Papers to be presented at CCWI2011

1 ICT for Efficient Urban Water Management

3 Reviewing the effectiveness of GPU power when used for water network optimization problems
   R Puust, M Maddison & J Laanearu

9 Data integration to support hydraulic modeling at a large water utility
   V Speight, E Betanzo & J Porro

15 High performance and grid computing based hydraulic Simulations using the Clement formula
   G P Pezzi, E Vaïssié, Y Viala, B Gravit, F Bonnadier & P Gourbesville

21 Lessons for parallelizing linear equation solvers and water distribution analysis
   Z Y Wu & I Lee

27 PortEau: An object oriented programming hydraulic toolkit for water distribution systems analysis
   O Piller, D Gilbert, K Haddane & S Sabatie

33 FluidEarth - A platform for integrated modelling using the OpenMI standard
   Q Harpham, G Pearce, B von Christierson & A Harper

39 GIS tools for water management: an implementation using JGRASSTOOLS, UDIG, BEEGIS and EPANET
   A Antonello, D Avesani, P Bertola, A Bosoni, S Franceschi, D Righetti & M Righetti

45 Computational performance analysis and improvement of the demand-driven hydraulic solver for the CWSNet Library
   M Guidolin, D A Savic & Z Kapelan

51 GIS thematic mapping to identify persistent failures in water distribution networks
   W J Hampson, J B Boxall & S B M Beck

57 Integrated water modelling with OpenMI
   D Fortune

63 Applying i-model technology for enabling interoperability of water distribution system analysis
   H Gao, D Diaz & Z Y Wu

69 Security, Reliability and Resilience of Water Systems

71 Evaluating water-related security threats for complex water systems using System Dynamics Modelling
   J Sušnik, L S Vamvakеридou-Lyroudia, D A Savić & Z Kapelan

77 How many isolation valves are needed in a water distribution system?
   T M Walski

83 Stochastic risk-based optimisation of water distribution systems with unknown water demands
   P Burovskiy, Z Kapelan & G Fu

89 Robust optimization methodologies for water supply systems design
   J Marques, M C Cunha, J Sousa & D Savić

95 Applying info-gap decision theory to water supply planning: Application to the Thames basin
   A Woods, E Matrosov & J J Harou

101 Reliability of pumping station in water distribution networks considering VSP and SSP
    N Mehzad, M Tabesh, S S Hashemi & B A Kia

107 Water used for fire fighting in Cape Town
Synthetic indices of robustness of water distribution networks
A Di Nardo, R Greco & G F Santonastaso

A comparison between two Bayesian approaches for probabilistic contamination source identification
X Yang, D L Boccelli & A E De Sanctis

Comparing reliability indicators for water distribution networks with a future perspective
S Atkinson, R Farmani, F A Memon & D Butler

Sustainability Issues in Urban Water Management

The challenges to designing ‘sustainable’ drinking water systems
Y R Filion & M G Nanos

‘Green’ urban water management for the future
Chris Shirley-Smith & Jerry Bryan

Designing sustainable drainage systems
D Fortune & J-F Chow

Water resources management: Planning for an uncertain climate and demand regime using info-gap decision theory
B Korteling, S Dessai & Z Kapelan

Sustainable water management - modelling acceptability for decision support: a methodology
S Ward, H Abdelmeguid, R Farmani, F A Memon & D Butler

Experiences of greywater reuse for toilet flushing within a university academic and residential building
A Ilemobade, O Olanrewaju & M Griffioen

Evolution of water balance of an urban catchment
C McCoy-Simandle, S G Buchberger & Y J Yang

Applications of back propagation neural networks in predicting nutrient effluent concentrations from permeable pavements
K Tota-Maharaj, T D Prasad & M Scholz

An analytical probabilistic approach to size cisterns and storage units in green buildings
A Raimondi & G Becciu

Formulating a model to investigate regulatory drivers of supply-demand infrastructure investment
S Padula & J J. Harou

Hydrological effects of sustainable drainage systems in an urbanizing area
H Qin, W Wang, Z Zhao & S T Khu

Urban Flooding

An off the shelf flood forecasting system
R Body

Design of a graphical framework for easy prototyping of pluvial flooding cellular automata algorithms
M Guidolin, A Duncan, E C Keedwell, A S Chen, S Djordjevic & D A Savic

A real options based decision support methodology for flood risk management
M Woodward, Z Kapelan & B Gouldby
217  Use of evolutionary approaches for flood risk assessment and system rehabilitation
F Anvarifar, Z Vojinovic, A Sanchez Torres & S Seyoum

