Evaluation of the Partially-Averaged Navier-Stokes method for high Mach flows BRANISLAV BASARA, AVL List GmbH — The performance of the variable-resolution Partially-Averaged Navier-Stokes (PANS) method has been well documented for predictions of separated and wall bounded flows but not for the high speed flows. This will be demonstrated in the present work. Furthermore, some of the latest variants of the PANS models will be discussed as well. For the present study, we use the PANS ζ-f model which is based on the near-wall RANS ζ-f model. This RANS model is a variant of the $v^2 - f$ model, the difference being that a transport equation for the wall-normal velocity scale ratio ζ is included rather than one for the velocity scale. Additionally, an elliptic relaxation equation for f, which is a parameter closely related to the pressure strain redistribution term, is solved. It is expected that such PANS variant could accurately predict a flow considered here. A test case is a transonic flow over a channel bump. It has been used as a benchmark for turbulence modelling in shock-wave/boundary-layer interactions. Measurements, but also previous RANS calculations, are used as a reference point to the present calculations.

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