoring Stations for Water Distribution Networks with Internet Interconnection**, funded by CONACYT, Mexico.

(2016-2017) **Digital Signal Processing for the Supervision of Fluid Transmission Lines**, funded by Fondo De Colaboración del Instituto de Ingeniería y la Facultad de Ingeniería de la UNAM, Mexico.

RESEARCH PROJECTS (MEMBER OF THE TEAM)

(2017-2022) **Zero Incidents in the Pipeline Network of Mexico**, funded by the Mexican Department of Energy (SENER) and CONACYT, Mexico and Canada.

(2021) **Development and application of a parametric and structural identification strategy for fractional order dynamical systems**, funded by Universidad Autónoma de la Ciudad de México, Mexico.

(2017-2018) **Leak detection and location using machine learning techniques**, funded by Tecnológico Nacional de México, Mexico.

(2016-2017) **Diagnosis system of hydraulic networks using algorithms based on dynamic models**, funded by Tecnológico Nacional de México, Mexico.

(2014-2015) **Detection of structural damage in marine risers via nonlinear observers**, funded by CONACYT-CNRS, Mexico and France.

(2014-2015) **Methodologies for the diagnosis of structural damages in rigid risers**, funded by Fondo de colaboración internacional del Instituto de Ingeniería de la UNAM, Mexico and Brazil.

(2011-2013) **System for the detection of leaks and clandestine intakes in gas and liquid pipelines**, funded by the Mexican Department of Energy (SENER) and CONACYT, Mexico.

(2009-2011) **Modélisation et estimation par la surveillance des réseaux d'eau sous pression**, funded by CONACYT-CNRS, Mexico and France.

INSTITUTIONAL SERVICE

(2022-present) Head of the Electrical and Computing Department, Electromechanical Sub-Division, Institute of Engineering, UNAM.

(2021-2025) Secretary of the IIUNAM Research and Teaching Ethics Committee (CÉTICAID-IIUNAM).

POSITIONS IN ACADEMIC ASSOCIATIONS

(2023-2024) President of the Board of Directors of the Mexican Association of Automatic Control.

(2022-2023) Vice President of the Board of Directors of the Mexican Association of Automatic Control.

(2021-presente) Member of the Editorial Committee of the international journal **Revista Iberoamericana de Automática e Informática Industrial** (RIAI) managed by the Spanish Committee of Automation.

(2020-2021) Secretary of the Board of Directors of the Mexican Association of Automatic Control.

(2016-2017) Member of the Board of Directors of the Mexican Association of Automatic Control.

- [1] M.Sc. co-supervisor: **Diagnóstico de fallas con diseño de un observador de alta ganancia para sistemas no lineales con dinámica híbrida.** Marcos Alfredo López Castro, CENIDET, Mexico, 08/01/2016.
- [2] M.Sc. co-supervisor: **Localización de múltiples fugas usando la onda de presión.** José Ángel Muñoz Vega, Posgrado de Ingeniería Eléctrica, UNAM, Mexico, 07/04/2016.
- [3] M.Sc. co-supervisor: **Diseño de un observador de Luenberger de orden fraccionario.** Mario Alberto Hernández Soriano, CENIDET, Mexico, 21/12/2016.
- [4] M.Sc. co-supervisor: **Caracterización de la matriz de transferencia de un ducto con múltiples fugas.** Flor Denisse Rentería, Posgrado de Ingeniería Eléctrica, UNAM, Mexico, 02/02/2017.
- [5] B.Sc. supervisor: **Caracterización de eventos anormales en un ducto utilizando las mediciones de un parche de monitoreo.** Diana Arleth Muñoz Menéndez, Instituto Tecnológico de Tuxtla Gutiérrez, Mexico, 07/06/2017.
- [6] M.Sc. co-supervisor: **Detección y localización de fugas en ductos mediante el filtro de Kalman extendido.** José Roberto Bermúdez Hernández, Instituto Tecnológico de Tuxtla Gutiérrez, Mexico, 15/12/2017.
- [7] PhD supervisor: **Architecture for the monitoring of liquid transport pipelines based on state estimators.** Autor: Javier Jiménez Cabas. Director: Marco Sanjuan. Directora externa: Dra. Flor Lizeth Torres Ortiz. Institución: Universidad del Norte, Colombia, 09/03/2018.
- [8] M.Sc. co-supervisor: **Diseño de algoritmos de diagnóstico y pronóstico. Caso de estudio: Modelado fractal de un ducto hidráulico.** Ian Llunas Correa Escudero, CENIDET, Mexico, 10/01/2019.
- [9] M.Sc. co-supervisor: **Estimación de demandas en redes de distribución de agua vía EKF.** Arlette Cano Vásquez, Instituto Tecnológico de Tuxtla Gutiérrez, Mexico, 24/07/2020.
- [10] PhD supervisor: **High-viscosity biphasic flow characterization in a pipeline: Application to flow pattern classification and leak detection.** José Fernando Noguera Polania, Universidad del Norte, Colombia, 02/07/2021.
- [11] M.Sc. co-supervisor: **Detección y diagnóstico de fallas en los inyectores de un motor de combustión interna.** José Juan López Díaz, CENIDET, Mexico, 16/07/2021
- [12] M.Sc. co-supervisor: **Modelado de sistemas de distribución de agua mediante un enfoque basado en energías,** Instituto Tecnológico de Tuxtla Gutiérrez, Mexico, 25/08/2021.
- [13] B.Sc. supervisor: **Sistema de telemetría para la identificación de patrones de flujo en tuberías por medio de redes neuronales.** María Fernanda Rocha Mancera & Salvador Arce Benítez, Facultad de Ingeniería, UNAM, Mexico, 20/10/2021.

EDITORSHIP AND ORGANIZATION OF EVENTS

(2022) Associate Editor, **30th Mediterranean Conference on Control and Automation**, Athens, Greece.

