Solar indoor temperature regulation method

This increases auxiliary heating output, leading to unstable heating stability and indoor temperature. To address these issues, this paper proposes a model predictive control (MPC)-based day-ahead operation regulation method for solar district heating systems. A sequence-to-sequence long short-term memory (Seq2seq-LSTM) prediction model is ...

In order to take better use of the attached sunspace to prevent heat transfer or promote natural ventilation, this paper presented a zero-state response control strategy for the opening and closing time of active interior window in the ASPSHS.

Taking Lanzhou as an example, the indoor temperature fluctuation increased by 0.47 °C when the SHGC increased from 0.59 to 0.79. However, the average indoor temperature increased to 14.73 °C and the corresponding DH raised by 114.53 °C·h. At this time, the indoor temperature was close to thermal comfort throughout the day. It illustrated ...

indoor temperature is mainly controlled by Air-Handling Unit (AHU), so a proper indoor temperature control strategy plays an important role in temperature regulation. In this paper, we consider the temperature regulation of a room effected by solar radiation, floor temperature and walls temperature. The nonlinear dynamic model of the room is ana-

Improving the solar thermal storage capacity of the north wall of the solar greenhouse can effectively enhance the indoor thermal environment during the night-time in winter. However, the indoor thermal environment is also influenced by the interaction between the spatial parameters of the solar greenhouse and outdoor meteorological conditions.

Improving the solar thermal storage capacity of the north wall of the solar ...

A new-type solar-based greenhouse heat and humidity regulation system is proposed to solve the shortcomings of low indoor temperature and high relative humidity in winter greenhouses at night in high altitude areas, by combining the active control process of heat and humidity inside greenhouse with the passive system of ground heat exchange, The main ...

Preparation and regulation of nanowire-based smart windows. The interface co-assembly method is a versatile and effective approach to preparing smart windows with tunable properties, which ...

Thermochromic smart windows realize an intelligent response to changes in environmental temperature through reversible physical phase transitions. They complete a real-time adjustment of solar transmittance,

create a livable indoor temperature for humans, and reduce the energy consumption of buildings. Nevertheless, conventional materials that are ...

In this paper, two independent passive houses in cold areas in China were selected as research objects, which had almost the same geographic locations, building shapes, and floor plans, through simulation and on-site measurement to discuss the influence of solar heat gain on non-heating sunny and overcast winter days on the indoor thermal enviro...

In solar district heating systems, MPC integrates key parameters such as solar radiation intensity, outdoor temperature, building load, heating temperature, and water tank temperature. By introducing predictive and day-ahead control methods, MPC effectively compensates for the ...

3 ???· Harnessing solar energy has gained popularity as an efficient method to power homes, businesses, and other utilities. One such efficient method is through the use of solar thermoelectric ...

Here, we develop a solar and thermal regulatory thermochromic window (STR smart window) with an ultrabroadband positive regulation covering both solar and thermal spectra.

Scientists have been focusing on developing thermochromic materials for smart windows to modulate solar irradiation to reduce energy demand for interior comfort. Most studies show visible-light modulation when the temperature rises but fail to show privacy protection at night when the temperature drops.

In solar district heating systems, MPC integrates key parameters such as solar radiation intensity, outdoor temperature, building load, heating temperature, and water tank temperature. By introducing predictive and day-ahead control methods, MPC effectively compensates for the inherent intermittency and variability of solar energy, as well as ...

In order to take better use of the attached sunspace to prevent heat transfer or promote natural ventilation, this paper presented a zero-state response control strategy for the opening and closing time of active interior ...

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