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Optimization of Tilt Angle for Solar Collectors: A Case Study for Bursa, Turkey

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Abstract : This paper deals with the optimum tilt angle for the solar collector in order to collect the maximum solar radiation. The optimum angle for tilted surfaces varying from 0[◦] to 90[◦] in steps of 1[◦]was computed. In present study, a theoretical model is used to predict the global solar radiation on a tilted surface and to obtain the optimum tilt angle for a solar collector in Bursa, Turkey. Global solar energy radiation on the solar collector surface with an optimum tilt angle is calculated for specific periods. It is determined that the optimum slope angle varies between 0[◦] (June) and 59[◦] (December) throughout the year. In winter (December, January, and February) the tilt should be 55[◦], in spring (March, April, and May) 19.6[◦], in summer (June, July, and August) 5.6[◦], and in autumn (September, October, and November) 44.3[◦]. The yearly average of this value was obtained to be 31.1[◦] and this would be the optimum fixed slope throughout the year.

Keywords : Bursa, global solar radiation, optimum tilt angle, tilted surface
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