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Neuronal Networks Approach for Characterization of Viscoelastic Polymers

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An accurate description of the material behavior, under the conjugated effect of applied stress and temperature, has been shown recently to be critically important in computer-aided polymer processing. In this work, we are interested in the characterization of circular thermoplastic membranes, ABS and HIPS thermoforming grade, under biaxial deformation using the bubble inflation technique. The viscoelastic behaviour of the Christensen model is considered. First, the governing equations for the inflation of a flat circular membrane are solved using a finite difference method with deferred corrections and there after, a neuronal algorithm (ANN model) is employed to determine the materials constants. The validation is performed by comparing the obtained results with the experimental measured data for the polymeric ABS and HIPS membrane inflation.