
A numerical investigation into the combustion and emission characteristics of DME direct injection mechanism

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Dimethyl ether (DME) is an attractive option because of its relatively low greenhouse gas (GHG) emissions, high energy density, competitive cost, and ubiquitous infrastructure for manufacturing, storage, and distribution. In this work, the optimum combustion characteristics are investigated to propose an efficient DME engine for future investigation. The effects of DME addition on diesel combustion characteristics were numerically investigated in a CI engine. The investigation was conducted by structured 3D CFD modeling to analyze the combustion characteristics. The validation of the boundary condition was compared to the designed experimental DME engine. The direct injection timing of 10°-50°BTDC and injection pressure 300-800 bar was proposed to identify the optimum autoignition characteristics. The equivalence ratios 1, 0.75, 0.5, and 0.25 were used in order to analyze the high cetane number characteristics and the air-fuel ratio.