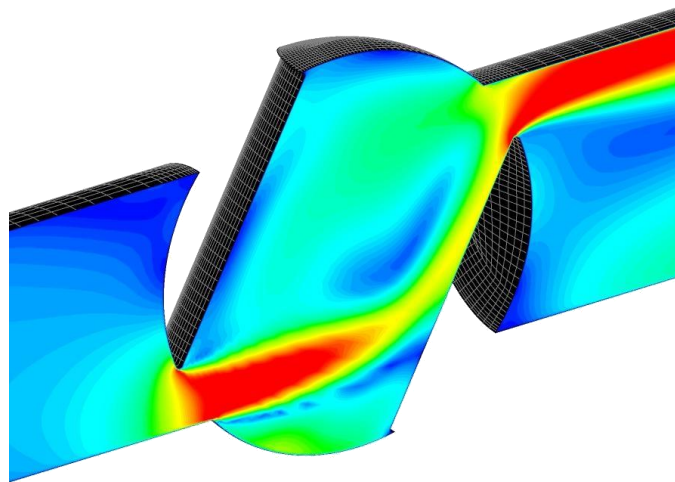


Bath/ASME Symposium on Fluid Power and Motion Control



FPMC 2022

14th – 16th September 2022

Preliminary Programme

Some timings may be subject to change.

Programme for Wednesday 14th September

09:00 – 09:15 Welcome and Introduction

09:15 – 10:30 **Session 1: Zero Carbon Technologies** **Chair: Eric Barth**

09:15 88967 Daniel Escobar-Naranjo, Kim A. Stelson and Biswaranjan Mohanty, *Experimental Validation of Extremum Seeking Control for a Midsized Hydrostatic Transmission Wind Turbine*

09:30 89567 Qin Zhou, Yue Yang, Shuming Shang, Jiarui Zhang, Chao Ai and Wenting Chen, *Research on High Precision Control of Maximum Power Point Tracking for Offshore Hydraulic Wind Turbine*

09:45 89650 Kim A. Stelson, Daniel Escobar, Biswaranjan Mohanty and Justin Chen, *Optimizing Viscosity for Maximum Power in a Hydrostatic Transmission Wind Turbine*

10:00 89985 Lucas Zanatta Manosso, Victor J. De Negri, *Design and Analysis of a Digital Hydrostatic Transmission for Wind Turbines*

10:15 Discussion

10:30 – 11:00 Refreshments

11:00 – 12:30 **Session 2: Efficient and Intelligent Systems 1** **Chair: Jim Van de Ven**

11:00 87665 Tobias Vonderbank and Katharina Schmitz, *Energetic Investigation of Common Pilot Operation and the Energy Saving Potential of Electromechanical Valve Actuators*

11:15 89547 Lasse Schmidt, Kenneth Vorbøl Hansen and Søren Ketelsen, *Perspectives on Component Downsizing in Electro-Hydraulic Variable-Speed Drive Networks*

11:30 89847 Matthias Scherrer and Rudolf Scheidl, *An Improved Elastic and Non-Contact Smart Sealing Concept for Digital Micro Hydraulic Valves*

11:45 89900 Andrea De Martin, Giovanni Jacazio, Massimo Sorli and Andrea Ruffinatto, *A Novel Hydraulic Solution to Simulate Inertial Forces on a Landing Gear Qualification Test Rig*

12:00 89984 James Gallentine, Eric J. Barth, Kourosh Shoele, Brian Van Stratum, Jonathan Clark and Kevin Galloway, *A Multimodal Climbing-Swimming Soft Robotic Lamprey*

12:15 Discussion

12:30 – 14:00 Lunch

14:00 – 15:30 **Session 3: Control** **Chair: Perry Li**

14:00 88959 Christian Haas, Andreas Opgenoorth, Arne Schneider and Katharina Schmitz, *Practical Evaluation of a Control Concept for a Remote Controlled 1.8T Excavator Using a 3D Input Device*

14:15 89019 Heng Liu, Hao Sun, Wei Sun, Jianfeng Tao and Chengliang Liu, *A Deep Koopman-Based Model Predictive Control Method for Valve-Controlled Hydraulic Cylinder Systems*

14:30 89072 Hao Sun, Honggan Yu, Jianfeng Tao and Chengliang Liu, *Fuzzy-Based Adaptive Model Predictive Control for Deteriorating Model Uncertainty of Hydraulic Servo Systems*

