

ASSESSMENT OF RNG $k-\epsilon$, SST $k-\omega$ AND REYNOLDS STRESS MODELS FOR NUMERICAL SIMULATION OF DLR SCRAMJET ENGINE

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ABSTRACT

In recent years, many researchers have used numerical simulation to investigate scramjet engine because, setting up of testing facilities for scramjet engine is very expensive. Completion of simulation work in less time is cost-effective but, it is also important to achieve good outcome from the simulation work. In this context, the use of appropriate turbulent model for the simulation for DLR scramjet engine is a vital aspect. From the available literature, it is seen that many researchers have used Reynolds stress, SST $k-\omega$ and RNG $k-\epsilon$ models in the field of supersonic flow and combustion. Thus, in this study, the primary objective was to find the better turbulence model in between Reynolds stress, SST $k-\omega$ and RNG $k-\epsilon$ models for numerical simulation of DLR scramjet engine. Finally, from the study, it is found that using SST $k-\omega$ model for numerical simulation of DLR scramjet engine results in more accuracy at a lesser computational time.

KEYWORDS: *DLR Scramjet Engine, Reynolds Stress, SST $k-\omega$, RNG $k-\epsilon$ & CFD*

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