

## **THERMOMECHANICAL PROBLEMS IN ENGINEERING AND SCIENCE**

**C.E. Majorana**

Dept. of Structural and Transportation Engineering, University of Padua, Via F. Marzolo, 9 – 35131  
Padua, Italy, email: majorana@dic.unipd.it

**B.A. Schrefler**

Dept. of Structural and Transportation Engineering, University of Padua, Via F. Marzolo, 9 – 35131  
Padua, Italy, email: majorana@dic.unipd.it

**Key Words:** *Thermal, Hygral, Mechanical, Porous Materials, Finite Elements.*

### **ABSTRACT**

Thermomechanical problems include several phenomena and fields in Engineering and Science. Thermal and Mechanical fields can arise as a consequence of hygral movement when temperature differences appear in deformable solids, but also when electromagnetic or chemical phenomena occur in structures. Well known finite element solvers are available in the market as well as research procedures and programs to resolve special problems. The key point of non-equilibrium and irreversible thermodynamics has been also developed recently, extending the traditional research fields of thermodynamics to incorporate these new topics.

The scope of this MS is to bring together the community of scientists and engineers interested to both classical and non-classical approaches and problems, having the common aim to resolve them using computational techniques, in particular those related to Finite Element Method and nonlinear algorithms.

### **REFERENCES**

- [1] R.W. Lewis, B.A. Schrefler, *The Finite Element Method in the Static and Dynamic Deformation and Consolidation in Porous Media*, J. Wiley, Chichester, 1998.
- [2] D. Gawin, C.E. Majorana, B.A. Schrefler, Numerical analysis of hygro-thermic behaviour, stresses and damage of concrete at high temperature, *Mechanics of Cohesive-Frictional Materials*, 4, 37-76, 1999.
- [3] B.A. Schrefler, P. Brunello, D. Gawin, C.E. Majorana, F. Pesavento, Concrete at high temperature with application to tunnel fire, *Computational Mechanics*, Springer Verlag, Berlin, 29, 1, 43-51, 2003.