(2022) Associate Editor, **21th International Conference on Computer Information Systems and Industrial Management Applications**, Barranquilla, Colombia.

(2015-2022) Associate Editor, **Congreso Nacional de Control Automático** (Editions: 2015, 2016, 2017, 2018, 2021, 2022), Mexico.

(2021) Associate Editor, **29th Mediterranean Conference on Control and Automation**, Bari, Puglia, Italy.

(2021) Associate Editor, **7A Jornada De Ciencia y Tecnología**, TecNM-CENIDET, Mexico.

(2020) Editorial coordinator of **Memorias del Congreso Nacional de Control Automático 2020** con ISSN: 2594-2492.

(2020) Associate Editor, **28th Mediterranean Conference on Control and Automation**, Saint Raphaël, France.

(2019) Program chair, **Congreso Nacional de Control Automático 2019**, Puebla, Mexico.

(2016) Guest editor, **Sistemas de detección y localización de fallas**, Congreso Nacional de Control Automático 2016, Cuernavaca, Mexico.

(2014) Associate Editor, **XVI Congreso Latinoamericano de Control Automático 2014**, Cancun, Mexico.

(2014) Guest editor, **Estimación de parámetros de estructuras civiles**, XVI Congreso Latinoamericano de Control Automático, Cancun, Mexico.

(2012) Guest editor, **Supervision and fault diagnosis for pipelines and networks**, 8th International Federation of Automatic Control (IFAC) Symposium SAFEPROCESS-2012, Mexico City, Mexico.

BOOKS

- [1] J. F. Gómez-Aguilar, L. Torres, R. F. Escobar. **Fractional Derivatives with Mittag-Leffler Kernel**. Springer International Publishing, 2019.
- [2] C. Verde, L. Torres. **Modeling and Monitoring of Pipelines and Networks**. Springer International Publishing, eBook ISBN: 978-3-319-55944-5, Hard cover ISBN: 978-3-319-55943-8, 2017.

BOOK CHAPTERS

- [1] J. E. Solís-Pérez, J. F. Gómez-Aguilar, R. F. Escobar-Jiménez, L. Torres, & V. H. Olivares-Peregrino. **Parameter Estimation of Fractional Gompertz Model Using Cuckoo Search Algorithm.** In *Fractional Derivatives with Mittag-Leffler Kernel* (pp. 81-95). Springer, 2019.
- [2] V. F. Morales-Delgado, J. F. Gómez-Aguilar, L. Torres, R. F. Escobar-Jiménez, & M. A. Taneco-Hernandez. **Exact Solutions for the Liénard Type Model via Fractional Homotopy Methods.** In *Fractional Derivatives with Mittag-Leffler Kernel* (pp. 269-291). Springer, 2019.
- [3] J. Jiménez, L. Torres, I. Rubio, M. Sanjuan. **Chapter 6: Auxiliary signal design and Liénard-type models for identifying a pipeline.** In: *Modeling and Monitoring of Pipelines and Networks*, Springer International Publishing, 2017.
- [4] L. Torres. **Chapter 7: Parameter identification of Liénard systems via nonlinear observers.** In: *Control Theory: Perspectives, Applications and Developments*. Nova Science Publishers, 2015.

PARTICIPATION IN EVALUATION COMMITTEES

(2016-2022) Evaluator of the Scientific Stories Competition organized by the Latin American Society of Science and Technology (SOLACYT), Latin America.

(2022) Evaluator of Scientific Research Projects (Call 2022) to be funded by the Council of Science and Technology of the State of Morelos, Mexico.

(2022) Referee for academic promotions, King Saud University, Saudi Arabia.

(2021) Evaluator of Postgraduate Programs within the framework of the 2021 Renewal Call for the National Quality Postgraduate Program (PNPC) issued by CONACyT.

(2019) Evaluator at the AFIRME-FUNAM Award 2019 1st Edition organized by AFIRME Financial Group and the UNAM Foundation.

