DMBEA International Doctoral Summer School 2019. Dynamic Methods for whole Building Energy Assessment

GRANADA (SPAIN) SEPT 9TH -20TH, 2019

The main purpose of this two-weeks Summer School is to train the students in a methodology for evaluation of in-situ measured data from a very practical point of view. Many of the dynamic methods can be seen as techniques which bridge the gap between physical and statistical modelling.

The course consists of two week, the first week (level 1) is devoted to general dynamic method techniques and the second week (level 2) is dedicated to assessing the heat transfer characteristics of building envelopes as well as whole building using benchmark data for hands-on exercises.

This summer school comprises 60 hours of doctoral training activities each week (30 hours each level).

- Website DMBEA 2019

Introduction

Careful examination of energy consumption in the building sector, which is about 39% of the final energy consumption in EU-28 is needed in order to identify the specific areas for energy savings. Due to improved insulation levels of buildings this saving potential moves to more dynamic energy use sectors such as gains from appliances, high energy demand and consumer behaviour.

Today, more and more data related to building and building components originate from outdoor testing under time-varying and dynamic conditions, or from real life use of buildings. Dynamic evaluation methods are techniques to analyse time series of data related to dynamic processes and to identify typical parameters of the physical processes for evaluation.

Attendants

The main purpose of this Summer School is to train the students in a methodology for evaluation of in-situ measured data. Many of the dynamic methods can be seen as techniques which bridge the gap between physical and statistical modelling. During the summer course, information on relevant software will be given and software tools will be used in the exercises.

Schedule

Half of the time of the course will be dedicated to lectures and half of the time will be dedicated exercises. These exercises will be based on bench mark data.

Lectures will provide the necessary background information on statistics, measurements and building physics to support the development of mathematical models for energy performance assessment of building components and whole buildings.

Fuente: https://escuelaposgrado.ugr.es/doctorado/escuelas/escuelasdeverano/2019/idss-2019/dmbea_2019/index

Different building envelopes will be characterised using different analysis approaches for hands-on examples through exercises. This will guide students through the application of different analysis approaches. These examples are designed to provide participants with the skills to apply the different techniques of modelling and validation.

The exercises will be designed to train the students on the different aspects which are necessary to carry out the analysis in a realistic case study. Benchmark data will be provided to the students for the necessary exercises. First, during the 1st week (level 1), simple walls structures will be used to acquire skills in statistical methods and tools for data based modelling. Afterwards, during the 2nd week (level 1), more complex and realistic case studies will be considered including a wide representation of the physical phenomena that are present in actual buildings.

The aim is to put the focus on how to transfer the main features of the physical systems to different modelling frameworks, in order to build candidate models. The different approaches will be presented “bottom up”, starting from the simplest, and gradually increasing complexity highlighting and discussing the main features added by each level of the corresponding modelling approach. The following approaches will be considered: average and pseudo-dynamic methods, transfer function models (using the statistical software R) and continuous-time state space models (CTSM-R).

Before the Summer School takes place, reading material will be made available to the students and some homework exercises will be made available. The students should do these exercises and submit them several weeks before the course. The aim is to get a minimum homogeneous starting level with the objective of optimising the usefulness of lectures and exercises.

Multidisciplinarity: This course combines complementarily the following disciplines: metrology, statistics, building physics, mathematics, civil and mechanical engineering and architecture.

Contact

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