

Validation and Application of the Room Model of the Modelica *Buildings* Library

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To support the design and operation of low energy buildings, the Lawrence Berkeley National Laboratory has been developing a free and open source Modelica *Buildings* library for building energy and control systems [1]. Version 1.1 Build1 of the library contains about 200 component models for building energy and control systems. These component models can be used for (1) rapid prototyping of innovative building systems, (2) design of building energy systems, (3) performance analysis of existing building systems, (4) development, specification and optimization of building control sequences, and (5) model-based operation for controls, fault detection and diagnostics.

Recently, we implemented window and room models into the *Buildings* library to extend its capability to whole building energy simulation [2]. However, the models were not systematically validated against reference data in [2]. In [3], we presented the validation of the window model which is an important part of the room model. This paper is to validate the room model and to show an application where the model is used as part of a controls framework of a window shading device of a building. After the introduction, we will briefly describe the physics and implementation of the room model. Then we will validate the room model using a subset of ANSI/ASHRAE Standard 140 [4], which is a standard test suite for evaluating building energy simulation tools. After validating the room model, we will describe an application where the room model is part of a simulation-based controls framework used to control a window shading device of a test cell for reducing building energy consumption.

References

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