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Nitrogen Effects on Ignition Delay Time in Supersonic Premixed and Diffusion Flames

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Abstract : Computational study of two dimensional supersonic reacting hydrogen-air flows is performed to investigate the nitrogen effects on ignition delay time for premixed and diffusion flames. Chemical reaction is treated using detail kinetics and the advection upstream splitting method is used to calculate the numerical inviscid fluxes. The results show that only in the stoichiometric condition for both premixed and diffusion flames, there is monotone dependency of the ignition delay time to the nitrogen addition. In other situations, the optimal condition from ignition viewpoint should be found using numerical investigations.

Keywords : diffusion flame, ignition delay time, mixing layer, numerical simulation, premixed flame, supersonic flow
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