

# ESTIMATION OF SOLAR RESOURCE USING ARTIFICIAL NEURAL NETWORKS AND COMPARISON WITH OTHER METHODS

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## **Abstract**

Artificial Neural Network (ANN) based models for the estimation of monthly mean daily and hourly values of solar global radiation are presented in this paper. Solar radiation data from 13 stations spread over the India and around the year have been used for training and testing the ANN. A multi layer feed forward network with sigmoid function and back propagation technique has been used. Number of input parameters considered is 9. The solar radiation data from 11 locations (6 from south India and 5 from north India) were used for training the Neural Networks and data from remaining 2 locations (one each from south India and north India) were used for testing the estimated values. The results of the ANN model have been compared with other empirical regression models for predicting daily solar global radiation, such as Angstrom (1924), Hargreevs *et al.* (1985) and Supit and Venkappel (1998). The relative mean deviations of predicted radiation values from these models are 43.9%, 27.39% and 27.71%, respectively as compared to maximum deviation of predictions from present ANN model is only 12.5%. Ability of the present model to assess hourly variation of global radiation has been compared with and found to be superior to Gopinathan *et al.* (1992) model. The solar radiation estimations by ANN are in good agreement with the actual values (maximum mean relative deviation has been found as 4.07%). The results indicate that the ANN model shows promise for evaluating solar global radiation possibilities at the places where monitoring stations are not established.