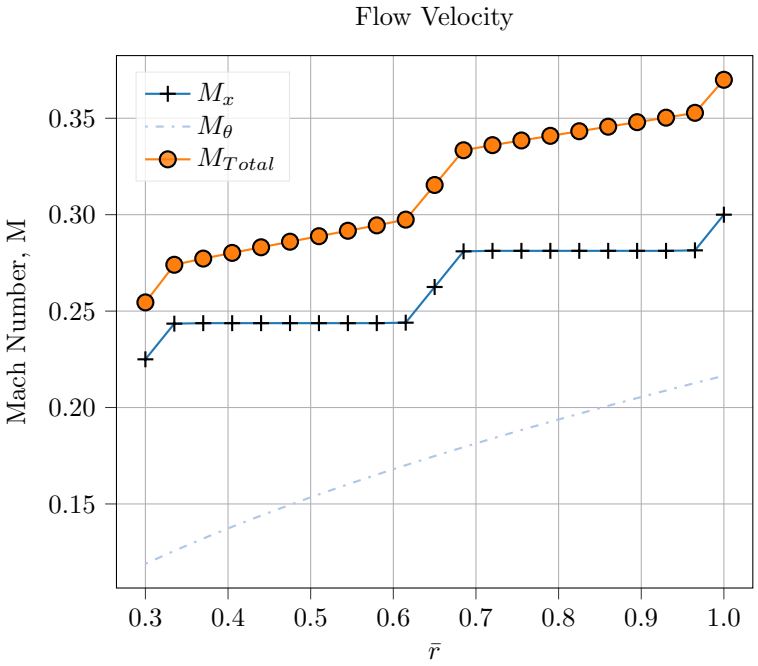

Figure 1: Mach distribution for method of manufactured solution case

1 Results

```
REAL IMAG
  132.45163135362651        0.0000000000000000
  122.43576389117432        0.0000000000000000
  122.34450419968586        0.0000000000000000
  122.36772555548241        0.0000000000000000
  122.38391865750972        0.0000000000000000
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  122.39827321142887        0.0000000000000000
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  122.39397598289989        0.0000000000000000
  122.26217572814555        0.0000000000000000
  113.63723037295571        0.0000000000000000
  106.14582857355705        0.0000000000000000
  106.03962929251533        0.0000000000000000
  106.02527834465930        0.0000000000000000
  106.01014737595943        0.0000000000000000
  105.99376162151984        0.0000000000000000
  105.97624884854034        0.0000000000000000
  105.95771859082710        0.0000000000000000
  105.93764116006238        0.0000000000000000
  105.82357855219932        0.0000000000000000
  99.278429398464695        0.0000000000000000

#   j       Re{gam}       Im{gam}      Re{gam}/k      Im{gam}/k      kappa
    1 -0.413625380697E+02 -0.445557345680E+01 -0.137875126899E+01 -0.148519115227E+00 -0.716974496085E+00  0.772325075550E-01
    2 -0.368543850968E+02  0.000000000000E+00 -0.122847950323E+01  0.000000000000E+00 -0.814014395335E+00 -0.000000000000E+00
