

HCCI COMBUSTION: MATHEMATICAL MODELLING APPROACH USING VISUAL BASIC FOR APPLICATIONS

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ABSTRACT

In recent times, alternative combustion technology such as Homogenous Charge Compression Ignition (HCCI) has been studied and results have been positive. HCCI combustion has the potential to reduce fuel consumption and NOx emissions pertaining to the most stringent of legislation of both present and future. HCCI technology is attractive as there is no need for major modifications to the existing structure of IC engines and with significantly low NOx emissions, after treatment systems are not required. However, it is difficult to control the process and achieve constancy every cycle. Therefore, globally experts are studying HCCI combustion in depth to understand the associated idiosyncrasies. Through advent of modern computers, it has become possible to simulate HCCI combustion by creating a mathematical model that can solve complex equations within minutes. This paper details mathematical modelling approach to model HCCI combustion using Visual Basic for Applications (VBA), along with insight on different types of modelling techniques and submodels required to construct the simulation model.

KEYWORDS: HCCI, Auto Ignition, Mathematical Modelling, Mechanistic Model, Visual Basic for Applications (VBA)



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