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Specific Heat of Fuel--Air Mixtures; 3.3 Liquid-Vapor-Gas Mixtures; 3.4 Stoichiometry; 3.5 Low-Temperature Combustion Modeling; Fuel-Air-Residual Gas; 3.6 General Chemical Equilibrium; 3.7 Chemical Equilibrium using Equilibrium Constants; 3.8 References; 3.9 Homework; Chapter 4:Fuel-Air Combustion Processes; 4.1 Introduction; 4.2 Combustion and the First Law; Heat of Combustion; Adiabatic Flame Temperature
Isentropic Processes4.3 Maximum Work and the Second Law; Exergy Change for an Isentropic Compression or Expansion; Available Energy of Combustion; 4.4 Fuel-Air Otto Cycle; 4.5 Four-Stroke Fuel-Air Otto Cycle; 4.6 Homogeneous Two-Zone Finite Heat Release Cycle; 4.7 Comparison of Fuel-Air Cycles with Actual Spark Ignition Cycles; 4.8 Limited Pressure Fuel-Air Cycle; 4.9 Comparison of Limited Pressure Fuel-Air Cycles with Actual Compression Ignition Cycles; 4.10 References; 4.11 Homework; Chapter 5:Intake and Exhaust Flow; 5.1 Introduction; 5.2 Valve Flow; Valve Flow and Discharge Coefficients
Exhaust Gas BlowdownValve Mach Index; Valve Timing; Effect of Valve Timing on Volumetric Efficiency and Residual Fraction; 5.3 Intake and Exhaust Flow; 5.4 Superchargers and Turbochargers; 5.5 Effect of Ambient Conditions on Engine and Compressor Mass Flow; 5.6 References; 5.7 Homework; Chapter 6:Fuel and Airflow in the Cylinder; 6.1 Introduction; 6.2 Carburetion; 6.3 Fuel Injection-Spark Ignition; Fuel Injection Systems; 6.4 Fuel Injection-Compression Ignition; Diesel Injection Systems; Diesel Sprays; 6.5 Large-Scale in-Cylinder Flow; Introduction; Cylinder Flow Measurement Techniques
Computational Simulation of In-Cylinder Flow Fields

Sommario/riassunto

"Since the publication of the Second Edition in 2001, there have been considerable advances and developments in the field of internal combustion engines. These include the increased importance of biofuels, new internal combustion processes, more stringent emissions requirements and characterization, and more detailed engine performance modeling, instrumentation, and control. There have also been changes in the instructional methodologies used in the applied thermal sciences that require inclusion in a new edition. These methodologies suggest that an increased focus on applications, examples, problem-based learning, and computation will have a positive effect on learning of the material, both at the novice student, and practicing engineer level. This Third Edition mirrors its predecessor with additional tables, illustrations, photographs, examples, and problems/solutions. All of the software is 'open source', so that readers can see how the computations are performed. In addition to additional java applets, there is companion Matlab code, which has become a default computational tool in most mechanical engineering programs"--

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