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## Multi-Objective Optimization of a Grease Mechanical Filter using modeFRONTIER & STAR-CCM+



This presentation deals with the multi-objective optimization of a mechanical filter for solid suspended substances used in extractor hoods of industrial kitchens, coupling STAR-CCM+ with modeFRONTIER. The filter performance has been analyzed by means of a STAR-CCM+ multiphase and unsteady model, that has been experimentally validated in Trieste University laboratory through a Laser Doppler velocimetry.

Since the baseline performance is not satisfactory for particles of diameter less than 10 micron, the geometry has been optimized through the coupling of multi-objective optimization environment modeFRONTIER with STAR-CCM+, in order to maximize the separation efficiency minimizing at the same time the pressure losses. The coupling to STAR-CCM+ was accomplished via modeFRONTIER's new direct interface with Optimate. This integration allows the geometry to be modified either in the STAR-CCM+ CAD Modeler, or, as in this case, in a separate CAD tool.

Efficient optimization algorithms based on adaptive Response Surfaces have been applied, and the CFD simulations have been distributed automatically on the available computational resources through the Grid system. The separation efficiency of the optimized geometry has been improved significantly by the automatic execution of a small number of CFD simulations.

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