

Daily Research Report

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1 Current Research Direction

2 Research Performed

2.1 Results

Hypothesis 1:

By using a composite trapezoidal rule numerical integration technique, the speed of sound is approximated using the tangential mach number. A second order convergence for the approximated speed of sound is expected (Refer to analysis).

Why is this my hypothesis?: As the grid spacing gets smaller from one iteration to the next, the computed order of accuracy is expected to approach a known value, which is the leading error term of the truncated term in the Taylor series used to derive the scheme, which in this case is the composite trapezoidal rule. By using the MMS, a computed order of accuracy was found.

Hypothesis 2:

What happened: In the Methods chapter, the MMS test case methodology was presented.

$$\bar{A} = \frac{711 \tanh\left(\frac{r}{30} - \frac{1}{30}\right) + 711 \tanh\left(\frac{r}{30} - \frac{11}{600}\right) + 711 \tanh\left(\frac{r}{30} - \frac{1}{300}\right) + 11344}{11376} \quad (1)$$

The $L2_{norm}$ error of the two grids ϵ_{grid_i} and $\epsilon_{grid_{i+1}}$

3 Issues and Concerns

4 Planned Research