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Study of Cyclic Variation in an SI Engine Using Quasi-Dimensional Combustion Model

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ABSTRACT

The paper is concerned with the effects of cyclic variation in turbulence (expressed in terms of rms turbulent velocity) on the burn rate and subsequent cyclic variation in in-cylinder pressure derived parameters. The task has been addressed by applying a thermodynamic engine modelling approach for simulations of two very different engines; a single cylinder research engine in which sources of cyclic variation other than turbulence had been minimised and a multi-cylinder production engine. The cyclic variability in the two engines had a number of similar features; the effects of turbulence variation cycle-to-cycle proved dominant in the production engine, mixture strength secondary and prior-cycle residual concentration feedback marginal.