عنوان مقاله:

Analyzing the longitudinal effect and squircle cross section of projectile in shock tube via perturbation method

محل انتشار:

ششمین کنگره بین المللی مهندسی شیمی (سال: 1388)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

In this paper the waverider-cone configuration, with longitudinal curvature and scuircle (combination of circle and square) cross-section is derived by means of perturbing a circular cone as a basic cone. Approximate analytic solution of the flow field properties in the shock-layer is found within the framework of hypersonic small-disturbance theory. Here we assume the flow, outside viscous boundary layer, is invisid, adiabatic, and steady. The governing equations and boundary conditions are also expanded via perturbation. Using an approximate analytical scheme, the complicated governing equation of flow field can be simplified and the first-order approximations of properties are derived. This study intends to discover uniformly valid analytical solutions in the shock layer by applying the perturbation expansions. waverider shapes derived from the perturbed flow fields can produce appropriate shock angle and provide design advantages for shock tube reactors. The graphs show that the shock angle increases with increase in semi vertex angle and curvature of body and ratio of specific heat. The results can be efficient in design of projectile in shock tubes.

کلمات کلیدی:

Shock tube, perturbation method, waverider, shock angle

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