ASME FPMC 2021

ASME/BATH Symposium on Fluid Power and Motion Control

CONFERENCE
October 19 – 21, 2021

Virtual, Online

Program

https://event.asme.org/FPMC

The American Society of Mechanical Engineers®
ASME®

ASME
SETTING THE STANDARD

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Welcome from the General Conference Chair!

Dear Colleagues,

Welcome to the ASME/Bath 2021 Symposium on Fluid Power and Motion Control (FPMC 2021)! The symposium was established in 1988 originally as the Bath Symposium on Fluid Power and Motion Control to be a premier forum for the international fluid power community from academia and industry to discuss recent developments and future challenges in fluid power technology. Since 2009, it has been jointly organized by the University of Bath and the American Society of Mechanical Engineers (ASME) and held every year, alternating between Bath and locations in the USA—usually in sunny Sarasota, Florida. Due to COVID-19 pandemic, FPMC this year is being held online, virtually, for the second year in a row. A silver lining is that we can enjoy the symposium without needing to travel.

Despite the virtual setting, we have an exciting technical program as well as plenty of opportunities for networking with colleagues via an online platform.

This year, we received submissions of 105 abstracts and 76 draft full papers. After a rigorous peer review of the submitted draft papers, 61 are included in the final program. The 61 papers are organized into 10 sessions distributed over three days. Under the virtual format, videos of the presentation will be played in two parallel tracks, followed by in-depth single-track discussions—a tradition of the Bath Symposium.

On Wednesday, the second day of the conference, we will have the Koski Lecture, presented by Professor Huayong Yang from Zhejiang University (the 2021 Koski Medal awardee). Although we cannot have the usual events of meeting colleagues over banquets and meals as in an in-person conference, we have allotted plenty of networking breaks during which attendees can socialize with each other virtually.

Many individuals and organizations have generously given their time and effort to make the 2021 ASME/Bath Symposium a success. I am grateful to Nigel Johnston and Jim Van de Ven, past conference chairs for helping me with the planning, members of the International Program Committee, members of the Editorial Board, session chairs, and numerous anonymous reviewers. I also would like to thank the staff of ASME, especially Mary Jakubowski and Lori Lee, for helping us navigate the nuances of organizing a virtual ASME conference.

Again, welcome, and thank you for your participation in this FPMC 2021. I am confident that you will find the conference enjoyable and technically rewarding!

Sincerely,

Perry Y. Li
General Chair, University of Minnesota

GENERAL INFORMATION

The Fluid Power Systems & Technology Division (FPST) of the American Society of Mechanical Engineers (ASME) and The University of Bath Centre for Power Transmission and Motion Control (PTMC) have jointly organized this international symposium on fluid power and motion control. The Symposium will be of great interest and value to all practitioners and researchers in the fluid power, power transmission, and motion control community. The symposium includes technical presentations, discussions, and a keynote speech given by the 2021 recipient of the prestigious Robert E. Koski Medal, Dr. Huayong Yang from Zhejiang University in China.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASME strategy is designed to meet our commitment to serving societal needs; ASME positively impacts the safety, public welfare, and overall quality of life globally. We strive to deliver innovative products and services to our members, the engineering community, and society.

Mission: Advancing engineering for the benefit of humanity
Vision: The premier resource for the engineering community globally.

CONFERENCE TOPICS:

- Modeling and Design of Fluid Power Components and Systems
- Control Methodologies for Fluid Power Systems/Applications
- Novel Energy-Efficient Components and Systems
- Novel Fluid Power Configurations
- Digital and Switched Fluid Power Systems
- Fluid Power Drives and Transmissions
- Safety, Reliability, Fault Analysis, and Diagnosis
- Noise and Vibration
- Fluid Power in Renewable Energy, Robotics, and Other Applications
- Human Scale and Mobile Self-Powered Fluid Power
- Environmental Aspects of Fluid Power
- Hydraulic Fluids, Materials, and Tribology
- Water Hydraulics
- Other Related Topics

KOSKI AWARD

Join us on Wednesday, October 21 from 2:00PM to 2:15PM where we will honor and present the Robert E. Koski Medal to Dr. Huayong Yang. The Robert E. Koski Medal recognizes individuals who have advanced the art and practice of fluid power motion and control through education and/or innovation.

