

Domain decomposition methods for almost incompressible elasticity problems within the simulation of biological soft tissue

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Abstract

The treatment of atherosclerosis by a balloon angioplasty involves large deformations of the arterial walls. The mechanical behavior of arterial walls in the physiological range can be described by anisotropic, almost incompressible hyperelastic elasticity. Discretization of the three dimensional models by the finite element method usually results in a large number of equations which are solved using a domain decomposition methods suitable for parallel computing. In this talk, departing from the framework for the solution of the anisotropic, almost incompressible nonlinear elasticity problem, we will concentrate on the incompressibility aspect of the elastic material and the development and analysis of robust solvers for these type of problems.

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