MODELING & SIMULATION PLATFORM FOR SYSTEMS ENGINEERING

AMESim

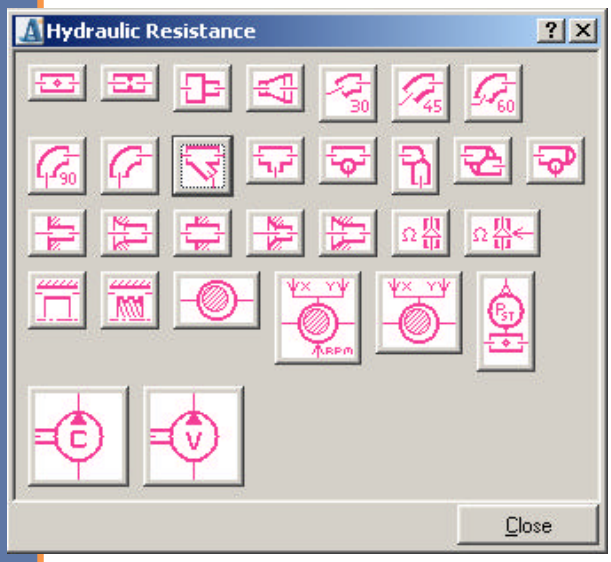
LIBRARIES – HYDRAULIC RESISTANCE

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 identification with technical drawings.
- Full multi-domain compatibility for total system analysis with energetic couplings study.
- 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).
- Activity index for energies and efficiencies evaluation, and models reduction.
- Matlab®/Simulink® interface for control design.
- Direct Integration of your own C or Fortran code.
- Fully compatible with other AMESim libraries.

Overview

Flow resistance has a great influence on the design of fluid circuits in which pressures are relatively low but flow rates are high. This type of system calls for the AMESim® Hydraulic Resistance library. This library includes a set of components from which it is easy to model oil, fuel, lubricant, coolant, water or other fluid networks in business areas such as automotive, off-highway, aerospace, marine, energy, oil & gas…. Evaluating the pressure drops and the distribution of flow rates through a circuit and modifying the design of the system if needed is very easy and intuitive.

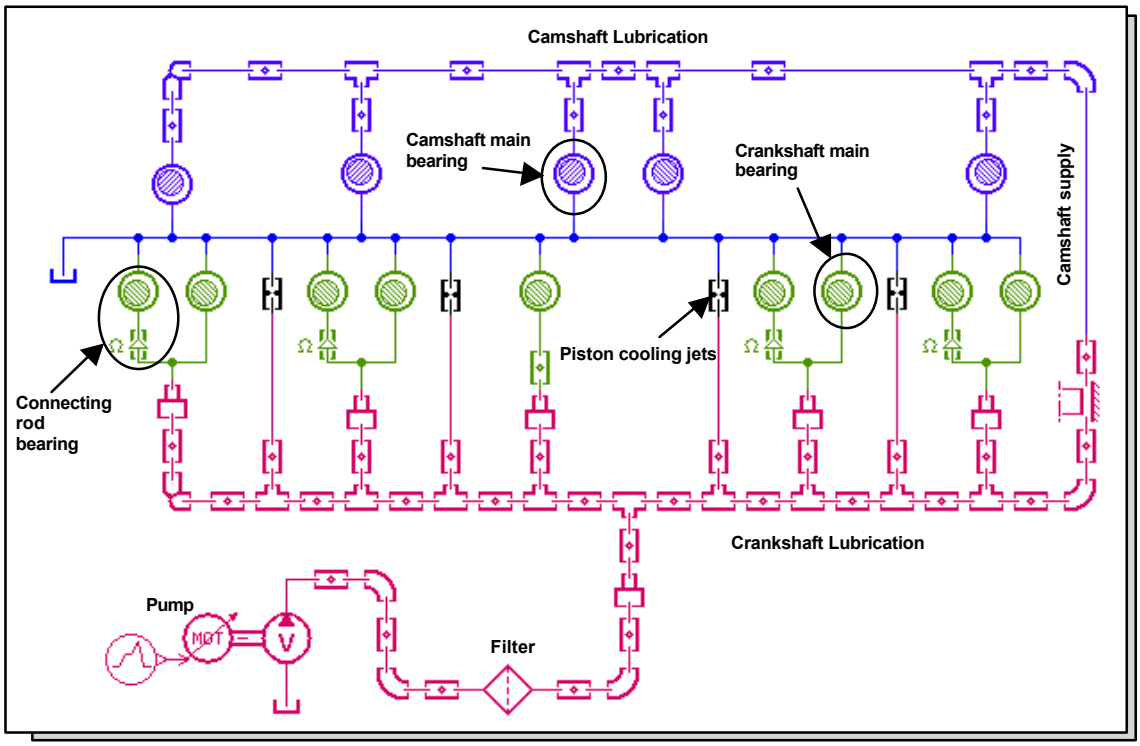


Benefits

Fully compatible and complementary to the other AMESim hydraulic libraries, the Hydraulic Resistance library offers a ready-to-use solution for the design of fluid networks. Thanks to a comprehensive collection of carefully validated experimental data (constant friction factors, Idel'Cik formulae and experiment-based friction factors), you can quickly solve for flow and pressure in any kind of network.

The AMESim user interface gives you the ability to design a network with minimum effort and maximum flexibility. Recognizable technological icons facilitate both the understanding of the simulation model and the direct observation of the evolution of flow rate and pressure levels through simple animation.

The AMESim Hydraulic Resistance library allows you to cut down on the number of prototypes, reduce the development cost and finally the time to market.



4-Cylinder engine lubrication circuit

Features

The AMESim Hydraulic Resistance library helps you to answer questions involving the design and optimization of hydraulic networks with a large set of capabilities enabling to:

- Model, analyze and design virtually any type of flow network.
- Model single piping runs, branches, tree networks, loops and/or combinations.
- Model gravity and centrifugal effects.
- Accept user-specified values to override built-in values.
- Handle incompressible and compressible Newtonian single-phase fluid.
- Proceed to steady-state and transient analysis.
- Build systems without network size limitations.

Requirements

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

The AMESim Hydraulic library is required.

Hydraulic Resistance models

- Pipe.
- Restriction.
- Sudden expansion/contraction.
- Progressive expansion/contraction.
- Hydraulic 30, 45, 60, 90 deg. bends.
- Hydraulic general bend.
- Hydraulic 45, 90 deg T-junction.
- Intersecting holes: 90, 180 deg, 3 ports.
- Intersecting holes: 90 deg, 2 ports, intersecting and non-intersecting axes.
- Volume connected to pipe: sharp entry.
- Volume connected to pipe: rounded entry.
- Volume connected to pipe: extended entry.
- Volume connected to pipe: conical entry 90 deg.
- Volume connected to pipe: conical entry 60 deg.
- Hydraulic pipe with centrifugal effects.
- Hydraulic annular pipe.
- Hydraulic grooved bushing.
- Steady-state and dynamic bearing.
- Look-up table characterized bearing.
- Hydraulic static pressure transducer.
- Hydraulic centrifugal and volumetric pump.

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