

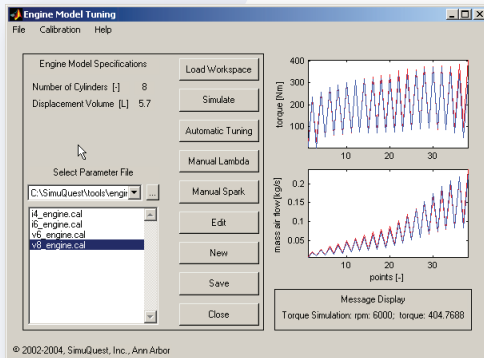
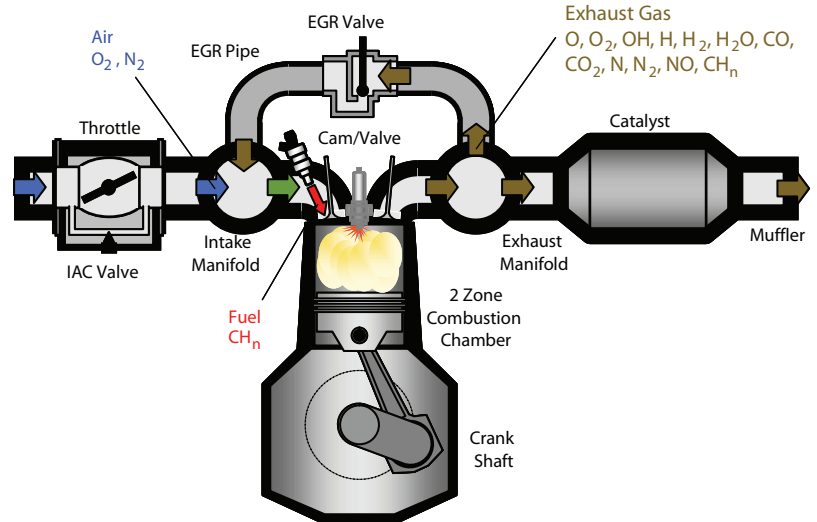
Enginuity



High-Fidelity Physics-Based SI Engine Model for Rapid Algorithm Design and Validation

Applications

- Rapid Algorithm Prototyping in Simulation
- Hardware-in-the-Loop Systems Validation
- Control System Design Support
- Training: Control Design, Calibration, Dynamics



GUI for Automatic Model Tuning

Enginuity enables engine strategy development within the Mathworks simulation environment, significantly reducing the dependence on expensive experimental testing. The underlying engine model has been designed to be real-time capable and emulates the engine dynamics with sufficient accuracy over the entire engine operating-envelope. The model supports control strategy development at any level of complexity, either for exploratory purposes or for production intent systems.

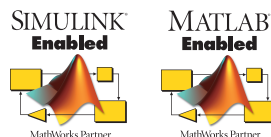
Key Features

- **Native Simulink Implementation**
- **Reusable Library Blocks Based on Engine Components**
Rapidly assemble models for any target engine configuration. Pre-built 4, 6, and 8-cylinder models included.
- **Rapid Automated Model Tuning**
Rapidly tune a model to match any engine. Create libraries of engine models. Avoid months of model tuning for each engine type.
- **Control Design Oriented**
- **Real-Time Execution for HIL**
- **Real-Time Tracking of 12 Gas Species**
- **Crank-Angle Based Cycle Calculation**
- **High Degree of Accuracy Over Entire Operating Envelope**

