

REVIEW OF PHASE TRANSFORMATION SURFACES AROUND A CRACK TIP FOR SHAPE MEMORY ALLOYS

Ch. LExcellent

Département de Mécanique Appliquée, France

1. General

Depending of the shape of the crack tip e.g. with or without curvature, the size of the phase transformation surface between a mother phase A (austenite) and a producted phase M (martensite) is different.

The presentation is focussed to the modes I and II (opening and shearing modes). The elastic stress field around the crack tip without curvature is known in the literature and the use of "Linear Elastic Mechanical Theory" is consistent with the deformations amplitude associated the beginning of the phase transformation ($A \Rightarrow M$). In order to take into account the curvature at the crack tip, one uses the approximated expressions of Creager and Paris (1967). A special attention is devoted to take into account the asymmetry between tension and compression behavior in the surfaces prediction.