

Investigation of solid propellant rocket motor nozzle via CFD simulation

ABSTRACT

The current work predicts the combustion characteristics of a solid rocket motor especially the flow in the nozzle part. The simulation work is done using computational fluids dynamic (CFD) software. The volume mesh was built in one quarter of the nozzle to reduce time for calculation. The same nozzle is also created with different mesh sizes for grid dependency check. All the rocket parameter is obtained from the theoretical design of rocket motor based on basic nozzle design. The simulation result in CFD is compared to the theoretical calculations and it shows that the modelling of rocket nozzle results shows good agreement with the theoretical ones. Parametric study on the nozzle was conducted. The results show that the best nozzle configuration for the current design is when the throat length is set to 1mm.

Keyword: Solid propellant rocket motor; CFD; FEA