

Klaudia Horváth

Curriculum Vitae

Department of Mechanical Engineering
Eindhoven University of Technology
GEM-Z Groene Loper
Eindhoven, 5600 MB

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Delft, 2628 ED
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EDUCATION

Ph.D. Department of Civil and Environmental Engineering, Technical University of Catalonia, Barcelona, Spain, 2013 (Cum laude)

Dissertation: *Model predictive control of resonance sensitive irrigation canals*

Committee: Eric Duviella (chair), Manuel Rijo, Juan Mantecón

M.Sc. Hydro-Informatics and Water Management, University of Nice - Sophia Antipolis, Nice, France, 2009

B.Sc. Environmental Engineering, Budapest University of Technology and Economics, Budapest, Hungary, 2008

PROFESSIONAL EXPERIENCE

- | | |
|-----------|---|
| 2019 | Consultant, Deltares, Delft, The Netherlands |
| 2016-2018 | Postdoctoral Researcher, Eindhoven University of Technology, Eindhoven, The Netherlands |
| 2015-2016 | Consultant, Deltares, Delft, The Netherlands |
| 2014-2015 | Postdoctoral Researcher, Incas3, Assen, The Netherlands |
| 2013-2014 | Postdoctoral researcher, Higher School of Engineering and a Research Centre from the French Ministry of Industry, Douai, France |

PUBLICATIONS

Peer Reviewed Journal Articles

- 2018 **K. Horváth**, B. P.M. van Esch, J. H., Baayen, I. Pothof . Categorization of trapezoidal open channels based on flow conditions for the choice of simple models. *La Houille Blanche*, (4) 5-12, 2018.
- 2016 J. V. Aguilar, P. Langarita, J. Rodellar, L. Linares, and **K. Horváth**. Predictive control of irrigation canals—robust design and real-time implementation. *Water Resources Management*, 30(11):3829– 3843.
- K. Horváth**, H. Nouasse, L. Rajaoarisoa, E. Duviella, and K. Chuquet. Etude de la résilience de réseaux de voies navigables en période d’étéage - Application au réseau du Nord-Pas de Calais. *Journal Européen des Systèmes Automatisés*, 49(3):299–323.
- 2015 **K. Horváth**, E. Galvis, M. G. Valentín, and J. Rodellar. New offset-free method for model predictive control of open channels. *Control Engineering Practice*, 41 (0): 13 – 25, 2015.
- 2014 **K. Horváth**, E. Duviella, J. Blesa, L. Rajaoarisoa, Y. Bolea, V. Puig, and K. Chuquet. Gray-box model of inland navigation channel: Application to the Cuinchy–Fontinettes reach. *Journal of Intelligent Systems*, 23 (2): 183–199.
- J. Blesa, **K. Horváth**, E. Duviella, V. Puig, Y. Bolea, L. Rajaoarisoa, and K. Chuquet. Model-based sensor supervision in inland navigation networks: Cuinchy–Fontinettes case study. *Journal of Maritime Research*, 11 (2): 81–88.
- K. Horváth**, E. Galvis, J. Rodellar, and M. Gómez. Experimental comparison of canal models for control purposes using simulation and laboratory experiments. *Journal of Hydroinformatics*, 16 (6): 1390–1408.
- K. Horváth**, E. Galvis, M. Valentín, and J. Rodellar. Is it better to use gate opening as control variable than discharge to control irrigation canals? *Journal of Irrigation and Drainage Engineering*, 141 (3): 04014054.1–04014054.12.
- P.-J. van Overloop, **K. Horváth**, and B. E. Aydin. Model predictive control based on an integrator resonance model applied to an open water channel. *Control Engineering Practice*, 27 (0): 54 – 60.
- 2013 A. Demeter, **K. Horváth**, K. Böőr, L. Molnár, T. Soós, and Gy. Lendvay. Substituent effect on the photoreduction kinetics of benzophenone. *The Journal of Physical Chemistry*, 117 (40): 10196–10210.