    3 -0.410609869384E+02  0.893929136549E-01 -0.136869956461E+01  0.297976378850E-02 -0.730617066165E+00 -0.159060931508E-02
    4 -0.409179157657E+02 -0.182993550805E+00 -0.136393052552E+01 -0.609978502684E-02 -0.733160510023E+00  0.327884845864E-02
    5 -0.398233007529E+02  0.129985845275E-02 -0.132744335843E+01  0.433286150918E-04 -0.753327810626E+00 -0.245891099890E-04
    6 -0.388970982530E+02 -0.103039846710E+00 -0.129656994177E+01 -0.343466155700E-02 -0.771260346581E+00  0.204309708062E-02
    7 -0.388989792043E+02  0.101102062135E+00 -0.129663264014E+01  0.337006873783E-02 -0.771223254607E+00 -0.200448091446E-02
    8  0.215234419152E+02  0.100926800293E+01  0.717448063839E+00  0.336422667642E-01  0.139077106075E+01 -0.652154398233E-01
    9  0.238271901517E+02  0.462435695669E-02  0.794239671724E+00  0.154145231890E-03  0.125906574292E+01 -0.244358205484E-03
   10  0.236791559644E+02 -0.389784729957E-02  0.789305198812E+00 -0.129928243319E-03  0.126693701550E+01  0.208551649055E-03
   11  0.225616501041E+02  0.334130168790E+00  0.752055003470E+00  0.111376722930E-01  0.132939840532E+01 -0.196879267034E-01
   12  0.230137784832E+02  0.455067320398E-01  0.767125949439E+00  0.151689106799E-02  0.130356180854E+01 -0.257762270380E-02
   13  0.228949672534E+02  0.767863116381E-01  0.763165575113E+00  0.255954372127E-02  0.131031690163E+01 -0.439460781225E-02
   14  0.224410660172E+02 -0.211028052878E+00  0.748035533906E+00 -0.703426842926E-02  0.133671668492E+01  0.125700231465E-01
```
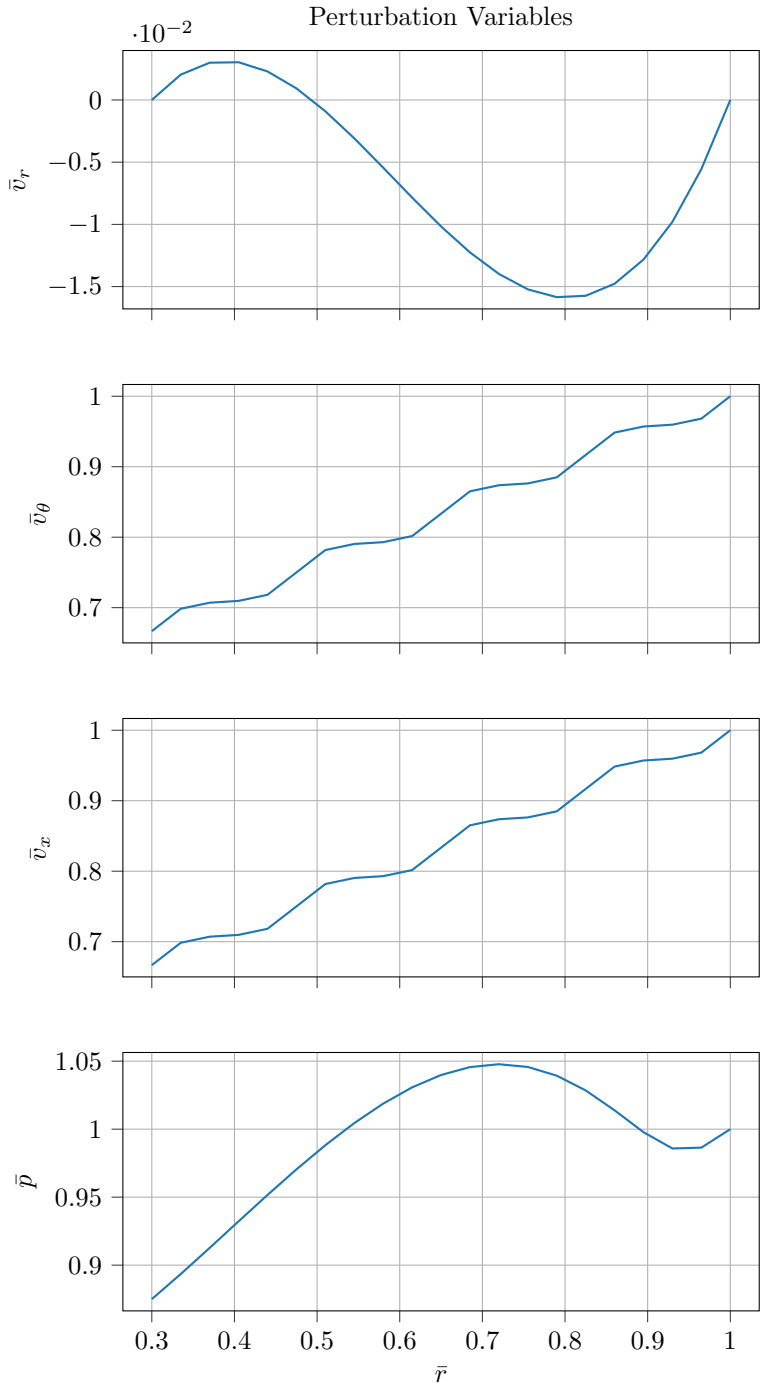


