

# System Analysis Using Multiple Expert Tools

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## **ABSTRACT**

Many of today's advanced simulation tools are suitable for modeling specific systems; however, they provide rather limited support for model building and management. Setting up a detailed vehicle simulation model requires more than writing down state equations and running them on a computer. In this paper, we describe how modern software techniques can be used to support modeling and design activities, with the objective of providing better system models more quickly by assembling these system models in a "plug-and-play" architecture. Instead of developing detailed models specifically for Argonne National Laboratory's Autonomie modeling tool, we have chosen to place emphasis on integrating and re-using the system models, regardless of the environment in which they were initially developed. By way of example, this paper describes a vehicle model composed of a detailed engine model from GT Power, a transmission from AMESim, and with vehicle dynamics from CarSim. The paper will explain the different options available for the interface and how each of these options can be implemented. It will use a simple case study to show how the detailed expert simulation models can be used with simpler Simulink models to address different vehicle design issues.