SOCIAL NETWORKS AND PROFESSIONAL PAGES

 Google Académico



- [1] Fontes, J. V., Mendoza, E., Silva, R., Hernández, I. D., González-Olvera, M. A., & Torres, L. (2022). **On the Evolution of Different Types of Green Water Events—Part II: Applicability of a Convolution Approach.** *Water*, 14(4), 510.
- [2] L. Reyes, L. Torres, M. Jiménez, C. Ríos. (2022). **Predicción de la máxima demanda en un sector de la red de distribución de agua potable de la ciudad de Guanajuato, México.** *Tecnología y Ciencias del Agua* 13(4), 2022.
- [3] J. Rojas, C. Verde, & L. Torres. (2021). **Estimation of Hydraulic Gradient for a Transport Pipeline.** *Journal of Pressure Vessel Technology*, 143(3), 2021.
- [4] I. Santos-Ruiz, F. R. López-Estrada, V. Puig, L. Torres, G. Valencia-Palomo, & S. Gómez-Peñate. (2021). **Optimal Estimation of the Roughness Coefficient and Friction Factor of a Pipeline.** *Journal of Fluids Engineering*, 143(5), 2021.
- [5] L. Torres, C. Verde, & L. Molina. (2021). **Leak diagnosis for pipelines with multiple branches based on model similarity.** *Journal of Process Control*, 99, 41-53, 2021.
- [6] M. A González-Olvera, L. Torres, J. V. Hernández-Fontes, & E. Mendoza (2021). **Time fractional diffusion equation for shipping water events simulation.** *Chaos, Solitons & Fractals*, 143, 2021.
- [7] E. J. Pérez-Pérez, F. R. López-Estrada, G. Valencia-Palomo, L. Torres, V. Puig, & J.D. Mina-Antonio. (2021). **Leak diagnosis in pipelines using a combined artificial neural network approach.** *Control Engineering Practice*, 107, 2021.
- [8] J. V. Fontes, I. D. Hernández, E. Mendoza, R. Silva, E. Brandão da Silva, M. Rocha de Sousa, J. Gonzaga, R. S. F. Kamezaki, L. Torres & P.T. Esperança (2021). **On the Evolution of Different Types of Green Water Events.** *Water*, 13(9), 2021.
- [9] L. Torres, J. Noguera, J. E. Guzmán-Vázquez, J. Hernández, M. Sanjuan, & A. Palacio-Pérez (2020). **Pressure Signal Analysis for the Characterization of High-Viscosity Two-Phase Flows in Horizontal Pipes.** *Journal of Marine Science and Engineering*, 8(12), 2020.
- [10] A. de la Guerra, V. M. Jiménez-Mondragón, L. Torres, R. Escarela-Perez, & J. C. Olivares-Galvan (2020). **On-line open-phase fault detection method for switched reluctance motors with bus current measurement.** In *Actuators* (Vol. 9, No. 4, p. 117). Multidisciplinary Digital Publishing Institute, 2020.
- [11] J. V. Hernández-Fontes, L. Torres, E. Mendoza, & M. Escudero (2020). **Identification of the advection-diffusion equation for predicting green water propagation.** *Ocean Engineering*, 214, 2020.
- [12] A. Coronel-Escamilla, J. E. Lavin-Delgado, J. F. Gómez-Aguilar, & L. Torres (2020). **Fractional dynamics and synchronization of Kuramoto oscillators with nonlocal, nonsingular and strong memory.** *Alexandria Engineering Journal*, 59(4), 1941-1952, 2020.
- [13] J. F. Noguera Polania, J. Hernández-García, D. F. Galaviz-López, L. Torres, J. E. V. Guzmán, M. E. Sanjuán-Mejía, & J. Jiménez-Cabas. (2020). **Dataset on water-glycerol flow in a horizontal pipeline with and without leaks.** *Data in brief*, 2020.
- [14] L. Torres, J. Jiménez-Cabas, O. González, L. Molina, & F. R. López-Estrada. (2020). **Kalman filters for leak diagnosis in pipelines: Brief history and future research.** *Journal of Marine Science and Engineering*, 8(3), 173, 2020.

- [15] J. Jiménez-Cabas, L. Torres, F. R. López Estrada, I. de los Santos Ruiz & F. Manrique-Morelos (2020). **Development of non-invasive monitoring approach to diagnose leaks in liquid pipelines.** Technology Reports of Kansai University, 2020.
- [16] J. Hernández, D. F. Galaviz, L. Torres, A. Palacio-Pérez, A. Rodríguez-Valdés, & J. E. V. Guzmán (2019). **Evolution of High-Viscosity Gas–Liquid Flows as Viewed Through a Detrended Fluctuation Characterization.** Processes, 7(11), 2019.
- [17] Coronel-Escamilla, A., Gómez-Aguilar, J. F., Torres, L., Escobar-Jiménez, R. F. **A numerical solution for a variable-order reaction–diffusion model by using fractional derivatives with non-local and non-singular kernel.** Physica A: Statistical Mechanics and its Applications. Volume 491, pp 406-424, 2018.
- [18] Coronel-Escamilla, A., Gómez-Aguilar, J. F., Torres, L., Escobar-Jimenez, R. F., Olivares-Peregrino, V. H. **Fractional observer to estimate periodical forces.** ISA transactions, 2017.
- [19] López-Estrada, F. R., Astorga-Zaragoza, C. M., Theilliol, D., Ponsart, J. C., Valencia-Palomo, G., Torres, L. **Observer synthesis for a class of Takagi–Sugeno descriptor system with unmeasurable premise variable. Application to fault diagnosis.** International Journal of Systems Science, pp 1-12, 2017.
- [20] L. Torres, J.F. Gómez-Aguilar, Javier Jiménez, Edgar Mendoza, F.R. López-Estrada, R.F. Escobar-Jiménez. **Parameter identification of periodical signals: Application to measurement and analysis of ocean wave forces.** Digital Signal Processing. Volume 69, pp 59-69, 2017.
- [21] A. Coronel-Escamilla, J.F. Gómez-Aguilar, L. Torres, R.F. Escobar-Jiménez. **Design of a state observer to approximate signals by using the concept of fractional variable-order derivative.** Digital Signal Processing, Volume 69, pp 127-139, 2017.
- [22] A. Coronel-Escamilla, J.F. Gómez-Aguilar, L. Torres, R.F. Escobar-Jiménez, M. Valtierra-Rodríguez. **Synchronization of chaotic systems involving fractional operators of Liouville-Caputo type with variable-order.** Physica A. Volume 487, pp 1-21, 2017.
- [23] O. González, C. Verde, L. Torres. **Leak estimation method for complex pipelines with branch junctions'** Journal of Pressure Vessel Technology. Volume 139, Issue 2, 2017.
- [24] M. A. López Castro, R.F. Escobar, L. Torres, J.F. Gómez Aguilar, J. A. Hernández, V.H. Olivares-Peregrino. **Sensor Fault Detection and Isolation System for a Condensation Process.** ISA Transactions. Volume 65, pp 456-467, 2016.
- [25] J.F. Gómez-Aguilar, L. Torres, H. Yépez-Martínez, D. Baleanu, J.M. Reyes and I.O. Sosa. **Fractional Liénard type model of a pipeline within the fractional derivative without singular kernel.** Advances in Difference Equations. Volume 2016, Issue 173, pp 1-13, 2016.
- [26] L. Torres, J. Delgado, G. Besançon, C. Verde, O. Begovich. **Equivalent Liénard-type models for a fluid transmission line.** Comptes Rendus Mécanique., Volume 43, pp 18-28, 2016.
- [27] C. Verde, L. Torres. **Decentralized Scheme for Leaks' Location in a Branched Pipeline.** Journal of Loss Prevention in the Process Industries. Volume 43, pp 18-28, 2016.

