Comparison of Solar Radiation Models

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Abstract : Up to now, most validation studies have been based on the MBE and RMSE, and therefore, focused only on long and short terms performance to test and classify solar radiation models. This traditional analysis does not take into account the quality of modeling and linearity. In our analysis we have tested 22 solar radiation models that are capable to provide instantaneous direct and global radiation at any given location Worldwide. We introduce a new indicator, which we named Global Accuracy Indicator (GAI) to examine the linear relationship between the measured and predicted values and the quality of modeling in addition to long and short terms performance. Note that the quality of model has been represented by the T-Statistical test, the model linearity has been given by the correlation coefficient and the long and short term performance have been respectively known by the MBE and RMSE. An important founding of this research is that the use GAI allows avoiding default validation when using traditional methodology that might results in erroneous prediction of solar power conversion systems performances.