

## A4 Model-Based Process Optimisation and Control

Time: Tuesday, 14.09.2010, 11:20 a.m.

Location: Humboldt-Building, Lecture Room 013/ Foyer

### Poster Session:

**Chairman: P. Li (DE-Ilmenau)**

F. Alexey (RU-St. Petersburg)

#### **Experience with digital microscopes**

We reviewed the theoretical and practical aspects of creating digital microscopes, in which the image of the object is projected onto the electronic.

A. Pavliy, O.A. Vinogradova, A.D. Frolov, D.N. Frolov (RU-St. Petersburg)

#### **Experience in creating elements of automated systems for quality control microobjectives**

The presentation confirms possibility of an automating assembly of the micro-objectives and monitoring of the image quality of micro-objectives.

G. Filaretov, V. Eliseev

#### **Modified Algorithm of Neural Network Control for Non-stationary Object**

A task of neural network control over non-stationary dynamic object is solved. It's supposed that dynamic behavior of the object may change at arbitrary moment. Reference signal and noise are considered as random series. A traditional approach in such conditions – to use permanently active adoption algorithms for neural network controller and neural network for object identification. This leads to additional expenses during periods of steady object condition and may decrease quality of control in general. To avoid mentioned disadvantages it's proposed to activate adoption algorithms only if a significant systematic change of object behavior is detected. It can be done by comparison of observed plant output and signal from neural network object model. This detecting is realized with help of a well known statistical algorithm of cumulative sum (CUSUM), regulated for revelation the increase of variance of the identification error ( - ). The proposed approach was implemented and successfully tested in computer simulation experiment. Conditions of more high efficient of proposed algorithm in comparison with traditional approach were established. Questions of optimal cumulative sum and learning algorithms tuning are discussed. A method of adaptive neural network controller synthesis using described idea of using CUSUM procedure is formulated as a result of the research.