Registration Fees: All conference participants must register and pay the advertised fee, including authors, presenters, chairs, co-chairs, session and discussion chairs, sponsors, and general attendees**. At least one author needs to register at the full conference rate, not the student rate!**

Payment Method: Individuals with incomplete registrations will not be able to attend the conference until payment has been made and registration is completed. ASME accepts VISA, MasterCard, American Express, and Discover as well as wire transfers. Non-member fees include a one-year complimentary membership to ASME.

Registration Includes: OnDemand access to the virtual platform for 90 days after the conference, online access to all technical presentations, pre-recorded technical presentations, and the live Koski Lecture by Dr. Haoyong Yang (recorded and posted after the conference), and digital access to all online papers as well as the official conference proceedings.

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Presenter Substitution: Each abstract/paper has a primary author identified who is responsible to present the abstract/paper at the conference. Should the primary author not be available to present the paper, a co-author may be nominated to present the paper as a substitution. Any proposed substitution must be approved one week in advance by ASME Publications, and the Event Management staff must be notified one week in advance of the presentation.

Refunds/Cancellation Fee: There will be no refunds for ASME Virtual Conference Registration.

Registration Substitutions: Registrations may not be transferred or substituted at any time.

CONFERENCE PROCEEDINGS

Each attendee receives an email with a unique code to access the papers online. Check your spam folder if you have not received an email shortly before the conference. The official conference archival proceedings will be published after the conference and will not include accepted papers that were not presented at the conference. The official conference proceedings are registered with the Library of Congress and are submitted for abstracting and indexing. The proceedings are published on the ASME Digital Library. You will be provided with an individual link to the online papers via email. In the event you do not receive the email, send a request to toolboxhelp@asme.org.

PRESENTER ATTENDANCE POLICY

According to ASME's Presenter Attendance Policy, if a paper is not presented at the conference, the paper will not be published in the official Archival Proceedings, which are registered with the Library of Congress and are abstracted and indexed. The paper also will not be published in the ASME Digital Collection and may not be cited as a published paper.

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TAX DEDUCTIBILITY

The expense of attending a professional meeting, such as registration fees and costs of technical publications, are tax deductible as ordinary and necessary business expenses for U.S. citizens. However, recent changes in the tax code have affected the level of deductibility.

MEMBERSHIP

It is easy to apply, and the benefits include the fellowship and recognition from being associated with one of the largest engineering societies in the world. ASME members and student members, and members from select countries can receive a discount on their conference registration. You can apply for ASME membership by registering online. Alternatively, you can call 1-800-THE-ASME (800-843-2763) or outside North America 973-882-1170 and ASME will mail you an application, or you can follow this link: https://www.asme.org/membership/membership-benefits to obtain an application.

PUBLICATION SALES

All FPMC Technical Papers are available electronically to registered attendees only. Attendees will receive electronic access via their email on record. Additional copies of the proceedings can be ordered from: **ASME Order Department, 150 Clove Road, 6th Fl, Little Falls, NJ 07424-2139**

HAVE QUESTIONS ABOUT THE MEETING?

If you have any questions or need assistance, please contact Mary Jakubowski, Manager, Events Management at jakubowskim@asme.org

Robert E. Koski Medal

Established in 2007, the Robert E. Koski Medal recognizes individuals who have advanced the art and practice of fluid power motion and control through education and/or innovation.

The Medal was established by the Fluid Power Systems and Technology Division to honor Robert E. Koski's contributions to the field of Design Engineering and Dynamic Systems and Control.

ROBERT E. KOSKI MEDAL RECIPIENTS

2007	Wolfgang Backe
2008	Clifford R. Burrows
2009	Jan Ove Palmberg
2010	Yongxiang Lu
2011	Richard T. Burton
2012	Siegfried Helduser
2013	Wayne J. Book
2014	Hubertus J. Murrenhoff
2015	Monika Ivantysynova
2016	Kim A. Stelson
2017	Werner Dieter
2018	Luca G. Zarotti
2019	Peter A.J. Achten
2020	Shinichi Yokota
2021	Huayong Yang

2021 Koski Lecture

Wednesday, October 20, 2021, 9:00AM–10:00AM EDT

Professor Huayong Yang
Development of Intelligent Tunnel Boring Machine

Prof. Huayong Yang received his B.Sc. from Huazhong University of Science and Technology, China in 1982 and Ph.D. degree from University of Bath in 1988. He has been with Zhejiang University since 1989 and was made a full professor in 1996. He is currently the head of the School of Mechanical Engineering at Zhejiang University. He is a member of the Chinese Academy of Engineering. He was awarded the Joseph Bramah Medal in 2017 and is a member in the board of directors in the Global Fluid Power Society (GFPS) since 2018. Prof. Huayong Yang holds more than 200 invention patents published and authored over 500 peer-reviewed journal papers. His research interests are in motion control and energy saving of mechatronic systems, development of fluid power component and system, integration of electro-hydraulic system and engineering applications, 3D bioprinting machine and biofabrication applications. Prof. Huayong Yang has been named the recipient of the 2021 Robert E. Koski Medal from the American Society of Mechanical Engineers (ASME).

