



3DEXPERIENCE®

HUMAN COMFORT

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 the 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 the thermal comfort of occupants and passengers.

With simultaneous simulation of air-conditioned zones and the air-conditioning system itself, it is possible to analyze the interactions between multiple heating and cooling systems and the resulting human comfort within the zone.

It is possible to carry out multiple 'what-if' scenarios in a cost-saving and time-efficient way, e.g. to understand the effects of a brief air-conditioning system failure and its impact on human comfort.

KEY FEATURES

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:

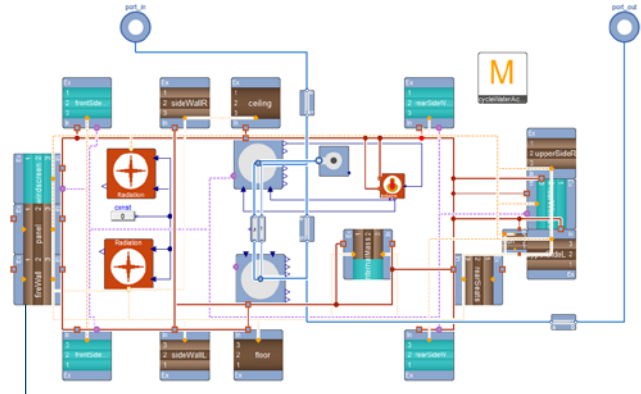
- DIN EN ISO 7730,
- ASHRAE Standard 55,
- Dutch Thermal Comfort Guidelines.

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

BENEFITS

- Eliminate the need for time consuming and costly co-simulation analysis to determine human comfort,
- Evaluate human comfort through the simultaneous dynamic simulation of zones and air conditioning systems,
- Save time through the use of state-of-the art engineering with the ability to leverage human comfort specific models,
- Easily construct and simulate detailed and realistic human comfort, zone, weather and fluid flow models,
- Addresses the human comfort analysis needs of multiple industries.

Our 3DEXPERIENCE® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

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