14:45 89548 Lasse Schmidt, Kenneth Vorbøl Hansen and Søren Ketelsen, *State Decoupling & Stability Considerations in Electro-Hydraulic Variable-Speed Drive Networks*

15:00 90575 Bobo Helian, Marcus Geimer and Sebastian Beiser, *High Precision Nonlinear Motion Control of a Hydraulic Orbital Motor-Driven Linear Rack*

15:15 Discussion

15:30 – 16:00 Refreshments

16:00 – 17:30 **Session 4: Digital and Switched Fluid Power Systems** **Chair: Rudolf Scheidl**

16:00 88503 Samuel Kärnell and Liselott Ericson, *Analysis of a Digital Pump With Variable Speed Drive*

16:15 88601 Bing Xu, Jiaming Wu, Feng Wang and Zongxuan Sun, *A Digital Hydraulic Load-Sensing System Based on Hydraulic Free Piston Engine*

16:30 88893 Daniil Dumnov and Niall Caldwell, *A Cylinder Enabling Algorithm for Reduction in Low Frequency Pulsation From Digital Displacement Pumps*

16:45 89366 Mikko Huova and Matti Linjama, *Control of Multi-Pressure Hydraulic Supply Line Using Digital Hydraulic Power Management System*

17:00 90598 Justin Darnet and Eric Bideaux, *State-of-the-art of Variable Displacement Technologies for Radial Piston Hydraulic Machines*

17:15 Discussion

18:30 – 21:00 Reception Buffet at the Holburne Museum, Bath

Programme for Thursday 15th September

- 09:15 – 10:30** **Session 5: Noise and Vibration** **Chair: to be confirmed**
- 09:15 88101 Zubin Mistry, Andrea Vacca, Manuel Rigosi and Sujan Dhar, *Modeling Fluid Inertia Effects in External Gear Machines Through Lumped Parameter Approach*
- 09:30 88957 Rudolf Scheidl, Helmut Kogler and Philipp Zagar, *A Hydraulically Controlled Multiple Buck Converter System*
- 09:45 89042 Jing Yao, Juntao Zhao, Pei Wang, Yuwang Cheng and Yupeng Wang, *Active Pressure Pulsation Suppression Method by Parallel-Series Structure in DFCU Based on Variable Step Size FXLMS Algorithm*
- 10:00 89855 Gudrun Mikota, Rainer Haas and Rudolf Scheidl, *Sensor Placement in a Hydraulic Drive System*
- 10:15 Discussion
- 10:30 – 11:00** **Refreshments**
- 11:00 – 12:30** **Session 6: Pumps and Motors** **Chair: to be confirmed**
- 11:00 88469 Israa Azzam, Sujan Dhar, Dipak Maiti, Veeranagouda Patil, Paul Asunda, Jose Garcia Bravo and Farid Breidi, *Gerotor Pump Simulation Modules for Enhancing Fluid Power Education*
- 11:15 89002 Paul Michael, Kim Stelson, Daniel Williams and Hassan Malik, *Dynamometer Testing of Hydraulic Fluids in an Axial Piston Pump Under Simulated Backhoe Loader Trenching Conditions*
- 11:30 89380 Elias V. Hansen, Per Johansen, Jens Rendbæk and Lasse Almind Jensen, *In-Situ Lubrication Film Thickness Measurements in a Radial Piston Motor Using Adaptive Ultrasound Reflectometry*
- 11:45 89553 Evan D. Sand and Perry Y. Li, *Incorporating a Rotatable Valve Cam to Improve the Efficiency of a Hydraulic Motor in an Inline Hydro-Mechanical Transmission (i-HMT)*
- 12:00 89718 Shanmukh Sarode, Lizhi Shang, Andrea Vacca and Scott D. Sudhoff, *Flux Weakening Operation Based Design of an Integrated Electrohydraulic Axial Piston Unit*
- 12:15 Discussion
- 12:30 – 14:00** **Lunch**
- 14:00 – 15:15** **Koski Lecture** **Chair: to be confirmed**
- 15:15 – 15:45** **Refreshments**
- 15:45 – 17:15** **Session 7: Components and Systems** **Chair: Kim Stelson**
- 15:45 88614 Brendan Deibert, Sophia Scott, Allan Dolovich and Travis Wiens, *The Use of Additive Manufactured Plastic in Small-Scale Poppet Valves and Pressure Vessels*
- 16:00 89252 Jianbin Liu, Jürgen Weber and André Sitte, *Investigation of Temperature Influence on Flow Mapping of Electrohydraulic Valves and Corresponding Application*
- 16:15 89721 Per Johansen, Uffe N. Christiansen, Sune Dupont, Anders Bentien, David N. Østedgaard-Munck, Jens L. Sørensen and Michael M. Bech, *An Experimental Study on High-Flowrate Ultrasonic Particle Monitoring in Oil Hydraulics*
- 16:30 89927 Emil Nørregård Olesen, Torben Ole Andersen and Poul Ennemark, *Active Damping of a Hydrostatic Steering Circuit for an Articulated Vehicle*
- 16:45 90897 Emil Nørregård Olesen and Torben Ole Andersen, *Investigation of a New Orbital Steering Concept with Focus on the Control Loop Performance*
- 17:00 Discussion
- 18:30 – 22:00** **Symposium Dinner and Awards Presentation at the Pump Room, Bath**

