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## An integrated approach for simulating diesel engine performance using Direct Injection Stochastic Reactor Model (DI-SRM)



Presented at the STAR Global Conference 2012

In this presentation the application of a direct injection stochastic reactor model (DI-SRM) to simulate diesel engine performance parameters and exhaust emissions will be illustrated. The DI-SRM has been applied to simulate diesel and n-heptane fuelled engines at different load conditions. The skeletal mechanism of n-heptane has been used as a main fuel model. Furthermore, investigations have also been performed with several fuel models alternatively to n-heptane that is commonly used to simulate diesel engines. Subsequently, to improve the overall simulation process, the DI-SRM has been integrated with genetic algorithms (GA) based optimization toolbox.

It has been found the DI-SRM accurately predicts diesel engine performance parameters such as in-cylinder pressure and exhaust emission, namely nitrogen oxides, unburned hydrocarbons and soot. Thanks to the integrated approach overall capabilities of the DI-SRM increased. The time needed for calibrating the model has been reduced. In the same time the accuracy of the results increased. The integrated approach has been found equally promising for optimization of engine, both fuel set-ups with a view towards high output performance and low exhaust emissions. These features go together with low CPU cost that further increases the usability of the method.

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