223  Sewer flood analysis of urban drainage systems using copulas
G Fu, D Butler & Z Kapelan

229  Supporting flooding risk assessment in ephemeral streams in Southern Italy
L Berardi, D Laucelli & O Giustolisi

235  Surface water management modelling at the city scale
P Davies

241  Hydrograph attenuation along a pipe using a flush tank
M Mofidi & S M Borghei

247  Hydraulic performance of drain pipe in a submerged tank
Milad Nabaei and S. Mahmoud Borghei

253  A national suitability dataset for infiltration-based sustainable drainage systems
R Dearden & S Price

259  UPM Risk Based Design
J Plant & J Lau

265  Application of cellular automata approach for fast flood simulation
B Ghimire, A S Chen, S Djordjević & D A Savić

271  A GIS-Based integrated modelling approach for the identification and mitigation of pluvial urban flooding
C Viavattene, J B Ellis & J Chlebek

277  Predicting head loss vs. flow relationship for overflowing manholes
T Walski, B Whitman, B Kelly, M Leaman & D Loughran

283  Urban flooding management strategies: international panorama, challenges and trends for resilience improvement
J Batica, P Gourbesville & F Tessier

289  Cheltenham flooding - The next step in an integrated approach
J Pickering & R Allitt

295  Flood risk management via collaborative modelling

301  Numerical research of the inflow into different gully outlets
R F Carvalho, J Leandro, L M David, R Martins & N Melo

307  Analysis of different objective functions sets applied to automatic calibration of the Storm Water Management Model (SWMM)
T A Shinna & L F R Reis

313  Accessibility disruptions in urban areas caused by extreme rainfall events
N Melo, B F Santos, J P Leitão, H Ramos & J Leandro

319  Performance indicators and efficiency assessment of drainage networks
P Piro, R Ermini, A Sole, M Carbone, F Frega, G Tomei & R Ataoui

325  Vortex flow control performance in response to single and time-series rainfall events
D S Jarman, P LeCornu, G Tabor & D Butler

337  Asset Management and Performance Modelling

339  Sanitation infrastructure management indicators (grades). The case of Cordoba, Argentina
A heuristic method to identify an individual pipe entity and its applications for economical maintenance of water pipelines
S Park, T G Lee & H S Lee

Modelling the impact of weather on leakage and bursts
Richard Cocks, and Andrew Oakes

Generalized Framework for High Performance Infrastructure System Optimization
Z Y Wu, Q Wang, S Butala & T Mi

Comparison of procedures for assessing water demand shortfalls caused by segment isolations
E Creaco, S Alvisi & M Franchini

Rehabilitation interventions in urban water supply assets using the multicriteria decision tool ELECTRE III
N Carriço, D I C Covas, M do C Almeida, J P Leitão & H Alegre

Selection of rehabilitation alternatives of water distribution systems in condition of lack of data by concise performance indices and optimization tools
A Fortunato, C Arena & M R Mazzola

Effects of temperature and hydraulic factors on water supply pipe breakage in seasonally frozen regions
K Yang, C Wu, Y Yuan & H Liu

Determining the route for a water main in a new urbanising area
A S Torres, Z Vojinovic & R Price

Inquiry into air and water temperature effect on water main breaks
B Rajani, Y Kleiner & J-E Sink

A performance-based tool for prioritising water meter substitution in a urban distribution network
C M Fontanazza, G Freni, G La Loggia, V Notaro & V Puleo

A comprehensive approach to long and short term planning of water main renewal
Y Kleiner and A Nafi

Investment planning for STW's sewerage pumping stations
G Taylor & M Engelhardt

A spatial and temporal analysis for long-term renewal of water pipes
Y Tlili, A Nafi & U Fratino

Business planning within water companies in England and Wales
M Engelhardt & M Turner

The analysis of water and sewage flows from mega stadiums during soccer World Cup 2010 matches in South Africa
H E Jacobs, J K Compion & M J Van Heerden

Sewerage infrastructure asset management: An approach to encapsulate effective planning, investment optimisation, enhanced data availability and efficient solution specification
B Ward, J Jorgensen, D Savić & S Rosser

Demand Forecasting, Leakage and Energy Management

Energy optimization and micro-hydro solution in WSS: a case study
F V Gonçalves & H M Ramos

