Numerical Analysis of Transient Response in a Single-Pass Cross flow Heat Exchanger

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***Abstract*— Crossflow heat exchangers are commonly employed in process critical applications in industries. A heat exchanger can be subjected to flow or temperature perturbation during its regular operation. It should be noted that a heat exchanger would require a finite time to overcome such perturbations. In this study, the transient response of a single-pass crossflow heat exchanger with variable inlet temperatures and mass flow rates was determined. Herein, the analysis of the transient performance of cross flow heat exchangers is conducted on a dimensionless basis. In every instance, the energy balance equations were solved using an explicit finite difference method. Numerical predictions were obtained for cases where both the fluids were subjected to step changes in inlet temperature, coupled with step mass flow rate change of the fluids. The analysis can be readily extended to study different flow circuiting and inlet conditions.**

***Index Terms*— Cross Flow Heat Exchangers, Transient Response**

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