

A physical solution for solving the zero-flow singularity in static thermal-hydraulics mixing models

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For the 0D-1D modelling of thermal-hydraulics systems, it is common practice to use static mixing models to compute the mixing specific enthalpy in fluid junctions such as mergers or splitters. However, this simplification leads to a well known singularity when the mass flow rate inside the junction goes to zero. The origin of the singularity is explained, and a rigorous physical solution is proposed to eliminate the singularity. A prototype implementation has been developed in the ThermoSysPro library for power plant modelling that illustrates the interest of the proposed solution, shows the impact on the structure of the library and enables to evaluate the computing overhead with respect to several possible variants.

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