John van Tonder

Promoter: Prof M.P. Venter

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Topic: Using Full Field Data to Produce a Single Indentation Test for Fully Characterising the Mooney Rivlin Material Model

A novel method is proposed to address the non-uniqueness problem in hyperelastic material characterisation by introducing a way to reduce the size of the parameter space and reformulate the material characterisation process as a constrained optimisation problem. The technique uses the Inverse Finite Element method to isolate the domain on which the correct material parameters is located. The proposed method provides a repeatable and accurate set of material coefficients, is validated with physical and synthetic testing, and has been demonstrated to outperform current state-of-the-art approaches. This method will improve the capacity of numerical simulation of soft materials.