Reviewer 2

Issue 1:

The described methodology is typical and there are no elements of scientific novelty in it. there are also no errors within the framework of well-known and widely used methods. In this regard, the author needs to specify specifically what is the element of scientific novelty in this article.

Discussion

Thank you for your suggestion. The main original contribution and scientific novelty of this article is to provide a feasible method for calculating the heat transfer of liquid rocket engines including film cooling, regenerative cooling, radiation cooling, and other cooling methods, providing a scalable and efficient framework for related software. As a loosely coupled method, convergence and stability are its advantages. The corresponding content of this article has been modified as follows:

In the literature we have reviewed, there is relatively little research on the coupled heat transfer mechanism of multiple physical regions in liquid rocket engines. The mechanism of data transfer between different computing regions, the solution flow chart of the coupled heat transfer problem, convergence criteria, and so on are lacking.

In this paper, a platform with strong extensibility and high stability for heat transfer calculation of composite cooling liquid rocket engines was provided, and a corresponding numerical method was presented.

Issue 2:

In particular, when modeling flows in the boundary layer, the presented RANCE equations are not suitable for high-temperature differences between the wall and the potka core. This is well known from the publications of the 1980-1990 years of the last century.

Discussion

Thank you for your review. The RANS equation is widely used in various software for calculating turbulent combustion, and it is also commonly used in various coupled heat transfer

problems in engineering [1-3], which has been recognized by researchers. Although its calculation results are not as accurate as some other turbulence calculation methods (LES, DNS), in the problem studied in this article, we believe that the RANS equation is available, and we also believe that our program has a lot of room for improvement in dealing with turbulence.

1. Hötte F, Haupt M C. Transient 3D conjugate heat transfer simulation of a rectangular GOX–GCH4 rocket combustion chamber and validation, Aerospace Science and Technology, 2020, 105: 106043.
2. Fu P, Hou L, Ren Z, et al. A droplet/wall impact model and simulation of a bipropellant rocket engine, Aerospace Science and Technology, 2019, 88: 32-39.
3. Daimon Y, Negishi H, Tani H, et al. Flow Field and Heat Transfer Analysis in AMON/MMH Bipropellant Rocket Engine, International Journal of Energetic Materials and Chemical Propulsion, 2017, 16(3).

Issue 3:

Minor editing of the English language is required.

Discussion

Thank you for your suggestion. We have carefully checked the English expression in the paper and corrected some errors.