

**THEORETICAL AND NUMERICAL PREDICTIONS OF PERFORMANCE OF
THE TOP-CONVERGENT SOLAR CHIMNEY**

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Abstract

Performances of the top-convergent solar chimney are predicted with a new theoretical model which is different in significant ways from the models proposed in the literature in that it allows interaction of flows in the greenhouse portion and the chimney portion through the small, but significant, pressure difference traditional ignored in the literature. For the top-convergent solar chimney, the results obtained by the newly proposed theoretical model are qualitatively different from the results predicted by an established model in the literature in that the efficiency is predicted to remain the same as in the straight chimney. Numerical predictions are also made by numerically integrating the full, quasi-one dimensional Euler's equations using the finite volume method. Results of the numerical and theoretical predictions compare very well with each other, qualitatively as well as quantitatively.

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