

Modeling and Control of a Floor Heating System Using a Heat Pump

9th Semester Project

Cooperated between Aalborg University Esbjerg and Danfoss A/S

1. INTRODUCTION

The use of heat pumps as a solution to provide effective room heating with lower power consumption is gaining market power as days go by. Houses with such heat sources and floor heating instead of radiators are increasing their presence all over Scandinavia. However the reaction times for such systems are sometimes not as fast as desired when the ambient temperature changes. This diminishes the comfort delivered to the end user.

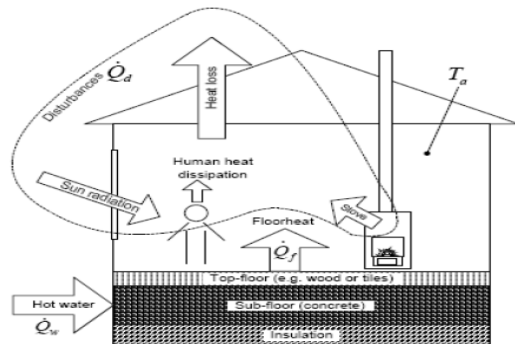


2. OBJECTIVE

The modeling of a floor heating system using heat pump needs to be investigated. Afterwards, a new controller for the expansion valve is expected instead of the current on-off controller.

3. STRATEGY

The modeling is carried out by combining the theoretical modeling (physical principles) and the parameter estimation based on testing data. The PI controller is used for controlling the expansion valve.



4. RESULT

The energy consumption is significantly reduced by using the PI controller comparing with on-off control. Meanwhile more comfort in terms of temperature deviation is also observed.

Power Consumption Comparison

