ABSTRACT TITLE (TIMES NEW ROMAN, 12 pt., bold)

M. First[1], D. Second[2] (authors, 11 pt., bold)

[1] Institute of Mechanics (Times New Roman, 11pt.)
Ruhr-Universitat Bochum, Universitatsstr. 150, D-44801 Bochum, Germany
e-mail: first@first.com
[2] Faculty of Mechanical Engineering,
The University of Belgrade, Kraljice Marije 16, 11120 Belgrade 35
e-mail: second@second.com

ABSTRACT: (Times New Roman, 11pt.) The primary objective of this investigation is to develop efficient and robust computational schemes for a damage-coupled cyclic thermoviscoplasticity model for solder materials. Three constitutive integration algorithms, Euler, modified Euler, and semi-implicit algorithm for the model are examined. The three algorithms for the model are coded in the commercial finite element (FE) code ABAQUS (version 6.21) via its user-defined material subroutine UMAT. Two single-step algorithms of the substep scheme are applied for the modified Euler algorithm to control the error in the integration of constitutive laws. A semi-empirical formulation is established for an adaptive time stepping algorithm that is based on the Euler algorithm. The simulations of single-element, miniature specimen and notched specimen simulations have been conducted and compared with the test results under monotonic tensile, creep, and fatigue tests of 63Sn-37Pb solder. It is observed that the explicit algorithm consistently requires much less CPU time than others. The modified Euler algorithm has shown, on the other hand, to be not only efficient but also accurate. The semi-implicit algorithm yields an accurate solution. It is worth noting that the method is also effective by applying an appropriate integration scheme [1].

Key words: word, word…(Times New Roman, 11pt.)

References

[1] Chow, C.L. and Wang, J. (1988), A Finite Element Analysis of Continuum Damage Mechanics for Ductile Fracture, *Int. J. Frac*., **38**: 83-102. (Times New Roman, 11pt.)

Abstract guidelines summary:

1) Please follow the above form of abstract
2) Number of words, including abstract title, author(s) name(s) and affiliation(s), key words and references, should be:
   minimum 150
   maximum 400
3) Preferable format of abstract is Word document (.doc), and pdf format is also acceptable
4) Abstract should be sent as attached file on the following e-mail address:
   info@icdm.rs
5) **Deadline for abstract submission is October 1st, 2011**