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Design and Study of a Parabolic Trough Solar Collector for Generating Electricity

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Abstract : This paper presents a design and study of Parabolic Trough Solar Collector (PTC). Mathematical models were used in this work to find the direct and reflected solar radiation from the air layer on the surface of the earth per hour based on the total daily solar radiation on a horizontal surface. Also mathematical models had been used to calculate the radiation of the tilted surfaces. Most of the ingredients used in this project as previews data required on several solar energy applications, thermal simulation, and solar power systems. In addition, mathematical models had been used to study the flow of the fluid inside the tube (receiver), and study the effect of direct and reflected solar radiation on the pressure, temperature, speed, kinetic energy and forces of fluid inside the tube. Finally, the mathematical models had been used to study the (PTC) performances and estimate its thermal efficiency.

Keywords : CFD, experimental, mathematical models, parabolic trough, radiation
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