Simplified Two-Time Step Method for Calculating Combustion Rates and Nitrogen Oxide Emissions for HydrogenAir and HydorgenOxygen

By Melissa Molnar

Bibliogov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 44 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.A simplified single rate expression for hydrogen combustion and nitrogen oxide production was developed. Detailed kinetics are predicted for the chemical kinetic times using the complete chemical mechanism over the entire operating space. These times are then correlated to the reactor conditions using an exponential fit. Simple first order reaction expressions are then used to find the conversion in the reactor. The method uses a two-time step kinetic scheme. The first time averaged step is used at the initial times with smaller water concentrations. This gives the average chemical kinetic time as a function of initial overall fuel air ratio, temperature, and pressure. The second instantaneous step is used at higher water concentrations ($1 \times 10(\exp -20)$ molescc) in the mixture which gives the chemical kinetic time as a function of the instantaneous fuel and water mole concentrations, pressure and temperature (T4). The simple correlations are then compared to the turbulent mixing times to determine the limiting properties of the reaction. The NASA Glenn GLSENS kinetics code calculates the reaction rates and rate constants for each species in a kinetic...

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