

Developing a Modified Version of KIVA-3V, Enabling Gaseous Injections

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Abstract : With the growing concerns about gasoline environmental pollution and also the need for a more widely available fuel source, natural gas is finding its way to the automotive engines. But before this could happen industrially, simulations of natural gas direct injection need to take place to maximize and optimize power output. KIVA is one of the most powerful tools when it comes to engine simulation. Widely accepted by both researchers and the industry, KIVA an open-source code, offers great in-depth simulation and analyzation. KIVA can compute complex phenomena's which can occur inside the chamber before, whilst and after ignition. One downside to KIVA, is its in-capability of simulating gaseous injections, making it useful for only liquidized fuel. In this study, we developed a numerical code, to enable the simulation of gaseous injection within the KIVA code. By introducing our code as a subroutine, we modified the original KIVA program. To ensure the correct application of gaseous fuel injection using our modified KIVA code, we simulated two different cases and compared them with their experimental data. We concluded our modified version of KIVA's simulation results came in very close to those measured experimentally.

Keywords : gaseous injections, KIVA, natural gas direct injection, numerical code, simulation

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