AMESim

LIBRARIES – THERMAL

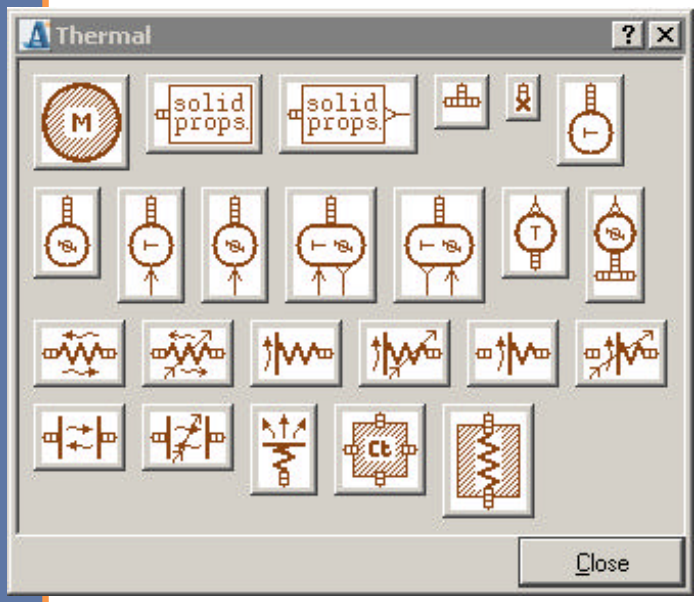
KEY POINTS

- Steady-state and transient simulation.
- Graphical interface enables you to create new designs quickly.
- State-of-the-art theory. Easy parameters filling from manufacturers' experiments or data from technical drawings .
- Recognizable technological icons facilitating direct model correlation with technical drawings.
- Full multi-domain compatibility for total system analysis with study of energetic couplings.
- Complex modeling without writing a single line of code thanks to a Basic Element approach.
- Build and save your own models for easy reuse.
- Sensitivity analysis and size optimization.
- Time domain and frequency analysis for vibration modes characterization (eigenvalues, modal shapes, transfer functions).
- Matlab®/Simulink® interface for control design.
- Direct integration of your own C and Fortran code.
- Fully compatible with other AMESim libraries.

Overview

Heat exchanges occur in most industrial processes either because they are expected (ovens, heat exchangers…) or unavoidable (thermal shocks, thermal losses, friction…). These exchanges are likely to occur through motionless solids or moving fluids as soon as temperature differences are encountered.

The AMESim® Thermal library deals with solid materials. It is based on a transient heat transfer approach and is used to model traditional heat transfer modes (conduction, free and forced convection, radiation) between solid materials.



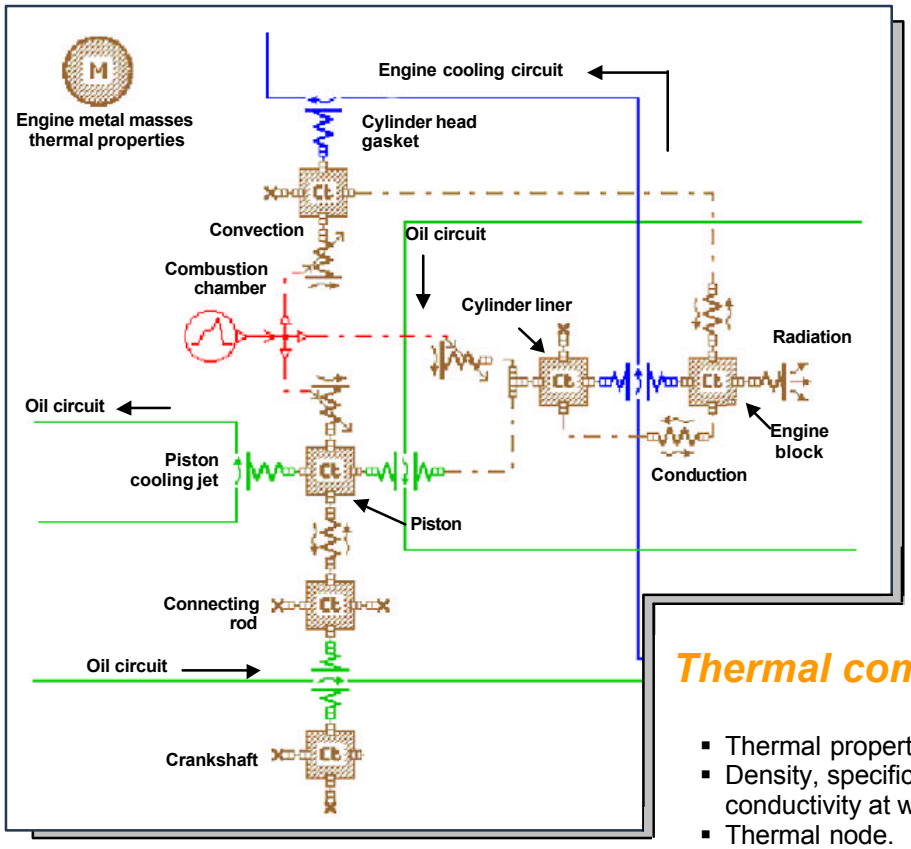
Benefits

The user-friendly AMESim Thermal library helps you to rapidly model any kind of thermal network without having to write a single line of code.

A collection of various thermal heat exchange models and thermal heat transfer correlations allows you to find answers for the optimal development of complex thermal systems.

The unrivaled AMESim solver automatically and dynamically selects the most adapted integration method based on the particular system dynamics.

All AMESim libraries are compatible with one another thus enabling true multi-domain simulation studies.



A simplified thermal engine model built with the AMESim Thermal and Thermal-Hydraulic libraries

Features

The AMESim Thermal library enables you to answer questions involving thermal systems with a large number of capabilities such as:

- All standard types of heat exchange included (conduction, convection, radiation).
- Rigorous handling of thermal properties.
- Database of solid properties.
- One or more solids in your model.
- Large number of built-in thermal correlations for each type of heat exchange.
- Capability to implement user-defined thermal correlations.
- Calculation of all the required variables (temperatures, heat flow rate, stored energy…), accessible during or after computation.

Thermal component models

- Thermal properties.
- Density, specific heat and thermal conductivity at working temperature.
- Thermal node.
- Zero heat flow source.
- Temperature and heat flow sources.
- Modulated temperature and heat flow sources.
- Signal port to thermal port converters.
- Temperature and heat flow transducers.
- Thermal conduction.
- Piloted conductive exchange.
- Thermal convection.
- Piloted convective exchange.
- 2 ports convective exchange.
- 2 ports piloted convective exchange.
- Thermal radiation between two bodies.
- Piloted irradiative exchange.
- Thermal radiation.
- Thermal mass (capacity).
- 1D conduction.

Requirements

The AMESim Thermal library runs on Unix®, Linux® platforms and Pentium®-based PCs.

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