Feasibility Investigation of Next-Generation Injectors using CFD Analysis

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Abstract Nowadays, the importance of reducing emissions and increasing fuel efficiency has become even more crucial than ever. Some alternative technologies to traditional gasoline and diesel engines have been developed, such as electric vehicles or hydrogen fuel cells, but the transition to these new technologies is slow and expensive, and it is likely that internal combustion engines will be used for a long time to come.

In this context, the development of new technologies that can be used in combination with existing engines structure is critical. The possibility of using alternative fuel sources, such as ammonia or dimethyl ether, is particularly attractive. These fuels have the potential to reduce emissions and increase fuel efficiency, but they require the development of new injectors that can handle their specific properties.

In this research we will not focus on fuel engineering per se, but on the feasibility of a new generation of fuel injectors that can be fitted to existing engines and that can handle these alternative fuel sources. To do this, the use of Computational Fluid Dynamics (CFD) simulations will be critical, as it will allow us to study the interaction between fluid dynamics and the chemical reactions occurring within the injector in an efficient and cost-effective manner.

Keywords Fuel injectors design, Computational Fluid Dynamics, Alternative fuel sources

1 Objectives and Impact

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3 Research Plan and Methodology

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