

# Powertrain Engineering Selected Papers

## Hybrids

### ■ Heat recovery for next generation of hybrid vehicles: simulation and design of a rankine cycle system

A. Duparchy, P. Leduc, G. Bourhis, C. Ternel

*EVS24 The International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exhibition*

Stavanger, Norway, May 13-16, 2009

### ■ Online implementation of an optimal supervisory control for a parallel hybrid powertrain

A. Chasse, Ph. Pognant-Gros, A. Sciarretta

*SAE International Powertrains Fuels and Lubricants Congress*

Florence, Italy, June 15-17, 2009 - SAE 2009-01-1868

### ■ Power split strategy for hybrid electric system: SIL validation

D. Di Domenico (IFP Energies nouvelles), G. Fiengo (University of Sannio)

*10<sup>th</sup> EEC European Control Conference*

Budapest, Hungary, August 23-26, 2009



### ■ Advanced hybrid vehicle simulation: from "virtual" to "HyHIL" test bench

A. Chasse, G. Corde, A. Del Mastro, Ph. Pognant-Gros

*ICE International Conference on Engine for Automobile*

Naples, Italy, September 13-18, 2009 - SAE 2009-24-0068

### ■ Supervisory control of hybrid powertrains: an experimental benchmark of offline optimization and online energy management

A. Chasse, G. Hafidi, Ph. Pognant-Gros, A. Sciarretta

*Les Rencontres Scientifiques d'IFP Energies nouvelles: E-COSM'09 - IFAC Workshop on Engine and Powertrain Control, Simulation and Modeling*

Rueil-Malmaison, France, November 30, December 1-2, 2009

## Energy storage

### ■ Modelling of onboard energy storage system ageing, the French SIMSTOCK research network

F. Badin (on behalf of the SIMSTOCK network)

*EVS24 The International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exhibition, "Towards Zero Emission"*

Stavanger, Norway, May 13-16, 2009

### ■ An integrated approach to high power modelling: from the electrochemistry to the vehicle

V. Sauvant-Moynot, E. Prada, J. Bernard, J. Martin, A. Sciarretta, N. Rajapakse, Y. Touzani, J.C. Dabadie, F. Badin

*EVS24 The International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exhibition "Towards Zero Emission"*

Stavanger, Norway, May 13-16, 2009

### ■ Experimental validation of a lithium-ion battery state of charge estimation with an extended Kalman Filter

C. Speltino (University of Sannio), D. Di Domenico (IFP Energies nouvelles), G. Fiengo (University of Sannio), A. Stefanopoulou (University of Michigan)

*10<sup>th</sup> EEC European control conference*  
Budapest, Hungary,  
August 23-26, 2009

## Calibration

### ■ Multi-objective optimization and global map optimization for engine calibration

D. Sinoquet, H. Langouet, F. Chaudoye, M. Castagné

*Conference Design of Experiments (DoE) in Engine Development, Modern Development Methods to Meet New Challenges*

Berlin, Germany, June 29-30, 2009

### ■ Comparison of engine calibration methods based on Design of Experiments (DoE)

M. Castagné, Y. Bentolila, F. Chaudoye, A. Halle, F. Nicolas, D. Sinoquet

*Oil & Gas Science and Technology - Revue d'IFP Energies nouvelles - Vol. 63, No. 4, 2008, pp. 563-582*

## Fuels

### ■ Impact of fuel properties on the performances and knock behaviour of a downsized turbocharged DI SI engine - Focus on octane numbers and latent heat of vaporization

J. Milpied, S. Guichaoua (IFP Energies nouvelles), G. Plassat (Ademe), N. Dioc (PSA Peugeot Citroën), A. Marchal (Renault - Powertrain Division), P. Schmelzle (Total France)

*SAE Int. J. Fuels Lubr. 2 (1): 118-126, 2009 - SAE 2009-01-0324*

### ■ Ethanol as a diesel base fuel: managing the flash point issue: consequences on engine behaviour

L. Pidol, B. Lecointe, N. Jeuland

*SAE International Powertrains Fuels and Lubricants Congress*  
Florence, Italy, June 15-17, 2009 - SAE 2009-01-1807

