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Effect of Local Junction Losses in the Optimization of T-shaped Flow Channels SRINIVAS KOSARAJU, Northern Arizona University — T-shaped channels are extensively used in flow distribution applications such as irrigation, chemical dispersion, gas pipelines and space heating and cooling. The geometry of T-shaped channels can be optimized to reduce the overall pressure drop in stem and branch sections. Results of such optimizations are in the form of geometric parameters such as the length and diameter ratios of the stem and branch sections. The traditional approach of this optimization accounts for the pressure drop across the stem and branch sections, however, ignores the pressure drop in the T-junction. In this paper, we conduct geometry optimization while including the effect of local junction losses in laminar flows. From the results, we are able to identify a non-dimensional parameter that can be used to predict the optimal geometric configurations. This parameter can also be used to identify the conditions in which the local junction losses can be ignored during the optimization.

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