JOURNAL ARTICLES (J C R)

- [28] L. Torres, C. Verde, G. Besançon, J. F. Guerrero-Castellanos. **Generalized synchronization of a class of spatiotemporal chaotic systems using nonlinear observers**. International Journal of Bifurcation and Chaos, Volume 25, Issue 11, 2015.
- [29] L. Torres, C. Verde, O. Vázquez, **Parameter identification of marine risers using Kalman-like observers**, Ocean Engineering, Volume 93, pp 84-97, 2015.
- [30] C. Verde, L. Molina, L. Torres. **Parameterized transient model of a pipeline for multiple-leaks location**, Journal of Loss Prevention in the Process Industries, Volume 29, pp 177-185, 2014.
- [31] L. Torres, C. Verde, R. Carrera, R. Cayetano. **Algoritmos de diagnóstico para fallas en ductos**, Tecnología y Ciencias del Agua, Volumen 5, No. 4, 2014
- [32] L. Torres, G. Besançon, C. Verde, O. González. **High gain observers for leak location in subterranean pipelines of liquefied petroleum gas**. International Journal of Robust and Nonlinear Control. Volume 24, Issue 6, pp 1127 –1141, 2014.
- [33] J. F. Guerrero-Castellanos, H. Madrigal-Sastre, S. Durand, L. Torres, G. A. Muñoz-Hernández. **A Robust Nonlinear Observer for Real-time Attitude Estimation using Low-cost MEMS inertial sensors**. Sensors, Volume 13, Issue 11, pp 15138 –15158, 2013.
- [34] L. Torres, G. Besançon, D. Georges. **EKF-like observer with stability for a class of nonlinear systems**, IEEE Transactions on Automatic Control. Volume 57, Issue 6, pp 1570 – 1574, 2012.
- [35] L. Torres, G. Besançon, D. Georges, C. Verde. **Exponential nonlinear observer for parametric identification and synchronization of chaotic systems**. Mathematics and Computers in Simulations. Volume 82, Issue 5, pp 836 – 846, 2012.

JOURNAL ARTICLES (S C O P U S)

- [1] J. Jiménez-Cabas, L. Torres, F. R. López Estrada, I. de los Santos Ruiz & F. Manrique-Morelos (2020). **Development of non-invasive monitoring approach to diagnose leaks in liquid pipelines**. Technology Reports of Kansai University, 2020.
- [2] L. Torres, J. Jiménez-Cabas, J. F. Gómez-Aguilar & P. Pérez-Alcázar. **A simple spectral observer**. *Mathematical and Computational Applications*, 23(2), 23, 2018.
- [3] J. R. Bermúdez, F. R. López-Estrada, G. Besançon, G. Valencia-Palomo, L. Torres, & H. R. Hernández. **Modeling and Simulation of a Hydraulic Network for Leak Diagnosis**. *Mathematical and Computational Applications*, 23(4), 70, 2018.
- [4] C. M. Astorga, E. Quintero-Mármol, L. G. Vela, L. Torres. **Observador No Lineal para la Estimación de Concentraciones en un Proceso de Destilación Metanol/Etanol**, Información Tecnológica. Volumen17, No. 6, pp 35 – 41, 2006

- [1] M.F. Rocha-Mancera, S. Arce-Benítez, L. Torres, J. E. G. Vázquez. (2022). **Estimation of Mass Flow Rates of Two-Phase Flow using Convolutional Neural Networks**. In 15th International Conference on Diagnostics of Processes and Systems, Gdansk, Poland.
- [2] O. A. Betanzos-Ramirez, A. Sanchez-Mendoza, J. F. Guerrero-Castellanos, L. Torres. (2021). **Evaluation of Deterministic Attitude Estimation Algorithms in Real-Time Using Low-Cost Hardware**. In 17th International Conference on Mechatronics, Electronics and Automotive Engineering. (Virtual)
- [3] L. F. López-Cortés, Y. Lozano-Hernández, L. Torres, J. F. Guerrero-Castellanos, J. A. Aguirre-Anaya. **Comparison of dynamic model-based control algorithms for trajectory tracking in an omnidirectional robot**. In 17th International Conference on Mechatronics, Electronics and Automotive Engineering. (Virtual)
- [4] L. Torres. **IoT stations for monitoring a district metered area of Guanajuato city**. In 2021 IEEE International Conference On Engineering Veracruz (IEEE ICEV 2021), Boca del Río, Veracruz, Mexico, 2021.
- [5] L. Torres, M. Jiménez, C. Verde, & L. Reyes. (2020). **A state observer for the calibration of the Hazen-Williams equation**. In 2020 IEEE Conference on Control Technology and Applications (CCTA) (pp. 917-921), Montreal, Canada.
- [6] J. A. Delgado-Aguiñaga, F. I. Becerra-López, L. Torres, G. Besançon, V. Puig, & M. Jiménez. (2020). **Dynamic model for a water distribution network: application to leak diagnosis and quality monitoring**. IFAC-PapersOnLine, 53(2), 16679-16684.
- [7] L. Torres & G. Besançon. (2019). **Port-hamiltonian models for flow of incompressible fluids in rigid pipelines with faults**. In 2019 IEEE 58th Conference on Decision and Control (CDC) (pp. 2946-2951)., Nice, France.
- [8] C. T. Martínez-Villegas, D. Theilliol, & L. Torres. (2019). **Interactive multiple model-based fault diagnosis approach for double integrator multi-agent networks**. In 15th European Workshop on Advanced Control and Diagnosis, ACD'19.
- [9] J. F. Noguera, L. Torres, C. Verde, E. Guzmán, & M. Sanjuan. (2019). **Model for the flow of a water-glycerol mixture in horizontal pipelines**. In 2019 4th Conference on Control and Fault Tolerant Systems (SysTol) (pp. 117-122).
- [10] M. Quiñones-Grueiro, L. Torres, & C. Verde. (2019). **Off-Line Data Validation for Water Network Modeling Studies**. In Multidisciplinary Digital Publishing Institute Proceedings (Vol. 48, No. 1, p. 13).
- [11] L. Torres, C. Verde & J. Rojas. **Minimal-order observers for locating leaks in a pipeline with a branch**. In 1st IFAC Workshop on Control Methods for Water Resource Systems, Delft, Netherlands, 2019.
- [12] L. Torres & C. Verde. **Nonlinear estimation of a power law for the friction in a pipeline**. IFAC-PapersOnLine, 51(13), 67-72, 2018.
- [13] J. Jiménez-Cabas, E. Romero-Fandiño, L. Torres, M. Sanjuan, & F. R. López-Estrada. **Localization of Leaks in Water Distribution Networks using Flow Readings**. IFAC-PapersOnLine, 51(24), 922-928, 2018.

