

ERCOFTAC DESIGN OPTIMIZATION: METHODS & APPLICATIONS

International Conference & Advanced Course Program

**Athens, GREECE
March 31-April 2, 2004**

CONFERENCE PROGRAM



**Venue: NTUA Campus, Zographou, Athens, GREECE
9 Iroon Polytechniou St. (Polytechniupolis Zografou)
Administration Building**

TENTATIVE CONFERENCE PROGRAM

WEDNESDAY, MARCH 31st 2004

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| 11:30-12:30 : REGISTRATION |
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| SESSION: 000 | ROOM: A | 12:30-13:00 |
| WELCOME CEREMONY – INTRODUCTORY LECTURE | | |

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| SESSION: I01 | ROOM: A | 13:00-14:30 |
| KEY LECTURES | | |

- Approaches to the Optimal Synthesis-Design-Operation of Energy Systems.
C. FRANGOPOULOS, NTUA, Greece.
- A Stochastic Framework for Flow Optimization.
P. KOUMOUTSAKOS, ETH, Switzerland.

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| SESSION: S01 | ROOM: A | 14:30-15:30 |
| ENGINE PERFORMANCE – OPTIMIZATION | | |

- Optimization Techniques in Gas Turbine Fault Diagnosis.
P. Kamboukos, K. Mathioudakis, NTUA, Greece.
- Test Bed Design and Optimisation.
P. Laskaridis, V. Pachidis & P. Pilidis, Cranfield Univ., UK.
- Sensor Checking Using Model Bases Engine Performance Test Analysis and Numerical Optimisation.
J. Kurzke, MTU, Germany.

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| 15:30-16:00 : COFFEE BREAK |
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| SESSION: S02 | ROOM: A | 16:00-19:00 |
| POWER GENERATION – SOFTWARE & APPLICATIONS | | |

- Application of a Thermodynamic and Exergetic Cycle Calculation Software Code for the Optimisation of a Combined Cycle Power Plant.
N. Aronis, E. Kakaras, A. Doukelis, NTUA, Greece.
- Optimal Design of Combined Cycle Power Plants Based on Gas Turbine Performance Data.
E. Bonataki, L. Georgoulis, C. Georgopoulou, K. Giannakoglou, PPC-NTUA, Greece.

- CT/CCPP O&M Cost Analyzer: Software Capabilities and Development.
H. Annendyck, D. Grace, J. Scheibel, EPRI, Belgium.
- Design Optimization Tools and Applications of Modern Industrial Power Generation & Combined Heat and Power Systems.
J. K. Prochaska, GE, USA.
- The Importance of Reliability Considerations on the Optimal Synthesis, Design and Operation of Energy Systems.
C. A. Frangopoulos & G. G. Dimopoulos, NTUA, Greece.
- Simulation and Optimization Design of the Freeboard of a Gasifier Unit with the Aid of a CFD Code.
J. De Smet, G. Desmet, G.V. Baron & H. Verelst, Vrije Univ., Belgium.
- Optimum sizing of a pumped-storage plant for the recovery of power rejected by wind farms.
J. Anagnostopoulos & D. Papantonis, NTUA, Greece.
- Energy Analysis and Optimization of Energetic Installations.
C. Deligiannis, G. Pappa, X. Kakatsios, NTUA, Greece.

THURSDAY, APRIL 1st 2004

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| SESSION: I02 | ROOM: A | 9:00-10:30 |
| KEY LECTURES | | |

- Aerodynamic Design of Classical and Innovative Configurations Using a Hybrid Asymmetric Multiobjective Algorithm.
D. QUAGLIARELLA, CIRA, Italy.
- Issues of the CAD-CAE Interface in Optimization.
E. GERTEISEN, Daimler-Chrysler, Germany.

10:30-11:00 : COFFEE BREAK

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| SESSION: S03 | ROOM: A | 11:00-13:00 |
| OPTIMIZATION IN AERONAUTICS – METHODS & APPLICATIONS | | |

- Impact of Automatic Optimization in the Design Process of Supersonic Business Jet.
L. Daumas, Q.v. Dinh, S. Kleinveld, G. Roge, Dassault Av., France.
- Optimisation in Aeronautics.
W. Haase, J. Grashof, G. Wedekind, EADS, Germany.
- Inviscid Aerodynamic Multipoint Airfoil Optimisation Using Control Theory on Unstructured Meshes.
F. Monge & F. Palacios, INTA, Spain.
- Adjoint-Based Shape Optimization for Natural Laminar Flow Design.
O. Amoignon, J. O. Pralits, A. Hanifi, M. Berggren & D. S. Henningson, Uppsala Univ., Sweden.

- Multipoint Constrained Optimization of Aerodynamic Shapes in Engineering Environment.
S. Peigin & B. Epstein, IAI, Israel
- Metamodel-assisted Multiobjective Optimisation with implicit Constraints and its Applications in Airfoil Design.
M. Emmerich & B. Naujoks, Dortmund Univ., Germany.

13:00-14:15 : LUNCH BREAK

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| SESSION: I03 | ROOM: A | 14:15-15:45 |
| KEY LECTURES | | |

- Multipoint Optimization for the Design of Turbomachinery Blades.
C. HIRSCH, VUB, Belgium.
- Multilevel Optimization of Turbomachinery Bladings.
H. R. SCHILLING, TUM, Germany.

