Advances in Computational Mechanics

Einladung zum Vortrag

Reliable and accurate brain shift estimation based on biomechanical models

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Long computation times of non-linear (i.e. accounting for geometric and material nonlinearity) biomechanical models have been regarded as one of the key factors preventing application of such models in predicting organ deformation for image-guided surgery. This seminar presents real-time patient-specific computation of the deformation field within the brain for six cases of brain shift induced by craniotomy (i.e. surgical opening of the skull). We used patient-specific finite element meshes consisting of hexahedral and non-locking tetrahedral elements, together with realistic material properties for the brain tissue and appropriate contact conditions at the boundaries. The loading was defined by prescribing deformations on the brain surface under the craniotomy. Application of the computed deformation fields to register (i.e. align) the pre-operative images with the intra-operative ones indicated that the models very accurately predict the intra-operative deformations within the brain. For each case, computing the brain deformation field took less than 40 s using a standard personal computer and less than 4 s using a graphics processing unit (GPU).

Donnerstag, 14. Juli 2011
11:00Uhr

MW 2250
(Boltzmannstr. 15)

Für weitere Informationen: http://www.lnm.mw.tum.de/events
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