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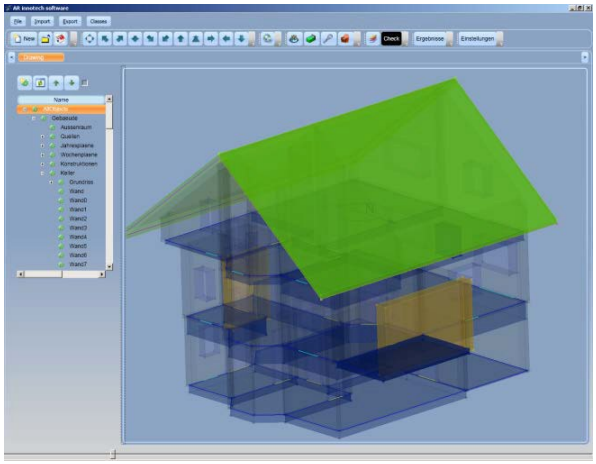

CAx Building Simulation

Efficient Collection of Thermal Building Data

In the ArInnotech project, an engineering tool is being developed that enables planners (civil engineers, architects) to create realistic, three-dimensional building models and perform thermodynamic simulations. The simulation data obtained is then used to implement optimizations in the building's structure and usage—meaning that the energy consumption of a specific building should be significantly reduced.

Problem Statement

Climate issues are currently among the most important problems that we (the world) must solve. Most countries have committed, through international agreements, to reducing their greenhouse gas emissions to a defined level. Since building heating systems in our regions account for a substantial portion of greenhouse gas emissions, optimizing the necessary resources (oil, wood, etc.) is both sensible and desirable.

Concept

The project will develop a tool for simulating and visualizing temperature and humidity conditions throughout the entire building structure. This structure includes the building envelope, interior spaces, and individual components (e.g., walls).

The building will be analyzed in the context of dynamic external influences. These external conditions will be derived from regional climate data or current weather forecasts.

The simulation can be short-, medium-, or long-term, meaning results can be provided with hourly, daily, or yearly resolution.

The simulation results will be used to optimize both the building structure and its usage. The new system will provide suggestions indicating where measures (structural adjustments) should be implemented.

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Applications

- **Building planners (architects, engineers):** Optimize the building
- **Building users:** Control the building's heating system using the building simulation model
- **Heating control system manufacturers:** Use the building simulation model for predictive control and regulation of the building

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