

عنوان مقاله:

On the tensile behavior of carbon nanotubes and nanotube-reinforced composites at large strains

محل انتشار:

هجدهمین کنفرانس سالانه مهندسی مکانیک (سال: 1389)

تعداد صفحات اصل مقاله: 6

نویسندگان:

Mohsen Asghari - Sharif University of Technology

Mehdi Sadeghpour - Sharif University of Technology

خلاصه مقاله:

In this paper, the nonlinear tensile behavior of single-walled carbon nanotubes and also carbon nanotube-reinforced composites is investigated in detail based on the equivalent continuum approach using nonlinear finite element method (FEM). The behavior of an isolated carbon nanotube is first simulated by using a progressive fracture model based on the modified Morse inter-atomic potential. Then, considering a representative volume element (RVE), the large strain tensile behavior of unidirectional nanotube-reinforced polymer composites is investigated in a rigorous approach. In this work based on a rational approach, analytical expressions for the strain dependent elastic modulus of carbon nanotubes and the nano-composites in the large strain unidirectional tension are presented. It is noted that a similar work exists in the literature (Tserpes et al., 2008, Theoretical and Applied Fracture Mechanics, V49, 51-60). But, some fundamental inconsistencies in the nonlinear analysis of that work are observed. Also, the method of derivation of the strain dependent elastic modulus is incorrect. The aim of this work is the analysis in a consistent and rigorous approach for deriving correct results

کلمات کلیدی:

Carbon Nanotube, Large Strains, Nonlinear Finite Element Method, Tensile Behavior

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/95600>

