

# ***New Trends in Engine Control, Simulation and Modelling***

***2 - 4 October 2006 - IFP, France***

## **FINAL PROGRAM**

### **Monday 2 October**

- 8.45 Registration
- 9.30 Welcome address:  
**P. Ungerer**, Scientific Director  
(IFP, France)

#### **Session 1: Modelling for engine control design - methodology and tools**

Chairpersons: **A. Dauron** (*Renault, France*) and **P. Higelin** (*University of Orléans, France*)

- 9.45 Keynote address: **Model- based powertrain control: many uses no abuse**  
**A. Dauron**  
(*Renault, France*)
- 10.15 **Towards a stronger simulation support for engine control design:  
a methodological point of view**  
**A. Albrecht**, O. Grondin, F. Le Berr , G. Le Solliec  
(*IFP, France*)
- 10.40 **Rapid control prototyping with Dymola and Matlab for model predictive  
control for the air-path of a boosted diesel engine**  
**K. Hoffmann**, F. Heßeler, A. Bollig, D. Abel  
(*Institute of Automatic Control, RWTH Aachen University, Germany*)
- 11.05 Poster session / Coffee break
- 11.30 **Engine control model based design with Achille Library**  
**V. Talon**, S. Castric, P. Emery  
(*Renault, France*)
- 11.55 **Effects of control parameters on performance and emissions of HDSI diesel  
engines: investigation and optimization via two zone modelling**  
**I. Arsie**, A. Mogavero, C. Pianese  
(*University of Salerno, Italy*)
- 12.20 Lunch

## Session 2: Engine control for LTC / HCCI engine

Chairpersons: **A. Stefanopoulou** (*University of Michigan, USA*) and **P. Rouchon** (*École des Mines de Paris, France*)

- 14.00 Keynote address: **Controlled transition among Thermal Equilibria in HCCI engines**  
**A. Stefanopoulou**  
(*University of Michigan, USA*)
- 14.30 **Critical aspects on the control in low-temperature combustion systems for high performance DI diesel engines**  
**G. Avolio**, C. Beatrice, C. Bertoli, N. Del Giacomo, C. Guido, M. Migliaccio  
(*Istituto Motori, Italy*)
- 14.55 **Closed-loop control of a 1-cylinder gasoline HCCI-engine in dynamic operation**  
**R. Karrelmeyer**, J. Häring, W. Fischer, J.P. Hathout  
(*Robert-Bosch, Germany*)
- 15.20 **Fuzzy controller for the air system of a diesel engine**  
**\*J.F. Arnold**, \*G. Tremoulière, \*\*N. Langlois, \*\*H. Chafouk  
(\**Le Moteur Moderne*, \*\**Irseem-Esigelec, France*)
- 15.45 Poster session / Coffee break
- 16.15 **Towards generic model based engine control – the concept**  
**C. Vigild**, C. Tumelaire, D. Röttger, E. Karvounis  
(*Ford Research, Germany*)
- 16.40 **Tuning strategies for online-adaptive PI-controllers**  
**L. Däubler**, C. Bessai, O. Predelli  
(*IAV, Germany*)
- 17.05 **Experimental air path control of a diesel HCCI engine**  
**\*J. Chauvin**, G. Corde, \*\*N. Petit, P. Rouchon  
(\**IFP*, \*\**École des Mines de Paris, France*)
- 17.30 **Flatness-based internal model control applied to boost pressure control of a diesel engine**  
**\*R. Nitsche**, \*\*J. Hanschke, **D. Schwarzmann**  
(\**Robert Bosch GmbH*, \*\**University of Stuttgart, Germany*)
- 18.00 Cocktail
- 19.30 Bus departure to Paris with a stop at Rueil-Malmaison RER Station

**Tuesday 3 October 2006**

8.30 Registration

**Session 3: Advanced strategies for engine control**

Chairman: **L. Eriksson** (*Linköping University, Sweden*)

9.00 Keynote address: **Modelling and control of turbocharged SI and DI engines**  
**L. Eriksson**  
(*Linköping University, Sweden*)

9.30 **A simulation-based approach for developing optimal calibrations for VVT/VVA engines**  
**\*B. Wu**, Z. Filipi, **\*\*D. Kramer**, G. Ohi  
(\**University of Michigan*, \*\**Daimler Chrysler Corporation, USA*)

