

NUMERICAL METHODS FOR BUILDING ENERGY SIMULATION

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ABSTRACT

In the field of building construction, thermal analyses are being run from the early stages of design to determine how buildings depend on their surroundings and what benefits can be obtained by adapting buildings to those surroundings. Many factors must be analyzed such as, sunlight, terrain, and the atmosphere which acts as energy sources and sinks, influencing the design of new buildings. The effects of these factors must be properly controlled. That is why it is necessary to develop new design strategies, introducing new materials and selecting locations and orientations, etc., aiming to achieve a more efficient and rational use of natural resources.

A large body of literature exists on this topic. For a more specific analysis of the climate and its variables, specific meteorological and solar bioclimatic design studies were modeled. Optimized building envelopes can be used to reduce significantly heating and cooling loads, so numerical methods capable of simulating accurately the thermal behavior of such configuration can be of a great help. Experimental processes carried out for validation purposes are also welcome.

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