



Overview of IPMC related papers published in summer of 2008

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Sissejuhatus | Ettekandest

- Suvi 2008
 - Juuni, juuli, august
- 10 publikatsiooni
 - IOP, ScienceDirect, IEEEXplore



Juuni (1/4)

Zheng Chen, Ki-Yong Kwon, Xiaobo Tan *Integrated IPMC/PVDF sensory actuator and its validation in feedback control*

Sensors and Actuators A: Physical, Volume 144, Issue 2, 15 June 2008, Pages 231-241

- Sensoriks PVDF, et määrata nii paindumist kui ka jõudu
- PVDF on IPMC mõlemal pinnal
- Tagasisidesüsteem, aga vähene liikumine (kuni 1 mm)

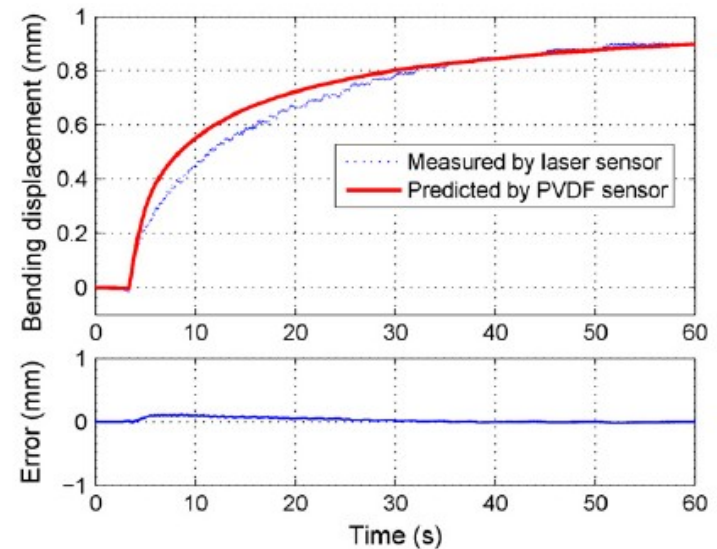


Fig. 12. Comparison between the bending displacements obtained from the PVDF sensor and from the laser sensor, when a 2 V step input is applied.



Juuni (2/4)

B. Andò, C. Bonomo, L. Fortuna, P. Giannone, S. Graziani, L. Sparti, S. Strazzeri *A bio-inspired device to detect equilibrium variations using IPMCs and ferrofluids*

Sensors and Actuators A: Physical, Volume 144, Issue 2, 15 June 2008, Pages 242-250