### ■ Effect of fuel characteristics on the performances and emissions of an early-injection LTC/Diesel engine

L. Pesant, L. Forti, N. Jeuland

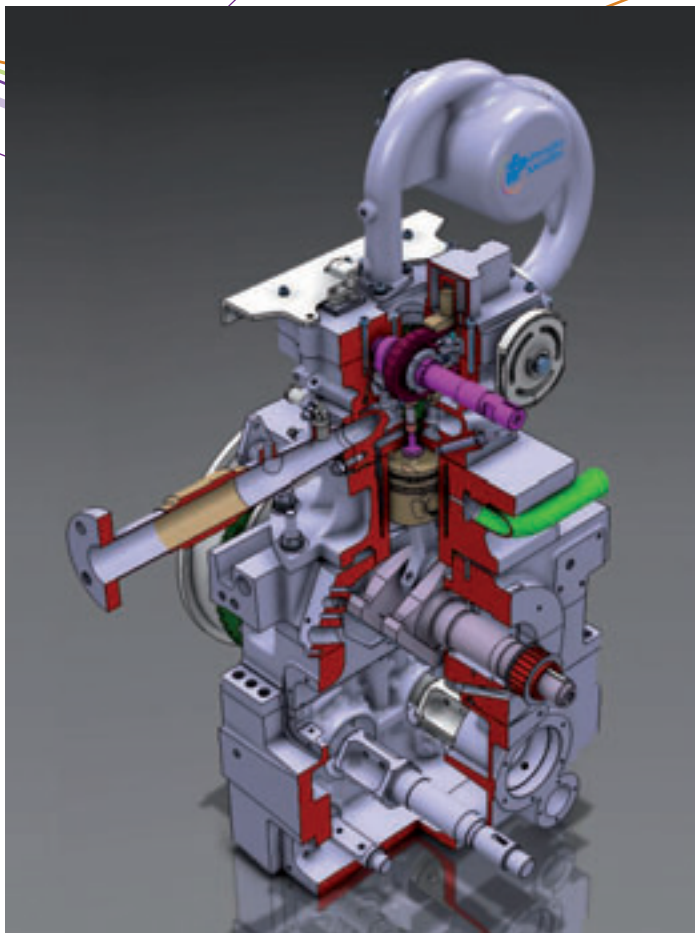
*SAE Powertrains, Fuels and Lubricants*  
Rosemont, USA, October 6-9, 2008 - SAE 2008-01-2408

### ■ Modeling and control of a mild-hybrid city car with a downsized turbo-charged CNG engine

P. Tona, P. Gautier, R. Amari

*9<sup>th</sup> International Symposium on Advanced Vehicle Control*  
Kobe, Japan, October 6-9, 2008





### Diesel HCCI

#### ■ Variable valve actuation systems for homogeneous diesel combustion: how interesting are they?

B. Walter, P. Pacaud, B. Gatellier  
*Oil & Gas Science and Technology - Revue d'IFP Energies nouvelles* - Vol. 63, No. 4, 2008, pp. 517-534

#### ■ Optimizing early injection strategy for diesel HCCI combustion

M. André, B. Walter, G. Bruneaux (IFP Energies nouvelles), F. Foucher, C. Mounaïm-Rousselle (Institut PRISME - Université d'Orléans)  
*SAE Powertrains, Fuels and Lubricants Meeting*  
 San Antonio, USA, November 2-5, 2009 - SAE 2009-01-2731

### Gasoline

#### ■ Optimal design for a highly downsized gasoline engine

J.M. Zaccardi, A. Pagot, F. Vangraefschepe (IFP Energies nouvelles), C. Dognin (Renault), S. Mokhtari (PSA Peugeot Citroën)  
*SAE International Powertrains Fuels and Lubricants Congress*  
 Florence, Italy, June 15-17, 2009 - SAE 2009-01-1794