Abstract: The key technology in tunnel boring machines in China has experienced significant progress in recent years, some of which are leading the world. Intelligent tunnel boring machine, based on automation, unmanned, and intelligence, is the future trend of tunning boring technology. It can realize the safety, adaption, and coordination of the tunnel boring process. The presentation focuses on four aspects, including intelligent design, intelligent perception, intelligent manipulation, and intelligent maintenance. A recent development and outlook on the key technology of the intelligent tunnel boring machine is also discussed.

TECHNICAL SESSIONS

TUESDAY, OCTOBER 19, 2021

Control 1
10/19/2021
9:10AM–10:25AM - Room 1

Chair: ***Kazushi Sanada, Yokohama University***

Noise Attenuation in a Secondary Controlled Electro-Hydraulic Actuator Using an Extended Kalman Filter
Technical Paper Publication: FPMC 2021-68658
Niklas Simonsen - Aalborg University
Emil Munk Sørensen - Aalborg University
Mikkel van Binsbergen-Galán - Aalborg University
Stine Flindt Hornemann Kleine - Aalborg University
Mikkel Hvid Nielsen - Aalborg University
Lasse Schmidt - Aalborg University

Model-Based Control of a Mobile Platform With Independently Controlled In-Wheel Hydraulic Motors
Technical Paper Publication: FPMC 2021-66665
Lionel Hulttinen - Tampere University
Jouni Mattila - Tampere University

Design and Efficiency Analysis of Closed Loop Pump Controlled Circuit Hydraulic Lifting System of Wheel Loaders Based on Gravity Self-Balancing Hydraulic Cylinder
Technical Paper Publication: FPMC 2021-68861
Xiangyu Wang - Taiyuan University of Technology
Hongjuan Zhang - Key Lab of Advanced Transducers and Intelligent Control System of Ministry of Education
Xiaogang Zhang - Taiyuan University of Technology
Long Quan - Key Lab of Advanced Transducers and Intelligent Control System of Ministry of Education

Real-Time Flow Optimization of Hydraulic Manipulator with One Degree of Redundancy Considering Joint Limit Constraint
Technical Paper Publication: FPMC 2021-70293
Linan Li - Chongqing University
Min Cheng - Chongqing University
Ruqi Ding - East China Jiaotong University
Junhui Zhang - Zhejiang University
Bing Xu - Zhejiang University

Using Extremum Seeking Control to Improve the Power Capture of Midsize Hydrostatic Wind Turbines
Technical Paper Publication: FPMC 2021-68058
Daniel Escobar-Naranjo - University of Minnesota
Biswaranjan Mohanty - University of Minnesota
Kim A. Stelson - University of Minnesota

Analysis of Pressure Response Characteristics and Influencing Factors of the Automatic Pressure Regulating Valve in Electronic-Controlled Pneumatic Braking System of Commercial Vehicle
Technical Paper Publication: FPMC 2021-68263
Hanwei Bao - Wuhan University of Technology
Zaiyu Wang - Wuhan University of Technology
Xiaoxu Wei - Wuhan University of Technology
Gangyan Li - Wuhan University of Technology

Digital Fluid Power
10/19/2021
9:10AM–10:25AM - Room 2

Chair: ***Min Pan - University of Bath***

A Novel Design Concept of Digital Hydraulic Drive for Knee Exoskeleton
Technical Paper Publication: FPMC 2021-68590
Rituraj Rituraj - Johannes Kepler University
Rudolf Scheidl - Johannes Kepler University
Peter Ladner - Linz Center of Mechatronics GmbH
Martin Lauber - Linz Center of Mechatronics GmbH

Hydraulic Control of a Buck Converter
Technical Paper Publication: FPMC 2021-68682
Rudolf Scheidl - Johannes Kepler University

