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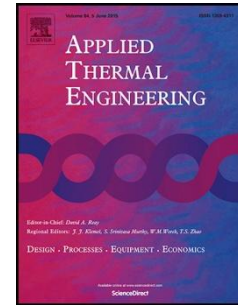
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Title: Regeneration in an Internal Combustion Engine: Thermal-Hydraulic Modeling and Analysis

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Highlights

- An arrangement is proposed for in-cylinder regeneration in a 4-stroke engine
- Thermodynamic models are formulated for overall cycle analysis
- A design procedure is outlined for micro-channel regenerators
- Partial differential equations are solved for flow inside the regenerator
- Regeneration with lean combustion decreases the idealized cycle efficiency

Abstract

An arrangement is proposed for a four-stroke internal combustion engine to: (a) recover thermal energy from products of combustion during the exhaust stroke; (b) store that energy as sensible heat in a micro-channel regenerator matrix; and (c) transfer the stored heat to compressed fresh charge that flows through the regenerator during the succeeding mechanical cycle. An extra moveable piston that can be locked at preferred positions and a sequence of valve events enable the regenerator to lose heat to the working fluid during one interval of

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