#### ■ Controlling in-cylinder composition on turbocharged variable-valve-timing spark ignition engines

Th. Leroy, J. Chauvin (IFP Energies nouvelles), N. Petit (Mines ParisTech)  
*10<sup>th</sup> EEC European Control Conference*  
 Budapest, Hungary, August 23-26, 2009

#### ■ Development and results of a new cylinder deactivation approach: the OValiD® concept

C. Ternel, A. Pagot, P. Anselmi, X. Gautrot

*SIA International Conference and Exhibition "The Spark Ignition Engine of the Future"*

Strasbourg, France, December 2-3, 2009

#### ■ Open-loop combustion timing control of a spark-ignited engine

M. Hillion, J. Chauvin (IFP Energies nouvelles), N. Petit (Mines ParisTech)

*47<sup>th</sup> IEEE Conference on Decision and Control*

Cancun, Mexico, December 9-11, 2008

### Gasoline CAI

#### ■ Influence of the valve lift strategy in a CAI engine using exhaust gas re-breathing - Part 1: Experimental results and OD analysis

F. Duffour, F. Vangraefschepe, V. Knop, L. de Francqueville  
*SAE World Congress*  
 Detroit, USA, April 20-23, 2009 - SAE 2009-01-0299

#### ■ Influence of the valve lift strategy in a CAI engine using exhaust gas re-breathing - Part 2: Optical diagnostics and 3D CFD results

V. Knop, L. de Francqueville, F. Duffour, Franck Vangraefschepe  
*SAE World Congress*  
 Detroit, USA, April 20-23, 2009 - SAE Int. J. Engines 2(1): 271-288, 2009 - SAE 2009-01-0495



### Air Loop

#### ■ Comparative study in LTC combustion between a short HP EGR loop without cooler and a variable lift and duration system

G. Bression, P. Pacaud, D. Soleri, J. Cessou (IFP Energies nouvelles), D. Azoulay (Renault Powertrain Division), L. Doradoux, N. Guerassi (Delphi Diesel Systems France), N. Lawrence (Mechadyne UK)  
*17<sup>th</sup> Aachen Colloquium*  
 Aachen, Germany October 7-8, 2008

#### ■ Control of a turbocharged diesel engine fitted with high pressure and low pressure exhaust gas recirculation systems

O. Grondin, Ph. Moulin, J. Chauvin  
*48<sup>th</sup> IEEE Conference on Decision and Control & Chinese Control Conference*  
 Shanghai, China, December 16-18, 2009

#### ■ Motion planning for experimental air path control of a variable-valve-timing spark ignition engine

Th. Leroy, J. Chauvin (IFP Energies nouvelles), N. Petit (Mines ParisTech)  
*Control Engineering Practice - Vol. 17, No. 12, 2009, pp. 1432-1439, Elsevier*

#### ■ Low pressure EGR control for a Diesel HCCI engine

B. Youssef, G. Le Solliec, G. Corde (IFP Energies nouvelles), O. Hayat, C. Jabeur, P.O. Calendini (PSA Peugeot Citroën)  
*IEEE Multi-Conference on Systems and Control - CCA Conference on Control Applications,*  
 St Petersburg, Russia, July 8-11, 2009