Perturbation Variables
$\cdot 10^{-2}$
0
−0.5
−1
−1.5
$\bar{v}_r$
1
0.9
0.8
0.7
$\bar{v}_\theta$
1
0.9
0.8
0.7
$\bar{v}_x$
1.05
1
0.95
0.9
$\bar{p}$
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
$\bar{r}$

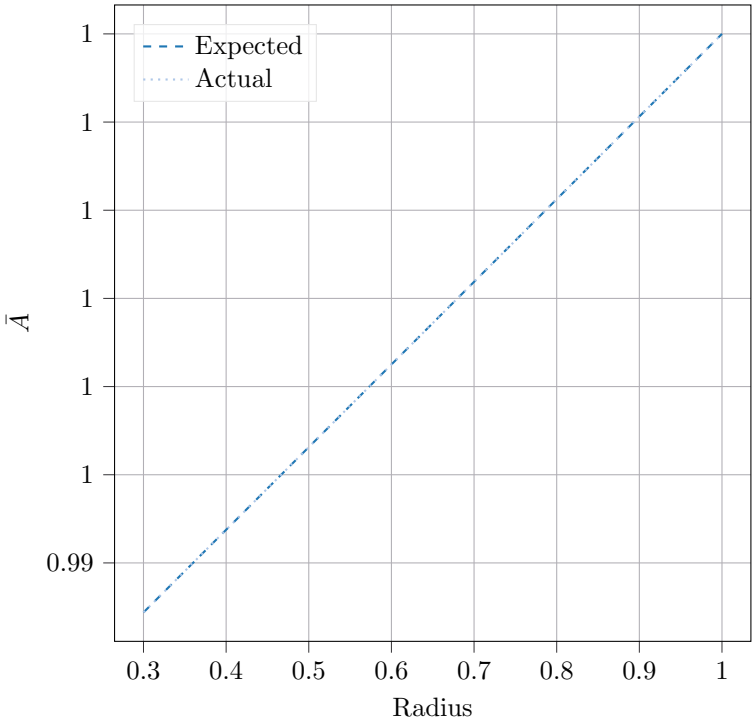