Practical Tips for Reducing Energy Use
T Walski

Study of the isolability of leaks in a network depending on calibration of demands
Abnormal quality detection and isolation in water distribution networks using simulation models
F Nejjari, R Pérez, V Puig, J Quevedo, M Cugueró, G Sanz, J M Mirats

Water and energy savings in water distribution systems with real-time monitoring
M Nicolini

Scaling properties of water demand in design and management of water distribution systems
I Vertommen, R Magini & M da C Cunha

Novel standardized energy auditing scheme in water supply systems
E V de Souza, D I Covas & A K Soares

Predicting the head-area slopes and leakage exponents of cracks in pipes
A M Cassa & J E van Zyl

Methods for improving the efficiency in the use of water resources and energy in water supply systems
E V de Souza, D I Covas & A K Soares

Identification of leaks in closed-loop water distribution networks using the Virtual Distortion Method
D Sala & P Kolakowski

Non-residential water demand model validated with extensive measurements
I Pieterse-Quirijns, M Blokker, E van der Blom & J Vreeburg

Recent developments in leak hotspot detection using network model optimisation
P Sage, N Croxton & Z Y Wu

Roles of water demand forecasting models in supporting business decision making processes
L Kiernan

Headloss piecewise linearization for optimal operation of water distribution systems
E Price & A Ostfeld

Experimental investigation of the leak hydraulics
M Ferrante, E Todini, C Massari, B Brunone & S Meniconi

Operational control of sewer pumping stations to minimise energy costs considering efficiency
S Ostojin, S R Mounce, D Singerton & J B Boxall

A probabilistic analysis of the residential water demand
R Gargano, C Tricarico & G de Marinis

Burst detection in water distribution systems via active identification procedure
P Skwocrow & B Ulanicki

Linking the power and FAVAD equations for modelling the effect of pressure on leakage
J van Zyl & A M Cassa

Leakage control management in water distribution systems by a multi-objective approach
K Behzadian, A Ardeshir, M M Mahdavi, K Hosseini and F Jalilsani

Leakages and pressure relations: An experimental research
F De Paola & M Giugni

Exploring the link between urban development and water demand: the impact of water-aware technologies and options
E Rozos, S Baki, D Bouziotas & C Makropoulos
575 Water Quality Modelling and Management

577 Optimization of booster disinfection in water distribution system using backtracking algorithm
F Meng, S Liu, P Auckenthaler, L Bai, H Wang, X Wu & G Meng

583 Comparing the fouling rate of one drinking water distribution system in two different flow configurations
E J M Blokker, P G Schaap & J H G Vreeburg

589 Intrusion into water distribution systems through leaks and orifices: Initial experimental results
R Collins, S Beck & J Boxall

595 Trunk main discolouration trials and strategic planning
S Husband, M Jackson & J Boxall

601 Carefully designed measurements provide insight into sediment build-up in drinking water distribution systems
P G Schaap & E J M Blokker

607 Optimization of sensor placement for source identification in water distribution networks under conditions of demand uncertainty
P Auckenthaler & L Shuming

613 Sampling of asellus aqaticus (water lice) in a drinking water distribution system and consequences for drinking water supply
K Ripl, I Slavik, W Uhl, U Michels, D Titze, G Gunkel & M Scheideler

619 Comparison of demand driven and pressure dependent hydraulic approaches for modelling water quality in distribution networks
A G Seyoum, T T Tanyimboh and C Siew

625 Sediment accumulation in drinking water trunk mains
J H G Vreeburg & H Beverloo

631 Targeting water distribution network interventions for the cost-effective mitigation of discolouration risk: A case study
M Randall-Smith, J Collingbourne & Kent McClymont

635 Dynamic hydraulic models to study sedimentation in drinking water networks in detail
I Pothof & M Blokker

641 A hybrid evolutionary data-driven model for Biofouling assessment in pipelines
T Opher & A Ostfeld

645 A data-driven methodology for determining the cause of discolouration in distribution networks
W R Furnass, S R Mounce & J B Boxall

651 Modeling the transport of nitrates and phosphorus within a residential potable water reticulation system due to greywater ingress
O Olanrewaju & A Ilemobade

657 Novel methods for ranking district metered areas for water distribution network maintenance scheduling
K McClymont, D Walker, E Keedwell, R Everson, J Fieldsend, D Savić & M Randall-Smith

663 The calibration and verification of urban storm water quality models using genetic programming (GP)
S Sun & J-L Bertrand-Krajewski

