

Control Conference Africa (CCA 2024)

IFAC PapersOnline Volume 58, Issue 25

BalACLava, Mauritius
16-17 September 2024

Editor:

Syamala Krishnannair

ISBN: 979-8-3313-0929-9

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

To the extent permissible under applicable laws, no responsibility is assumed by the Owner, the Publisher or the Licensee for any injury and/or damage to persons or property as a result of any actual or alleged libelous statements, infringement of intellectual property or privacy rights, or products liability, whether resulting from negligence or otherwise, or from any use or operation of any ideas, instructions, procedures, products or methods contained in the material therein.

The publication of an advertisement in the POD Edition does not constitute on the part of the Owner, the Publisher or the Licensee a guarantee or endorsement of the quality or value of the advertised products or services described therein or of any of the representations or the claims made by the advertisers with respect to such products or services.

Copyright© (2024) by the authors
Open access publication under the CC-BY-NC-ND License
<https://creativecommons.org/licenses/by-nc-nd/4.0/>
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact the publisher, Elsevier Limited
at the address below.

Elsevier Limited
The Boulevard, Langford Lane
Kidlington
Oxford OX5 1GB UK

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Model Predictive Control of an Underground Mine Cooling Water Operation..... 1 <i>Jordan Anastasiou, Tobias M. Louw, William J. Shipman</i>	1
Intelligent Setting of ORP Under Multiple Operation Modes 7 <i>Peng Kong, Bei Sun, Guoxin Liu, Zhixuan Peng, Chunhua Yang</i>	7
Automatic Tuning of Level Controllers in a Flotation Bank using Bayesian Optimisation 13 <i>Albertus V. Richter, Johan D. Le Roux, Ian K. Craig</i>	13
Multi-Objective Feed Reservoir Control via Optimal Pump Scheduling 19 <i>Laurentz E. Olivier, Shaun M. Van Zyl, Bongeka Madolo</i>	19
An Assessment of Engagement, Experience, and Attitudes After Participation in the Girls in Control Workshop..... 25 <i>Roxanne R. Jackson, Damiano Varagnolo, Steffi Knorn</i>	25
Santa Has Everything Under Control: A Control Themed Advent Calendar..... 31 <i>S. Knorn, A. Visioli, C. Stoica, G. Lichtenberg, D. Varagnolo, H. Sánchez, D. Rotondo, J. L. Guzmán</i>	31
Empowering Tomorrow's Scientists: 'Girls in Control' Workshop Promotes STEM Education for Young Girls 37 <i>S. Krishnannair, A. Krishnannair</i>	37
Community Farm Monitoring Toolkit: Design and Implementation of a Low-Cost Tool for Sustainable Community Based Agricultural Projects in Africa 43 <i>Franck T. Pouomogne, Merlin B. S. Tsefack, Steffi Knorn, Hilaire B. Fotsin, Aurelle T. Kouanou, André R. Tchamda</i>	43
Optimization of the Paris Wastewater Treatment Plants and Sewer Network: Preliminary Results..... 49 <i>Cassandra Tasiaux, Denis Dochain, Joshua Taylor, Alain Rapaport, Peter Vanrolleghem</i>	49
Model-Plant Mismatch Detection using the Plant-Model Ratio: The Influence of Multivariable Systems Containing Both Fast and Slow Dynamics..... 55 <i>Heinz K. Mittermaier, Johan D. Le Roux, Ian K. Craig</i>	55
Time Based Stiction Compensation..... 61 <i>G. Z. Gous, J. D. Le Roux, I. K. Craig</i>	61
Modelling of Consumer Dynamics to Improve Fuel Gas Blending Control 67 <i>M. D. Sibiyi, A. J. Wiid, J. D. Le Roux, I. K. Craig</i>	67
Improvement of Model Predictive Control on a Depropaniser: An Industrial Case Study..... 73 <i>L. P. D. Lombard, G. P. Slabbert, N. S. Mqadi, P. Biyela</i>	73
A Lean Path for Learning Control in Undergraduate Electronics Programmes..... 78 <i>Paulo Garrido, Daniel Silvestre</i>	78
First Outlook on a Finite Gain from \mathcal{L}_1 to \mathcal{L}_∞ Space 84 <i>Magnus Axelson-Fisk, Gerrit Lassahn, Steffi Knorn</i>	84
A Comparison of Two Methods of Adaptive Nonlinear Model Predictive Control..... 90 <i>A. Bamimore, D. A. Akomolafe, P. J. Asubiaro, A. S. Osunleke</i>	90

A Generalized Anti-Windup Approach for Internal Model Control	96
<i>Ambrose A. Adegbeye, Kolawole S. Ogunba, Opeyemi S. Owolabi</i>	
A RBF-FD Physics-Informed Machine Learning Approach to Air Pollution Source Estimation.....	102
<i>Didier Georges, Sylvain Leirens, Roman Lopez-Ferber</i>	
Time-Constrained Gaussian Mixture Model for Clustering Multi-Modal Chemical Process Data	108
<i>J. F. Olivier, T. M. Louw</i>	
Stability-Constrained Contingency Analysis for Modern Power Systems	114
<i>Rajan Ratnakumar, Ganesh K. Venayagamoorthy</i>	
Particle Filtering on Hybrid Dynamical Systems for Sensor Fault Detection	120
<i>Simone D. Loubser, Tobias M. Louw, Steven M. Bradshaw</i>	
Closed-Form Approximations for the Minimal Robust Positively Invariant Set using Constrained Convex Generators	126
<i>Daniel Silvestre</i>	
Air Levitation State Feedback Control using Pole Placement and Kalman Filter	132
<i>D. Rosinova, R. Schwarz, A. Kozakova</i>	
LQG - Based Robust Tracking for the Magnetic Levitation Laboratory Plant.....	138
<i>Alena Kozáková, Danica Rosinová, Mária Hypiusová, Štefan Kozák</i>	
Optimal Decision-Making in a Captive Users Context	144
<i>A. Y. Kibangou, R. C. Kalaoane</i>	
Optimization of Resource Allocation in Remanufacturing Systems: A Labor and Automation Perspective.....	150
<i>Moritz Hoffmann, Steffi Knorn</i>	
Cable Shaping with MPC: A Reliable, Fast, and Real-Time Feasible Formulation	156
<i>Ruan Viljoen, Shamil Mamedov, Johan Ubbink, Wilm Decré, Erwin Aertbeliën, Jan Swevers, Joris De Schutter</i>	
A Compact Set of Closed-Form Equations for the Set of Dubins and Reeds-Shepp Paths	162
<i>Liam K. McAlpine, Arnold Pretorius</i>	
Q-Bert: MPC for Walking in a Legged Robot	168
<i>J. L. Van Der Walt, C. Fisher</i>	
Development and Validation of an Automatic Waypoint Navigation Control System for Watercrafts.....	174
<i>Alexander Köthe, Oliver Guske, Ivan Martinen, Janik Hopf, Paul Worrmann</i>	
Investigating Mechanisms of Robust Perfect Adaptation in Cancer Metabolisms using Chemical Reaction Network Theory	180
<i>R. Rithik Radhan, S. Pavan Kumar, Nirav Bhatt</i>	
Optimal Power Allocation in Wireless Communication Networks using Stochastic Control	186
<i>Moirangthem S. Singh, Ramkrishna Pasumarthy</i>	
Transcritical and Hopf Bifurcation Analysis of Cyberattacks in Software-Defined Networking.....	192
<i>B. O. S. Biaou, A. O. Oluwatope, B. S. Ogunbare</i>	

Author Index