### Control

#### ■ Combustion control of diesel engines using injection timing

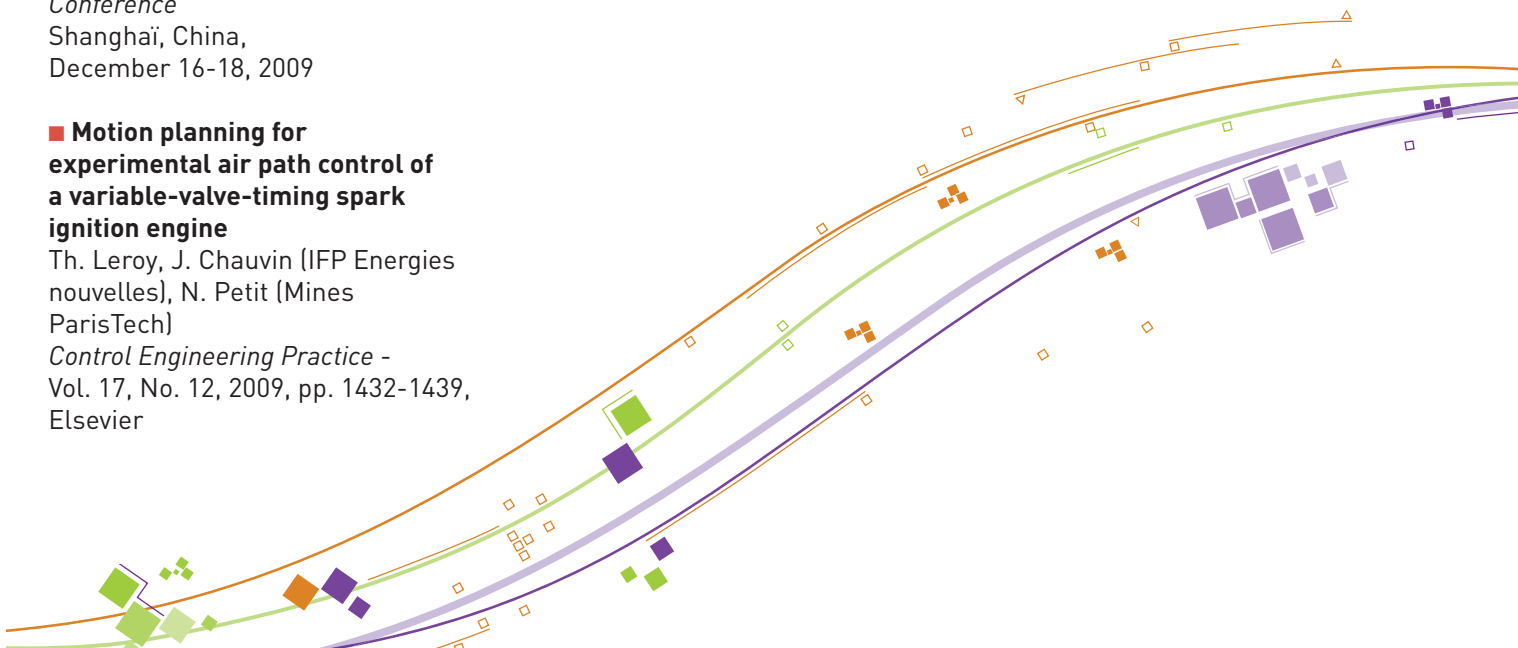
M. Hillion, H. Buhlback, J. Chauvin (IFP Energies nouvelles), N. Petit (Mines ParisTech)  
*SAE World Congress*  
 Detroit, USA, April 20-23, 2009 - SAE 2009-01-0367

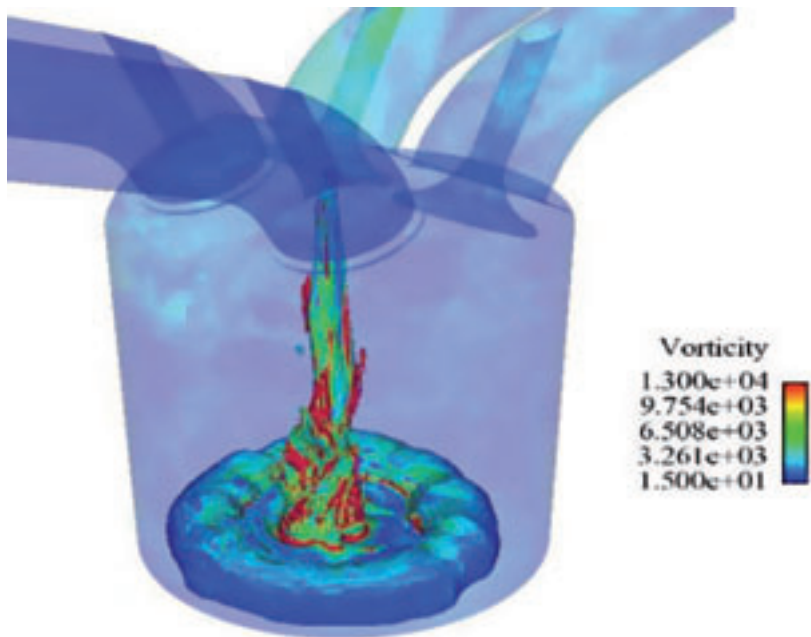
#### ■ In Cylinder burned gas rate estimation and control on VVA diesel engines

