

Exothermic Explosions in a Slab: a Case Study of Series Summation Technique

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This paper examine the steady-state solutions for the strongly exothermic decomposition of a uniformly distributed combustible material between symmetrically heated parallel plates under Bimolecular, Arrhenius and Sensitised reaction rates, neglecting the consumption of the material. Analytical solutions are constructed for the governing nonlinear boundary-value problem using perturbation technique together with a special type of Hermite-Pad approximants and important properties of the temperature field including bifurcations and thermal criticality are discussed.

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