Modeling and Analysis of a Digital Hydraulic Actuator for Flight Control Surfaces
Technical Paper Publication: FPMC 2021-68923
R.S. Lopes Jr. - LASHIP - UFSC
M.P. Nostrani - LASHIP - UFSC
L.A. Carvalho - LASHIP - UFSC
A. Dell'Amico - FLUMES - LiU and SAAB AB
P. Krus - FLUMES - LiU
V.J. De Negri - LASHIP - UFSC

Investigating the Influence of Design Parameters on the Fluid-Structure Interaction in Fast Switching Valves
Technical Paper Publication: FPMC 2021-70569
Henrik C. Pedersen - Aalborg University
Torben O. Andersen - Aalborg University
Niels C. Bender - R&D A/S
Incorporating Valve Switching Losses Into a Static Optimal Control Algorithm for the Hybrid Hydraulic-Electric Architecture (HHEA)
Technical Paper Publication: FPMC 2021-69045
Aditya Khandekar - University of Minnesota
Jackson Wills - University of Minnesota
Meng (Rachel) Wang - Eaton Corporation
Perry Y. Li - University of Minnesota

Efficient Control of a Switched Inertance Hydraulic Converter With a Time-Varying Load
Technical Paper Publication: FPMC 2021-68832
Chenggang Yuan - University of Bath
Andrew Plummer - University of Bath
Min Pan - University of Bath

Components 1
10/19/2021
11:45AM–1:00PM - Room 1

Chair: Lizhi Shang, Purdue University

Experimental Validation of Subsystem Models for a Novel Variable Displacement Hydraulic Motor
Technical Paper Publication: FPMC 2021-68604
Jacob Larson - University of Minnesota
Jonatan Pozo-Palacios - University of Minnesota
Grey Boyce-Erickson - University of Minnesota
Nathan Fulbright - University of Minnesota
Jaichen Dai - University of Minnesota
John Voth - University of Minnesota
Ninaad Gajghate - Milwaukee School of Engineering
Jordan Saikia - Milwaukee School of Engineering
Paul Michael - Milwaukee School of Engineering
Thomas Chase - University of Minnesota
James Van de Ven - University of Minnesota

The Effect of Slotted Hole on Minimum Oil Film Thickness of Piston of Radial Piston Hydraulic Motor
Technical Paper Publication: FPMC 2021-69937
Xiaolong Zhang - Zhejiang University
Junhui Zhang - Zhejiang University
Bing Xu - Zhejiang University
Zhixian Yang - Zhejiang University
Qi Zhao - Zhejiang University
Hongjuan Zhang - STF Hydraulic Transmissions Co., Ltd.

Dynamic Modeling and Design of a Radial Hydrostatic Piston Pump for Integrated Pump-Motor
Technical Paper Publication: FPMC 2021-68788
Md. Minal Nahin - University of Minnesota
Garrett R. Bohach - University of Minnesota
F.N.U. Nishanth - University of Wisconsin-Madison
Eric L. Severson - University of Wisconsin-Madison
James D. Van de Ven - University of Minnesota

Modelling of the Cross Angle and its Impact on Pump Performance
Technical Paper Publication: FPMC 2021-67416
Andris Rambaks - RWTH-Aachen University
Katharina Schmitz - RWTH-Aachen University

Exhaustive Regressor Search (XRS) for Creating Models of Hydraulic Pumps and Motors
Technical Paper Publication: FPMC 2021-70568
Jack Johnson - IDAS Electrohydraulics
John Montague - Bosch-Rexroth Group
Jose Garcia-Bravo - Purdue University

Commutation Loss in Hydrostatic Pumps and Motors
Technical Paper Publication: FPMC 2021-68277
Robin Mommers - Innas, BV
Peter Achten - Innas, BV
Jasper Achten - Innas, BV
Jeroen Potma - Innas, BV

Modeling and Simulation
10/19/2021
11:45AM–1:00PM - Room 2

Chair: ***Travis Wiens - University of Saskatchewan***

Model Updating of a Hydraulic Chain Oscillator
Technical Paper Publication: FPMC 2021-68690
Paul Treml - Johannes Kepler Universität
Gudrun Mikota - Johannes Kepler Universität
Bernhard Manhartsgruber - Johannes Kepler Universität

Consideration of Air Bubble Dynamics in 1D Hydraulic Pipeline Simulation: Source Term Development and Verification Utilizing Transmission Line Theory
Technical Paper Publication: FPMC 2021-66944
Fabian Guse - Institute for Fluid Power Drives and Systems
Enrico Pasquini - FLUIDON, GmbH
Katharina Schmitz - Institute for Fluid Power Drives and Systems

