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TAKAGI-SUGENO ALGORITHM FOR GLOBAL SOLAR IRRADIATION USING AIR TEMPERATURE DATA

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Abstract

Air temperature is certainly the most measured surface meteorological parameter and accurate forecasting of air temperature is usually performed worldwide. This fact inspired the idea that a predicted value of air temperature may be used as input in solar radiation air temperature-based models, aiming to generate the reference solar radiation year or to forecast solar irradiation. Following this, a Takagi-Sugeno fuzzy model for estimating global solar irradiation via air temperature data is reported here. This is intended to be a simple and accurate tool for solar engineering use. Since air temperature-based models are sensitive to the origin locations, an approach for enlarging the area of application is presented. A critical assessment of the model performance against measured data is conducted, with overall results demonstrating a level of accuracy suitable for most practical applications.

Key words: air temperature, fuzzy logic, model performance, solar irradiation

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