

# Mechatronic Hydraulic Drive with Regulator, Based on Artificial Neural Networks

Burennikov YURIY, Kozlov LEONID,  
Pyliavets VOLODYMYR, Piontkevych OLEH

Vinnitsia National Technical University, 95 Khmelnytske shose, Vinnitsia, Ukraine

E-mail: osna2030@gmail.com

---

**Abstract.** Mechatronic hydraulic drives, based on variable pump, proportional hydraulics and controllers find wide application in technological machines and testing equipment. Mechatronic hydraulic drives provide necessary parameters of actuating elements motion with the possibility of their correction in case of external loads change. This enables to improve the quality of working operations, increase the capacity of machines.

The scheme of mechatronic hydraulic drive, based on the pump, hydraulic cylinder, proportional valve with electrohydraulic control and programmable controller is suggested. Algorithm for the control of mechatronic hydraulic drive to provide necessary pressure change law in hydraulic cylinder is developed. For the realization of control algorithm in the controller artificial neural networks are used. Mathematical model of mechatronic hydraulic drive, enabling to create the training base for adjustment of artificial neural networks of the regulator is developed.

**Keywords:** mechatronic hydraulic drive, proportional control, programmable controller, control algorithm, artificial neural networks.

---

## References:

- [1] Козлов Л. Г., 2013, Застосування нейромережі для зменшення часу регулювання в мехатронній гідросистемі *Вісник Сумського державного університету. Серія «Технічні науки»*, **4**, с. 165-174.
- [2] Burennikov Yu., Kozlov L., Shevchuk Yu., Pyliavets V., 2015 Mechatronic Hydraulic System with Adaptive Controller on the Basis of Neural Networks *Bulletin of the Polytechnic Institute of Iasi*, **LXI (LXV)**, 1-2, pp. 132-151.