Prediction of Flow Path Pressure Drops in Curved Galleries for Additively Manufactured Hydraulic Manifolds
Technical Paper Publication: FPMC 2021-68676
L.D. Hashan Peiris - University of Bath
Andrew Plummer - University of Bath
Jens Roesner - University of Bath
Vimal Dhokia - University of Bath
Wesley Essink - Gen3D

Pressure Loss and Multi-Objective Optimization of Three-Way Spatial Flow Channel Based on Additive Manufacturing
Technical Paper Publication: FPMC 2021-69927
Jing Yao - Yanshan University
Yiman Duan - Yanshan University
Yingzhe Song - Yanshan University
Hao Zhang - Yanshan University
Mandi Li - Yanshan University
Jianqi Zhang - Yanshan University

Real-Time Simulation of Fluid Power Systems
Technical Paper Publication: FPMC 2021-70304
Matthias Liermann - Danfoss Power Solutions
Christian Feller - Danfoss Power Solutions
Florian Lindinger - Danfoss Power Solutions

Double-Input Multi-Output Pressure Control System Based on Addressable Pressure Component
Technical Paper Publication: FPMC 2021-68817
Qiandiao Wei - Harbin Engineering University
He Xu - Harbin Engineering University
Siqing Chen - Harbin Engineering University
Weiwang Fan - Harbin Engineering University

WEDNESDAY, OCTOBER 20, 2021

Control 2
10/20/2021
10:30AM–11:45AM - Room 1

Chair: ***Eric Barth, Vanderbilt University***

Composite Adaptive Dynamic Surface Control for a Multi-DOF Hydraulic Manipulator With Disturbance Observer
Technical Paper Publication: FPMC 2021-68665
Xiaofu Zhang - Shanghai Jiao Tong University
Guanglin Shi - Shanghai Jiao Tong University

Gain-Scheduled Position Control of a Pneumatic Muscle Actuator
Technical Paper Publication: FPMC 2021-69433
Matt Cotton - University of Bath
Andrew Plummer - University of Bath

HIL Testbed and Motion Control Strategy for the Hybrid Hydraulic-Electric Architecture (HHEA)
Technical Paper Publication: FPMC 2021-68888
Arpan Chatterjee - University of Minnesota
Perry Y. Li - University of Minnesota

Leveraging Flow Regeneration in Individual Energy-Efficient Hydraulic Drives
Technical Paper Publication: FPMC 2021-68594
Damiano Padovani - University of Agder

Blade Control for Surface Profile Tracking by Heavy-Duty Bulldozers
Technical Paper Publication: FPMC 2021-68656
Teemu Mononen - Tampere University
Jouni Mattila - Tampere University
Antti Kolu - Novatron Oy

Nonlinear Cutterhead Pose Control of Large-Diameter Slurry Shields in Complicated Stratum
Technical Paper Publication: FPMC 2021-68920
Hangjun Zhang - Zhejiang University
Jianhua Wei - Zhejiang University
Jinhui Fang - Zhejiang University
Yuzhu Yang - Zhejiang University

Design and Analysis
10/20/2021
10:30AM–11:45AM - Room 2

Chair: ***Matthias Liermann, Danfoss Power Solutions***

Comparative Analysis of Actuator Dimensioning Methods in Pneumatics
Technical Paper Publication: FPMC 2021-68674
Vladimir Boyko - Technische Universität Dresden
Steffen Hülsmann - Festo SE & Co. KG
Jürgen Weber - Technische Universität Dresden

Sizing Directional Pneumatic Valves Based on the Characteristic Dynamic Behavior of Linear Actuators
Technical Paper Publication: FPMC 2021-68837
Vinícius Vigolo - Federal University of Santa Catarina
Antonio Carlos Valdiero - Federal University of Santa Catarina
Victor Juliano De Negri - Federal University of Santa Catarina

Machine Learning Prediction of Journal Bearing Pressure Distributions, Considering Elastic Deformation and Cavitation
Technical Paper Publication: FPMC 2021-68483
Nathan Hess - Purdue University
Lizhi Shang - Purdue University

Towards a Standard Taxonomy for Levels of Automation in Heavy-Duty Mobile Machinery
Technical Paper Publication: FPMC 2021-70251
Tyrone Machado - Tampere University
Andrei Ahonen - Tampere University
Reza Ghabcheloo - Tampere University