Figure 2: Speed of Sound from Integrating the Tangential Mach Number

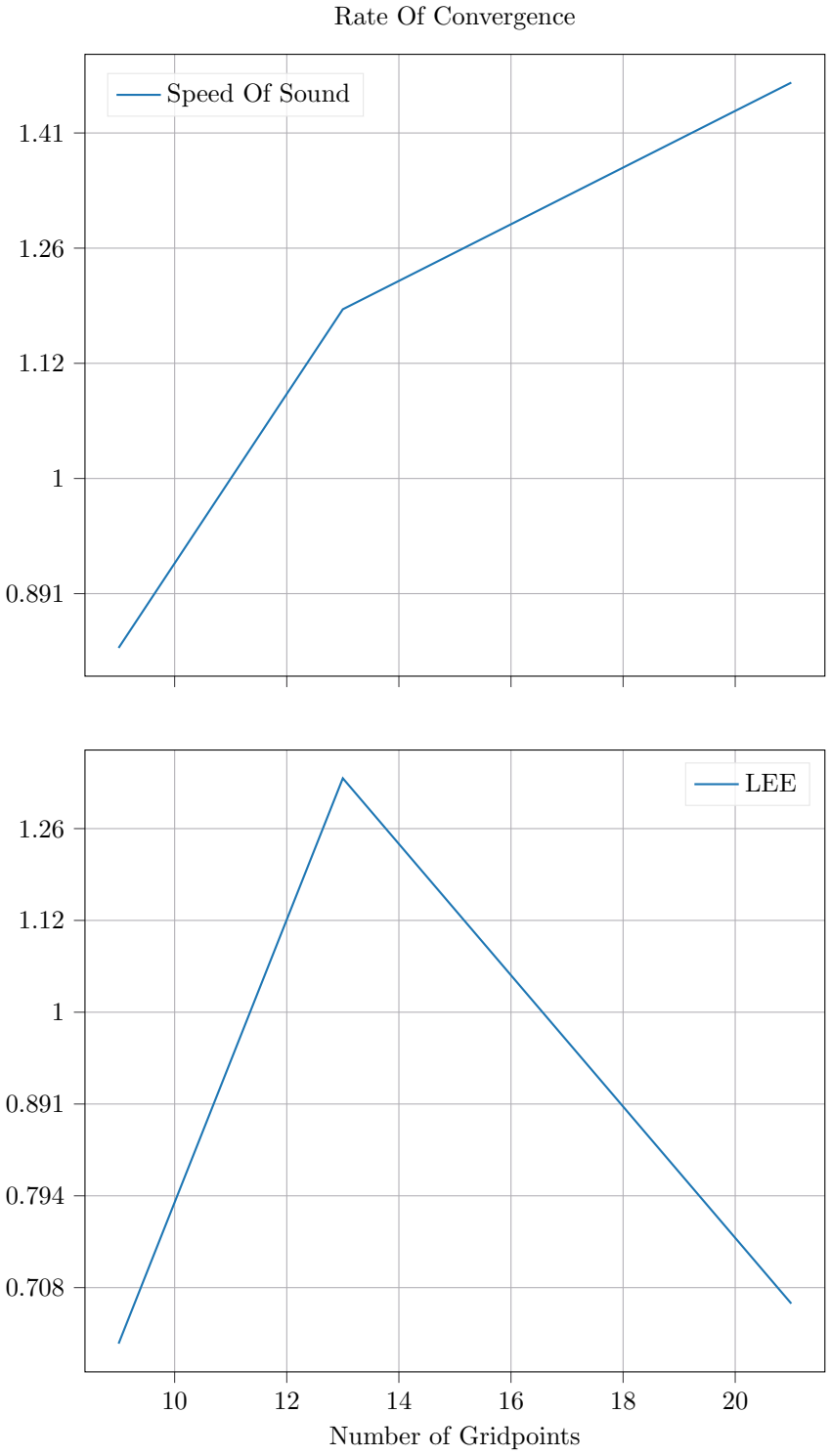


Figure 3: Rate of Convergence for the Speed of Sound Integration

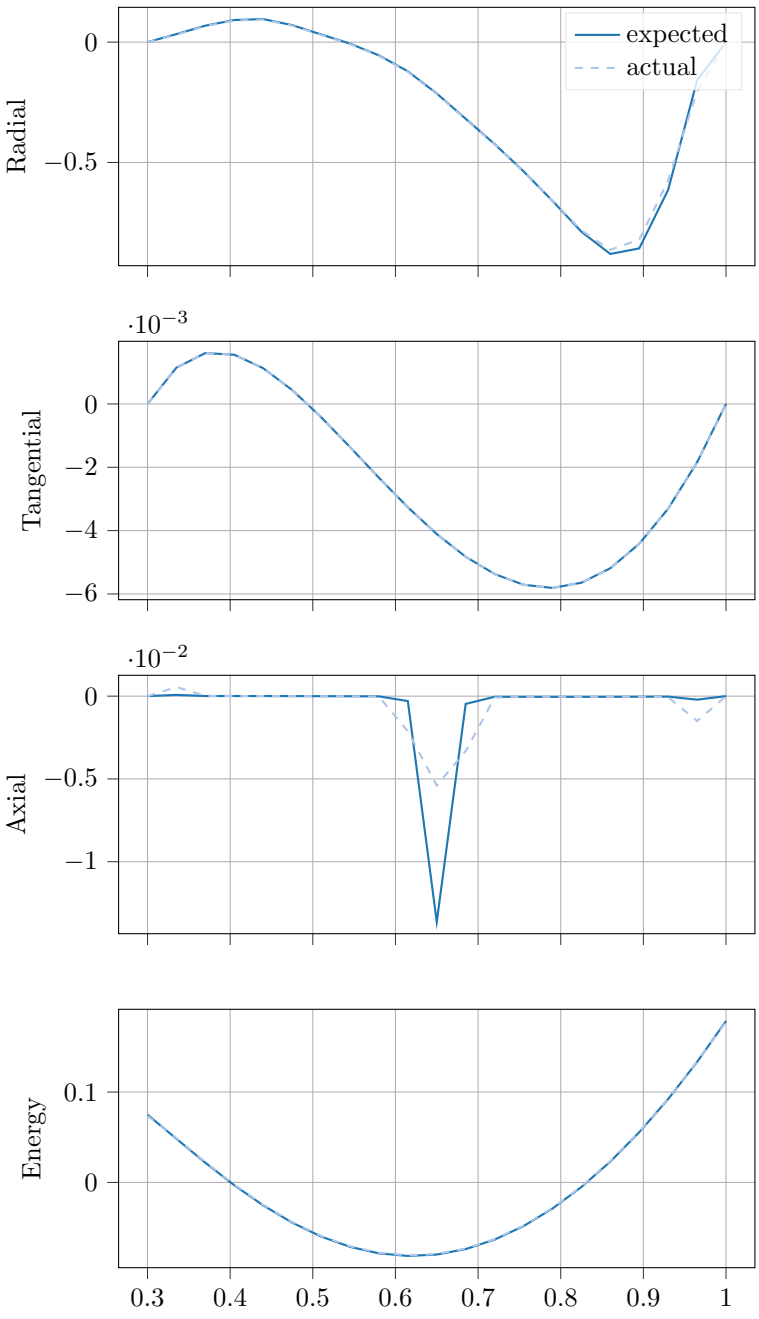
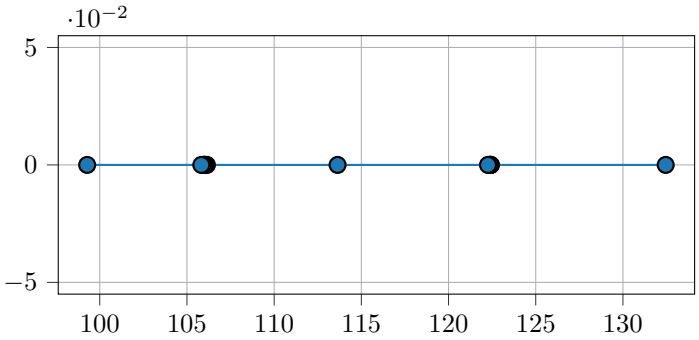


