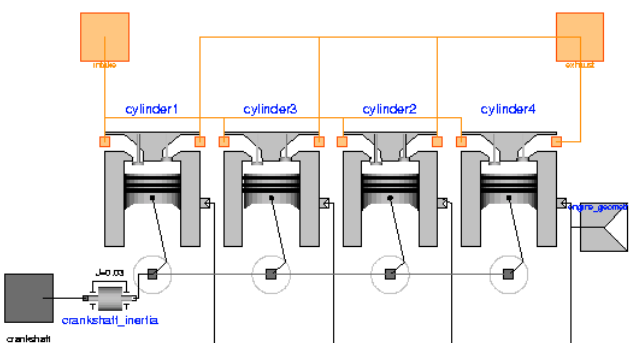


Modelica is a powerful modeling language capable of simulating a wide variety of systems. The book “Introduction to Physical Modeling with Modelica” by Dr. Michael Tiller helps you to get the most out of Modelica by providing numerous examples that highlight the important features of the Modelica language. Although the emphasis of the book is on physical modeling (*i.e.* constructing models of physical systems from first principles), several of the examples demonstrate how physical models can be used in conjunction with control systems to explore some of the complex dynamics that occur with real-world, design-oriented plant models.

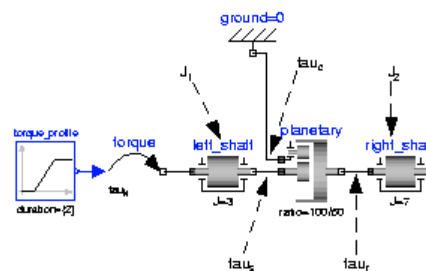
## Acausal Modeling

An important aspect of modeling with Modelica is the ability to construct models using an “acausal” formulation. This means that it is not necessary to decide in advance what the inputs and outputs of a model must be. Instead, each model simply contains the constitutive relationships appropriate for that component (*e.g.* Ohm’s law, Hook’s law, *etc.*). These constitutive relationships are then augmented with conservation laws (*e.g.* conservation of mass, energy, *etc.*) yielding a complete system of equations. The flexibility of acausal modeling means that it is much easier to make changes to models without having to worry about reformulating the problem using the kinds of *a priori* causality assumption that are common in block diagram modeling tools. Furthermore, Modelica does not require component behavior to be transformed into state space form. Instead, models can be written naturally using differential-algebraic equations without restrictions against the presence of algebraic loops or implicit non-linear equations.



## Multi-domain Modeling

To emphasize the fact that Modelica can be used to model behavior from a wide variety of engineering domains, “Introduction to Physical Modeling with Modelica” includes examples of mechanical, hydraulic, chemical, electrical and thermal systems. In addition, an entire chapter is devoted to describing models that contain components from several different domains to demonstrate how such components can be made to work together.



## Maximizing Reuse

The Modelica modeling language was designed with large scale modeling in mind. Like other modern computer languages, Modelica applies software-engineering principles to allow maximum reuse of work. Several chapters are dedicated to getting the most out of these features when developing large models.

## Companion CD-ROM

Included with the book is a companion CD-ROM which includes all the examples from the book, as well as an evaluation copy of the Dymola modeling and simulation environment. Another feature of the companion CD-ROM is that it includes the complete Modelica source code for a thermal component library and a simple automotive library.

## Ordering and Availability

“Introduction to Physical Modeling with Modelica” is available from Kluwer Academic Publishers (ISBN 0-7923-7367-7). For more information on ordering or availability, please contact Kluwer at:

Email: [kluwer@wkap.com](mailto:kluwer@wkap.com)  
Phone: (781) 871-6600