The Non Linear Behavior of the Microplane Model in COMSOL

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Abstract

The safety of large civil structures is often evaluated by means of numerical models based on the Finite Element Method (FEM). In the last year, the elastic behavior of the Microplane Model was implemented in COMSOL because it is a promising approach able to overcome the limit typical of the classical approaches, which in general are able to simulate in a proper way only a few specific characteristics of concrete, but they often present a limited capacity to reproduce the overall material behavior. The basic idea of the Microplane Model is related to the observation that the main mechanical phenomena of concrete take place on planes whose orientation depends on load and material conditions. This paper deals with a detailed description of the implementation process of the non-linear behavior of the Microplane Model, based on the definition of boundary surfaces. The examples used to validate this part are presented as well.