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ABSTRACT BOOK

ACE-X 2010 / PARIS – FRANCE / 8-9 JULY, 2010

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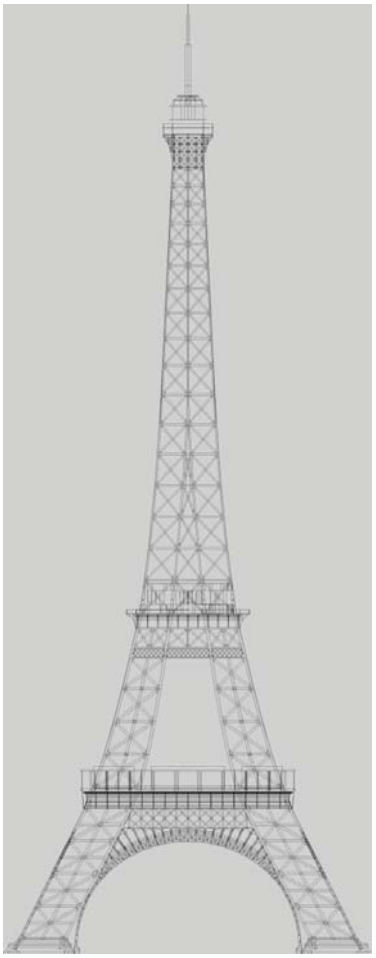

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PREFACE

It is our great pleasure to welcome you to the 4TH International Conference on Advanced Computational Engineering and Experimenting, (ACE-X 2010) at **Hotel Concorde La Fayette** (Village 5, 50 place de l'Ellipse, CS 70050, 92081 / PARIS LA DEFENSE CEDEX) Paris, France, from 08-09 JULY, 2010. More details on the event can be found on our web page www.ace-x2010.com

ACE-X 2010 aimed at attracting a balanced portion of delegates from academia, industry and research institutions and laboratories involved with research and development work. In doing so, the conference provides a binding platform for academics and industrialists to network together, exchange ideas, provide new information and give new insights into overcoming the current challenges facing the academics and the industrialists relating to the Advanced Computational Engineering and Experimenting area.

I would like to thank the Organising Committee members and members of the Local Committe for their help in contributing to the successful organisation of this meeting and special thanks to **Prof. Jean-Yves Cognard** (Head of Local Committee) for his support.

I would like to thank the colleagues, organisers of the SPECIAL SESSIONS, Thank you!
A special thanks to ACEX2010 Co-chairs, Professor Lucas da Silva and Professor Holm Altenbach for supporting one more ACEX CONFERENCE.

We would like to thank all delegates for the decision in attending ACEX 2010.

We hope you will find the meeting very useful for your work, business and a useful forum for obtaining new knowledge.

2011, we will celebrate 5 Years of ACEX conference and you are invited to celebrate it at the beach where started: Algarve (PORTUGAL)

Have fun learning and meeting new people!

Be helthy and keep yourself helthy!

Professor Andreas Öchsner
ACEX CONFERENCES – Chairman

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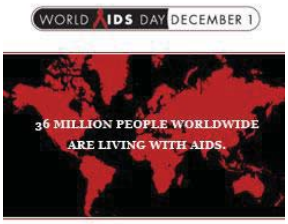

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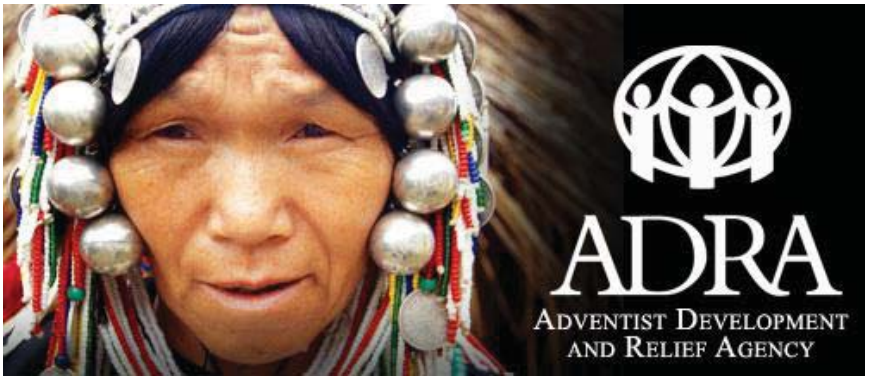

ACEX290
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An enhanced iterative method for inverse structural problems

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In Computational Structure Mechanics (CSM) the continuum media under study is modeled by a bunch of nodes. The well known technique of Finite Element Method (FEM) is a CSM routine devised to correlate the force and deflection of the nodes. In a direct FEM problem, in each node just one of the force or their associated displacement components is unspecified. Then if in some nodes both force and displacement components are unknowns, the problem is called an inverse problem. A typical inverse problem for a beam is the estimation of load on the beam by measuring its displacement. The solutions of inverse problems are naturally sensitive to the input data and are classified as ill-posed problems. In practice the FEM modeling of a CSM inverse problem results in a sparse, un-symmetric, and often rectangular stiffness matrix. A through treatment of the problem is given in [1]. There are both iterative and non-iterative methods of solution for such a problem. One of the well-known iterative techniques is the method of Least Squares (LSQR). As it can be seen in [2], the function of the method may be improved by invoking of some additional matrix manipulations known as preconditioning and column scaling. Here in this work to improve the results of the application of LSQR method in CSM problems the use of some pre-conditioners and column scaling techniques are introduced. To this ends, the estimations of the end load of a cantilever beam is selected as the case study. The numerical results show that LSQR method with the pre-conditioners known as AINV and CIMGS are the proper combinations for the solution technique. It is also shown that a definite norm known as "condition number" is a good criterion for the evaluation of the solution accuracy.

[1] T.J. Martin, J. Halderman, G.S. Dulikravich, Comput. Struct., 56, 825 (1995)
[2] D. Khojasteh Salkuyeh, S. Karimi, F. Toutounian, J. Appl. Math. Inform., 28, 213 (2008)

ACEX294
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Generating Optimal Temperature Trajectory of a S-PVC Batch Reactor Based on Genetic Algorithm