Novel Methods and Technologies for Assessing Usability of Off-Road Machines in R&D Phase: The Lutergo Laboratory
Technical Paper Publication: FPMC 2021-68979
Victor Zhidchenko - LUT University
Amin Hekmatmanesh - LUT University
Heikki Handroos - LUT University
Asko Kilpeläinen - LAB University of Applied Sciences
Kari Kauranen - LAB University of Applied Sciences

ASME FPMC 2021

Meaningful and Physically Consistent Efficiency Definition for Positive Displacement Pumps: Continuation of the Critical Review of ISO 4391 and ISO 4409

Technical Paper Publication: FPMC 2021-68739

Christian Schänzle - Technische Universität Darmstadt
Peter F. Pelz - Technische Universität Darmstadt

THURSDAY, OCTOBER 21, 2021

Renewable Energy and Other Applications
10/21/2021
9:00AM–10:25PM - Room 1

Chair: ***Andrew Plummer – University of Bath***

Dynamical Characteristics of a Hydraulic Soft Actuator With Three Degrees of Freedom
Technical Paper Publication: FPMC 2021-68734
Qing Xie - Zhejiang University
Tao Wang - Zhejiang University
Shiqiang Zhu - Zhejiang University

Hydraulic Test Stand to Model Circulatory System Dynamics for Artificial Heart Evaluation
Technical Paper Publication: FPMC 2021-69806
Joseph T. Howard - Vanderbilt University
Seth Thomas - Vanderbilt University
James C. Gallentine - Vanderbilt University
Eric J. Barth - Vanderbilt University

Numerical Study of a Weight-Adjustable Buoy for Efficient Wave Energy Conversion
Technical Paper Publication: FPMC 2021-68884
Hao Tian - Dalian Maritime University
Boyang Zhou - Dalian Maritime University
Zengmeng Zhang - Dalian Maritime University
Yongjun Gong - Dalian Maritime University

Pipeline Model Fidelity for Wave Energy System Models
Technical Paper Publication: FPMC 2021-68484
Jeremy W. Simmons II - University of Minnesota
James D. Van de Ven - University of Minnesota

A Power Take-Off (PTO) for Wave Energy Converters Based on the Hybrid Hydraulic-Electric Architecture (HHEA)
Technical Paper Publication: FPMC 2021-68871
Jackson Wills - University of Minnesota
Adam Keester - Sandia National Lab
Perry Y. Li - University of Minnesota

Experimentation on a Hydraulic Energy Storage System for Mid-Size Wind Turbines
Technical Paper Publication: FPMC 2021-68813
Eric Mohr - University of Minnesota
Biswaranjan Mohanty - University of Minnesota
Daniel Escobar-Naranjo - University of Minnesota
Kim Stelson - University of Minnesota

Fault Detection and Diagnostics
10/21/2021
9:00AM–10:25PM - Room 2

Chair: ***Saeid Habibi - McMaster University***

Using Dynamic Pressure Response for Erosion Detection in Hydraulic Tubes and Hoses
Technical Paper Publication: FPMC 2021-70511
Elnaz Etminan - University of Saskatchewan
Mahdiyar Molahasani - University of Saskatchewan
Seokbum Ko - University of Saskatchewan
Travis Wiens - University of Saskatchewan

Measurement of Step Responses of Flowrate in a Pipe Using a Kalman-Filtering Laminar Flowmeter
Technical Paper Publication: FPMC 2021-68858
Kazushi Sanada - Yokohama National University

Characterization of Solenoid On-Off Valve Faults: A Faster Analytical Modeling Approach
Technical Paper Publication: FPMC 2021-69415
Hao Tian - Dalian Maritime University
Sichen Li - Dalian Maritime University
Jianbo Liu - Dalian Maritime University
Jiaoyi Hou - Dalian Maritime University
Yongjun Gong - Dalian Maritime University

A Simulation Survey on the Effects of Progressing Faults Within the SCAS of a Flight Control Actuator for Helicopters
Technical Paper Publication: FPMC 2021-69755
Andrea De Martin - Politecnico di Torino
Giovanni Jacazio - Politecnico di Torino
Massimo Sorli - Politecnico di Torino
Giuseppe Vitrani - Politecnico di Torino

