Trabalho de formatura / Iniciação científica

Laboratory of Thermal and Environmental Engineering

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Numerical investigations of flames propagating in dual fuel mixtures

Dual fuel combustion has receiving lot of attention in technical and scientific research communities as an alternative to reduce methane slip. Indeed, methane is an attractive alternative fuel to mitigate CO_2 emissions due to its high H to C amount. Nevertheless, the tetrahedral structure of methane molecules turn it a relatively stable species, which is harder to be ignited than long-chain alkanes. The inclusion of long-chain alkanes, or a mixture of them, to ignite methane air mixtures has been found as an alternative to improve the ignitability of such mixtures avoiding, therefore, the methane slip. With this concept in mind, the Laboratory of Thermal and Environmental Engineering of EPUSP has been started studies on diesel assisted methane combustion focusing on large scale IC-engines. Due to the novelty and technical challenges associated with this technology, few works can be found in the literature to give support to the ongoing studies at EPUSP. In view of this demand, this proposal aims to contribute with such studies delivering more details about flame characteristics propagating in dual fuel mixtures. As a first approach, diesel will be represented as n-dodecane to isolate multi-component aspects.

Task Description:

This work consists of:

- Determination of a chemical mechanism able to properly represent the combustion of n-dodecane and methanol mixtures at IC-engine operating conditions
- Set up a Matlab script to perform sequential simulations for phenomenological analysis

Pre requisites:

- Knowledge on thermodynamics
- Knowledge on fluid mechanics
- Interest on programming

Do you have interest on it? Mail or easily come to a talk!

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