- [14] J. Rojas, C. Verde, L. Torres & E. Pérez. **On-line head loss identification for monitoring of pipelines**. IFAC-PapersOnLine, 51(24), 748-754, 2018.
- [15] De la Guerra, L. Alvarez-Icaza & L. Torres. **Brushless DC motor control with unknown and variable torque load**. IFAC-PapersOnLine, 51(13), 644-649, 2018.
- [16] C. T. Villegas-Martínez, D. Theilliol, L. Torres. **Review of two non-centralized observer-based diagnosis schemes for interconnected systems**. In 10th IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes, SAFEPROCESS 2018, 2018.
- [17] C. T. Martínez-Villegas, L. Torres, D. Theilliol. **Residual Generation Synthesis for Sensor Fault Diagnosis in Multi-Agent Systems**. In 2018 UKACC 12th International Conference on Control (pp. 389-396), 2018.
- [18] J. Jiménez, L. Torres, C. Verde, M. Sanjuan. **Friction estimation of pipelines with extractions by using state observers**, IFAC World Congress 2017, Toulouse, France, 2017.
- [19] J. Jiménez, L. Torres, M. Sanjuan, Francisco-Ronay López-Estrada. **Leak diagnosis in pipelines by only using flow measurements**. The 3rd Colombian Conference on Automatic Control, Cartagena, Colombia, 2017.
- [20] F. Rentería, C. Verde, L. Torres and A. Muñoz. **Locating leaks by using the step response of a pipeline**. International conference on control and fault-tolerant systems. Systol 2016, Barcelona, Spain, September, 2016.
- [21] L. Torres, G. Besançon and C. Verde. **Liénard type model of fluid flow in pipelines: Application to estimation**. 12th International Conference on Electrical Engineering, Computing Science and Automatic Control, Mexico City, Mexico, October, 2015.
- [22] Villanueva, C. Verde, L. Torres, **Improved implementation of nonlinear Analytical Redundancy Relations: Application in Robotics**. 11th IFAC Symposium on Robot Control, Salvador, Brazil, August, 2015.
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- [24] L. Torres, C. Verde, A. Villanueva. **Global diagnostic system for pipelines using nonlinear redundancy relations**, The 9th International Federation of Automatic Control (IFAC) Symposium SAFEPROCESS-2015, Paris, France, September 2015.
- [25] L. Torres, C. Verde, F. Borges, C. Magluta, N. Roitman. **Parameter Identification of Steel Catenary Risers Using Wavelets and Hilbert Transforms**. 34th International Conference on Ocean, Offshore and Arctic Engineering. St. John's, Newfoundland, Canada, 2015.
- [26] L. Torres, C. Verde, F. Borges, C. Magluta, N. Roitman. **Experimentos para la identificación de los parámetros de un riser en Catenaria**. XVI Congreso Latinoamericano de Control Automático, Cancún, México, 2014.
- [27] S. Durand, L. Torres, J.F. Guerrero-Castellanos, **Event-Triggered Observer-based Output-Feedback Stabilization of Linear System with communication Delays in the Measurements**. European Control Conference, Strasbourg, France, 2014.

- [28] L. Torres, C. Verde, G. Besançon, J.D. Avilés, **Modeling and identification of the restoring force of a marine riser**. 19th IFAC World Congress, Cape Town, South Africa, 2014.
- [29] L. Torres, C. Verde. **Modeling improvements for leak detection in pipelines of LPG**. European Control Conference, Zurich, Switzerland, July 2013.
- [30] C. T. Villegas-Martínez, D. Theilliol, L. Torres. **Review of two non-centralized observer-based diagnosis schemes for interconnected systems**. In 10th IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes, SAFEPROCESS 2018, 2018.
- [31] C. T. Martínez-Villegas, L. Torres, D. Theilliol. **Residual Generation Synthesis for Sensor Fault Diagnosis in Multi-Agent Systems**. In 2018 UKACC 12th International Conference on Control (pp. 389-396), 2018.
- [32] J. Jiménez, L. Torres, C. Verde, M. Sanjuan. **Friction estimation of pipelines with extractions by using state observers**, IFAC World Congress 2017, Toulouse, France, 2017.
- [33] J. Jiménez, L. Torres, M. Sanjuan, Francisco-Ronay López-Estrada. **Leak diagnosis in pipelines by only using flow measurements**. The 3rd Colombian Conference on Automatic Control, Cartagena, Colombia, 2017.
- [34] F. Rentería, C. Verde, L. Torres and A. Muñoz. **Locating leaks by using the step response of a pipeline**. International conference on control and fault-tolerant systems, Systol 2016, Barcelona, Spain, September, 2016.
- [35] L. Torres, G. Besançon and C. Verde. **Liénard type model of fluid flow in pipelines: Application to estimation**. 12th International Conference on Electrical Engineering, Computing Science and Automatic Control, Mexico City, Mexico, October, 2015.
- [36] Villanueva, C. Verde, L. Torres. **Improved implementation of nonlinear Analytical Redundancy Relations: Application in Robotics**. 11th IFAC Symposium on Robot Control, Salvador, Brazil, August, 2015.
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- [39] L. Torres, C. Verde, F. Borges, C. Magluta, N. Roitman. **Parameter Identification of Steel Catenary Risers Using Wavelets and Hilbert Transforms**. 34th International Conference on Ocean, Offshore and Arctic Engineering. St. John's, Newfoundland, Canada, 2015.
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INTERNATIONAL CONFERENCE ARTICLES

