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A PROBABILISTIC INCOMPRESSIBLE HYPERELASTIC MATERIAL CONSTITUTIVE MODEL FOR HUMAN BRAIN TISSUE

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In this work, we have presented an incompressible hyperelastic constitutive model for the human brain tissue. The Bayesian theorem is utilized to identify the parameters of the hyperelastic model. As a result of using Bayesian inversion, a probabilistic model for brain tissue is created. The model is calibrated with the reported test data from different regions of the brain. The parameters of the model are determined by utilizing the uniaxial test. Model parameters are obtained in an iterative procedure in conjunction with a surrogate model (substituting finite elements (FE) modeling of the tissue). As Numerical simulation of Brain tissue might be expensive, an artificial neural network surrogate model is used to reduce the computational cost. The applicability of using Neural networks in substituting Finite element modeling in this case has been investigated. Also, the result of our probabilistic model has been compared with the previous deterministic models.