

A New Approach to Evaluate the Spring-back Phenomena during Sheet Bending Process

A.M.S. Hamouda¹ and F. Abu Khadra¹

Summary

One of the greatest challenges of manufacturing sheet metal parts is the elastic recovery phenomenon during unloading which leads to springback. Precise prediction of the springback after removing the bending tools is the key to design the bending tools, to control the bending process and assessing of the accuracy of the part geometry. This paper is devoted to present a new approach to estimate the spring-back phenomena during sheet metal forming process. The new approach uses the metamodeling technique to study the spring-back problem in the air bending process. The neural network and response surface methodology are used to approximate two important nonlinear relationships for the bending process. Results showed the neural network approximates the two relationships more accurately than the response surface method. The results clearly show the viability of the use of the metamodel to derive optimal process parameters for metal forming operations.

keywords: Springback; Finite element analysis; Metamodeling

¹Department of Mechanical and Industrial Engineering, Qatar University, Doha, Qatar University

