

Biologic Tissues Properties Deduction Using an Opto-Mechanical Model of the Human Eye

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Abstract

The visual accommodation is a complex biomechanical & optical process. Today in vivo imaging technologies do not allow to measure the eye components material properties, such as the refractive index or the stiffness: these properties are essential to understand and diagnose the effect of aging on the eye accommodative performance and develop new surgeries.

To address this problem, Kejako has set up a parametric 3D mechanical model of the human eye in COMSOL Multiphysics® (Solid Mechanics, Truss, Shell and Fluid-Structure Interaction physics interfaces), in addition with an optical evaluation (Ray Tracing Module).

This paper present how this model can be use to deduce with reverse engineering some of these non measurable properties from in vivo imaging. The values obtained have been calibrated using ex-vivo tissue submitted to optical and mechanical test.

Figures used in the abstract

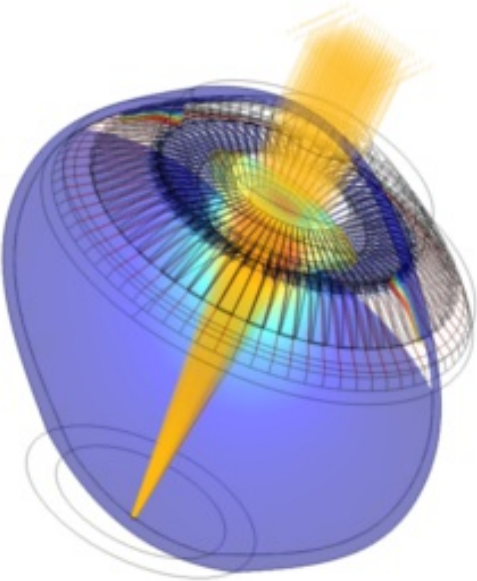


Figure 1: 3D model of a human eye.