Submitted

- 2018 **K. Horváth**, P. Segovia, L. Rajaoarisoa, E. Duviella, M. Petreczkyd, F. Nejjari, V. Puig. Active disturbance rejection based on predictive and 2 optimal controllers for a navigation canal. Submitted to *Control Engineering Practice*
- 2018 **K. Horváth**, B. van Esch, D. Vreeken, I. Pothof, J. Baayen. Convex modeling of pumps in order to optimize their energy use, *Water Resources Research*

In Preparation

- 2018 **K. Horváth**, J. Broekmans, B. van Esch. Guidelines to choose the right model for control purposes of open water channels, *Water Resources Management*

Book chapters

- 2015 **K. Horváth**, L. Duviella, E. and Rajaoarisoa, and K. Chuquet. Improvement of navigation conditions using model predictive control: The Cuiuchy-Fontinettes case study. In F. Corman, S. Voß, and R. Negenborn, editors, *Computational Logistics*, pages 222–237. Springer, Singapore.
- 2014 **K. Horváth**, L. Rajaoarisoa, E. Duviella, J. Blesa, M. Petreczky, and K. Chuquet. Enhancing inland navigation by model predictive control of water level – the Cuiuchy-Fontinettes case. In C. Ocampo- Martinez and R. Negenborn, editors, “*Transport of Water*” versus “*Transport over Water*,” pages 211–234. Springer.
- K. Horváth**, L. Duviella, E. and Rajaoarisoa, and K. Chuquet. Modeling of a navigation canal with unknown inputs: The Cuiuchy-Fontinettes case study. In C. Ocampo-Martinez and R. Negenborn, editors, *Advances in Hydroinformatics*, pages 317–332. Springer, Singapore.
- 2013 **K. Horváth**, P.-J. van Overloop, E. Galvis, M. Go´mez, and J. Rodellar. Multivariable model predictive control of water levels on a laboratory canal. In P. Gourbesville, J. Cunge, and G. Caignaert, editors, *Advances in Hydroinformatics*. Springer Verlag, Singapore.

CONFERENCE ACTIVITY

Panels Organized

- 2018 “Model predictive control for water management”, 13th International Conference on Hydroinformatics, Palermo, Italy, July 1-6., 2018
- 2014 "Modélisation et simulation des systèmes intégrés au cycle de l'eau dans un contexte de changement climatique" (Modelling and simulation of integrated water systems in the climate change context) in MOSIM 2014, Nancy, France, 5–7 Nov.

Papers

- 2018 **K. Horváth**, B. van Esch, J. Baayen, I. Pothof, J. Talsma, D. Vreeken. Model predictive control of a river reach with weirs, 13th International Conference on Hydroinformatics, Palermo, Italy, July 1-6., 2018
- 2017 F. L. Rodríguez, **K. Horváth**, J. G. Martín, and J. M. Maestre. Mobile model predictive control for the Évora irrigation test canal. In *20th World Congress of the International Federation of Automatic Control*, Toulouse, France, 9–14 July.
- K. Horváth**, B. van Esch, and J. Baayen. Categorization of trapezoidal open channels based on flow conditions for the choice of simple models. In *SimHydro 2017: Choosing the right model in applied hydraulics*, Sophia Antipolis, France, 14–16 June.
- K. Horváth**, B. van Esch, J. Baayen, I. Pothof, J. Talsma, and K.-J. van Heeringen. A water management decision support system contributing to sustainability. In *EGU General Assembly*, Vienna, Austria, 23–28 Apr.
- P. Segovia, J. Blesa, **K. Horváth**, L. Rajaoarisoa, F. Nejjari, V. Puig, and E. Duviella. Fault detection and isolation in flat navigation canals. In *4th International Conference on Control, Decision and Information Technologies*, Barcelona, Spain, 5–7 Apr.
- P. Segovia, **K. Horváth**, L. Rajaoarisoa, F. Nejjari, V. Puig, and E. Duviella. Modeling of two sub- reach water systems: Application to navigation canals in the north of France. In *14th International Conference on Informatics in Control, Automation and Robotics*, Madrid, Spain, 26–28 July.
- 2016 E. Duviella, **K. Horváth**, L. Rajaoarisoa, and K. Chuquet. Study of global change impacts on the inland navigation management: Application on the Nord-Pas de Calais network. In *Transport Research Arena*, Warshow, Poland, 18–21 Apr.
- 2015 **K. Horváth**. One-dimensional lake models with wind effects. In *NCR DAYS - Netherlands Centre for River studies*, Nijmegen, The Netherlands, 1–2 Oct.
- A. Tejada, **K. Horváth**, H. Shiromoto, and H. Bosman. Towards WaterLab: A test facility for new cyber-physical technologies in water distribution networks. In *Proceedings of the CySWater Workshop*, Seattle, United States.
- 2014 E. Duviella, **K. Horváth**, and K. Chuquet. Modèle intégré de réseaux de voies navigables pour l'étude de leur résilience dans un contexte de changement climatique (Integrated model of navigation canals for climate change resilience study). In *10th international conference on modeling, optimization and simulation*, Nancy, France, 5–7 Nov.