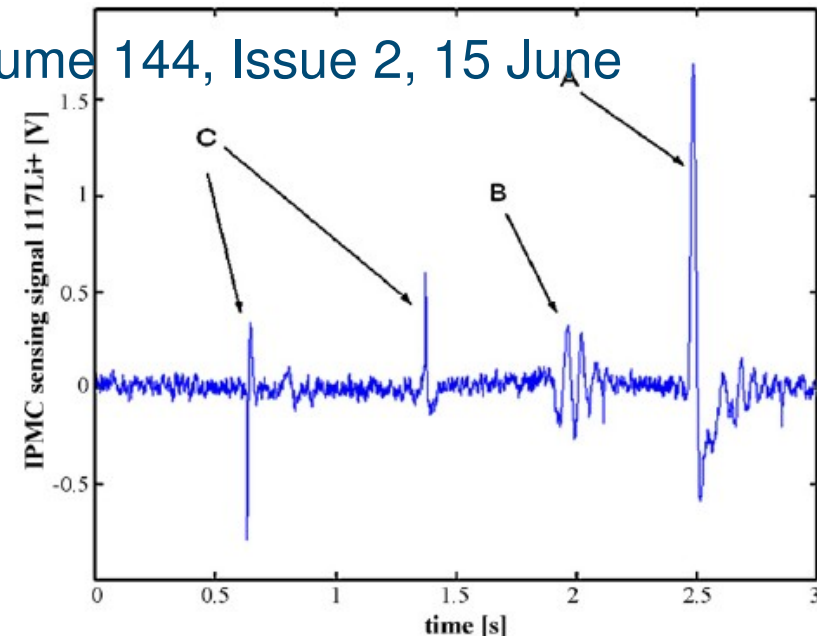
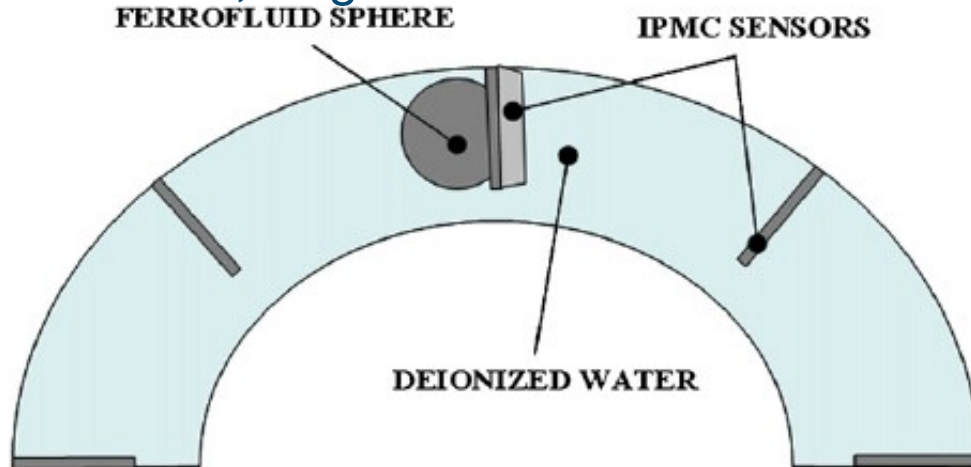


Fig. 8. Top view scheme of the realized system: the ferrofluid sphere moves in deionized water, following a circular trajectory given by a varying magnetic field. While moving, the sphere touches the IPMC sensors, which detect its position.

Fig. 14. IPMC sensing signal acquired for 3 s at a sample rate of 2048 samples per second before being triggered. Three kinds of peaks are highlighted: A, touching between the sphere and the IPMC; B, liquid movement and C, magnetic effects on the clip.



Juuni (3/4)

Sang-Mun Kim and Kwang J Kim ***Palladium buffer-layered high performance ionic polymer-metal composites***

Smart Mater. Struct. 17 No 3 (June 2008) 035011 (6pp)

- Polümeeri ja Pt vahele pannakse puhverkiht pallaadiumi (Pd)
- Pt/Pd IPMC pinnajuhtivus oli parem
- Sama pinge korral painutus suurem, suurem takistav (blocking) jõud, stabiilsem täitur
- Sensorpinge amplituud ca 2 korda suurem



Juuni (4/4)

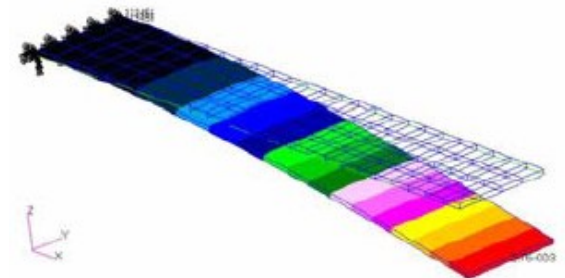
Xuan-Lun Wang, Il-Kwon Oh, Tai-Hong Cheng ***Mechanical model and analysis of ionic polymer metal composites biomimetic actuators***

Intelligent Control and Automation, 2008. WCICA 2008. 7th World Congress on 25-27 June 2008 Page(s):4751 - 4756

- FEA abil määratakse täituri tipu hälve materjali jäikuse järgi.