- [41] L. Torres, G. Besançon, D. Georges. **A collocation model for water-hammer dynamics with application to leak detection.** 47th IEEE Conference on Decision and Control, Cancun, Mexico, December 2008.
- [42] L. Torres, C.M. Astorga, B. Targui, E. Quintero-Marmol. **On-line monitoring and modelling of multivariable nonlinear systems: methanol/ethanol distillation.** 2nd IFAC Symposium on System, Structure and Control, Oaxaca, Mexico, December 2004

MEXICAN CONFERENCE ARTICLES

- [1] M. A. Gonzalez-Olvera, A. Flores-Perez, L. Torres. **Adaptive Observer Design for the Fractional-Order Hindmarsh-Rose Neuron Model.** In Memorias del Congreso Nacional de Control Automático, 2021.
- [2] J.J. López-Díaz, R. F. Escobar- Jiménez, L. Torres, J. F. Gómez-Aguilar, V.M. Alvarado-Martínez. **Detección y diagnóstico de fallas basado en señales en un sistema de inyección electrónica de combustible.** In Jornada de Ciencia y Tecnología Aplicada, 2021.
- [3] Cano, F. R. López-Estrada, L. Torres, I. Santos-Ruiz. **Diseño de un algoritmo basado en el EKF para la estimación de demandas desconocidas en ductos de agua.** In Jornada de Ciencia y Tecnología Aplicada, 2020.
- [4] D. Sánchez-Jiménez, L. Torres, F. R. López-Estrada. **Euler-Lagrange approach for modeling water pipelines with leaks.** In Memorias del Congreso Nacional de Control Automático, 2020.
- [5] González-Olvera, M., Torres, L., Hernández-Fontes, J.V. **Non-integer Derivatives for Modeling Shipping Water Events: A Numerical Evaluation.** In Memorias del Congreso Nacional de Control Automático, 2020.
- [6] M. Rojas, S. Avila-Becerril, & L. Torres. (2019). **An energy-based approach for modeling water distribution networks with faults.** In Memorias del Congreso Nacional de Control Automático (pp. 501-506), Puebla, Mexico.
- [7] J. R. Bermúdez, I. Santos-Ruiz, F. R. López-Estrada, G. Besançon, L. Torres, G. Valencia-Palomo. **Modelado y simulación de una red hidráulica para diagnóstico de fugas.** In Memorias del Congreso Nacional de Control Automático, San Luis Potosí, Mexico.
- [8] J. R. Bermúdez, I. Santos-Ruiz, F. R. López-Estrada, L. Torres, V. Puig. **Diseño y modelado dinámico de una planta piloto para detección de fugas hidráulicas.** Congreso de la Asociación de México de Control Automático 2017, Monterrey, Mexico, 2017.
- [9] De La Guerra, L. Torres, V. A. Maldonado Ruelas. **An Online Fault Detection and Isolation Approach for Switched Reluctance Motors,** Congreso de la Asociación de México de Control Automático 2016, Querétaro, Mexico, 2016.
- [10] F. D. Rentería, C. Verde, L. Torres. **Análisis de la respuesta al escalón en un ducto para localización de fugas,** Congreso de la Asociación de México de Control Automático 2016, Querétaro, Mexico, 2016.

- [11] J. A. Guzmán Rabasa, J. R. Bermudez Hernandez, F. R. Lopez-Estrada, L. Torres, G. Valencia-Palomo. **Sistema de diagnóstico de fallas para una tubería basado en observadores de estado quasi-LPV**, Congreso de la Asociación de México de Control Automático 2016, Querétaro, Mexico, 2016.
- [12] Coronel-Escamilla, A., Gómez-Aguilar, J. F., Guerrero-Ramírez, G. V., Torres, L., Escobar-Jiménez, R. F. **Comportamiento Dinámico de un Péndulo Simple y Doble: Enfoque Basado en Derivadas Fraccionarias**, Congreso de la Asociación de México de Control Automático 2015, Cuernavaca, Mexico, 2015.
- [13] López-Castro, M. A., Jiménez-Escobar, R. F, Torres, L., Quintero-Mármol, E., Gómez-Aguilar, J. F., Hernández-Pérez, J. A. **Estimación de estados por medio de observadores de alta ganancia para un condensador: enfoque híbrido**, Congreso de la Asociación de México de Control Automático 2015, Cuernavaca, Mexico, 2015.
- [14] L. Torres, C. Verde. **Modelado e Identificación de la fuerza de reacción de un riser marino**. Congreso de la Asociación de México de Control Automático, Ensenada, Mexico, 2013.
- [15] L. Torres, C.M. Astorga, G. Vela, A. Santiago. **Observador no lineal para el monitoreo y control de columnas de destilación**, Congreso de la Asociación de México de Control Automático, México City, Mexico, octubre 2004.

