

عنوان مقاله:

Three-Dimensional Modeling of Effects of Fuel Injection Mode on Soot and NOx Emissions Formation in a Direct- Injection Diesel Engine

محل انتشار:

پنجمین همایش موتورهای درونسوز (سال: 1386)

تعداد صفحات اصل مقاله: 13

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خلاصه مقاله:

This paper deals with the numerical study of effect of four schemes of direct fuel injection on the emissions (NOx and Soot) formation for a direct injection diesel engine with common single stage injection system. Computations are well carried out using a three-dimensional symmetrical model for flows, and Advanced Wave Standard model in which initial droplets have the diameter of nozzle orifice as spray model while Eddy breakup model as a turbulent controlled combustion model was used for combustion process prediction. The mechanism was used for NOx is based on Zeldovich mechanism whereas soot formation model was developed by the Kennedy, Hiroyasu and Magnussen mechanism. Results including temperature, NOx and Soot mass fraction and heat release rate show noticeable difference in emission reduction and released energy under effect of different fuel injection modes. Finally it was revealed that with constant injected fuel mass, the split injection scheme is the most reasonable one from emission production view point for a diesel engine with a common single stage direct injection system. Optimization can be done to reduce NOx and Soot without great efficiency-reduction. The paper ends with some concluding remarks

کلمات کلیدی:

Diesel Engine, Turbulent, Combustion, Injection mode, emission

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