

Automotive spark-ignited direct-injection gasoline engines

F. Zhao, M. -C. Lai, D.L. Harrington



PERGAMON

Automotive Spark Ignited Direct Injection Gasoline Engines

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Automotive Spark Ignited Direct Injection Gasoline Engines:

Automotive Spark-Ignited Direct-Injection Gasoline Engines F. Zhao, M.-C. Lai, D.L. Harrington, 2000-02-08 The process of fuel injection spray atomization and vaporization charge cooling mixture preparation and the control of in cylinder air motion are all being actively researched and this work is reviewed in detail and analyzed The new technologies such as high pressure common rail gasoline injection systems and swirl atomizing gasoline fuel injections are discussed in detail as these technologies along with computer control capabilities have enabled the current new examination of an old objective the direct injection stratified charge DISC gasoline engine The prior work on DISC engines that is relevant to current GDI engine development is also reviewed and discussed The fuel economy and emission data for actual engine configurations have been obtained and assembled for all of the available GDI literature and are reviewed and discussed in detail The types of GDI engines are arranged in four classifications of decreasing complexity and the advantages and disadvantages of each class are noted and explained Emphasis is placed upon consensus trends and conclusions that are evident when taken as a whole thus the GDI researcher is informed regarding the degree to which engine volumetric efficiency and compression ratio can be increased under optimized conditions and as to the extent to which unburned hydrocarbon UBHC NO_x and particulate emissions can be minimized for specific combustion strategies The critical area of GDI fuel injector deposits and the associated effect on spray geometry and engine performance degradation are reviewed and important system guidelines for minimizing deposition rates and deposit effects are presented The capabilities and limitations of emission control techniques and after treatment hardware are reviewed in depth and a compilation and discussion of areas of consensus on attaining European Japanese and North American emission standards presented All known research prototype and production GDI engines worldwide are reviewed as to performance emissions and fuel economy advantages and for areas requiring further development The engine schematics control diagrams and specifications are compiled and the emission control strategies are illustrated and discussed The influence of lean NO_x catalysts on the development of late injection stratified charge GDI engines is reviewed and the relative merits of lean burn homogeneous direct injection engines as an option requiring less control complexity are analyzed

Automotive Spark-ignited Direct-injection Gasoline Engines F. Zhao, 1999 *Automotive Gasoline Direct-Injection Engines* Fuquan Zhao, David L Harrington, Ming-chia Lai, 2002-05-15 This book covers the latest global technical initiatives in the rapidly progressing area of gasoline direct injection GDI spark ignited gasoline engines and examines the contribution of each process and sub system to the efficiency of the overall system Including discussions data and figures from many technical papers and proceedings that are not available in the English language Automotive Gasoline Direct Injection Systems will prove to be an invaluable desk reference for any GDI subject or direct injection subsystem that is being developed worldwide

Gasoline Direct Injection Engine and Spark Ignition Performance Society of Automotive Engineers, 2003

