

## A HIGH ORDER COMPACT SCHEME FOR HYPERSONIC INTERNAL FLOW WITH TURBULENCE MODELS

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**Abstract.** Using the same stencils, the compact schemes can get higher accuracy and resolution compared to the traditional ones. In order to describe the internal flow accurately, and capture the complex flow structures, a high order compact scheme combined with TVD limiters is applied here. The  $k-\omega$  turbulence model, the shear-stress transport (SST) turbulence model are reevaluated for hypersonic internal flow. Some results of low-order schemes are also present. When compared to the results of the high-order compact schemes, the resolution properties of shock wave are weaker, some important flow structures are neglected, and the loss of accuracy in the vicinity of high gradients. The high order compact TVD algorithm applied here is proven to have good resolution properties and robust of capturing shock waves and contacts, and it is suitable for internal flow computation.

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