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Development of a model for the auto-ignition phenomenon in spark ignition engine operating with natural gas

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Abstract :This paper presents the development of a thermodynamic model for prediction of the auto-ignition phenomenon, applied to spark-ignition engines, and the characterization of said model, in order to accurately predict the temperature in the combustion chamber, and therefore evaluate the auto-ignition probability at a certain operating condition. From the results, can be concluded that the auto-ignition probability increases at higher intake pressures and compression ratios, and the intake temperature greatly raises the phenomenon, generating the auto-detonation at lower compression ratios. The model results are in accordance to the experimental data, and this gives the possibility to verify if a machine operating under certain conditions can be used in another place and another type of fuel without the risk of auto-ignition.

Keywords:Auto-ignition; Engine; Modelling; Polytropic process; Spark ignition.

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