

# LINEAR AND NON-LINEAR HIGH ORDER ACCURATE RESIDUAL DISTRIBUTION SCHEMES FOR THE DISCRETIZATION OF THE STEADY COMPRESSIBLE NAVIER-STOKES EQUATIONS

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A robust and higher order accurate Residual Distribution scheme for the discretization of the steady Navier-Stokes equation is presented. The proposed method is very flexible; it is formulated for unstructured grids, regardless the shape of the elements and the number of spatial dimensions. The approximation of the solution is obtained using standard Lagrangian finite elements. To cope with the fact that the normal component of the gradient of the numerical solution is discontinuous across the faces of the elements, the gradient of the numerical solution is recovered at each degree of freedom of the grid and then interpolated with the same shape functions used for the solution. Linear and non-linear schemes are constructed, and their accuracy is tested with the method of the manufactured solutions. The numerical method is also used for the discretization of smooth and shocked laminar flows.