Investigating the Condition Monitoring Potential of Oil Conductivity for Wear Identification in Electro Hydrostatic Actuators
Technical Paper Publication: FPMC 2021-68818
Yannick Duensing - Institute for Fluid Power Drives and Systems
Katharina Schmitz - Institute for Fluid Power Drives and Systems
Oliver Richert - Institut for Fluid Power Drives and Systems

AI-Based Condition Monitoring of Hydraulic Valves in Zonal Hydraulics Using Simulated Electric Motor Signals
Technical Paper Publication: FPMC 2021-68615
Abid Abdul Azeez - Tampere University
Xu Han - Tampere University
Viacheslav Zakharov - Tampere University
Tatiana Minav - Tampere University

A Model-Based FDD Approach for an EHA Using Updated Interactive Multiple Model SVSF
Technical Paper Publication: FPMC 2021-68065
Ahsan Saeedzadeh - McMaster University
Saeid Habibi - McMaster University
Marjan Alavi - McMaster University

Components 2
10/21/2021
11:45AM–1:00PM - Room 1

Chair: ***Songjing Li, Harbin Institute of Technology***

An Analysis of the Effects Causing an Asymmetric Behavior of the Lateral Lubricating Films of External Spur Gear Machines
Technical Paper Publication: FPMC 2021-68605
Kaeul Lim - Purdue University
Federico Zappaterra - Purdue University
Swarnava Mukherjee - Purdue University
Andrea Vacca - Purdue University

A Novel Positive Displacement Axial Piston Machine With Bent Cylinder Sleeves
Technical Paper Publication: FPMC 2021-68694
Swarnava Mukherjee - Purdue University
Antonio Masia - Purdue University
Mark Bronson - Bronson and Bratton, Inc.
Lizhi Shang - Purdue University
Andrea Vacca - Purdue University

Development of Glycerin/Chitosan-Based Fluids for Stationary and Mobile Hydraulic Drives
Technical Paper Publication: FPMC 2021-68089
Malte Otten - Technische Universität Braunschweig
Deniz Bulutcu - Technische Universität Braunschweig
Ludger Frerichs - Technische Universität Braunschweig

Analysis of Cavitation Characteristics of High Temperature Fuel Piston Pump in the Process of Suction and Discharge
Technical Paper Publication: FPMC 2021-68735
Tianzhao Wang - Zhejiang University
Hongyi Jiao - Liyuan Hydraulic Co. Ltd., AVIC
Xingjia Ma - Liyuan Hydraulic Co. Ltd., AVIC
Xiaoping Ouyang - Zhejiang University
Heran Zhang - Zhejiang University

Design and Analysis of a Flow-Control Valve With Controllable Pressure Compensation Capability for Mobile Machinery
Technical Paper Publication: FPMC 2021-68806
Wang Bo - Taiyuan University of Technology
Li Yunwei - Taiyuan University of Technology
Quan Long - Taiyuan University of Technology
Xia Lianpeng - Taiyuan University of Technology

'Shuttle' Technology for Noise Reduction and Efficiency Improvement of Hydrostatic Machines: Part 2
Technical Paper Publication: FPMC 2021-67874
Robin Mommers - Innas, BV
Peter Achten - Innas, BV

Power Transmission
10/21/2021
11:45AM–1:00PM - Room 2

Chair: ***Victor J. De Negri - Federal University of Santa Catarina***

Simulated and Experimental Analysis of a Log Crane With Conventional and Direct Driven Hydraulics
Technical Paper Publication: FPMC 2021-68939
Dmitrii Shevchuk - Lappeenranta-Lahti University of Technology
Iuliia Malysheva - Lappeenranta-Lahti University of Technology
Marjan Alizadeh - Lappeenranta-Lahti University of Technology
Heikki Handroos - Lappeenranta-Lahti University of Technology

Experimental Study on Energy Efficiency of Two-Cylinder Direct Driven Hydraulic System in a Large-Scale Test Bench
Technical Paper Publication: FPMC 2021-68797
Robert Hermansson - Aalto University
Ville Närvänen - Aalto University - Department of Mechanical Engineering
Jyrki Kajaste - Aalto University
Olof Calonius - Aalto University
Matti Pietola - Aalto University - Department of Mechanical Engineering
Petri Kuosmanen - Aalto University

Improving the Efficiency of a Compact Inline Hydro-Mechanical Transmission (i-HMT) at Lock-Up
Technical Paper Publication: FPMC 2021-68843
Johnathan (Hans) Barkei - University of Minnesota
Perry Y. Li - University of Minnesota

