

Real-Time Testing with Simulink Real-Time and Speedgoat Hardware

Prerequisites

Simulink for System and Algorithm Modeling (or *Simulink for Automotive System Design* or *Simulink for Aerospace System Design*). Knowledge of Simscape™ preferred.

| Day 1 of 2 | |
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| Workflow Overview | <p>Objective: Set up the real-time testing hardware and test communications between host and target computers.</p> <ul style="list-style-type: none">Real-time testing overviewSetting up the host and target computersRunning a real-time application |
| Developing Real-Time Applications | <p>Objective: Use Speedgoat driver blocks to convert a desktop-based test bench to an RCP application.</p> <ul style="list-style-type: none">PMSM hardware introductionConverting plant models into plant hardware interfacesImplementing Speedgoat IO driversTesting sensors and actuatorsExecuting closed-loop real-time simulations with physical hardwareVisualizing and logging signals |
| Building Interactive Interfaces | <p>Objective: Use Simulink dashboard blocks, instrument panels, and host scopes to create interactive interfaces to a real-time application.</p> <ul style="list-style-type: none">Using Simulink Dashboard blocksCreating instrument panels and host scopes |

| Day 2 of 2 | |
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| Automating Real-Time Tests | <p>Objective: Use Simulink Test to create and execute an automated test suite.</p> <ul style="list-style-type: none">Building a harness for automatic testingCreating test sequencesIterating input and parameter setsAnalyzing test results |
| Using Communications Protocols | <p>Objective: Configure IO blocks to interface the target machine with standard communication protocols.</p> <ul style="list-style-type: none">Simulink Real-Time protocol supportReal-time UDPInter-Integrated Circuit (I2C) loopback testing |

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| Optimizing Plant Models for Real-Time Execution | <p>Objective: Use the desktop model to validate model fidelity with respect to optimization considerations, and optimize the plant model to execute on target hardware.</p> <ul style="list-style-type: none">Characterizing the plant modelProfiling and debugging real-time applicationsOptimizing plant model performance |
| Hardware-in-the-Loop Testing | <p>Objective: Convert a simulation test bench into a HIL testing configuration, and use a real-time plant model to validate system requirements.</p> <ul style="list-style-type: none">Hardware-in-the-loop (HIL) workflow overviewRunning the controller algorithm on production hardwareSetting up a HIL systemRunning HIL tests |