

The following gives a top-level description of a project offered by Aj Niphon Lapanaphan, for the course "Main Project Part A":

"Improvement of the heat transfer rate of a house roof by the use of an ambient air cooling system"

The overall aim:

- To apply the theoretical and technical knowledge of control theory and partly thermal science to a house roof section so as to improve the heat transfer rate between the roof section and the surrounding.
- To use a micro-controller to control a forced flow of ambient air to reduce the temperature under the house roof.

Description:

This project is a mixture of theory, modelling, and experimentation of both control engineering and thermal science. However, the primary focus here will be in the area of control engineering with a slight concern on the details of thermal science which will be simplified as much as possible. The final outcome will be some measurable data that shows the improvement of the heat transfer rate.

Part of the project includes the student's own extensive research relating to the theory of control engineering and thermal science, ending with a simulation model created through a software package. Besides the simulation model, the student may be required to design and build a real down scaled model with greatly enhanced function and accuracy as a further means of verification of theory and experiment.

Part of the project will include a typical control strategy and architecture, such as PID controlling method, used for the cooling system. This work could also link to industry but not required. Other theoretical and technical competencies will be developed if necessary, in support of the main theme and overall objectives. This may involve such things as heat transfer modelling of structures and/or components, thermal analysis of objects with and w/o the cooling system, and advanced control strategies.

Other points of interest:

- Grant applications may be submitted by the supervisor to one or more institutions, supplementing the budget for a high quality test rig and other project expenses.
- One or more co-supervisors from other Universities may be involved to give some support on the thermal aspects as well as the use of a particular software package.