

The Urgency of Using Adaptive Observers to Identify the Parameters of the DC Electric Drive

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Abstract. The aim of this work is to analyze the use of surveillance devices in modern digital electric drives with the prospect of modernization of existing DC drives used in the metallurgical industry of the Dnieper region of Ukraine and develop a mathematical model of electric drive with adaptive observer identification of basic coordinates. The urgency of the work is justified, given the large number of outdated control systems for DC electric drives at metallurgical enterprises in the Dnieper region. There are even drives with a generator-DC motor system in the presence of thyristor converters in the excitation windings of motors and generators, such as a generator system - a blooming DC motor 1050 in a rolling shop №1 PJSC "Dnieper Metallurgical Plant", a generator system - DC motor rolling shop of PJSC "Dnieper Metallurgical Plant". There are also more modern - for example, digital system thyristor converter - DC motor of the electric drive of a calibration condition in the conditions of rolling shop №7 INTERPIPE NIKO TUBE, Nikopol. The power of the main drives is from 80 kW to 8 MW. Also, the aim of the work is to create a general classical mathematical model of the DC electric drive with observers to identify such parameters as the moment of inertia, the resistance of the armature circuit. The obtained results give an idea of the interdependence of the main parameters of the electric drive, which characterize and influence the dynamic properties of observers - the roots of the characteristic equation, structural coefficients, the frequency of undamped oscillations. The practical value includes recommendations for adjusting the control circuits for regenerative monitoring devices, the coordinates of the electric drive, which are obtained as a result of research on a mathematical model. The recommendations can be used as input, for example in the configuration of control systems, control circuits for digital complete DC electric drives in environments such as the TIA Portal Siemens before the first start-up of electric drives in the plant.

Keywords: DC motor, thyristor converter, adaptive observer, programmable controller, control circuit, parameter identification.

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