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Final Program and Book of Abstracts

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An illustrative example is provided at the end.

Paper 240
12:00 - 13:00 Room Asamblea
Parallel Session 3 - Signal Processing, Sensors,
Systems Modeling and Control

ATMOSPHERE CONTROL BY CHEMORESISTIVE POLYMER COMPOSITES

Gita Sakale, Maris Knite, Marika Novada, Elina
Liepa, Santa Stepina and Velta Tupureina
Riga Technical University, Riga, Latvia

Keywords: Chemoresistive composite, Volatile
organic compounds, Carbon nanoparticles.

Abstract: This work reports about polymer-
nanostructured carbon composite (PNCC) and it
possible application for relative humidity registration
and volatile organic compound (VOC) detection
in the air. PNCC have been produced using high
structured carbon black (HSCB) nanoparticles
and polyisoprene (PI), ethylene-vinylacetate (EVA)
copolymer, polyvinylacetate (PVAc), polyethylene
glycol (PEG) and polyvinylalcohol (PVA). Matrix
material for composite production has been selected
with respect to desired analyte to be tested.
Composites show selective response to particular
species of analytes vapour. It has been found that
humidity sensing mechanism changes from proton
conductivity to electron tunnelling by addition of
HSCB to PVA matrix. Plasticizer effect on PVAc-NCC
ethanol vapour sensitivity has been evaluated.

Paper 5
12:00 - 13:00 Room Alegria 1
Special Session - Special Session on Artificial
Neural Networks and Intelligent Information
Processing

DEVELOPMENTAL PLASTICITY IN CARTESIAN GENETIC PROGRAMMING BASED NEURAL NETWORKS

Maryam Mahsal Khan, Gul Muhammad Khan
*University of Engineering and Technology, Peshawar,
Pakistan*

Julian F. Miller
University of York, York, U.K.

Keywords: Generative and developmental ap-
proaches, NeuroEvolutionary algorithms, Pole
balancing.

Abstract: This work presents a method for exploiting
developmental plasticity in Artificial Neural Networks
using Cartesian Genetic Programming. This is

inspired by developmental plasticity that exists in the
biological brain allowing it to adapt to a changing
environment. The network architecture used is that
of a static Cartesian Genetic Programming ANN,
which has recently been introduced. The network
is plastic in terms of its dynamic architecture,
connectivity, weights and functionality that can
change in response to the environmental signals.
The dynamic capabilities of the algorithm are tested
on a standard benchmark linear/non-linear control
problems (i.e. pole-balancing).

Paper 7
12:00 - 13:00 Room Alegria 1
Special Session - Special Session on Artificial
Neural Networks and Intelligent Information
Processing

INTERVAL TYPE-2 FUZZY CONTROLLER BASED ON SLIDING MODE CONTROL FOR ROBOT ARM DRIVEN BY ARTIFICIAL MUSCLES

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Tadjine²

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Keywords: Artificial muscles, Type-2 fuzzy logic,
Sliding mode control, Fuzzy sliding mode control.

Abstract: In this paper, we propose the application
of an Interval Type-2 Fuzzy Sliding Mode Controller
IT2FSMC for 2 degrees of freedom robot arm
actuated by pneumatic artificial muscles (PAM).
A robust IT2FL controller based on the Lyapunov
stability condition of sliding mode control SMC was
adopted. The objectives of the control are: (1) to
avoid the modelling problem in this type of robot,
(2) to attenuate the chattering effect of the SMC,
(3) to reduce the rules number of the fuzzy control,
(4) to guarantee the stability and the robustness of
the system and (5) to handle the uncertainties of
the system. First joints of robot are approximated
by adequately linear differential equations; next we
present the proposed IT2FSM approach of control.
In the last, this method has experimented and
compared to an interval type-2 fuzzy controller IT2FC
in order to demonstrate its effectiveness.