Figure 4: Source Term Error



15	0.992784293985E+02	0.000000000000E+00	0.330928097995E+01	0.000000000000E+00	0.302180445257E+00	0.000000000000E+00
16	0.104523070174E+03	0.000000000000E+00	0.348410233912E+01	0.000000000000E+00	0.287017975554E+00	0.000000000000E+00
17	0.104508001033E+03	0.000000000000E+00	0.348360003444E+01	0.000000000000E+00	0.287059361039E+00	0.000000000000E+00
18	0.107355855625E+03	0.000000000000E+00	0.357852852084E+01	0.000000000000E+00	0.279444468355E+00	0.000000000000E+00
19	0.107548069747E+03	0.000000000000E+00	0.358493565822E+01	0.000000000000E+00	0.278945034259E+00	0.000000000000E+00
20	0.111867288290E+03	0.000000000000E+00	0.372890960968E+01	0.000000000000E+00	0.268174910275E+00	0.000000000000E+00
21	0.115407757705E+03	0.000000000000E+00	0.384692525685E+01	0.000000000000E+00	0.259947863094E+00	0.000000000000E+00
22	0.124502973806E+03	0.000000000000E+00	0.415009912688E+01	0.000000000000E+00	0.240958099897E+00	0.000000000000E+00
23	0.124780808439E+03	0.000000000000E+00	0.415936028129E+01	0.000000000000E+00	0.240421587064E+00	0.000000000000E+00
24	0.120283721059E+03	0.000000000000E+00	0.400945736863E+01	0.000000000000E+00	0.249410308693E+00	0.000000000000E+00
25	0.120014355081E+03	0.000000000000E+00	0.400047850269E+01	0.000000000000E+00	0.249970097159E+00	0.000000000000E+00
26	0.132451628167E+03	0.000000000000E+00	0.441505427222E+01	0.000000000000E+00	0.226497781985E+00	0.000000000000E+00
27	0.000000000000E+00	0.000000000000E+00	0.000000000000E+00	0.000000000000E+00	0.000000000000E+00	0.000000000000E+00
28	0.000000000000E+00	0.000000000000E+00	0.000000000000E+00	0.000000000000E+00	0.000000000000E+00	0.000000000000E+00