

Advanced Virtual Medicine: Techniques and Applications for Virtual Endoscopy and Soft-Tissue Simulation

Michael Hauth

WSI/GRIS, University of Tübingen

www.gris.uni-tuebingen.de/staff/Michael_Hauth.html

The following list does not claim to be complete, nor to cover especially closely related work. It is intended to give some starting points for further bibliographic research on the topics presented in the course and to complete the references given on the slides.

References

- Balaniuk, R. & Salisbury, K. (2003), Soft-tissue simulation using the radial elements methods, *in* 'Proc. International Symposium on Surgery Simulation and Soft Tissue Modeling', pp. 48–58.
<http://www.springerlink.com/openurl.asp?genre=article&iissn=0302-9743&volume=2673&spage=48>
- Bathe, K. L. (1982), *Finite Element Methods*, Prentice Hall, Englewood Cliffs.
- Bro-Nielsen, M. (1998), 'Finite Element Modeling in Surgery Simulation', *Journal of the IEEE* **86**(3), 490–503.
- Capell, S., Green, S., Curless, B., Duchamp, T. & Popovic, Z. (2002), Interactive skeleton-driven dynamic deformations, *in* 'SIGGRAPH 2002', ACM SIGGRAPH, pp. 586–593.
- Debunne, G., Desbrun, M., Cani, M.-P. & Barr, A. H. (2001), Dynamic Real-Time Deformations using Space and Time Adaptive Sampling, *in* 'SIGGRAPH 2001', pp. 31–36.
- Delingette, H. (1998), 'Towards realistic soft tissue modeling in medical simulation', *Proceedings of the IEEE : Special Issue on Surgery Simulation* pp. 512–523.
- Friskin-Gibson, S. F. (1999), 'Using Linked Volumes to Model Object Collisions, Deformation, Cutting, Carving, and Joining', *IEEE Transactions on Visualization and Computer Graphics* **5**(4), 333–348.
<http://www.computer.org/tvcg/tg1999/v0333abs.htm>
- Fung, Y. C. (1993), *Biomechanics: Mechanical Properties of Living Tissues*, Springer, New York.
- Galea, A. M. & Howe, R. D. (2003), Mammography registered tactile imaging, *in* 'Proc. International Symposium on Surgery Simulation and Soft Tissue Modeling', pp. 183 –

193.

<http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2673&spage=183>

- Grinspun, E., Krysl, P. & Schröder, P. (2002), CHARMS: A Simple Framework for Adaptive Simulation, *in* 'SIGGRAPH 2002 Conference Proceedings', ACM Press/ACM SIGGRAPH, pp. 281–290.
- Gross, J., Hauth, M., Eitzmuß, O. & Buess, G. F. (2001), Modelling Viscoelasticity in Soft Tissues, *in* 'Int. Workshop on Deformable Modelling and Soft Tissue Simulation', Elsevier.
- Hairer, E., Nørsett, S. P. & Wanner, G. (1993), *Solving Ordinary Differential Equations. I: Nonstiff problems. 2. rev. ed.*, Springer-Verlag, Berlin.
- Hairer, E. & Wanner, G. (1996), *Solving Ordinary Differential Equations II*, Springer-Verlag, Berlin.
- Hauth, M., Gross, J. & Straßer, W. (2003), Interactive physically based solid dynamics, *in* 'Proc. SIGGRAPH Symposium on Computer Animation 2003', ACM Press.
- James, D. L. & Pai, D. K. (1999), ArtDefo - Accurate Real Time Deformable Objects, *in* 'SIGGRAPH 1999', ACM SIGGRAPH, pp. 65–72.
- Kalanovic, D., Ottensmeyer, M. P., Gross, J. & Dawson, S. L. (2003), Independent testing of soft tissue visco-elasticity using indentation and rotary shear deformations, *in* 'Proc. MMVR 11', IOS Press.
- Kauer, M., Vuskovic, V., Dual, J., Szekely, G. & Bajka, M. (2001), Inverse finite element characterization of soft tissues, *in* 'Proc. Medical Image Computing and Computer-Assisted Intervention - MICCAI 2001: 4th International Conference', pp. 128–136.
<http://link.springer-ny.com/link/service/series/0558/bibs/2208/22080128.htm>
- Kjartansson, E. (1979), 'Constant-Q, Wave Propagation and Attenuation', *Journal of Geophysical Research* **85**, 4737–4748.
- Ko, H.-S., Breen, D., Fedkiw, R., Hauth, M. & House, R. (2003), Clothing simulation and animation, *in* 'ACM SIGGRAPH Course 29'.
- Krysl, P., Grinspun, E. & Schröder, P. (2001), 'Natural Hierarchical Refinement for Finite Element Methods', *Int. J. for Num. Meth. Eng.* **to appear**.
- Maaß, H. & Kühnapfel, U. (1999), Noninvasive measurement of elastic properties of living tissue, *in* 'EMBECC'99', Vol. 37, pp. 1460–1461.
- Nava, A., Mazza, E., Kleinermaier, F., Avis, N. & McClure, J. (2003), Determination of the mechanical properties of soft human tissues through aspiration experiments, *in* 'Proc. Medical Image Computing and Computer-Assisted Intervention - MICCAI 2003: 6th International Conference'.
- O'Brien, J. F. & Hodgins, J. K. (1999), Graphical Modeling and Animation of Brittle and Fracture, *in* 'SIGGRAPH 1999', pp. 137–146.

