Tutorial on

AUTONOMIE, A PLUG-AND-PLAY SOFTWARE ARCHITECTURE

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Abstract

Because of time and cost constraints, designers cannot build and test each of the many possible powertrain configurations for advanced vehicles. Thus, developing conventional, hybrid electric vehicles (HEVs), and Plug-in HEVs (PHEVs) requires accurate, flexible simulation tools. Based on more than a decade of experience acquired in developing PSAT (Powertrain System Analysis Toolkit) to assess the performance and fuel consumption benefits of advanced vehicles, Argonne National Laboratory has developed the next generation of vehicle simulation tool in collaboration with General Motors. Autonomie has been developed to accelerate the development and introduction of advanced technologies through a Plug&Play architecture. Autonomie has been designed to be used as a single tool throughout the Vehicle Development Process by promoting reuse and exchange of models and supporting Model Based Design approaches.

This hands-on tutorial will demonstrate the advanced functionalities of Autonomie and its models and will tackle the following topics:

- Plug&Play Architecture Benefits and Implementation
- Selecting Model Complexity to Meet Objectives
- Component Sizing to Meet Vehicle Technical Specifications
- Hybrid Vehicle Control Strategy
- Use of Model Based Design (MIL, SIL, HIL, RCP, CIL) to Accelerate Development

Biographies of the Speakers

Dominik KARBOWSKI received a Master's degree in Science and Executive Engineering with a major in Energy Systems from Mines ParisTech, France, in 2006. At Argonne, Dominik works on modeling advanced powertrains such as hybrids or plug-in hybrids, both light- and heavy-duty. He focuses his research on vehicle level control optimization and powertrain design optimization, using different approaches from rule based to instantaneous optimization and dynamic programming.

Sylvain PAGERIT received a Master of Science in Industrial Engineering from the Ecole des Mines de Nantes, France, in 2000, as well as a Master of Science in Electrical Engineering from the Georgia Institute of Technology, Atlanta, in 2001. At Argonne, he focuses his work on the development of Autonomie and PSAT user interfaces, as well as automated optimization and sizing algorithms for advanced powertrains.

References

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