Modeling Hybrid Hydro-Electro-Mechanical Power-Split Propulsion Systems
Technical Paper Publication: FPMC 2021-69056
John R. Haughery - Millersville University
Brian L. Steward - Iowa State University
Saxon J. Ryan - Iowa State University
R. Gallolu Kankanamalage - Iowa State University

Investigating the Filtration Characteristics of Direct Driven Hydraulics
Technical Paper Publication: FPMC 2021-70614
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Technical Paper Publication: FPMC 2021-69399
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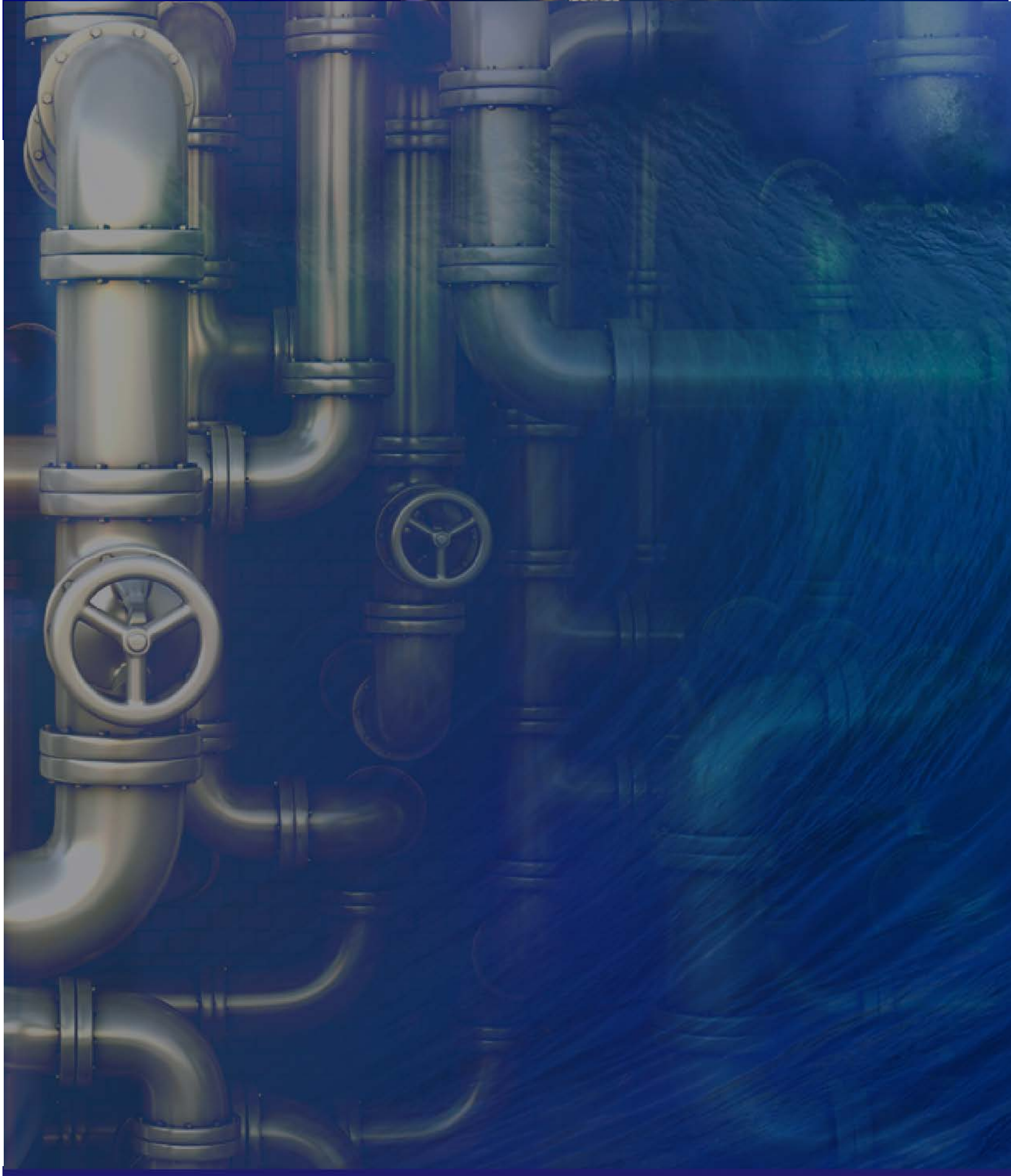

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