

Modelling, Control and Fault Diagnosis for Building Energy Management Systems

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Abstract

Recent studies have shown that building represent 40 % of the global energy demand in industrialized countries. Moreover, 90% of the buildings life cycle carbon emissions occur during their operational phase, mainly as consequence of the HVAC (Heating, Ventilation and Air Conditioning), lighting and appliances energy use. These studies has also pointed out that 20% of energy loss are due to poorly maintained, degraded, or improperly controlled HVAC equipment. Within this context, energy efficiency could be improved by developing effective control strategies and continuous commissioning for building Energy Management Systems (BEMS).

One of the challenges in the research area in Modelling, Control and Fault Diagnosis for Building Energy Management systems is due to the fact that Buildings are large-scale complex systems composed of sub-systems interconnected in a variety of ways, which may cause more or less complicated dependencies between local behaviours and external phenomena such as weather conditions. Moreover, the various building components may have different physical structures that require different scales in time or space for their representation. Implementation of performance monitoring, FDD algorithms and control laws require adequate modelling tools adapted to those specific systems.

This invited track aims at gathering research works on operating buildings in an effective way throughout building and components modelling, control, Fault Detection and Diagnosis (FDD).

Papers to be submitted to this invited track are expected to provide recent advances, but not limited, to the following topics :

- Building modelling and HVAC components approaches
- Optimal supervisory control, model based predictive control for BEMS
- Energy optimal for space conditioning systems
- FDD for HVAC and building systems
- Continuous commissioning for BEMS