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Anisotropic Hyperelastic and Pseudo-hyperelstic Materials and Applications to Soft Tissue Modelling

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Fung's model of pseudo-elastic behaviour of soft is not appropriate both from the viewpoint of continuum mechanics and interpretation of experimental data as well as implementation of this model in FEM. Therefore a consistent mathematical model applicable to pseudo-hyperelastic behaviour of orthotropic soft tissues has been proposed. The model describes loading and unloading processes as well as the dissipation in cyclic process. An appropriate approximation of constitutive relationships in respect to Lagrange strain measure reduces them to the orthotropic model of the Saint-Venant-Kirchhoff. Having in mind available experimental data, our considerations have deliberately been restricted to the plane stress state.

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