- [1] **Fractional-Order System Identification for Fluid Mechanics.** Plenary Lecture in 5th Mexican Workshop on Fractional Calculus (5th MWFC). October 2022, Monterrey, Nuevo León, Mexico
- [2] **Hydroinformatics tools for the diagnosis and monitoring of water networks.** Plenary Lecture in 15th International Conference on Diagnostics of Processes and Systems. September 2022 Gdansk, Poland.
- [3] **Fugología.** Invited Talk organized by Universidad Politécnica de Atlacomulco. In **500 conferencias por el medio ambiente.** June 2022.
- [4] **Prontuario para escribir un artículo.** Invited Talk organized by TecNM Campus CENIDET. In **Semana de producción científica.** March 2022.
- [5] **Manual para futuras científicas mexicanas.** Invited Talk organized by IEEE Woman in Engineering de la Facultad de Ingeniería de la UNAM. March 2022.
- [6] **Manual para futuras científicas mexicanas.** Invited Talk organized by TecNM Campus San Luis Potosí. February 2022.
- [7] **Mujeres en la Ingeniería.** Panel organized by Rama Estudiantil IEEE UNAM de la Facultad de Ingeniería. November 2021.
- [8] **Diagnóstico de fallas basado en técnicas de estimación: una introducción con aplicaciones.** Workshop in Congreso Nacional de Control Automático 2021 held by Universidad de Guanajuato. October 2021.
- [9] **Modelado e Identificación Paramétrica de eventos de embarque de agua en cubierta.** Conference in **Seminario Enzo Levi** organized by División de Dinámica de Fluidos de la Sociedad Mexicana de Física (Virtual). June 2021
- [10] **Modelado de la demanda de Agua en Redes de distribución.** Conference in **11° Congreso Nacional de Investigación** organized by Universidad del Valle de México, Campus Monterrey Norte. October 2020.
- [11] **Diseño de estaciones de telemetría para la gestión de redes hidráulicas.** Invited Talk organized by División en las Ciencias de la comunicación y diseño de la Universidad Autónoma Metropolitana – Unidad Cuajimalpa (Virtual). May 2020.
- [12] **La experiencia internacional de detección de fugas en redes de distribución del agua.** Invited Talk in **Jornadas hacia una Gestión Integral del Agua en Jalisco, Guanajuato y México: Alternativas para el abastecimiento del agua en sustitución de la Presa El Zapotillo,** organized by SEMARNAT, Guadalajara, Jalisco. November 2019.
- [13] **Sistemas de diagnóstico para redes de transporte y distribución de fluidos.** Plenary Lecture in **Simposio Internacional Sobre Sistemas Electromecánicos** organized by Universidad Antonio Nariño, Santa Marta, Colombia. October 2019.
- [14] **Instalación de estaciones IoT para el monitoreo y diagnóstico de la red de agua de la ciudad de Guanajuato.** In **Monitoreo de redes de distribución de agua: avances y desafíos** organized by Centro de Investigación Innovación y Desarrollo Tecnológico (CIIDETEC-UVM), Tlaquepaque, Jalisco. August 2019.

- [15] **Holistic Management for Fluid Distribution Networks.** Conference in **Applied Research Forum Conference Series on Smart Engineering: Automatic Control and Materials** organized by Tecnológico de Monterrey, Monterrey, Nuevo León. May 2019.
- [16] **Diseño de algoritmos para la localización de fugas en ductos de agua.** Workshop organized by Tecnológico Nacional de México, Instituto Tecnológico de Tuxtla Gutiérrez. January 2019.
- [17] **Calibración de modelos de tuberías para el diseño e implementación de sistemas de diagnóstico.** Talk organized by Posgrado de Ingeniería Eléctrica, UNAM. November 2018.
- [18] **Sistemas de diagnóstico para ductos.** Invited talk organized by Instituto Tecnológico de Chiapas. June 2017.
- [19] **Sistemas de diagnóstico para ductos.** Invited talk organized by Posgrado en Ingeniería Eléctrica, organized by Universidad Autónoma de San Luis Potosí. September 2016.
- [20] **¿Qué tipo de huella quieres dejar?.** Panel organized by Women & Technology, Schlumberger. October 2015.
- [21] **Sistemas de diagnóstico para ductos LPG.** Talk organized by Facultad de Ingeniería, UNAM. October 2015.
- [22] **Sistemas de diagnóstico de ductos LPG.** Invited Talk organized by Instituto Mexicano de Ingenieros Químicos, Sección Tlaxcala. September 2015.
- [23] **Fault detection in land and marine pipelines.** Invited Talk organized by Université de Lorraine. Centre de Recherche en Automatique de Nancy. December 2014.
- [24] **Los fractales en el surrealismo.** Invited Talk organized by Universidad Autónoma Metropolitana. Unidad Xochimilco. División Ciencias y Artes para el diseño. November 2013.
- [25] **Sensores virtuales para la localización de tomas clandestinas en tuberías de gas LPG.** Invited Talk organized by Universidad Autónoma de Tlaxcala. September 2013.
- [26] **Modelado e Identificación de Parámetros de un Riser Marino.** Invited Talk organized by Centro Nacional de Investigación y Desarrollo Tecnológico. June 2013.
- [27] **Observadores de gran ganancia para la localización de tomas clandestinas en tuberías de gas LPG.** Invited Talk organized by Benemérita Universidad Autónoma de Puebla. November 2012.
- [28] **Observadores de gran ganancia para la localización de tomas clandestinas en tuberías de gas LPG.** Invited Talk organized by Centro Nacional de Investigación y Desarrollo Tecnológico. October 2012.
- [29] **Observadores de gran ganancia para la localización de tomas clandestinas en tuberías de gas LPG.** Invited Talk organized by CINVESTAV-Mecatrónica. October 2012.
- [30] **Observadores de gran ganancia para la localización de tomas clandestinas en tuberías de gas LPG.** Talk organized by Posgrado de Ingeniería Eléctrica, UNAM. October 2012.
- [31] **Teoría y aplicaciones de observadores de gran ganancia.** Talk organized by Posgrado de Ingeniería Eléctrica, UNAM. September 2011.

