



THE UNIVERSITY OF
MELBOURNE

Mechanical Engineering PhD Completion Seminar

SEMINAR SERIES 2008

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PhD Candidate

Department of Mechanical Engineering
The University of Melbourne

Tuesday 16th December, 3pm

Theatre C2

Level 4, Civil Engineering, Block C,
Building 174

Improving SI engine cold start performance through enhanced control strategies.

The dramatic increase in vehicle use in urban situations and the short average length of the subsequent journey leads to a large proportion of engine operation under cold start conditions. The consequences of cold start are larger fuel consumption and higher emissions relative to a fully warmed engine. Growing environmental concerns and the significant rise in the oil price has led to progressively stricter government legislation and consumer demands for more efficient engines, thus there is significant motivation to quickly yet efficiently bring the engine to its warm operating condition.

The current OEM approach to developing a cold start strategy involves a time consuming and costly engine calibration process. Engine calibration requires multidimensional sweeps across engine control variables to find the best combination of inputs for each steady-state load-speed operating condition, with these results stored in lookup tables. Cold start calibration over transient drive cycles is even more difficult, as the engine temperature changes, leading to a higher dimensional, multi-input, constrained problem with conflicting objectives. Model-based design is the paradigm I have proposed to solve this problem, as it leads to significantly reduced calibration effort.

In my PhD work, generic control-oriented cold start engine models have been proposed, identified and validated. These models have then been used both analytically and numerically to obtain optimal warm up strategies with validation on a Ford I6 engine.

MORE INFORMATION

For more Mechanical Engineering seminar
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