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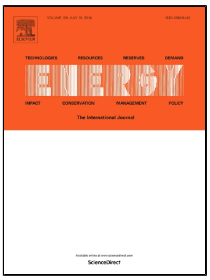

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A ZERO-DIMENSIONAL MODEL TO SIMULATE INJECTION RATE FROM FIRST GENERATION COMMON RAIL DIESEL INJECTORS UNDER THERMODYNAMIC DIAGNOSIS

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ABSTRACT

The injection rate curve is an important input parameter in the thermodynamic diagnosis and in the predictive models, and it can also be used to simulate fuel sprays under different operating conditions. In this work, a zero-dimensional fuel injection rate model is proposed from experimental data obtained from a common-rail injection system with two solenoid-operated injectors. The model proposed is a useful tool when the internal component's dimensions of the injector are unknown. The presented model only requires the injection pressure, the injector energization signal, the total fuel mass consumed per stroke, the geometry and the holes number of the fuel injector and, finally, some physical properties of fuel. The model has been applied to two different solenoid-operated injectors and two fuels. The comparative results between the experimental and the modelled fuel injection rate show excellent results despite the simplicity of the experimental data requirements. The effects of the introduction of the modelled and measured fuel injection rate in a thermodynamic diagnostic tool are shown. This proposed model can be a useful, simple and alternative tool for estimating rates of injection without the need to carry out a test of the rate of injection.