669 Control of THM formation in multi-objective booster chlorination for water distribution systems
A Ardeshir, M Alimohammadnejad, K Behzadian & H V Farahani
Real-Time Monitoring, Modelling and Control

Adaptive model based control for wastewater treatment plants
A de Niet, M van de Vrugt, H Korving, & R J Boucherie

Challenges in the implementation of a DSS for real-time WDS management
J Bicik, Z Kapelan & D A Savić

Geostatistical techniques for approximate location of bursts in water distribution systems
M Romano, Z Kapelan & D A Savić

Application of an optimal predictive controller for a small drinking water network in Luxembourg
D Fiorelli, G Schutz & J Meyers

A FEM approach to water balance and quality parameters identification, towards Real Time Networks Monitoring
D Aubry, J Boudon & T L Paradinas

Sensitivity of calibration results to uncertainties in input data. Case of operational water distribution system.
A Vassiljev, T Koppel & A Saare

Power harvesting wireless sensor node framework for monitoring water distribution systems
M I Mohamed, W Wu & M Moniri

Water distribution systems event detection through classification and regression trees
J Arad, L Perelman & A Ostfeld

Development of simulink based controller for water distribution networks
P K Rai, C D D’Souza & M S M Kumar

Online hydraulic simulation as operative tool for improving water network security
J Deuerlein & A Wolters

Real-time distribution system modeling: Development, application, and insights
S Hatchett, J Uber, D Boccelli, T Haxton, R Janke, A Kramer, A Matracia & S Panguluri

Online simplification of water distribution network models
D Paluszczyszyn, P Skworcow & Bogumil Ulanicki

Proof of concept of an on-line pump scheduling and control system
K Woodward & M Fowler

Applying intelligent technologies to optimise distribution pump pressures
A Burrows

Systems Modelling, Optimisation and Decision Support

A comparison of risk-based optimization methods to design branched and looped water distribution networks for fire flow protection
Y Filion & B Jung

Guidelines for capacity reducing gas pockets in wastewater mains
I Pothof, M Tukker, K Kooij & F Clemens

Parametric analysis of differential evolution algorithm applied to water distribution system optimization
F Zheng, A R Simpson & A C Zecchin

Long period analysis of transient pressure signals for in-line valve checking
S Meniconi, B Brunone, M Ferrante, R Neri & C Massari

Experimental and numerical analysis of water hammer in a metal pipe rig
Applying genetic algorithm optimization to identify leakage locations in district meter area with roof tanks and underground reservoirs
J L da Silva, R S Ribeiro, D I C Covas & H M Ramos

An Excel-based solution to bring water distribution network analysis closer to users
O Giustolisi, D A Savić, L Berardi & D Laucelli

A proposal of topological sampling design
D Laucelli, L Berardi & O Giustolisi

Testing linear solvers for WDN models
Orazio Giustolisi, Dragan A. Savić, Daniele Laucelli and Luigi Berardi

Filtering alternative surge protection schemes for long distance water pipeline system: A case study of a quintuplicate U-shaped pipeline
C Zheng, J Gao, F Zhang, W Wu, L Chen, J Han, H Cao & W He

Modelling urban water management by using System Dynamics; Case study of Tabriz city, Iran
M Zarghami, S Akbarieh, A Bagheri & S Behjat

Effective urban water management by using an improved particle swarm optimization
M Zarghami & H Hajykazemian

Graph partitioning for automatic sectorization of a water distribution system
A Di Nardo, M Di Natale, G F Santonastaso & S Venticinque

Detecting topological changes in water distribution systems featuring one-way devices
S Alvisi, E Creaco & M Franchini

Evaluating the robustness of proposed capacity expansion plans in the Thames basin using the Robust Decision Making framework
E S Matrosov, A Woods, J J Harou & K Zhou

Surge protection for large diameter long distance flat pipeline system: A case study
C Zheng, J Gao, M Tu, W Wu, X Huang, D Tang, D Zhong, H Cao & W He

Design of air vessels for long-distance water-transmission pipelines with the GA algorithm
Q Sun, Y Wu, Y Xu & M Liu,

MOGA-ANN based optimisation of integrated urban wastewater system control strategies
M Astaraie-Imani, Z Kapelan, G Fu & D Butler

Modeling of hydraulic transient prevention with vented hydropneumatic tank
R Wang, Z Wang, T M Walski, M Sharkey, S R Coran, & S H Zemell

