

عنوان مقاله:

Investigation of Spark Plug Location in SI Engine Combustion Chamber

محل انتشار:

پنجمین همایش موتورهای درونسوز (سال: 1386)

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خلاصه مقاله:

This paper describes a 3-D computational study of flow field and combustion process inside the combustion chamber of a gasoline engine. The unsteady compressible flow within the ports and cylinder for the full cycle is simulated using VECTIS CFD code. In order to predict the transient conditions in combustion chamber, the valves and piston motion as moving boundaries, are simulated. Also, using the locally mesh refinement in CFD domain saved the CPU time of calculations. The boundary conditions are obtained by complete 1-D simulation of the engine using commercial WAVE software. The time variations of pressure at the intake and exhaust ports are used as the flow boundary conditions. In order to simulate the combustion process, the Ricardo Two-Zone Flamelet (RTZF) model has been used. After simulation of combustion, the emissions formation model has been employed to predict the concentration of residual species. The model for NO formation is based on the Zeldovich mechanism. Furthermore, some engine performance parameters such as in-cylinder pressure and volumetric efficiency are compared with the experimental data. The numerical model is validated by experimental data which have been generated in another project. Comparison of the CFD results and the experimental data showed a good agreement. The spark plug location has an important role in engine performance and emissions reduction. But these improvements are limited by knock phenomena. CFD can be responsible to this idea as a good selection and powerful device. Some different points in the cylinder head are investigated as spark plug new locations. In this paper, Comparison between these points and the first simulation is presented. The influence of the spark plug location on In-cylinder pressure rise, cooling system and flame propagation and emissions reduction has shown, respectively. Also, for a few locations in combustion chamber these effects have compared.

کلمات کلیدی:

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