

역사다리꼴 흰의 성능 해석

한영민[†](강원대 원)
강형석*(강원대)

Performance Analysis of Reversed Trapezoidal Fins

Young Min Han and Hyung Suk Kang

Key Words: Fin Effectiveness (흰 유용성), Fin Efficiency (흰 효율), lateral slope (측면 기울기)

Abstract : Heat loss, fin effectiveness and fin efficiency of reversed trapezoidal fins with various lateral slope are presented as a function of Biot number, dimensionless fin length and lateral slope. The shape of reversed trapezoidal fins becomes rectangular profile when the value of lateral slope is 0. The height of fin base becomes one half of fin tip height when the lateral slope is given as the reciprocal of dimensionless fin length. Temperature distribution with the variation of lateral slope at the fin tip is presented. The one dimensional analytic method is used for this analysis. One of results shows that heat loss and fin effectiveness increases linearly while fin efficiency decreases very slightly as the value of lateral slope increases.

3차원 정육면체 캐비티내의
자연대류 현상에 관한 수치해석적 연구

명 현 국[†](국민대) · 김 종 은*(국민대 원) · 안 종 기*(국민대 원)

Numerical Study on the Nature of
Natural Convection in a Cubical-Cavity

Hyon Kook Myong, Jong Eun Kim and Jong Ki Ahn

Key Words: Numerical Study(수치해석적 연구), Natural Convection(자연대류), Cubical Cavity(3차원 정육면체 캐비티), Unstructured Cell-Centered Method(비정렬 셀 중심 방법), Rayleigh Number(Ra수), Benchmark Solution(검증용 해)

Abstract : Natural convection flows in a cubical air-filled cavity that has one pair of opposing faces isothermal at different temperatures, T_h and T_c , respectively, the remaining four faces having a linear variation from T_c to T_h are numerically simulated by a solution code(PowerCFD) using unstructured cell-centered method. Special attention is paid to three-dimensional flow and thermal characteristics according to the variation of inclination angle Θ of the isothermal faces from horizontal: namely $\Theta = 0^\circ, 15^\circ, 30^\circ, 45^\circ, 60^\circ, 75^\circ$ and 90° . Comparisons of the average Nusselt number at the cold face are made with benchmark solutions and experimental results found in the literature. It is demonstrated that the average Nusselt number at the cold face has a maximum value around the inclination angle of 50° . It is also found that the code is capable of producing accurately the nature of the laminar convection in a cubical air-filled cavity with differentially heated walls.