

Control System Development

We find the optimal solution



Value of our engineering service:

Improving performance of system

- ✓ Higher accuracy
- ✓ Higher stability
- ✓ Reduce energy consumption
- ✓ On-line parameters identification
- ✓ System without manual adjustment
- ✓ Control without using speed, flux or other sensors

Shorten time-to-market

- ✓ Possibility to find errors in technical solutions, analytical calculations, at an early stage
- ✓ Work in one development area - ability to quickly correct the control algorithm, simulate and convert to the language of the target platform
- ✓ Using automatic C-code generation tools optimized for target platform (reduce project time and eliminate coding mistakes)

Plant model

- ✓ Ability to see the work of an interconnected complex of equipment - the physical part with the control system
- ✓ Possibility to test different control strategies
- ✓ Ability to see the operation of equipment in emergency / abnormal mode
- ✓ Using data measurements from the facility
- ✓ Tuning parameters of controllers for setting it at the facility (shorten commissioning time)
- ✓ Ability to use HIL and RCP approaches


New Control System may include:



✓ Feed-back PID control




✓ Feed-forward control



✓ Decoupling matrix for feedback controllers calculated using H-infinity optimization method. This is one of approaches provides the robustness of the control system



✓ Additional stabilization channels



✓ Inject special signals for on-line parameters identification



✓ Other control elements

The developed control algorithm may be:

- ✓ **tested immediately with Rapid Control Prototyping** using a real-time machine. The control algorithm developed in Simulink is loaded into a real-time machine, which has certain interfaces for communication with the plant, and it can be immediately tested together with the execution equipment. This eliminates the stages of low-level programming (usually C-coding) of the algorithm for the target platform and the development of the hardware. This significantly reduces the development time a new product and the time to market it.
- ✓ **tested immediately using Hardware-in-the-Loop approach** using a real-time machine and laboratory hardware (motors, converters, etc.). For complex systems, the hardware can be replaced with a second real-time machine. This approach allows you to test the control algorithm in real time (as in real life), to test the control system in boundary modes.
- ✓ **automatically converted to C-code using Matlab** for target controller, hdl code for FPGA, code for PLC and other Matlab supported languages.

Key projects:

<https://www.m-works.pro/projects-2>



1 Robust control system for wastewater treatment plants

Development the robust two cascaded control systems of dissolved oxygen, consists of 12 feed-back valve controllers, 1 feed-back and 1 feed-forward blower controllers and decoupling matrix

<https://www.m-works.pro/wwtp>

2 Automatic voltage regulator for power generators

Improvement of Automatic voltage regulator (AVR) with stabilization channels (PSS) for excitation systems of power generators

<https://www.m-works.pro/controlsystemdesign-avr>

3 Torque control system for vertical stand of the Slabbing-1150 mill

Control system for equalizing the electromagnetic torques of two DC motors working on a common gearbox of a vertical stand of the Slabbing-1150 mill

<https://www.m-works.pro/controlsystemdesign-torque>

4 Intelligent diagnostic system for stand mill 1700 based on the Digital Twin concept

Development the on-line diagnostic system of the electrical and mechanical parts of the stand mill 1700. Main component in the project is Speedgoat real time target machine Performance.

<https://www.m-works.pro/speedgoat-diagnostic-system>

About company



M-Works is the industrial branch of IT Master Soft GmbH company.

IT Master Soft GmbH

IT Master Soft company was established in 2012.

Main activity of the company is software development.

Company has offices in Germany, Bulgaria, Ukraine.

M-Works

M-Works offers engineering services using **Matlab/Simulink software**.

Our key strength are **Responsibility, Result oriented, Confidentiality**.

Our experts has been working with Matlab products **since 2004** and keep knowledge up to date.

Our team has engineering background in **Electrical Engineering** and **Control System Design**.

We work closely **with industry** and understand production processes.

We work **with universities** and can extend our team for specific project (not limited to the mentioned engineering).

All this allows us to take a comprehensive approach to solving the problem and find the optimal solution.



We offer services

Model-Based Design

Control System Design

Hardware-in-the-Loop testing

Digital Twin Development

Engineering background

Electrical Engineering (Power electronics, Electric drives, Energy Production)

Control System Engineering

Multiphysical Systems Engineering

Main Industries

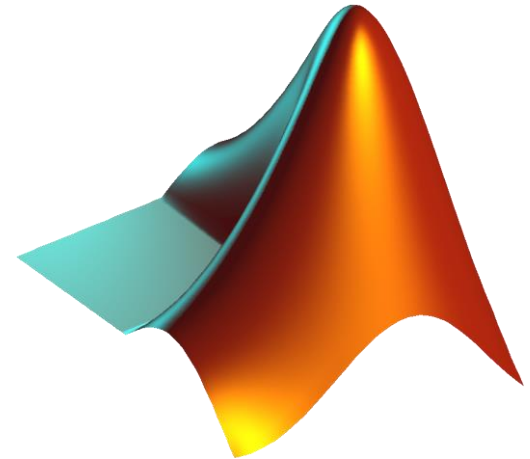
Power Electronics

Energy Production

Power Systems

Experience with Matlab/Simulink Toolboxes

- Simulink
- Simscape
 - Foundation Library (Electrical, Mechanical, Thermal, Gas...)
 - Driveline
 - Electrical
 - Specialized Power Systems
- Control System Toolbox
- Robust Control Toolbox
- Simulink Control Design
- Simulink Desktop Real-Time
- Simulink Real-Time (Speedgoat hardware)
- Embedded Coder
- DSP for TI C2000
- App Designer (GUI)



Contacts



**We look forward to discuss the details
of our pilot project**

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