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## Special Issue SICFP 2023

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Welcome to the special issue of the Journal of the International Fluid Power. Most of the papers included here are extended versions of ones presented at the **Scandinavian International Conference on Fluid Power (SICFP)** conference (Tampere, Finland, 30 May–1 June 2023).

In recent years SICFP has broadened its focus from “traditional” fluid power engineering to include automation, sustainability, and lately machine learning. Fluid power is in an exciting stage of transformation, from perspective of digitalization, intelligence, automation, and sustainability point of view. Papers now range from scientific theoretical and mathematical to engineering applications and system design. The contents of this special issue mirror this trend.

New computational methodologies are introduced in “A STUDY ON DESIGN METHODOLOGIES FOR COMPACT ELECTRIC MACHINES USED IN ELECTRIFIED MOBILE HYDRAULICS”. The paper concentrates on operational sizing strategies based on corner point operation, flux weakening and transient operation for electrification of off-road machinery.

Improving efficiency and redundancy according to functional safety and safety integrity level was proposed in paper entitled “ENERGY EFFICIENT AND REDUNDANT STEER-BY-WIRE FOR ARTICULATED NON-ROAD MOBILE MACHINES”. The proposed electro-hydrostatic steering system is compared to the traditional steering of a wheel loader in the digital twin environment and has been found to be substantially more energy efficient.

Enhance the energy utilization in hydraulic actuators was proposed in “DYNAMIC RESPONSE ANALYSIS OF THE MAIN PLUNGER IN A TWO-STAGE ON/OFF POPPET VALVE FOR THE DIGITAL HYDRAULICS FIELD”. The findings indicated that the pilot plunger dynamics are crucial determinants of the valve response time and future component development.

Finally, evaluation of “PUMP-CONTROLLED THREE-CHAMBER CYLINDER SYSTEM FOR HYDRAULIC BOOM WITH FEED-FORWARD LADRC” was presented for excavator applications. The results demonstrated benefits of direct motor control systems for differential cylinder actuator such as energy-saving in addition to good stability, fast response, and high position control accuracy.

The diversity of SICFP conferences and their inclusiveness foster crosstalk between academy and industry, and in the broader engineering community to create an environment that generates new ideas and collaborations. We hope that this special issue will encourage you, the reader, to contribute your own results to future of fluid power and automation in off-road machinery and publish them in the coming SICFP2027 or special issues such as this.

**Prof. Tatiana Minav, and Dr. Mikko Huova, editors.**  
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