New Results in 3D Surface Reduction

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The mechanical simulation of the human bones is an important task in the treatment planning, for example, to analyse the mechanical features of the components of the bone system, or to test the possible operational solutions from the viewpoint of tension.

In order to give quantitative mechanical results, some finite element analyzer software tool (e.g., Cosmos/M by Structural Research and Analysis Corporation) should be applied to the geometrical model of the simulated bone structure. As input data for the creation of the geometric model, CT images are used. In our presentation we show the steps of the geometric modelling. One of the most difficult problem that the bones are described with some hundreds of thousends of surface elements. On the other hand the finite element analyzer software can not analyze so huge models. So the task is to reduce the amount of data describing the model while its shape should be kept as much as possible. The shape is visualized by its VRML model. During the simplification method polyhedral estimation of the shape of the object is used and homogenuos bone material is supposed.

In this presentation the steps of the method are described. The difficulties, possible solutions and reached results are shown.