

CFD AS A TOOL FOR OPTIMIZATION OF SOLID BOWL CENTRIFUGES: ACHIEVEMENTS AND CHALLENGES

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ABSTRACT

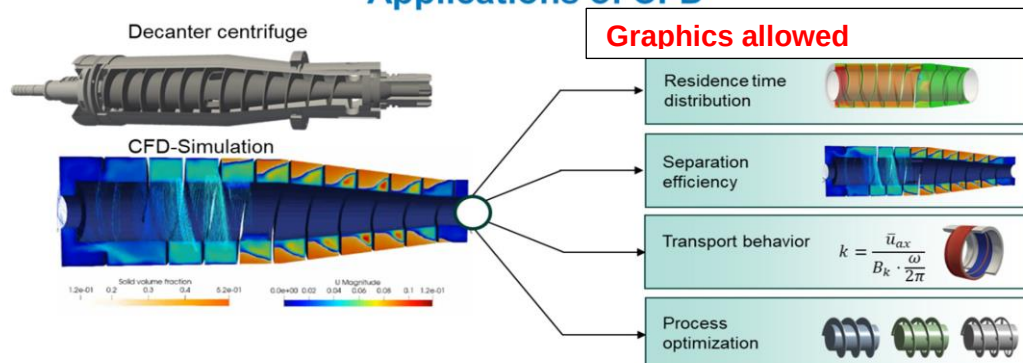
Computational Fluid Dynamics (CFD) is now well established in many areas of the process industry and is a powerful tool for process optimization. CFD simulation in the field of solid-liquid separation poses several challenges, such as the description of particle and apparatus size scales, complex computational domains, and the integration of the material behavior of the disperse and continuous phases.

This talk presents the development of a framework for the CFD simulation of the long-term process behavior for different types of solid bowl centrifuges. This enables an in-depth understanding of the physical processes in the centrifuges and the use of this data for the development of real-time optimization.

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For the applicability of the presented framework is the integration of the material behavior of the suspension, which is measured experimentally on laboratory equipment. However, this leads to the fact that CFD simulations of multiphase flows for solid bowl centrifuges are always based on assumptions that lead to deviations between experiment and simulation. Therefore, developed models require extensive verification by comparing simulation results with experimental data. Furthermore, the influence of the assumptions made, and the limitations of the developed framework will be discussed in this presentation. Finally, the challenges for a broad applicability of the developed CFD models in solid- liquid separation are discussed and future trends for CFD simulation are shown.

Applications of CFD



Graphics allowed

Figure: Summary of different applications for the extended mixture model.

KEYWORDS:

Solid bowl centrifuges, Multiphase flow, CFD

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