Dynamic model of an helical double-pipe evaporator using second-order approach in temporal terms

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\textbf{ABSTRACT}

A dynamic model to describe the thermo-hydraulic fluid behavior of a helical double-pipe vertical evaporator with a second-order approach in temporal terms was presented. The model considers equations of continuity, momentum, and energy in each flow; these based on control volume formulation. Liquid phase, two-phase, and vapor flow were considered in the analysis. Conduction in the internal pipe is assumed with a second-order approach in the temporal terms. Also, the heat transfer in the external wall is considered adiabatic. Governing balance equations are discretized. Thermo-physical properties of water were calculated in each point of mesh. Numerical results with the first- and second-order approximation in temporal terms are compared considering the computer’s consumption time. Typical perturbations of thermal and fluid flow in the two-phase flow were presented for a double-pipe vertical evaporator. The evaporator is part of a water purification system coupled to a heat transformer. The aim of this work is to identify the advantages of second-order temporal approach.

\textit{Keywords:} Heat transformer; Simulation time; Water purification

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