LabVIEW Control Design and Simulation Module

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Updated 2023-02-21 | 2 minutes read # LabVIEW G # API Reference # LabVIEW Control Design and Simulation Module

March 2018, 371894J-01

Simulation is a process that involves using software to recreate and analyze the behavior of dynamic systems. You use the simulation process to lower product development costs by accelerating product development. You also use the simulation process to provide insight into the behavior of dynamic systems you cannot replicate conveniently in the laboratory. For example, simulating a jet engine saves time, labor, and money compared to building, testing, and rebuilding an actual jet engine. You can use the LabVIEW Control Design and Simulation Module to simulate a dynamic system or a component of a dynamic system. For example, you can simulate only the plant while using hardware for the controller, actuators, and sensors.

If you are new to the Control Design and Simulation Module, consider completing the Getting Started with Simulation tutorial.

In addition to the topics contained in this help file, the LabVIEW Control Design User Manual contains information about using LabVIEW to design, analyze, and deploy controllers for dynamic systems.

The following table describes the tasks you can perform with the Control Design and Simulation Module and the components you use for these tasks.

| Task | Component |
| --- | --- |
| Design, analyze, and deploy controllers for dynamic system models | Control Design VIs and functions. You also can use the Control Design MathScript RT Module functions to design and analyze controllers. |
| Configure simulation parameters, including the ordinary differential equation (ODE) solver, and define the simulation as part of a LabVIEW block diagram | Control & Simulation Loop |
| • Build, simulate, and deploy dynamic system models, including models developed with the LabVIEW Advanced Signal Processing Toolkit or the Control Design and Simulation Module.<br>• Execute offline, Rapid Control Prototype (RCP), and Hardware-in-the-Loop (HIL) configurations<br>• Generate and combine input and feedback signals<br>• Collect and display simulation data | Simulation functions |
| Trim and linearize a nonlinear dynamic system model | Trim & Linearize VIs; Linearize Subsystem dialog box |
| Determine the optimal parameters for a dynamic system model, given a set of constraints | Optimal Design VIs |
| Convert your model you developed in The MathWorks, Inc. Simulink® application software into LabVIEW block diagram code | Simulation Model Converter |
| (Windows) Identify large, multivariable models of high-order systems from large amounts of data<br>• acquire and preprocess data from a system<br>• estimate models<br>• analyze, validate, and convert models | (Windows) System Identification VIs |

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