- E. Duviella, **K. Horváth**, L. Rajaoarisoa, and K. Chuquet. Multi-scale modeling approaches of inland navigation networks for their management in a global change context. In *Transport Research Arena*, Paris, France, 14–17 Apr.
- E. Galvis, M. Gómez, **K. Horváth**, J. Rodellar, and J. Mantecón. Cierre automático en tiempo real de canales de regadío: estudio en un canal de laboratorio (Automatic closing of an irrigation canal in real time: a study with a laboratory canal). In *Seminario Red de Laboratorios de Hidráulica de España*, June.
- E. Galvis, J. Mantecón, M. Gómez, **K. Horváth**, and J. Rodellar. Predictive control based on multiple models for canals that require large change in operating conditions. In *Congress on industrial and agricultural canals*, Lleida, Spain, 2–5 Sept.
- E. Galvis, J. Mantecón, M. Gómez, **K. Horváth**, and J. Rodellar. An automatic control strategy for closure and opening of irrigation canals. In *Planning, Operation and Automation of Irrigation Delivery Systems: USCID Water Management Conference*, Phoenix, Arizona, 2–5 Dec.
- M. Gómez, **K. Horváth**, E. Galvis, J. Rodellar, and J. Mantecón. Canal PAC-UPC: una instalación experimental para el ensayo de algoritmos de control automático de canales (in English; UPC-PAC canal: a laboratory canal to test automatic control algorithms). In *Congress on industrial and agricultural canals*, Lleida, Spain, 2–5 Sept.
- K. Horváth**, J. Blesa, E. Duviella, and K. Chuquet. Fault tolerant model predictive control of open channels. In *Planning, Operation and Automation of Irrigation Delivery Systems: USCID Water Management Conference*, Phoenix, Arizona, 2–5 Dec.
- K. Horváth**, J. Blesa, E. Duviella, L. Rajaoarisoa, V. Puig, and K. Chuquet. Sensor fault diagnosis of inland navigation system using physical model and pattern recognition approach. In *19th World Congress of the International Federation of Automatic Control*, Cape Town, South Africa, 24–29 Aug.
- K. Horváth**, E. Duviella, J. Blesa, L. Rajaoarisoa, S. Lecoeuche, D. Juge-Hubert, K. Chuquet, E. Sauqueta, F. Guibert, and N. Gaffet. A national project for the efficient management of inland navigation networks in a global change context. In *7th International Scientific Conference on the Global Water and Energy Cycle*, The Hague, The Netherlands, 14–17 July.
- K. Horváth**, E. Duviella, L. Rajaoarisoa, and K. Chuquet. Modelling of a navigation canal with unknown inputs: The Cuinghy-Fontinettes case. In *SimHydro 2014: Modelling of rapid transitory flows*, Sophia Antipolis, France,

11–13 June.

K. Horváth, M. Petreczky, L. Rajaoarisoa, E. Duviella, and K. Chuquet. MPC control of water level in a navigation canal - the Cuinchy-Fontinettes case study. In *European Control Conference*, Strausburg, France, 24–27 Sept.