Frequency response measurement of pipelines by using the inverse-repeat binary sequence
J Gong, M F Lambert, A C Zecchin & A R Simpson

Research on the arriving time of water head in the projects of long-distance water transmission at first watering
J Yu, C Wu, C Wang, X Bian, Z Hu, Y Yuan & W Chen

The analysis of oilfield urban water supply network planning practice
J Gao, J Zhang, C Chen, W Wu & C Zheng

State of the art and directions in development of the hydraulic circuit theory methods for modeling and technological control of water supply systems
N N Novitskiy & A V Alekseev

Impact of surge vessel location and valve closure time on residual transients at large pump station: model vs. field test
S Krstevski

Transient flow during filling of horizontal pipe containing water
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>919</td>
<td>Optimising rehabilitation of water distribution systems accounting for water demand management intervention measures</td>
<td>J Laanearu, I Annuus, M Raidmaa &amp; T Koppel</td>
</tr>
<tr>
<td>925</td>
<td>WaterSPOT: Improving virtual commissioning with hydraulic modeling</td>
<td>I Basupi, Z Kapelan &amp; D Butler</td>
</tr>
<tr>
<td>931</td>
<td>Fractal classification of water supply networks</td>
<td>T Lapikas, R Nugteren &amp; I Worm</td>
</tr>
<tr>
<td>937</td>
<td>WaterNetGen - An EPANET based tool for water distribution network synthetic models generation and sizing</td>
<td>D Kowalski &amp; B Kowalska</td>
</tr>
<tr>
<td>943</td>
<td>Assessing variable speed pump efficiency in water distribution systems</td>
<td>J Muranho, A Ferreira, J Sousa, A Gomes &amp; A S Marques</td>
</tr>
<tr>
<td>949</td>
<td>Multi-objective water distribution system design using an expert algorithm</td>
<td>A Marchi, A R Simpson &amp; N Ertugrul</td>
</tr>
<tr>
<td>955</td>
<td>Experimental evidence of backflow phenomenon in a pressurised pipe</td>
<td>J Saldarriaga, S Takahashi, F Hernández &amp; M Escovar</td>
</tr>
<tr>
<td>961</td>
<td>Impulse response function and wavelet analysis of transient pressure signals for leak detection in pipes</td>
<td>S Meniconi, B Brunone, M Ferrante, A Berni &amp; C Massari</td>
</tr>
<tr>
<td>967</td>
<td>Water distribution network calibration using DE-MC</td>
<td>T D Prasad, M Scholz &amp; K Tota-Maharaj</td>
</tr>
<tr>
<td>973</td>
<td>A hyper-heuristic approach to water distribution network design</td>
<td>K McClymont, E Keedwell, D Savić &amp; M Randall-Smith</td>
</tr>
<tr>
<td>979</td>
<td>A numerical unsteady friction model for the transient flow arising during the filling process of intermittent water distribution systems</td>
<td>M De Marchis, G Freni &amp; E Napoli</td>
</tr>
<tr>
<td>985</td>
<td>Comparison among best solutions of the optimal design of water of distribution networks obtained with different algorithms</td>
<td>S Artina, A Bolognesi, C Bragalli, C D’Ambrosio &amp; A Marchi</td>
</tr>
<tr>
<td>991</td>
<td>Optimal design of pipes in series: an explicit approximation</td>
<td>S Padula, R Vergnory-Mion &amp; J J Harou</td>
</tr>
<tr>
<td>997</td>
<td>Possible routes to improve supply-demand balance optimization for England and Wales water sector</td>
<td>S Meniconi, B Brunone, M Ferrante, A Berni &amp; C Massari</td>
</tr>
<tr>
<td>1003</td>
<td>Comparing and contrasting traditional membrane bioreactor activated sludge models with novel ones based on time series analysis</td>
<td>S Meniconi, B Brunone, M Ferrante, A Berni &amp; C Massari</td>
</tr>
<tr>
<td>1009</td>
<td>Water distribution looped systems. Reservoirs influence (number, location and elevation)</td>
<td>P Paul &amp; B Ulanicki</td>
</tr>
<tr>
<td>1015</td>
<td>Inverse problem solving in water distribution networks</td>
<td>P-A Jarrige &amp; G Gancel</td>
</tr>
<tr>
<td>1021</td>
<td>Validation of a Dual Calibration Method for Coupled Flow and Transport models of Water Distribution Systems</td>
<td>O Piller, D Gilbert &amp; J E van Zyl</td>
</tr>
</tbody>
</table>