Maximum tip displacement of sSEBS actuator

	2V Direct Current Input
Simulation by FEA (mm)	2.75
Measurement by experiments (mm)	2.80
Relative error (%)	1.8





Juuli (1/3)

Zhen Chen; Lina Hao; Dingyu Xue; Xinhe Xu; Yanmei Liu *Modeling and control with hysteresis and creep of ionic polymer-metal composite (IPMC) actuators*

Control and Decision Conference, 2008. CCDC 2008. Chinese 2-4 July 2008 Page(s):865 - 870

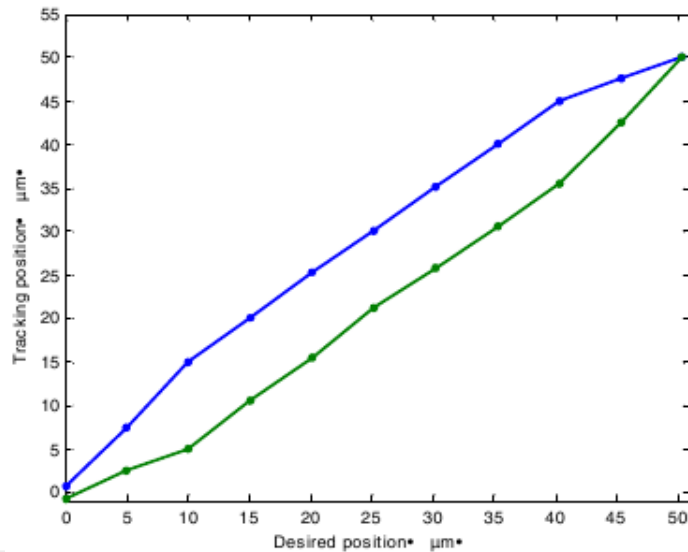


Fig 9. Control without any compensation.

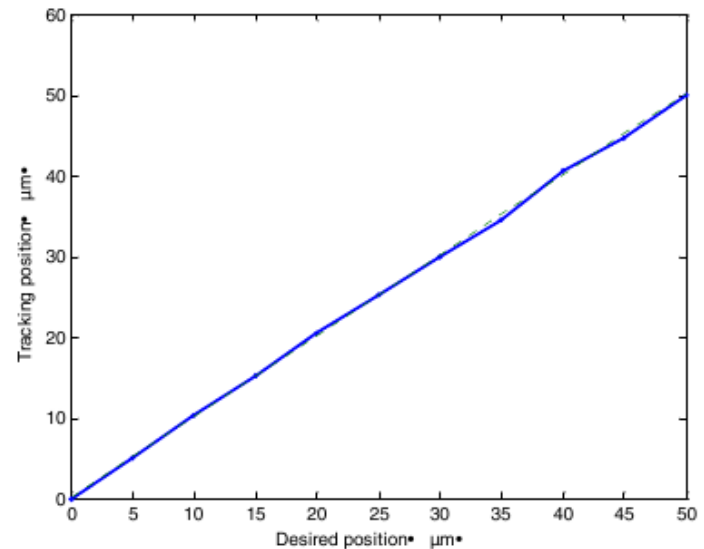


Fig 10. Control with hysteresis and creep compensated

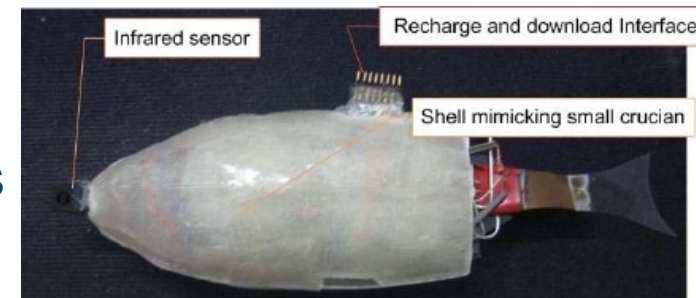


Juuli (2/3)

Xiufen Ye, Yudong Su, Shuxiang Guo, Liquan Wang ***Design and realization of a remote control centimeter-scale robotic fish***

Advanced Intelligent Mechatronics, 2008. AIM 2008. IEEE/ASME International Conference on 2-5 July 2008 Page(s):25 - 30

- Ilma tagasisideta IPMC-sabauimega kala. Kaugjuhitav.
- Võib kanda raskust 5.5 g
- Keerab paremale/vasakule ja sõidab otse
- Aku kestab kuni 15 min, kiirus kuni 24 mm/s





Juuli (3/3)

Abadi, S.; Dehghani, A.; Nelson, E.A. ***A soft sensing method for monitoring ambulatory activities of patients with venous ulceration***

Advances in Medical, Signal and Information Processing, 2008.

