STUDY OF MODELLING APPROACHES FOR ESTIMATION OF GLOBAL SOLAR RADIATION FOR SRI LANKA.

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There are 22 metrological stations in Sri Lanka of which only 5 stations have monthly averages for solar radiation and sunshine hours, and the remaining 17 stations have only the monthly average for sunshine hours data. Since the knowledge of solar radiation in a given location is important today in the development of solar based technology, it is a challenging issue to estimate the solar radiation at a given location where the solar radiation measurements are not available, using the measurements available from other stations.

There are several equations and approaches proposed in literature to estimate global radiation from sunshine hours, using only the relative duration of sunshine. The aim of this project is to study the different approaches proposed in the literature with the intention of finding the best approach to estimate the monthly average of solar radiation of the seventeen places where there are no solar radiation measurements available, using the solar radiation data from the other five stations

The most of the approaches use the original Angstrom formulae or the modified Angstrom formulae as the basis for the development of the estimators. In this project we have chosen two approaches from the literature for the study, and have also proposed an approach to develop the estimator. The best approach and the respective model are decided using statistical criteria. Our study shows that the second order polynomial model developed using the data from all the 5 stations and the least squares method give the most reasonable estimator, to estimate the solar radiation for the other 17 metrological stations where the solar radiation data are not available.