Programme for Friday 16th September

- 09:00 – 10:30** **Session 8: Efficient and Intelligent Systems 2** **Chair: to be confirmed**
- 09:00 88563 Rituraj Rituraj and Rudolf Scheidl, *Advancements in the Control Strategy for Digital Hydraulically Driven Knee Exoskeleton*
- 09:15 89099 Zichang Lin, Bing Xu and Feng Wang, *Improving Wheel Loader Energy Efficiency With a Series Electric Hybrid Powertrain*
- 09:30 89509 Annalisa Sciancalepore, Andrea Vacca and Steven Weber *Control Strategy of Adjustable Pilot Counterbalance Valves for Efficient Hydraulic Actuation*
- 09:45 89646 Zhiyong Su, Jingfu Wang, Tianbao Zhu, Haodi Tang and Xu Zang, *Design and Modeling of Heave Compensation System Based on Secondary Regulation Technology*
- 10:00 90090 Xu Han, Manu Leinonen and Tatiana Minav, *Design and Simulation Analysis of a Pump-Controlled Actuation System for Heavy-Duty Booms*
- 10:15 Discussion
- 10:30 – 11:00** **Refreshments**
- 11:00 – 12:30** **Session 9: Fault Analysis and Diagnosis** **Chair: to be confirmed**
- 11:00 88249 He Xu and Feng Sun, *Research on Life Extension of Water Hydraulic Control Valve Based on Augmented Reality for Fault Diagnosis*
- 11:15 88646 Faried Makansi and Katharina Schmitz, *Fault Detection and Diagnosis for a Hydraulic Press by Use of a Mixed Domain Database*
- 11:30 89083 Terkil Bak-Jensen and Lasse Schmidt, *Prognostics in Custom-Build Electro-Hydraulic Variable-Speed Drive Applications*
- 11:45 89107 Andris Rambaks, Paul Knipper, Niklas Bauer and Katharina Schmitz, *Autofrettage and Its Impact on High-Cycle Fatigue of Hydraulic Components*
- 12:00 89359 Hao Yin, He Xu, Feng Sun and Yuhan Zhao, *Research on Application of Elastic Consolidation Algorithm in Fault Diagnosis of the Control Valve*
- 12:15 Discussion
- 12:30 – 14:00** **Lunch**
- 14:00 – 15:15** **Session 10: Modelling and Simulation** **Chair: Travis Wiens**
- 14:00 89105 Philipp Zagar and Rudolf Scheidl, *The Connection Between Sliding Mode Analysis and Singular Perturbation Theory for Modelling Fast Hydraulically Fed-Back Switching Valves*
- 14:15 89636 Jeffrey J. Bies and William Durfee, *Fluid-Structure Optimization of Small-Scale Hydraulic Conduits*
- 14:30 90184 Jackson Wills and Perry Y. Li, *Accumulator Sizing for the Hybrid Hydraulic Electric Architecture (HHEA) Using Dynamic Programming*
- 14:45 90185 Bernhard Manhartgruber, *A Set of Benchmark Problems for Fluid Power System Simulation*
- 15:00 90715 Zihan Wu, Feng Wang, Bing Xu and Wieslaw Fiebig, *An Electric-Hydraulic Hybrid Wheel Loader With Mode-Driven Control Strategy*
- 15:15 Discussion
- 15:30 – 15:45** **Closing Remarks**
- 15:45 – 17:00** **Commercial Modelling Software Demonstrations – to be confirmed**