9.55 **Engine control of a downsized spark ignited engine: from simulation to vehicle**  
**\*G. Le Sollicc**, F. Le Berr, G. Corde, **\*\*G. Colin**, Y. Chamaillard  
(\**IFP*, \*\**Laboratoire de Mécanique et d'Énergétique, France*)

10.20 Poster session / Coffee break

10.50 **Improved diesel particle filter thermal management using simulation tools**  
**S. Sadai**  
(*Renault, France*)

11.15 **Control oriented gas exchange models for CVCP engines and their sensitivity**  
**P. Öberg**, L. Eriksson  
(*Linköping University, Sweden*)

11.40 **Experimental evaluation of the impact of VGT control malfunction on pollutant emissions**  
**F. Payri**, J. M. Lujan, C. Guardiola, G. S. Lapuente  
(*CMT Motores Térmicos, Spain*)

12.05 Lunch

**Session 4: Control and modelling of advanced power sources**

Chairpersons: **L. Guzzella** (*Institute of Measurement and Control, Switzerland*) and **A. Sciarretta** (*IFP, France*)

- 13.30            Keynote address: **Modelling and control of advanced propulsion systems**  
**L. Guzzella**  
(*Institute of Measurement and Control, Switzerland*)
- 14.00            **Architecture of hybrid systems – from Toyota Prius to Lexus RX400h**  
**\*S. Abe, \*\*G. Killmann**  
(\**Toyota Motor Corporation, Japan, \*\*Toyota Motor Europe, Belgium*)
- 14.25            **Power management decoupling control for a hybrid electric vehicle**  
**O. Barbarisi, F. Vasca**  
(*Università del Sannio, Italy*)
- 14.50            **Comparison of two real-time predictive strategies for the optimal energy management of a hybrid electric vehicle**  
**R. Beck**  
(*Institute of Automatic Control, RWTH, Germany*)
- 15.15            Poster session / Coffee break
- 15.40            **Modelling and simulating an "ideal hybrid vehicle" - development methods for physically simulating a heterogeneous system**  
**J. Kitte, T.M. Wolter, M. Gustke, A. Sommer**  
(*IAV, Germany*)
- 16.05            **Integrated powertrain control for a mild-hybrid urban vehicle with a downsized turbo-charged CNG engine**  
**P. Tona, P. Moulin, S. Venturi, R. Tilagone, P. Gautier**  
(*IFP, France*)
- 16.05            Closing Address:  
**P. Pinchon**, Powertrain Engineering Technology Business Unit Director  
(*IFP, France*)
- 16.45            Bus departure to Rueil-Malmaison RER Station

## POSTERS

**Monday 2 and Tuesday 3 October 2006**

• **Model based engine control using Asics**

**C. Wilhelmsson**, P. Tunestål, B. Johansson  
(*Lund Institute of Technology, Sweden*)

• **Modelling for fuel optimal control of SI VCR engines**

**Y. Nilsson**, L. Eriksson  
(*Linköping University, Sweden*)

• **Hinf Linear Parameter-Varying (LPV) anti-windup control of a diesel engine common rail injection system**

**\*C. Gauthier**, O. Sename, L. Dugard, **\*\*G. Meissonnier**  
(*\*LAG University of Grenoble, \*\*Delphi, France*)

• **Development of a dynamic engine brake model for control purposes**

**\*X.L.J. Seykens**, **\*R.S.G. Baert**, **\*\*F.P.T. Willems**, **\*\*W. Vink**, **\*\*\*I. van der Meuvel**  
(*\*Eindhoven University of Technology, \*\*TNO Automotive, \*\*\* DAF Trucks, The Netherlands*)

• **MPC-based optimal control of dry clutch engagement**

**\*P. Dolcini**, C. Canudas de Wit, **\*\*H. Béchart**  
(*\*LAG, \*\*Renault, France*)

• **Constraint optimization of energy management for a mild-hybrid**

**\*G. Rousseau**, D. Sinoquet, **\*\*P. Rouchon**  
(*\*IFP, \*\*École des Mines de Paris, France*)