

AN APPROACH FOR THERMOVISCOELASTIC
MICRO-ANALYSIS FOR WOVEN
FABRIC LAMINATES

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ABSTRACT

Structures containing micromechanical details is an active area of interest in the analysis of composite materials. The present investigation proposes a method for studying the thermorheological-viscoelastic problem associated with manufacturing and post-analysis of woven fabric laminates. The homogenization approach is employed to resolve the multi-scale issue. A general purpose 3-D finite element code has been developed containing features for heterogeneous thermoviscoelastic constituents exhibiting thermorheological behavior. Material nonlinearities via temperature dependent properties with instantaneous memory are considered and thus, allow for prediction of curing and cool-down residual stresses during manufacture. Test examples and comparisons with experimental observations are also presented.