

# AMESim

## LIBRARY – PLANAR MECHANICAL

### KEY POINTS

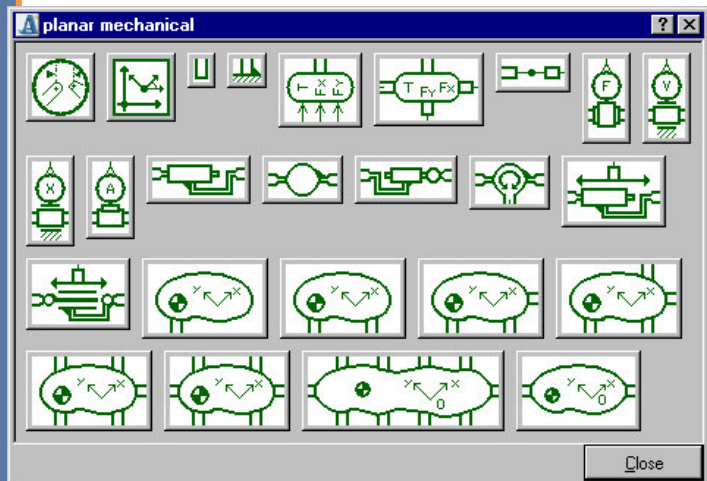
- Steady-state and transient simulation.
- Automatic assembly
- Graphical interface enables you to create new designs quickly.
- State of the art theory. Forces and displacements multi-body analysis with real dynamic calculations.
- All planar kinematical joints and bodies.
- Easy coordinates parameters filling in relative or absolute references.
- Recognizable technological icons facilitating direct model identification with technical drawings.
- Full multi-domain compatibility for total system analysis.
- 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.
- 3D animation tool with AMEAnimation.

### Overview

The AMESim® Planar Mechanical library contains components that enable to model 2-dimensional (2D) translational and rotational mechanical systems.

Since most mechanical systems are planar mechanisms, this library is fully dedicated to the study of such systems. Moreover, a large number of spatial mechanisms can be reduced to a planar analysis due to symmetry properties.

The main point of interest is the multi-domain direct couplings with the powerful technological AMESim libraries covering hydraulic, pneumatic, electromechanical or electrical applications (e.g. actuators, pumps, motors, crankshafts, spools...). All are instantaneously compatible with the AMESim Planar Mechanical library.



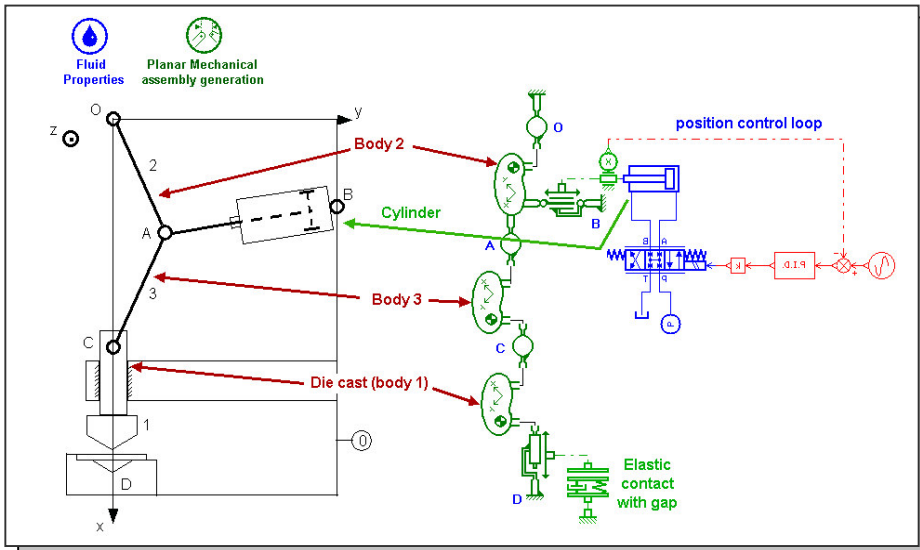
### Benefits

The user-friendly AMESim Planar Mechanical library helps you to rapidly model any kind of planar mechanism systems without having to write a single line of code.

A collection of various bodies and kinematical joint type models allows you to create your real mechanism.

This library enables you to make the kinematical validation of your system and to proceed to real dynamic calculations with the different system parts acting all together.

All the results can be visualized in a 3D CAD-type dedicated tool, AMEAnimation, in which all standard visualization functionalities are proposed (zoom, rotation, animation...)



Stamping machine system modeled using the AMESim Planar Mechanical library.

## Features

The AMESim Planar Mechanical library gives answers to your questions through a large number of capabilities. It gives you access to:

- Body location in the absolute reference.
- Relative and absolute angular positions for the different bodies.
- Velocities and accelerations of the body characteristic points.
- Center mass and bodies trajectories.
- X and Y-axis directions dynamic forces.
- Dynamic torque around the Z-axis.
- External force influence in relative or absolute references.
- Contact handling between two bodies (elastic contact, friction, spring...).
- Variable gravitational constant to test inclination influence.
- All standard planar kinematical joints with stiffness and viscous damping included.
- Direct instantaneous couplings (GUI & energy exchange calculations) with all others AMESim libraries.
- 3D visualization through the AMFAnimation tool.

## Planar Mechanical models families

### Tools:

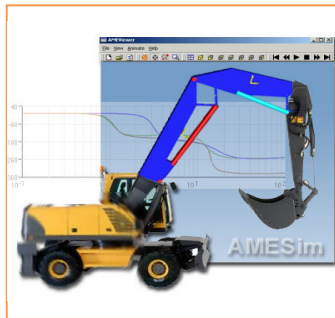
- Assembly generation with geometric and cinematic constraints.
- Coordinate calculation from absolute to relative and from relative to absolute references.

### Sources & Transducers:

- Zero force and velocity sources.
- Signal force and torque to body port converters.
- 2D to 1D converters.
- Force, displacement, velocity, acceleration transducers.

### Kinematical joints:

- End restraint.



- Prismatic junction (piloted or not).
- Revolute junction (piloted or not).
- Slotted link junction (piloted or not).
- Coupled junctions with the X/Y projection actuator.

### Bodies:

- Mass and inertia components with different numbers of ports (1 to 10)

## Requirements

The AMESim Planar Mechanical library runs on Unix<sup>®</sup>, Linux<sup>®</sup> platforms and Pentium<sup>®</sup>-based PCs. The 3D animation tool, AMEAnimation, is required.

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