TEACHING

Industrial Control, Electrical Engineering, UAEM 09/2003-01/2004 (Cuernavaca, Mexico)

Digital Systems, Computer Science, UAEM 02/2005-07/2005 (Cuernavaca, Mexico)

Design of Digital Systems, Computer Science, UAEM 02/2005-07/2005 (Cuernavaca, Mexico)

BE Regulation, Génie électrique et énergétique, INPG 09/2010-02/2011 (Grenoble, France)

TP Modeling and Control Systems, Tronc commun, INPG 09/2010-02/2011 (Grenoble, France)

BE Advanced control and optimization, Automatique et systèmes intelligents, INPG 02/2011-07/2011 (Grenoble, France)

BE Control, Ingénierie de l'énergie nucléaire, INPG 02/2011-07/2011 (Grenoble, France)

BE Discrete Systems and Regulation, Ingénierie de l'énergie nucléaire, INPG 02/2011-07/2011 (Grenoble, France)

BE Automation, Génie électrique et énergétique, INPG 02/2011-07/2011 (Grenoble, France)

BE Automation, Mécanique et énergétique, INPG 02/2011-07/2011 (Grenoble, France)

TD Natural and Anthropized Systems Project, Tronc commun, INPG 02/2011-07/2011 (Grenoble, France)

Analysis of systems and signals, Faculty of Engineering, UNAM 01/2014-01/2017 (Mexico City, Mexico)

Systems and signals, Faculty of Engineering, UNAM 08/2017-01/2019 (Mexico City, Mexico)

Dynamics of physical systems, Faculty of Engineering, UNAM 08/2018-present (Mexico City, Mexico)

Digital Control, Mechatronics, Campus Ciudad de México, ITESM, 08/2021-present (Mexico City, Mexico)

Advanced Mathematics, Postgraduate Course in Electrical Engineering, Instrumentation, UNAM 08/2022 (Mexico City, Mexico)

29/09/2021. M.Sc. Committee member (UNAM), Delgado Santiago Fermin Oscar. **Diagnosticador acústico de fallas en ductos**. Advisor: María Cristina Verde Rodarte.

08/10/2021. . M.Sc. Committee member (UNAM), López Rojas Ángel Jared. **Observador de Dimensión Infinita para Localizar Fugas en Ductos**. Advisor: María Cristina Verde Rodarte.

11/07/2021. . PhD Committee member (TecNM), Ildeberto de los Santos Ruiz. **Leak Detection and Localization in Pipeline Networks Using Machine Learning and Principal Component Analysis**. Advisors: Francisco ronay López-Estrada & Vicenç Puig Cayuela.

08/01/2020. M.Sc. Committee member (UNAM), López Rojas Ángel Jared. **Modelo de Propagación y Análisis de Ondas Acústicas en Tuberías para Detección de Fallas**. Advisor: María Cristina Verde Rodarte.

24/05/2019. PhD Committee member (CINVESTAV), Marcos Alberto Rosaldo Serrano. **Control de Grupos de cuadrirrotores empleando observadores de estado**. Advisor: Eduardo Aranda Bricaire.

10/04/2019. PhD Committee member (UNAM), Omar González González. **Modelos referenciados para localización de fugas en ductos con tomas laterales**. Advisor: María Cristina Verde Rodarte.

06/02/2019. M.Sc. Committee member (UNAM), Benjamín Ángel Ovierdo Suárez. **Respuesta Ondulatoria Ante Una Excitación Acústica En Un Ducto Presurizado**. Advisors: María Cristina Verde Rodarte & Rafael Bernardo Carmona Paredes.

05/10/2018. M.Sc. Committee member (UNAM), Fernández Bobadilla Héctor Alberto. **Observador por Modos Deslizantes de Orden Superior para Reconstrucción de Flujos Desconocidos en Ductos**. Advisors: María Cristina Verde Rodarte & Jaime Alberto Moreno Pérez.

14/05/2018. M.Sc. Committee member (UNAM), Erick Cabrera Fernández. **Análisis sobre la indentificabilidad de la fricción en un ducto con ramales**. Advisor: María Cristina Verde.

24/08/2018 B.Sc Committee member (UNAM), Alan Josue Olvera Mata. **Respuesta dinámica de conductos circulares de materiales diferentes sometidos a una despresurización**. Advisor: José Enrique Guzmán Vázquez.

07/02/2017. PhD Committee member (CENIDET), Omar Hernández González . **Observador en cascada para una clase de sistemas no lineales con salidas discretas con retardo**. Advisors: Gerardo Guerrero Ramírez & Carlos Manuel Astorga Zaragoza.

15/09/2016 PhD Committee member (UASLP) **Caracterización de señales biomédicas aplicada a terapia de rehabilitación**, Luz Roxana de León Lomelí. Advisors: Emilio Jorge González & José Salomé Murguía Ibarra.

28/01/2016. M.Sc. Committee member (UNAM), Cayetano Sánchez Raúl. **Identificación de parámetros de fricción en ductos con tomas laterales**. Advisor: María Cristina Verde Rodarte.

10/07/2015. PhD Committee member (CENIDET), Jorge Aurelio Brizuela Mendoza. **Control Tolerante a Fallas de Sistemas LPV**. Advisor: Carlos Astorga Zaragoza.

27/01/2015. M.Sc. Committee member (UNAM), Jorge Luis Rojas Albino. **Detección e identificación de fallas secuenciales en ductos**. Advisor: María Cristina Verde Rodarte.

DISSERTATION COMMITTEE MEMBER

16/Dic/2014. PhD Committee member (CENIDET), Francisco Ronay López Estrada. **Detección y Localización de sistemas singulares lineales de parámetros variables S-LPV.** Advisor: Carlos Astorga Zaragoza.

5/Dic/2014. PhD Committee member (Université de Lorraine), Francisco Ronay López Estrada. **Model-Based Fault Diagnosis Observer Design for Descriptor LPV System with Unmeasurable Gain Scheduling.** Advisors: Didier Theilliol & Jean Christophe Ponsart.