

Open Master's thesis:

Investigation of Ventilation Control Strategies based upon CO₂-Concentration — Modelling the Thermodynamic and Flow Situation

Description:

Demand-controlled ventilation can have great impact on indoor air quality, thermal comfort and heating consumption. The carbon dioxide (CO₂) gas concentration in buildings is one of the major pollutant factor to reduce indoor air quality. In order to improve the indoor air quality, while at the same time reduce the energy consumption in the room, an automatic ventilation system will be necessary. Therefore, the CO₂ concentration in buildings must be measured and appropriate ventilation control strategies implemented to maintain high thermal comfort (temperature variations kept within a small range) and minimize the heating energy consumption.

Activities and objectives:

In the Master's thesis, various ventilation control strategies and methods are to be investigated and their respective advantages and disadvantages are to be compared. The software packages TRNSYS/TRNFlow, ANSYS 12.1 (including Fluent and CFD) as well as Matlab/Simulink are to be applied to the development of ventilation control strategies and the simulation of heat and air flow with particular consideration of CO₂-concentration. The major task is to model the thermodynamic and air flow situation and develop appropriate control strategies.

Desirable knowledge and requirements:

A basic knowledge of thermodynamics, heat transfer theory, and possibly also of aerodynamics as well as of TRNSYS/TRNFlow, ANSYS and Matlab/Simulink programming will be helpful in achieving the above-defined objectives in a time-efficient manner.

Applicants should be keen on programming with TRNSYS/TRNFlow, ANSYS and Matlab/Simulink.

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