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EFFECT OF INTERFACIAL PROPERTIES ON NONLINEAR BEHAVIOR OF THE 4D IN-PLANE BRAIDED C/C COMPOSITES

Abstract

In order to investigate the effect of interfacial properties on the tensile behavior of the four-directional (4D) in-plane braided C/C composites, a nonlinear finite element model is proposed, and the Cohesive Zone Model (CZM) is used to evaluate the debonding behavior of interface between yarn and matrix in the model. Taking account of interface damage mode and several damage modes of yarns and matrix in the braided composites, the damage initiation and failure process is simulated and the tensile modulus and strength of the material are predicted and compared with the experimental results. The effect of the interfacial properties on the stress-strain curves is parametrically studied. The numerical results show that the interfacial modulus produces an obvious effect on the tensile modulus of the material, and the interfacial damage controlled by interfacial strength is one of critical factor causing the nonlinear behavior of the tensile stress-strain curves. Keywords: braided composites; interface; Cohesive Zone Model; damage model; nonlinear