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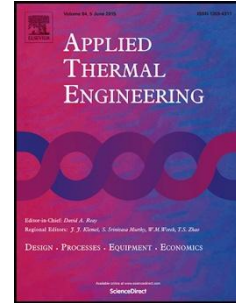
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# Optimization of Fuel Injection in GDI Engine Using Economic Order Quantity and Lambert W Function

Abbreviated title: GDI Engine Control and Optimization

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## Highlights

- EOQ approach for fuel injection event in GDI engine has been evaluated.
- Analogy between EOQ and fuel injection and combustion process has been drawn.
- Components that contribute to the loss of energy in the system have been modelled using EOQ.
- A fuel injection control strategy has been proposed using EOQ and Lambert W function.

## ABSTRACT

The present work evaluated the suitability of Economic Order Quantity (EOQ), commonly used in supply chain management and process optimization, for combustion in Gasoline Direct Injected (GDI) engines. It identified appropriate sub-models to draw an analogy between the EOQ for melon picking and fuel injection in GDI engines. It used experimental data from in-cylinder combustion processes for validating the model. It used peak cylinder pressure and indicative mean effective pressure for validating the model; the  $R^2$  value for linear correlation between the experimental value and estimated value is 0.98. This work proposes that the EOQ based on Lambert W function could be employed for optimizing the fuel quantity in GDI engines for real-world fuel economy.

**KEYWORDS:** *Fuel consumption, Economic Order Quantity, Lambert W function, Gasoline Direct Injection*

## NOMENCLATURE

<b>ANN</b>	Artificial Neural Network
<b>DISI</b>	Direct Injection, Spark Ignition
<b>ECU</b>	Electronic Control Unit
<b>EOQ</b>	Economic Order Quantity
<b>GDI</b>	Gasoline Direct Injection
<b>MVT</b>	Marginal Value of Time
<b>PFI</b>	Port Fuel Injection
<b>SMD</b>	Sauter Mean Diameter
<b>THC</b>	Total hydrocarbon

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