MEDSIP 2008. 4th IET International Conference on 14-16 July 2008

Page(s):1 - 4

- Tahavad mõõta inimese jalaliigutust, eelkõige hüppeliigest
- Katsetavad IPMC-d ja Flexpoint® painutusandurit
- Näevad, et IPMC registreerib paremini väikseid liigutusi ja Flexpoint suuri.



August (1/3)

J Brufau-Penella, K Tsiakmakis, T Laopoulos and M Puig-Vidal

Model reference adaptive control for an ionic polymer metal composite in underwater applications

Smart Mater. Struct. 17 No 4 (August 2008) 045020 (9pp)

- Simuleerivad kontrolli! Korrigeerivad eksperimenti simuleeritu abil.
- Saavad vea väikseks kuskil 30 ja enama sekundi jooksul
- Tipu hälve 0,2 mm; sagedused 1 Hz ja 0,5 Hz



August (2/3)

Giovanni Del Bufalo, Luca Placidi and Maurizio Porfiri ***A mixture theory framework for modeling the mechanical actuation of ionic polymer metal composites***

Smart Mater. Struct. 17 No 4 (August 2008) 045010 (14pp)

- Esitlevad 3-komponendilist mudelit deformatsiooni analüüsimiseks - *seguteooria*
- 3 liigi superpositsioon: polümeer, vedeliksolvent ja liikuvad ioonid
- IPMC riba tipu hälve on paraboolse seoses liigutava osa pikkusega

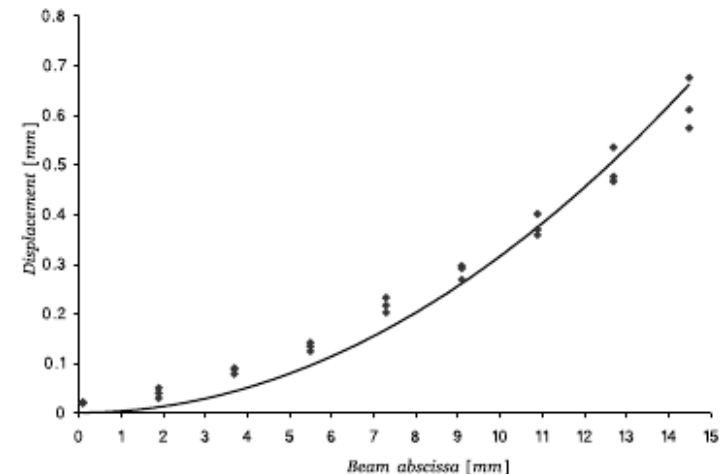


Figure 10. Transverse steady-state displacement of the IPMCs for a steady-state voltage of 1.3 V. Diamonds are experimental data, and the solid line is the theoretical prediction through (55).

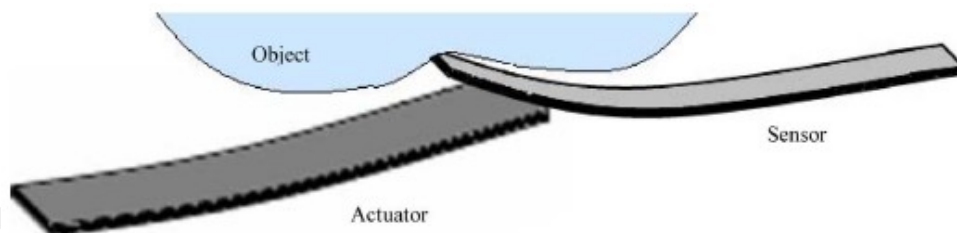


August (3/3)

Bonomo, C.; Brunetto, P.; Fortuna, L.; Giannone, P.; Graziani, S.; Strazzeri, S. ***A Tactile Sensor for Biomedical Applications Based on IPMCs***

Sensors Journal, IEEE Volume 8, Issue 8, Aug. 2008 Page(s):1486 - 1493

- Sondi prototüüp, mis on võimeline tuvastama takistuse ja määrama selle jäikust
- Aktuaator liigutab sensorit ning mõõdetakse sensori amplituudi.





Täna tähelepanu eest!

Kommentaari, küsimused?