

HUMAN COMFORT LIBRARY

CATIA SYSTEMS ENGINEERING

MODEL AND ANALYZE THE THERMAL COMFORT OF BUILDING AND VEHICLE OCCUPANTS

The Modelica-based Human Comfort Library provides an integrated approach to simulate thermal comfort within an occupied building or vehicle. Rapidly model and analyze the impact that air-conditioning systems, weather, equipment and occupant heat loads have on the overall thermal comfort of zone occupants.

COMPLETE HUMAN COMFORT MODELING

The Human Comfort Library models the dynamic thermal behavior of buildings, vehicles, trains, aircraft and ship cabins to analyze thermal comfort for occupants and passengers. By simultaneously simulating air-conditioned zones and the air-conditioning system itself, it is possible to analyze interactions among multiple heating and cooling systems and the resulting human comfort within the zone. It is possible to run multiple 'what-if' scenarios cost-effectively and efficiently, for example, to understand the effects of a brief air-conditioning system failure and its impact on human comfort.

KEY FEATURES

An extensive library of ready-to-use descriptions of all physical heat transfer processes to accelerate the complete modeling, analysis and visualization of human comfort through:

1. Human comfort package for the analysis of the thermal comfort of zone occupants by applying the following standards:

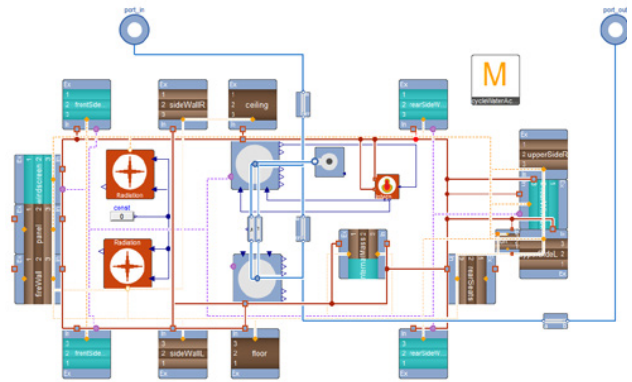
- DIN EN ISO 7730,
- ASHRAE Standard 55,
- Dutch Thermal Comfort Guidelines.

2. Zone package for modeling:

- Mobile applications, e.g. aircraft and automotive cabin models,
- Stationary applications, e.g. building model that include Heating, Ventilation and Cooling (HVAC) systems.

3. Weather package for calculating environmental conditions by modeling the impact of ambient & ground temperature, direct and diffuse solar radiation, atmospheric pressure, humidity, cloud cover and the position of the sun.

4. Computational Fluid Dynamics (CFD) package for realistic Navier-Stokes based simulation with 3D animation. Provide symmetric and periodic boundary conditions and exact calculation of thermal radiation exchange between surfaces.



Typical Human Comfort Vehicle Cabin Model

POWERFUL SIMULATION CAPABILITIES

Model and analyze the physical effects of heating and cooling phenomena including:

- Solar irradiation
- Long wave thermal radiation
- Convective heat transfer
- Thermal conduction in materials
- Internal heating and cooling sources (e.g. humans, equipment)
- Compressible humid air flow
- Moisture transport between air and walls
- Geographic position of vehicles (latitude, longitude and rotation) and movement in space

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