- Pai, D. K., van den Doel, K., James, D. L., Lang, J., Lloyd, J. E., Richmond, J. L. & Yau, S. H. (2001), Scanning physical interaction behavior of 3D objects, *in* 'SIGGRAPH 2001', ACM Press, pp. 87–96.
- Picinbono, G., Delingette, H. & Ayache, N. (2001), Non-linear and anisotropic elastic soft tissue models for medical simulation, *in* 'ICRA2001'.
- Ruspini, D. C., Kolarov, K. & Khatib, O. (1997), 'The haptic display of complex graphical environments', *Computer Graphics (Proc. ACM SIGGRAPH 1997)* **31**, 345–352.
- Sakuma, I., Nishimura, Y., Chui, C. K., Kobayashi, E., Inada, H., Chen, X. & Hisada, T. (2003), In vitro measurement of mechanical properties of liver tissue under compression and elongation using a new test piece holding method with surgical glue, *in* 'Proc. International Symposium on Surgery Simulation and Soft Tissue Modeling', pp. 284 – 292.
<http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2673&spage=284>
- Satava, R. (1996), Medical virtual reality : The current status of the future., *in* 'Proc. of 4th conf. Medicine Meets Virtual Reality (MMVR IV)', pp. 100–106.
- Sinkus, R., Lorentzen, J., Schrader, D., Lorenzen, M., Dargatz, M. & Holz, D. (2000), 'High-resolution tensor mr elastography for breast tumour detection', *Physics in Medicine and Biology* **45**, 1649–64.
- Suzuki, N. & Suzuki, S. (2003), Surgery simulation system with haptic sensation and modeling of elastic organ that reflect the patients' anatomy, *in* 'Proc. International Symposium on Surgery Simulation and Soft Tissue Modeling', pp. 155 – 164.
<http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2673&spage=155>
- Szekely, G., Brechbühler, C., Hutter, R. & Rhomberg, A. (1998), 'Modelling of soft tissue deformation for laparoscopic surgery simulation'.
- Terzopoulos, D. & Fleischer, K. (1988), 'Deformable Models', *The Visual Computer* **4**, 306–331.
- Terzopoulos, D. & Witkin, A. (1988), 'Physically based models with rigid and deformable components', *IEEE Comput. Graph.* **8**, 41–51.
- Wellman, P. S. (1999), Tactile Imaging, PhD thesis, Division of Engineering and Applied Sciences, Harvard University.
- Wu, X., Downes, M. S., Goktekin, T. & Tendick, F. (2001), Adaptive nonlinear finite elements for deformable body simulation using dynamic progressive meshe, *in* 'Proc. EG 2001', Vol. 20(3) of *Comp. Graphics Forum*, pp. 349–358.
- Zienkiewicz, O. C., Watson, M. & King, I. P. (1968), 'A numerical method of visco-elastic stress analysis', *Int. J. Mech. Sci.* **10**, 807–27.
- Zienkiewicz, O. & Taylor, R. (2000), *The Finite Element Method. Vol. 1-3.*, Oxford: Butterworth-Heinemann.

Zilles, C. & Salisbury, J. (1995), A constraint based god-object method for haptic display, *in* 'Proc. IEE/RSJ International Conference on Intelligent Robots and Systems, Human Robot Interaction, and Cooperative Robots', Vol. 3, pp. 146–151.

citeseer.nj.nec.com/zilles95constraintbased.html