T. Leroy, J. Chauvin, M. Bitauld (IFP Energies nouvelles), N. Petit (Mines ParisTech)  
*SAE World Congress*  
 Detroit, USA, April 20-23, 2009 - SAE 2009-01-0366

#### ■ Model-based adaptive observers for intake leakage detection in diesel engines

R. Ceccarelli, P. Moulin (IFP Energies nouvelles), C. Canudas de Wit (CNRS, GIPSA LAB)  
 A. Sciarretta (IFP Energies nouvelles),  
*American Control Conference*  
 Saint-Louis, USA, June 10-12, 2009





■ **Combustion parameters estimation and control using vibration signal: application to the Diesel HCCI engine**

O. Grondin, J. Chauvin, F. Guillemain, E. Nguyen  
*47<sup>th</sup> IEEE Conference on Decision and Control*  
 Cancun, Mexico,  
 December 9-11, 2008

■ **Controlling air and burned gas masses of turbocharged VVT SI engines**

T. Leroy, J. Chauvin (IFP Energies nouvelles), N. Petit (Mines ParisTech)  
*47<sup>th</sup> IEEE Conference on Decision and Control*  
 Cancun, Mexico,  
 December 9-11, 2008

**Modeling/Simulation**

■ **An experimental database dedicated to the development and validation of a LES methodology for predicting cyclic variations in SI engine**

C. Lacour, C. Pera, C. Angelberger, G. Parameswaran  
*IFP Energies nouvelles Sessions: LES for Internal Combustion Engine Flows*  
 Rueil-Malmaison, France,  
 December 1-2, 2008

■ **LES of fuel injection in an Euler/Euler framework: application to diesel and gasoline injections**

A. Vié, M. Martinez, A. Benkenida (IFP Energies nouvelles), B. Cuenot (CERFACS)  
*IFP Energies nouvelles Sessions: LES for Internal Combustion Engine: Flows*  
 Rueil-Malmaison, France,  
 December 1-2, 2008

■ **LES of fuel sprays using the eulerian mesoscopic approach, validation in realistic engine conditions**

L. Martinez, A. Vié, S. Jay, A. Benkenida (IFP Energies nouvelles), B. Cuenot (CERFACS),  
*ICLASS International Conference on Liquid Atomization and Spray Systems*  
 Vail, USA, July 26-30, 2009

■ **Modelling and simulation of the combustion of ethanol blended fuels in a SI engine using a coherent flame model**

S. Bougrine, S. Richard (IFP Energies nouvelles), D. Veynante (École Centrale de Paris)  
*ICE International Conference on Engine for Automobile*  
 Naples, Italy,  
 September 13-18, 2009 - SAE 09ICE-0140

■ **Pollutant emissions and fuel efficiency prediction for a downsized spark ignition engine using a 0-dimensional combustion model**

S. Richard, S. Bougrine, G. Font, F. Le Berr  
*SIA International Conference and Exhibition "The Spark Ignition Engine of the Future"*  
 Strasbourg, France,  
 December 2-3, 2009

**After-treatment**

■ **SCR for passenger car: the ammonia-storage issue on a Fe-ZSM5 catalyst**

A. Frobert, Y. Creff, S. Raux (IFP Energies nouvelles), C. Charial, A. Audouin (PSA Peugeot Citroën), L. Gagnepain (Ademe)  
*SAE International Powertrains Fuels and Lubricants Congress*  
 Florence, Italy, June 15-17, 2009 - SAE 2009-01-1929

