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**Numerical Investigation of Evaporating Droplets with Direct Quadrature-Based Moments of Closure Method** SEYED MOHAMMAD JAMALY, MOHAMMAD HASAN SAIDI, AKBAR GHAFOURIAN, Sharif University of Technology — In this study, due to the weaknesses of the models with Lagrangian approaches, an attempt has been made to model the spray flow with Eulerian approach. In this regard, the quadrature-based moment closure model for the spray equation, the so-called DQMOM, is applied. This method overcomes the shortcoming of other Eulerian methods while it is in good agreement with the Lagrangian methods. After that, the model has been developed to be able to deal with the evaporating droplets. Moreover, the feasibility of applying non-linear external forces, such as drag forces, and evaporation laws for the droplets are considered and implemented. The required order for the equations in this method has been studied thoroughly as well. Finally, the solution procedure for accurate computations of multi dimension problems is presented. In general, the proposed modified DQMOM method can consider and solve all kinds of spray flows with any desirable dimension for the problem. Here, assuming one-way coupling situation with the gas-phase in an axial engine, the spray phase equations are solved by the proposed method to account for evaporating droplets. Results are compared with the methods with Lagrangian approach and the computational costs and accuracies of the methods are compared as well.

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