

A Parametric Analysis on the Performance of Ideal Scramjets

Abstract and Background

Supersonic combustion ramjets, known as scramjets, are useful for applications where hypersonic flight is desired. Main areas of research include the use of alternative fuels to reduce system weight and increase performance, and suitable combustor materials to allow for the high temperatures occurring in scramjets, and improve performance. While the research is promising, physical testing in scramjet engines can be expensive. Numerical models offer a good alternative to physical testing, and can be used to analyze trends, and to help direct physical models. The purpose of this research is to analyze the performance of a scramjet numerically using an ideal, one-dimensional thermodynamic model.

Conclusion

- ‡ The data from this analysis shows:
 - ‡ the three alternative fuels used can produce a lower fuel air ratio than JP-7.
 - ‡ increasing the maximum allowable temperature of the combustor increases thrust output, but also increases