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DISJOINT DOMAINS INTERACTIONS FRAMEWORK FOR HYPERELASTIC SIMULATIONS

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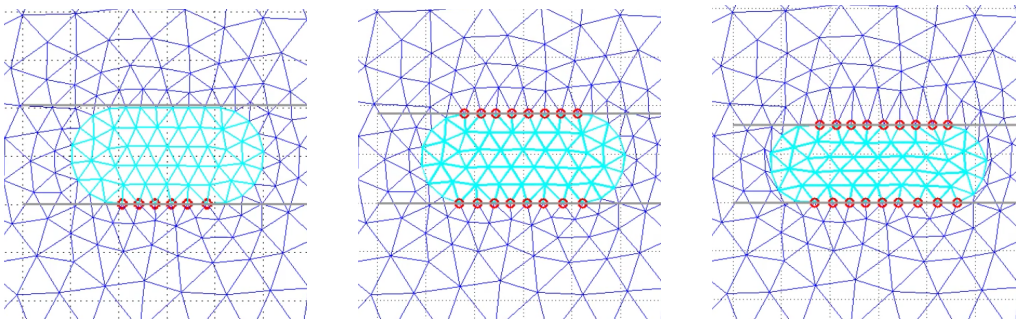
Contact interactions in the modeling of biomechanical systems are often simplified as Dirichlet or Neumann boundary conditions. The aim of this work is to propose a generic framework for the simulation of biomechanical disjoint domains and large transformations.

Moving Meshes [1] is a mesh framework dealing with disjoint domains interactions and finite deformations, previously applied to immiscible fluids [2]. This framework uses an ambient mesh embedding the material domains, much like the third medium proposed in [3], but without considering material properties for the ambient mesh. This discretization of the space and local remeshing performed during the simulation are useful for both collision detection and explicit representation of the contact manifold.



(a) **(b)** **(c)**

Figure 1: Mock-up mesh topology in a new approach for simulating contact between deformable bodies. Blue triangles are part of the ambient mesh and have no material properties. Green triangles are hyperelastic elements. Figure 1a shows the topology before contact. Figure 1b and Figure 1c show two deformed configurations.

An example of soft body under compression is shown in Figure 1. The contact conditions are dynamically handled by the moving meshes framework allowing sticking, sliding and separation with (for simplicity here) two infinitely stiff parallel-plates.

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