Advanced Direct Injection Combustion Engine Technologies and Development H

Zhao,2014-01-23 Direct injection enables precise control of the fuel air mixture so that engines can be tuned for improved power and fuel economy but ongoing research challenges remain in improving the technology for commercial applications As fuel prices escalate DI engines are expected to gain in popularity for automotive applications This important book in two volumes reviews the science and technology of different types of DI combustion engines and their fuels Volume 1 deals with direct injection gasoline and CNG engines including history and essential principles approaches to improved fuel economy design optimisation optical techniques and their applications Reviews key technologies for enhancing direct injection DI gasoline engines Examines approaches to improved fuel economy and lower emissions Discusses DI compressed natural gas CNG engines and biofuels Turbulent Premixed Flames Nedunchezian Swaminathan,K. N. C. Bray,2011-04-25 A work on turbulent premixed combustion is important because of increased concern about the environmental impact of combustion and the search for new combustion concepts and technologies An improved understanding of lean fuel turbulent premixed flames must play a central role in the fundamental science of these new concepts Lean premixed flames have the potential to offer ultra low emission levels but they are notoriously susceptible to combustion oscillations Thus sophisticated control measures are inevitably required The editors intent is to set out the modeling aspects in the field of turbulent premixed combustion Good progress has been made on this topic and this cohesive volume contains contributions from international experts on various subtopics of the lean premixed flame problem *Proceedings of the FISITA 2012 World Automotive Congress* SAE-China,FISITA,2012-11-07 Proceedings of the FISITA 2012 World Automotive Congress are selected from nearly 2 000 papers submitted to the 34th FISITA World Automotive Congress which is held by Society of Automotive Engineers of China SAE China and the International Federation of Automotive Engineering Societies FISITA This proceedings focus on solutions for sustainable mobility in all areas of passenger car truck and bus transportation Volume 3 Future Automotive Powertrains I focuses on Alternative Fuel and New Engine Advanced Hybrid Electric Vehicle Plug in Electric Vehicle Above all researchers professional engineers and graduates in fields of automotive engineering mechanical engineering and electronic engineering will benefit from this book SAE China is a national academic organization composed of enterprises and professionals who focus on research design and education in the fields of automotive and related industries FISITA is the umbrella organization for the national automotive societies in 37 countries around the world It was founded in Paris in 1948 with the purpose of bringing engineers from around the world together in a spirit of cooperation to share ideas and advance the technological development of the automobile *Simulation and Optimization of Internal Combustion Engines* Zhiyu Han,2021-12-28 Simulation and Optimization of Internal Combustion Engines provides the fundamentals and up to date progress in multidimensional simulation and optimization of internal combustion engines While it is impossible to include all the models in a single book this book intends to introduce the pioneer and or the often used models and the physics behind them providing readers with ready to use knowledge Key issues useful modeling methodology

and techniques as well as instructive results are discussed through examples Readers will understand the fundamentals of these examples and be inspired to explore new ideas and means for better solutions in their studies and work Topics include combustion basis of IC engines mathematical descriptions of reactive flow with sprays engine in cylinder turbulence fuel sprays combustions and pollutant emissions optimization of direct injection gasoline engines and optimization of diesel and alternative fuel engines

Pollutants from Energy Sources Rashmi Avinash Agarwal, Avinash Kumar Agarwal, Tarun Gupta, Nikhil Sharma, 2018-11-01 This book discusses different aspects of energy consumption and environmental pollution describing in detail the various pollutants resulting from the utilization of natural resources and their control techniques It discusses diagnostic techniques in a simple and easy to understand manner It will be useful for engineers agriculturists environmentalists ecologists and policy makers involved in area of pollutants from energy environmental safety and health sectors

Droplet Interactions and Spray Processes Grazia Lamanna, Simona Tonini, Gianpietro Elvio Cossali, Bernhard Weigand, 2020-03-14 This book provides a selection of contributions to the DIPSI workshop 2019 Droplet Impact Phenomena Spray Investigations as well as recent progress of the Int Research Training Group DROPIT The DIPSI workshop which is now at its thirteenth edition represents an important opportunity to share recent knowledge on droplets and sprays in a variety of research fields and industrial applications The research training group DROPIT is focused on droplet interaction technologies where microscopic effects influence strongly macroscopic behavior This requires the inclusion of interface kinetics and or a detailed analysis of surface microstructures Normally complicated technical processes cover the underlying basic mechanisms and therefore progress in the overall process modelling can hardly be gained Therefore DROPIT focuses on the underlying basic processes This is done by investigating different spatial and or temporal scales of the problems and by linking them through a multi scale approach In addition multi physics are required to understand e g problems for droplet wall interactions where porous structures are involved

Unveiling the Magic of Words: A Report on "**Automotive Spark Ignited Direct Injection Gasoline Engines**"

In a world defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their capability to kindle emotions, provoke contemplation, and ignite transformative change is really awe-inspiring. Enter the realm of "**Automotive Spark Ignited Direct Injection Gasoline Engines**," a mesmerizing literary masterpiece penned with a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve to the book is central themes, examine its distinctive writing style, and assess its profound affect the souls of its readers.

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