

## Documents

Alsabery, A.I., Hashim, I., Chamkha, A.J., Saleh, H., Chanane, B.

**Effect of spatial side-wall temperature variation on transient natural convection of a nanofluid in a trapezoidal cavity**  
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### Abstract

**Purpose** - This paper aims to study analytically and numerically the problem of transient natural convection heat transfer in a trapezoidal cavity with spatial side-wall temperature variation. **Design/methodology/approach** - The governing equations subject to the initial and boundary conditions are solved numerically by the finite difference scheme consisting of the alternating direction implicit method and the tri-diagonal matrix algorithm. The left sloping wall of the cavity is heated to nonuniform temperature, and the right sloping wall is maintained at a constant cold temperature, while the horizontal walls are kept adiabatic. **Findings** - It is shown that the heat transfer rate increases in non-uniform heating increments, whereby low wave number values are more affected by the convection. The best heat transfer enhancement results from larger side wall inclination angle; however, trapezoidal cavities require longer time compared to that of square to reach steady state. **Originality/value** - The study of natural convection heat transfer in a trapezoidal cavity filled with nanofluid and heated by spatial side-wall temperature has not yet been undertaken. Thus, the authors of the present study believe that this work is valuable. © Emerald Publishing Limited.

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