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Numerical Computation of Compressible Viscous Flow Through a Male Rotor-Housing Gap of Screw Compressors

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Gas leakage is a phenomenon that has a lot of different features, many of significant importance. Compressor engineers are mostly interested in estimation for the mass flow rate. It has a great influence on the compressor performance, especially with regard to its internal efficiency. Therefore it is necessary to make reasonable estimates for mass flow rates or to investigate the details of the leakage flow. The aim of this contribution is to show the numerical computation of compressible viscous fluid flow through a 2D model of the male rotor-housing gap in the srew compressor. Numerical solution of the nonlinear conservative system of the compressible Navier–Stokes equations is obtained by means of the cell-centred finite volume formulation of the explicit two-step TVD MacCormack scheme proposed by Causon on a structured quadrilateral grid. The viscous part is approximated by using a finite volume version with central differences.

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