■ **Simulation of urea-SCR process applied to lean-burn SI engines**

S. Zinola, S. Raux, J.C. Dabadie  
*SAE Powertrains, Fuels and Lubricants Meeting*  
 San Antonio, USA, November 2-5, 2009 - SAE 2009-01-2776

■ **Model-based control design of a diesel oxidation catalyst**

O. Lepreux, Y. Creff (IFP Energies nouvelles), N. Petit (Mines ParisTech)  
*ADCHEM International Symposium on Advanced Control of Chemical Processes*  
 Istanbul, Turkey, July 12-15, 2009

**Optical diagnostic**

■ **Comparison of combustion and emissions behaviour in optical and metal single-cylinder diesel engines**

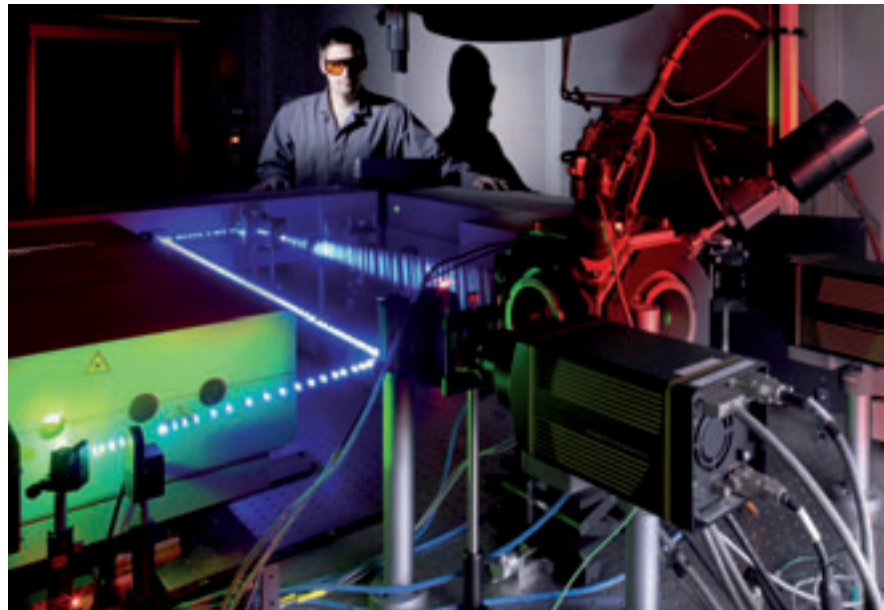
J.T. Kashdan, B. Thirouard  
*SAE International Powertrains Fuels and Lubricants Congress*  
 Florence, Italy, June 15-17, 2009 - SAE Int. J. Engines 2(1): 1857-1872, 2009 - SAE 2009-01-1963

■ **Cold operation with optical and numerical investigations on a low compression ratio diesel engine**

B. Walter, H. Perrin, J.P. Dumas, O. Laget  
*SAE Powertrains, Fuels and Lubricants Meeting*  
San Antonio, USA, November 2-5, 2009 - SAE 2009-01-2714

■ **Detailed analysis of mixture and combustion of diesel jets by laser induced fluorescence techniques**

G. Bruneaux  
*TCDE International Symposium Towards Clean Diesel Engine*  
Aachen, Germany, June 4-5, 2009



**Transmissions**

■ **Unified MPC strategy for idle-speed control, vehicle start-up and gearing applied to an automated manual transmission**

R. Amari, M. Alamir, P. Tona  
*IFAC World Conference 2008*  
Seoul, Korea, July 6-11, 2008

■ **Modeling and estimation of clutch transmissibility for transmission control applications**

R. Amari, P. Tona, M. Alamir  
*Conference on Control Applications CCA09*  
St Petersburg, Russia, July 8-10, 2009

■ **Experimental evaluation of a hybrid MPC strategy for vehicle start-up with an automated manual transmission**

R. Amari, P. Tona, M. Alamir  
*European Control Conference ECC09*  
Budapest, Hungary, August 23-26, 2009

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