



## Experiments and Modelling of Elasto-Viscoplasticity for Thermoplastics with Asymmetric Effects

By Ahmed Shaban

Shaker Verlag Sep 2011, 2011. Taschenbuch. Book Condition: Neu. 208x146x10 mm. Neuware - Experimental tests for thermoplastics exhibit different behaviours for different loading types such as tension, compression and shear. This observation is called asymmetric effects. Also strain rate and temperature influence the mechanical behaviour of thermoplastics. One objective of this thesis is to formulate constitutive equations which can simulate the elasto-viscoplastic deformation of polymers taking into consideration the asymmetric, strain rate and temperature effects. Therefore different frameworks at small and large strains are presented. These frameworks are based on the concept of stress mode dependent weighting functions with a characteristic behaviour dependent on the loading state. In this concept, an additive decomposition of the flow rule is assumed into the sum of weighted stress mode related quantities. A main advantage of the concept is, that the stress modes can directly be associated to certain characteristic loading scenarios, such as tension, compression and shear, which are experimentally investigated in the laboratory. The capability of the proposed models is assessed by simulating a laser transmission welding process and a cold drawing process using a finite element programs such as ABAQUS. Another objective of this thesis is to model the induced anisotropic...



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