CLIMA 2000

Session 5 : Control

Summary of discussions

Philippe ANDRE

Fondation Universitaire Luxembourgeoise
ARLON – Belgium

First question :

"How difficult to set up physical models ?"

Phil. HAVES :

"Use of physical models for commissioning operation requires a lot of work. The long term solution is to consider the whole life-cycle of the building so that the model used for design can be re-used for commissioning. Thereby, it provides a direct evaluation of how the plant works."

Jim BRAUN :

"Pay attention to the choice of the physical model ! For FDD, a detailed model including geometry is not necessary".

Arthur DEXTER :

"What is the signification of the term "physical model ?"

Jim BRAUN :

"Aggregated models are still physical because they start from physics".

VAN PASSEN :

"Simple physical models are best because they require less parameters and are consequently easier to tune".

Madjid MADJIDI :

"Physical models are able to detect faults".

Other opinion :

"Physical models make problem in transient conditions".

Second question :

Is it difficult to tune parameters ?

John SEEM :

"For an AHU, the model is difficult to tune manually. Adaptive controllers can do it easily but require simple models".

Gunther LAUCKNER :

Model adaptive control methods are powerful in case of :

- *non linear systems*
- *time varying parameters*
- *changing setpoints*

But commissioning engineers have not the knowledge of adaptive control. A simple model which only includes a global parameter and a time constant is easier to tune.

Arthur DEXTER :

We have to distinguish between developpers and users. The problem of communication is essential and difficult. A solution could be to relate parameters of adaptive controllers to PID parameters.

Third question :

Are advanced methods too complex ? Is it wasted time to develop them ?

JC VISIER :

"From a lot of experience it appears that even when engineers have to install the system, there are problems. Three questions arise :

1. *What is the control algorithm ?*
2. *How is it commissioned ?*
3. *How are faults detected ?*

It is important to promote "user assisted design" and an "evolutionary" approach rather than a revolutionary one. It is important that the engineers appropriate ***their*** *tool.*

Fourth question :

What is the sensitivity of the model to measurement errors ?

Jonathan WRIGHT :

"Not easy to answer to that question. The concept of sensitivity is important. Passive buildings are less sensitive to errors. It is linked to the accuracy of sensors. A 3° C measurement error may be still acceptable".

Jim BRAUN :

"It depends on the application. Models for FDD : modelling errors can be greater than measurements errors".

Arthur DEXTER :

"Errors limit the sensitivity of the scheme".