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Indoor temperature predictions in an energy efficient solar house

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This paper presents results of long term temperature monitoring in an energy efficient solar house at the University of Fort Hare, South Africa. Measured data was stored by a datalogger every 10 minutes. Formulas for predicting the daily indoor maximum, average and minimum temperatures were developed on the basis of outdoor climatic parameters. Passive solar housing aims to raise and lower indoor temperatures in winter and summer respectively. As a result, analysis of the data and development of predictive formulas of indoor temperature were done separately on part of the winter and summer seasons. The models were then validated against measurements taken in different time periods. Results indicated that indoor maximum, average and minimum temperatures can be predicted on the basis of outdoor temperature. Prediction of maximum indoor temperature was improved by incorporating daily solar irradiance in the formula. It was also revealed that indoor temperatures are affected by outdoor temperatures of the previous two days. The different ways at which the house is cooling and heating were also investigated.

Level (Hons, MSc,
 PhD, other)?

PhD

Consider for a student
 award (Yes / No)?

Yes

Would you like to
> submit a short paper
> for the Conference
> Proceedings (Yes / No)?

Yes

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