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Peter Vorobieff* (kalthoth@unm.edu), Department of Mechanical Engineering, MSC01 1150, The University of New Mexico, Albuquerque, NM 87131, and **Vakhtang Putkaradze, Andrea Mammoli** and **Nima Fathi**. *Optimal design of an inflatable, free-standing solar updraft tower.*

A solar chimney uses temperature difference between the air in a greenhouse heated by the sun and the air at an elevation above the greenhouse to produce an updraft flow and harvest its energy. Recently, a novel design was proposed for solar chimneys, with the chimney that generates the updraft implemented as a self-supporting, free-standing stack of inflatable toroidal balloons. Stability of such an inflatable chimney would depend on many factors, including shape, overpressure, wind loading, and buoyancy of the gas used for inflation. Surprisingly, the system of difference equations describing the shape of the tower under fairly realistic constraints allows an explicit solution. (Received February 11, 2013)