T-MATS

## Toolbox for the Modeling and Analysis of Thermodynamic Systems

Description

The Toolbox for the Modeling and Analysis of Thermodynamic Systems (T-MATS) is a MATLAB/Simulink (The MathWorks Inc.) plug-in for creating and simulating thermodynamic systems and controls. The package contains generic parameterized components that can be combined with a variable input iterative solver and optimization algorithm to create complex system models, such as gas turbines.
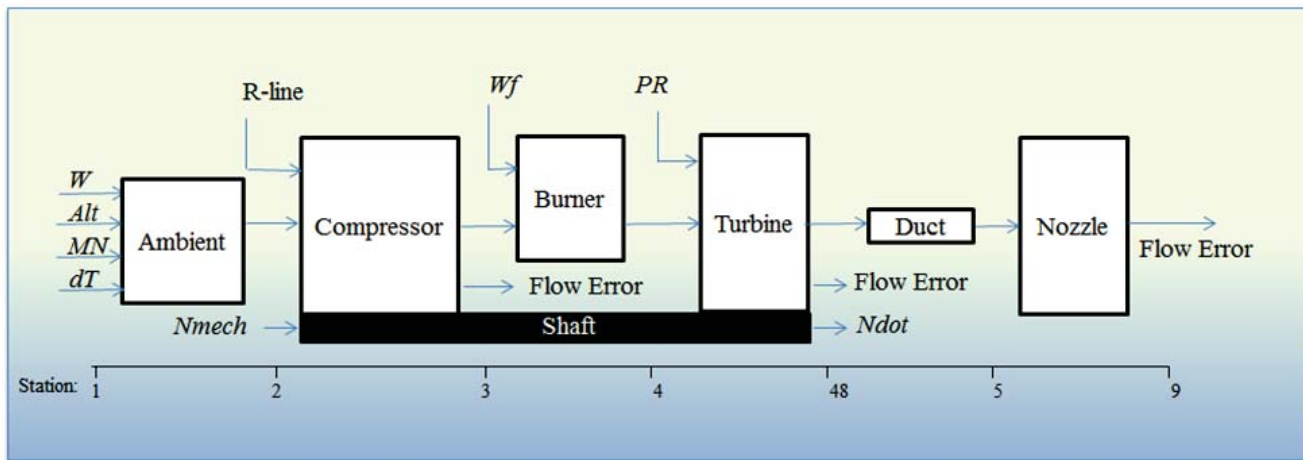

Technical Approach

- Customizable turbo-machinery component models based on map data and physics-based algorithms.
- Iterative solver blocks that utilize an automated Jacobian calculation within the Newton Raphson numerical solving method.
- Baseline controller models that can be used in the simulation of control hardware and software.

Features of T-MATS

- Simple dynamic system framework architecture.
- Drag and drop parameterized turbo-machinery and control system modeling blocks.
- Automated solver blocks color coded for easy model set up.
- Capable of running faster than real time.
- Tools that make model creation easy and fast.
- Open source license, encourages unrestricted collaboration.
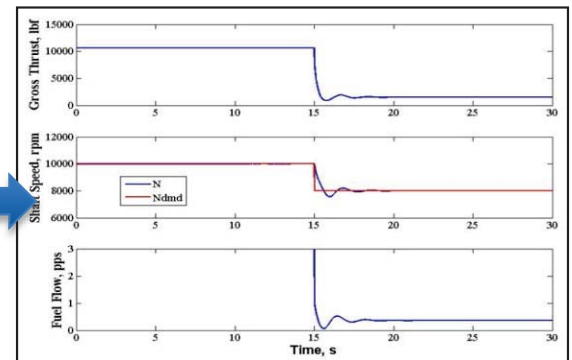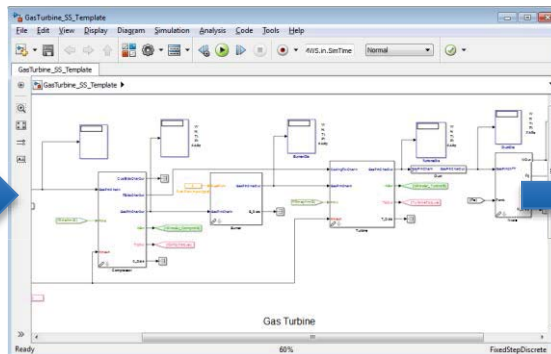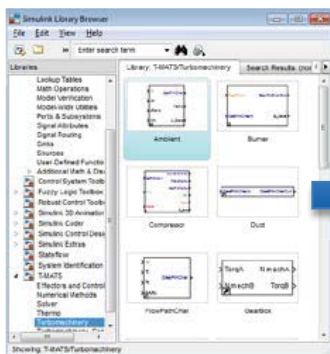
More Information

Download the latest open source software from: https://github.com/nasa/T-MATS/releases/

J. Chapman, et al., "Toolbox for the Modeling and Analysis of Thermodynamic Systems (T-MATS) User's Guide, NASA/TM—2014-216638

J. Chapman, et al., "Propulsion System Simulation Using the Toolbox for the Modeling and Analysis of Thermodynamic Systems (T-MATS)," AIAA JPC, July 2014

T. Lavelle, et al., "Cantera Integration with the Toolbox for the Modeling and Analysis of Thermodynamic Systems (T-MATS)," AIAA JPC, July 2014