

عنوان مقاله:

Fuel Spray Simulation Employing a Turbulent-Induced Secondary Breakup Model

محل انتشار:

بیست و نهمین همایش سالانه بین المللی انجمن مهندسان مکانیک ایران و هشتمین همایش صنعت نیروگاه های حرارتی (سال: 1400)

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خلاصه مقاله:

This paper considers the effect of gaseous flow turbulence on the secondary breakup of droplets. Many methods have been developed to simulate the secondary breakup of spray droplets. However, most of the developed models are based on laminar flow assumptions and neglect the effects of turbulence of gaseous flow on droplets breakup, which causes inaccurate modeling. In this study, fuel-spray is simulated using Reitz-Diwakar, Hsiang-Faeth, and Omidvar-Khaleghi breakup models, and spray behavior results are compared with experimental data. For this aim, an in-house, two-phase flow CFD code, called EPISO, is used to simulate the spray behavior in a 2D axisymmetric, computational domain. Spray penetration and Sauter mean diameter were compared for different models, also spray structure was provided to fully understand the general shape of the liquid phase. It was found that the turbulence causes an earlier droplet breakup, which leads to lower penetration of droplets into the cylinder. Moreover, the effect of in-cylinder pressure on spray behavior and droplet size was investigated.

کلمات کلیدی:

Turbulent flow, secondary breakup, spray modeling, two-phase flow

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