

## Numerical Modeling of a Parabolic Trough Solar Collector Under Climatic Conditions of Errachidia, Morocco

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### Abstract:

In this work, we are interested in the study and the modeling conversion of solar energy into thermal energy using parabolic through concentrator (PTC) under the climatic conditions of an area in south-east of Morocco. Water is used as heat transfer fluid (HTF). A mathematical model is established from the energy balance equation applied to the absorber tube. The resulting equations system is solved by the finite difference method.

The modeling is done by a calculation and programming procedure. The obtained results, for typical days are the change in the outlet temperature of the HTF, the absorber tube temperature, the glass envelope temperature, the useful power and the solar irradiance as a function of time. As well as, we did examine the effect of wind speed on the distribution of the HTF temperature at the outlet. For that purpose, our choice fell on Errachidia city which represent the South -East of our country.

**Keywords:** Solar thermal energy, parabolic trough collector, HTF outlet temperature, numerical modeling, simulation.