



3D Constitutive Modeling of Superelastic Shape Memory Alloys

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Taschenbuch. Book Condition: Neu. 220x150x4 mm. This item is printed on demand - Print on Demand Neuware - Within this work is the presentation of a general 3D model capable of capturing the multiaxial behavior of superelastic shape memory alloys (SMAs) under quasi-static isothermal or dynamic loading conditions. A semi-analytical framework is developed to numerically implement the model. An extended experimental study is conducted on NiTi thin walled tubes to investigate the performance of the model. The proposed approach is shown to be able to capture the non-Mises thermomechanical response of NiTi under complex tension-torsion loading conditions. The effect of loading sequence and loading rate is also experimentally studied. The main motivation of the present study is to develop a platform for analyzing and designing biomedical devices with SMA actuator under combined tension-torsion loading conditions. The torsional stiffness of NiTi is shown to be adjustable by applying an extra axial load. This will lead to developing desirable torque response in NiTi tubes and rods by varying the axial load. A possible application of this technique in the form of an assistive device is discussed. 68 pp. Englisch.



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