

SUMMARY

The Bachelor thesis comprises 93 pages which contain 33 diagrams, 9 tables and 3 posters A1.

The aim of this project is to research and develop the system of automation and programming control of servomotors to form a typical synchronous servo system by means of Mitsubishi Motion Controller Case made by Mitsubishi Electric company. Another aim is to improve knowledge in automation engineering, especially, technological installations and complexes, and technical problem solving skills as well.

To achieve these objectives, firstly, an analytical review of servo systems features is performed. This analytical review includes such points as classification of servomotors, their purpose and applications, and the description of the main components of the applied technological installation. The following requirements for this type of electric drive have been determined:

- high accuracy of performing tasks;
- lack of fluctuations in speed;
- a wide range of speed control;
- high overload capacity;
- high dynamic transients.

Secondly, all components of the applied technological installation are observed. Thus, the laboratory installation consists of:

- 3 servomotors;
- 3 servodrives;
- Q-Series modules.

Mathematical model of synchronous motor with permanent magnets in a fixed coordinate system (a-b) and moving coordinate system (d-q) has been developed.

During the synthesis of control, the method of controlling electric motor has been justified. The field oriented control algorithm as well as the synthesis of

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current, speed and position regulators have been developed. Stability of the system has been proven which results in proper calculation of the parameters of each regulator. The detailed calculation is presented in terms of formulas.

Another motor was chosen for modeling because of lack of information about electric motor in technological installation.

Transients graphics were withdrawn by simulation results and experimental results to study the dynamic and static modes. The results on diagrams were compared.

The description of the power part was presented in detail. Program of automation and motion control programs were created and verified deepen knowledge in the field of automation of technological installations and facilities, development of skills, independence in taking appropriate technical solutions in the analysis of the results.

Practical part involves 4 Motion SFC program and 1 Ladder program.

Motin SFC programs are developed to research:

- positioning control;
- speed control;
- following control;
- control of whole system by using previous types of control

Calculation and realization of the diploma project were provided by using the following software: MATLAB R2009b, Microsoft Office Word 2007, Microsoft Office Visio 2016, MT-Works2, MT-Developer2, MR-Configurator, MT-Test, MT-Oscilloscope.

SERVOSYSTMES, SYNCHRONOUS MOTOR WITH PERMANENT MAGNETS, MODELING, AUTOMATION , SERVO ELETRIC DRIVE, MOTION CONTROL, SYNCHRONOUS SYSTMES, FIELD ORIENTED CONTROL.

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	<i>Sh.</i>	<i>№ docum.</i>	<i>Sign.</i>					
<i>Designed</i>		<i>Terletskiy Y.S.</i>			<i>Positional synchronous servodrive</i>	<i>Liter.</i>	<i>Sh.</i>	<i>Scale</i>
<i>Checked</i>		<i>Teryaev V.I.</i>					9	
<i>Reader</i>						<i>NTUU «KPI», FEPEA, gr. ED-21</i>		
<i>R. control</i>								
<i>Approve</i>		<i>Peresada S.M.</i>						