L. Rajaoarisoa, **K. Horváth**, E. Duviella, and K. Chuquet. Large-scale system control based on decentralized design. In *19th World Congress of the International Federation of Automatic Control*, Cape Town, South Africa, 24–29 Aug.

2013 **K. Horváth**, M. Gómez, and J. Rodellar. The effect of the choice of the control variables of the water level control of open channels. In *The 10th IEEE International Conference on Networking, Sensing and Control*, Paris, France, 10–12 Apr.

2012 **K. Horváth**, E. Galvis, M. Gómez, and J. Rodellar. Comparison of two control algorithms based on different canal models using numerical simulation and experiments on a laboratory canal. In *HIC 2012, 10th International Conference on Hydroinformatics*, Hamburg, Germany, 14–18 July.

K. Horváth, P.-J. van Overloop, E. Galvis, M. Gómez, and J. Rodellar. Multivariable model predictive control of water levels on a laboratory canal. In *SimHydro 2012: New frontiers of simulation*, Sophia Antipolis, 12–14 Sept.

2011 J. Aguilar, P. Langarita, L. Linares, E. Galvis, **K. Horváth**, J. Rodellar, and M. Gómez. Control automático de niveles en un canal experimental de tres tramos (Automatic control of water levels of a three-pool laboratory canal). In *JIA 2011. II Jornadas del Ingeniería del agua, Modelos numéricos en dinámica fluvial*, Barcelona, Spain, 5–6 Oct.

E. Galvis, **K. Horváth**, J. Rodellar, and M. Gómez. Simplified modeling of a laboratory irrigation canal for control purposes. In *Proceedings of the IV Seminar for advanced industrial control applications*, pages 83–88., Barcelona, Spain, 7–8 Nov.

K. Horváth, E. Galvis, M. Gómez, and J. Rodellar. Pruebas de algoritmos de control automático en un canal de laboratorio y un canal simulado (Test of control algorithms in a laboratory canal and in simulation). In *JIA 2011. II Jornadas del Ingeniería del agua, Modelos numéricos en dinámica fluvial*, Barcelona, Spain, 5–6 Oct.

K. Horváth, E. Galvis, M. Gómez, and J. Rodellar. Control automático en canales de riego - experiencias en el canal de laboratorio UPC-PAC (Automatic control of irrigation canals - experiences in a laboratory canal). In *RLHE 2011, IV Seminario sobre las Líneas Prioritarias de Investigación de la Red de*

Laboratorios de Hidráulica de España, pages 20–21., Madrid, Spain, 9 June.

K. Horváth, E. Galvis, M. Gómez, and J. Rodellar. Irrigation canal models for automatic control purposes. In *Jornada Recerca i Innovació Escola de Camins*, Barcelona, Spain, 15–16 Nov.

TEACHING EXPERIENCE

Saint Thomas Aquinas University, Colombia

Design of hydraulic structures, Sole instructor (spring 2016)

Higher School of Engineering, Research Centre, French Ministry of Industry, France

Multi-modelling and hybrid systems, Sole instructor (spring 2014)

University of Nice - Sophia Antipolis, France

HydroEurope course, Teaching Assistant (spring 2012)

Technical University of Catalonia, Spain

Real time control and operation of irrigation canals, Teaching Assistant (fall 2010-2012)

Computer skills: Matlab, Sole Instructor (fall 2010-2012)

RESEARCH EXPERIENCE

2012 Guest researcher, Delft University of Technology, Delft, The Netherlands

2006-2007 Student researcher, Institute of Materials and Environmental Chemistry,
Hungarian Academy of Sciences, Budapest, Hungary

PROFESSIONAL SERVICE

Peer Review

IET Control Theory and Applications

Journal of Irrigation & Drainage Engineering

Journal of Dynamic Systems, Measurement and Control

LANGUAGES

Hungarian: native language

English: Advanced reading, writing, speaking

Spanish: Advanced reading, writing, speaking

Dutch: Intermediate reading, writing, speaking

German: Beginner reading, writing, speaking

French: Beginner reading, writing, speaking

Catalan: Beginner reading, writing, speaking

PROGRAMMING LANGUAGES

Matlab, Python, VBA