15:45-16:15 : COFFEE BREAK

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| SESSION: S04a | ROOM: B | 16:15-19:00 |
| OPTIMIZATION IN FLUID MECHANICS AND AERODYNAMICS | | |

- Numerical Investigation into Aerofoils' Drag Reduction in Transonic Periodic Flows.
C. Tulita, S. Raghunathan & E. Benard, Queen's Un. Belf., UK.
- Artificial Neural Networks for Shape Optimization in CFD.
K. Hirschen, S. Meynen & M. Schafer, TU Darmstadt, German.
- Shape Parameterisation Based on Freeform Deformation in Aerodynamic Design Optimization.
A. Ronzheimer, DLR, Germany.
- Acceleration of Aerodynamic Optimization Based on RANS-Equations by Using Semi-Structured Grids.
J. Wild, DLR, Germany.
- Numerical Shape Optimization for Flow Configurations.
Z. Harth & M. Schafer, TU Darmstadt, Germany.
- Generating and Maintaining Highly Efficient Adjoint and Hessian Code for Optimisation and Uncertainty Analysis by Automatic Differentiation.
R. Giering, T. Kaminski & M. Vossbeck, FastOpt, Germany.
- Inverse Design of Aerodynamic Shapes Using Differential Evolution Coupled with Artificial Neural Network.
I. K. Nikolos, TU Crete, Greece.

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| SESSION: S04b | ROOM: A | 16:15-19:00 |
| I. OPTIMIZATION IN AUTOMOTIVE ENGINEERING | | |

- Automotive Aerodynamic.

- **F. Muyl & H. Vincent**, Peugeot, France.
- Optimization of Fuel Injection in Gasoline Direct Injection Internal Combustion Engines.
G. Ioannou & G. Bergeles, NTUA, Greece.
- Optimization of the Acoustic Insulation of a Car Engine Compartment, Using Genetic Algorithms.
D. Poteinos, S. Giannareli & D.T. Tsahalis, Univ. of Patras, Greece.
- Self Checking Strategies to Detect Failures in Electromechanical Systems.
G. M. Repici, A. Sorniotti & G. P. Zoppo, Politecnico di Torino, Italy.
- Computer-aided Design Optimization of Catalytic Exhaust Treatment Systems for Gasoline-Powered Cars.
G. Konstantas & A. Stamatelos, Univ. of Thessaly, Greece.

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| II. STRUCTURAL OPTIMIZATION |
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- Developments and Applications of Multi-Level Procedure for Structural Optimization of Aerospace Structures.
L. Guadagni & E. Carrera, Pol. di Torino, Italy.
- Optimization of Truss Structures under Arbitrary Constraints including Structural Dynamics Constraints.
S. Kanarachos & D. Koulocheris, NTUA, Greece.
- Seismic Design Optimization of Steel Frames Incorporating Pushover Analysis.
M. Papadrakakis, M. Fragiadakis, N.D. Lagaros & V. Rizou, NTUA, Greece.

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| 21:00- : APHRODITE'S DINNER |
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FRIDAY, APRIL 2nd 2004

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| SESSION: I04 | ROOM: A | 9:00-10:30 |
| KEY LECTURES | | |

- A Multiobjective Evolutionary Technique for Optimization and Inverse Design Problems Applied to UAV Systems.
J. PERIAUX, Paris VI Univ., France
- The Design of High-Efficiency Small-Size Turbomachinery Components for Various Applications.
K. PAPAILIOU, NTUA, Greece.

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| 10:30-11:00 : COFFEE BREAK |
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| SESSION: S05 | ROOM: A | 11:00-14:00 |
| OPTIMIZATION IN TURBOMACHINES | | |

- A Review of Automatic Optimisation Applications in Aerodynamic Design of Turbomachinery Components.
S. Shahpar, Rolls Royce, UK.
- Design and Optimization of a New Small Turbojet Engine Compressor Stage.
X. Carbonneau, ENSICA, France.
- Turbofan Noise Reduction Using Optimisation Method Coupled to Aero-Acoustic Simulation
S. Pierret & P. Ploumhans, Cenaero A.S.B.L., Belgium.
- Optimizations of a Gas Turbine Feeding System
L. Fuligno, D. Micheli & C. Poloni, Univ. of Udine, Italy.
- Optimal Francis Runner Design: Preliminary Tests.
F. Avellan, J. L. Kueny, L. Ferrando, L. Tomas & C. Pedretti, EPFL, Switzerland.
- Sequential Progressive Optimization using Evolutionary and Gradient Algorithms.
G. Anaclerio, L.A. Catalano, A. Dadone & V. Daloiso, Pol. di Bari, Italy.
- Multi-objective Aerodynamic Design Optimization.
T. Kipouros, G.T. Parks & A.M. Savill, Cambridge Univ., UK.
- Stochastic and Deterministic Optimization in Turbomachinery Applications based on the Adjoint Formulation.
D. Papadimitriou, I.C. Kampolis, K.C. Giannakoglou, NTUA, Greece

14:00-14:15 : CLOSURE