



## **A Numerical Study of Channel Flow in a Vertical Plain Fin Heat Exchanger**

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### **Abstract**

Natural convection heat transfer in a narrow channel flow is investigated to get the maximum performance of a plane fin heat exchanger which has two tubes. First, a narrow vertical channel flow with isothermal heated surface is studied with the following parameters: the Prandtl number, the Nusselt number, and the plate width ratio. These parameters are suggested to get grid and convergence independency. After the test investigation, the vertical plain fin with two tubes are studied. Using the Finite Volume Method (FVM) which is selected as a numerical tool, the optimum design arrangements are suggested to get a maximum thermal performance in a plain fin heat exchanger.

**Keywords:** Channel flow; Computational fluid dynamics; Heat exchanger; Plain fin