ADVANCED COMPUTATIONAL TECHNIQUES FOR THE DESIGN OF DEFORMATION PROCESSES

AFOSR CONTRACT NO. F49620–00-1-0373

Nicholas Zabaras
Materials Process Design and Control Laboratory
Sibley School of Mechanical and Aerospace Engineering
188 Frank H. T. Rhodes Hall
Cornell University, Ithaca, NY 14853-3801
URL: http://www.mae.cornell.edu/zabaras/

Abstract

A number of advances towards the development of a robust computational design simulator for industrial deformation processes will be presented. We will discuss the development of an updated Lagrangian formulation and implementation of the continuum sensitivity method for multi-stage deformation processes and the development of design algorithms for hot forming processes. We will finally present innovative design techniques for the deformation processing of materials with ductile damage. Emphasis of the developed techniques remains in an efficient near net shape manufacturing with additional control of the material state in the product.