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A simplified approach to compute distribution matrices for the mapping method

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Abstract

The mapping method has proven its efficiency as an analysis and optimization tool for mixing in many different flow devices. In this paper, we present a new approach to compute the coefficients of the distribution matrix, which is, both in terms of computational speed and complexity, more easy to implement as compared to the original approach developed in our group. The new approach is of the same accuracy as the original approach as is demonstrated by studying mixing in the standard two-dimensional cavity flow. The power of the new approach is that it can easily be implemented to analyze mixing in complex geometries where the original approach fails. This is demonstrated by analyzing mixing in a static Sulzer SMX mixer. To enhance the availability of the mapping method for general users of CFD in commercial packages like Fluent, CFX, Star CD, etc., we finally add an example of an implementation of the new

approach in Matlab, applying it to study mixing in a time periodic sine flow (TPSF).



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Keywords

Mixing; Mapping method; Interfacial tracking; SMX; CFD

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