

The Application of FSI Techniques in Modeling of Realist Pulmonary Systems

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Abstract : The modeling lung respiratory system which has complex anatomy and biophysics presents several challenges including tissue-driven flow patterns and wall motion. Also, the lung pulmonary system because of that they stretch and recoil with each breath, has not static walls and structures. The direct relationship between air flow and tissue motion in the lung structures naturally prefers an FSI simulation technique. Therefore, in order to toward the realistic simulation of pulmonary breathing mechanics the development of a coupled FSI computational model is an important step. A simple but physiologically-relevant three dimensional deep lung geometry is designed and fluid-structure interaction (FSI) coupling technique is utilized for simulating the deformation of the lung parenchyma tissue which produces airflow fields. The real understanding of respiratory tissue system as a complex phenomenon have been investigated with respect to respiratory patterns, fluid dynamics and tissue visco-elasticity and tidal breathing period.

Keywords : lung deformation and mechanics; Tissue mechanics; Viscoelasticity; Fluid-structure interactions; ANSYS

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