

APPLICATION OF HYBRID KT/PISO SCHEME FOR DIFFERENT COMPRESSIBLE FLOWS

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In previous year authors proposed hybrid scheme for compressible flows simulation. This scheme was a mixing of two approaches - standard PISO/PIMPLE algorithm for compressible flows and implicit modification of the Kurganov-Tadmor scheme, previously implemented in the rhoCentralFoam solver. Such blending of two schemes allows us to solve compressible flows in the wide range of Mach numbers using just one solver.

The scheme was tested for the several analytical and experimental two-dimensional and one-dimensional test cases. In recent times this method was extended on multi-component simulation of ideal gas mixtures. Hybrid scheme was coupled with semi-implicit MULES algorithm to achieve boundedness of mass fraction transport. Further investigations showed that this scheme can also be extended on two-phase homogenous flows.

We proposed and considered several test cases for two-phase flows. This cases were defined for simple problems with analytical solution as well as for geometries close to "real", for example - two phase flow in ERCOFTAC compressor, see Fig. 1.

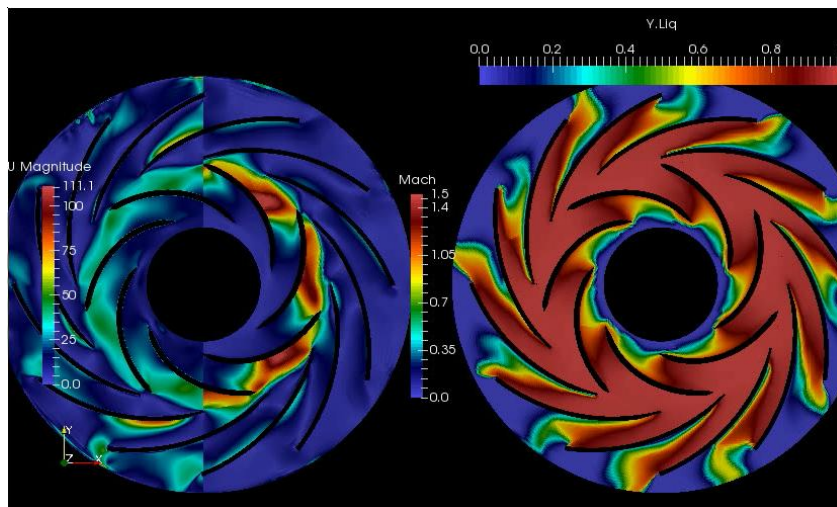


Figure 1: Visualization of compressible homogeneous two-phase flow in "dummy" compressor - velocity magnitude, local Mach number, liquid mass fraction