

Contents

Preface	ix
<u>Systems and Control</u>	
A high performance force control system for dynamic loading of fast moving actuators <i>G Jacazio and G Balossini</i>	3
Knowledge based tools for the design of servo-hydraulic closed loop control <i>M Liermann and H Murrenhoff</i>	17
Low-order robust controller for flexible hydraulic manipulators <i>M Linjama and T Virvalo</i>	29
Hybrid control with on/off electropneumatic standard valve for tracking positioning <i>X Legrand, M Smaoui, X Brun, D Thomasset, J-M Retif and X-F Lin Shi</i>	45
Comparing different control strategies of timber sawing process <i>T Virvalo and J Inberg</i>	59
Closed-loop velocity control for an electrohydraulic impact test system <i>A R Plummer</i>	75
Pressure peak phenomenon in digital hydraulic systems – a theoretical study <i>A Laamanen, M Linjama and M Vilenius</i>	91
<u>Water Hydraulic Systems</u>	
Control of water hydraulic manipulator with proportional valves <i>H Sairiala, K T Koskinen and M Vilenius</i>	107
Development of a novel water hydraulic vane actuator applied for control of a two-links test manipulator <i>F Conrad and F Roli</i>	117
<u>Fault Analysis and Diagnosis</u>	
Analysis of fault tolerance of digital hydraulic valve system <i>L Siivonen, M Linjama and M Vilenius</i>	133
Experiences on combining fault tree analysis and failure mode, effects and criticality analysis for fault diagnosis of hydrostatic transmission <i>H Rusanen, T Koivula and J Rininen</i>	147

System Modelling and Simulation

- Model identification of the electrohydraulic actuator for small signal inputs 163
E Sampson, S Habibi, Y Chinniah and R Burton
- An efficient numerical method for solving the dynamic equations of complex fluid power systems 179
S Esqué and A Ellman
- Dynamic modelling of a pilot-operated pressure relief valve 193
C Hös and L Kullmann

Component Design and Analysis

- A computer aided conceptual design method for hydraulic components 209
B Steiner and R Scheidl
- Determining the steady state flow forces in a rim spool valve using CFD analysis 223
N Okungbowa, D Bergstrom and R Burton
- Design of valve solenoids using the method of finite elements 243
A Schultz
- Virtual design of high dynamic pneumatic valves 255
M Fiedler, F Rüdiger and S Helduser

Smart fluids

- A micro artificial muscle actuator using electro-conjugate fluid 269
K Takemura, S Yokota and K Edamura
- A magneto-rheological valve-integrated cylinder and its application 277
K Yoshida, T Soga, S Yokota, M Kawachi and K Edamura
- Systematic experimental studies and computational perspectives of the non-linear squeeze mode behaviour of magneto-rheological fluids 291
N Gstöttenbauer, A Kainz, B Manhartsgruber and R Scheidl

Vehicle systems

- An adaptable hydraulic system for tractors 307
T Fedde, T Lang and H-H Harms
- Design of a hybrid vehicle powertrain using an inverse methodology 317
E Bideaux, J Laffite, A Derkaoui, W Marquis-Favre, S Scavarda, and F Guillemard
- CPS hybrid vehicle with flywheel for energy storage 333
S-K Lee, K Ichiryu, K Kawamura, S Ikeo, E Koyabu, K Ito and H Shimoyama

Pneumatics

- Bilateral control of multi DOFs forceps using a pneumatic servo system 351
K Kawashima, K Tadano and T Kagawa

Experimental identification and validation of a pneumatic positioning servo-system <i>M Sorli, S Pastorelli, G Figliolini and P Rea</i>	365
Performances of cam-follower systems with pneumatic return spring <i>S Pastorelli, A Almondo and M Sorli</i>	379
Motion simulator with 3 D.o.F pneumatically actuated <i>G Mattiazzo, S Pastorelli and M Sorli</i>	395
<u>Fluid Dynamics and Noise</u>	
Elucidation of the noise generating mechanism produced by a hydrodynamic source associated with cavitation in an oil hydraulic valve orifice <i>E Kojima, T Yamazaki, A Terada and K A Edge</i>	409
An experimental result on the measurement of concentrated flow resistances <i>B Manhartgruber</i>	427
The dynamics of hydraulic fluids – significance, differences and measuring <i>J-P Karjalainen, R Karjalainen, K Huhtala and M Vilenius</i>	437
Measurements of elastohydrodynamic pressure field in the gap between piston and cylinder <i>M Ivantysynova, C Huang and R Behr</i>	451
Authors' Index	467