Contact

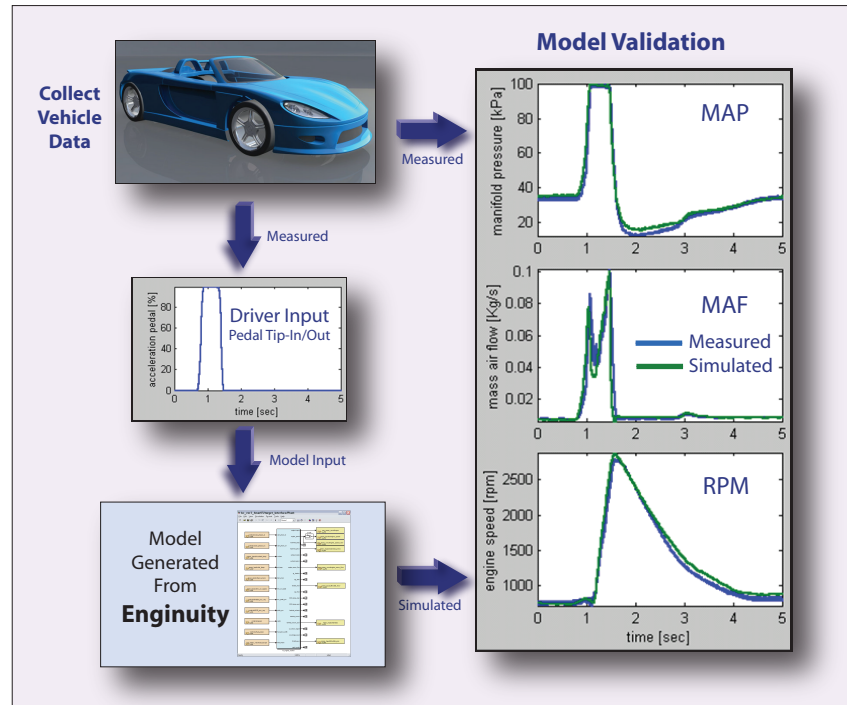
For product pricing, information, demos, or other inquiries:

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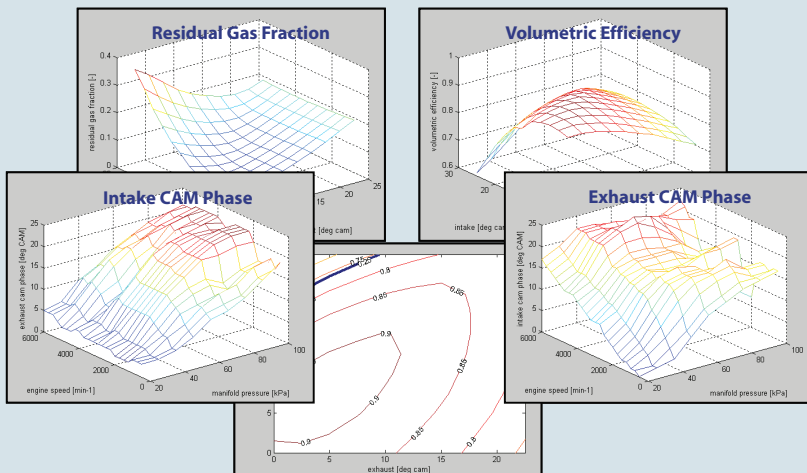


In Just A Few Easy Steps:

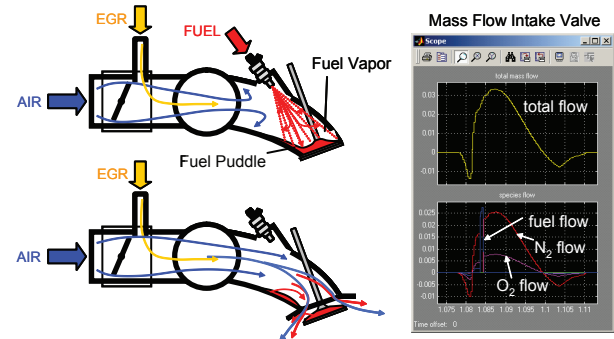
- Assemble any engine model from the engine component library.
- Determine geometric and material constants and enter using the parameter editor.
- Collect static engine mapping data and convert to Matlab format.
- Use this data to tune the engine model using the automated tuning tool.
- You now have an accurate model of your engine in native Simulink.
- Use this model to design and test any engine control system in simulation.
- Optionally, use the add on tool, LTI++, to generate a linear minimum order model of your engine. Then use this tool to assist with the design of your control system.



Application Example - CAM Phasing Calibration



Intake System and Port Fuel Dynamics



Requires: Matlab, Simulink, Optimization Toolbox

Related Products:

SimuQuest UniPhi. Manage models of any level of complexity from concept to production.

SimuQuest LTI++. Generate linear engine models from Enginuity at any operating point. Select engine IO for control and then perform PI, LQG or H^∞ linear control design.