Reference List for 15-464 / 15-664 March 1, 2017

We continued talking about setting parameters for cloth simulation with this recent paper, which attempted to capture how people perceive qualities of cloth:

Sigal L, Mahler M, Diaz S, McIntosh K, Carter E, Richards T, Hodgins J. A perceptual control space for garment simulation. ACM Transactions on Graphics (TOG). 2015 Jul 27;34(4):117. https://www.disneyresearch.com/publication/garment-simulation/

We also took a brief look at this earlier paper, which set parameters as the result of a large search to match observed behavior of cloth as it was waved back and forth.

Bhat KS, Twigg CD, Hodgins JK, Khosla PK, Popović Z, Seitz SM. Estimating cloth simulation parameters from video. InProceedings of the 2003 ACM SIGGRAPH/Eurographics symposium on Computer animation 2003 Jul 26 (pp. 37-51). Eurographics Association. http://graphics.cs.cmu.edu/projects/clothparameters/

We then went on to take a closer look at the adaptive subdivision approach of Rahul Narain:

Narain R, Samii A, O'Brien JF. Adaptive anisotropic remeshing for cloth simulation. ACM transactions on graphics (TOG). 2012 Nov 1;31(6):152. http://graphics.berkeley.edu/resources/ARCSim/

This system is still somewhat slow, taking up to a minute per frame. One option that the author and others explored was to attempt to precompute the full space of expected cloth states, given a small library of motions which the character was constrained to perform.

Kim D, Koh W, Narain R, Fatahalian K, Treuille A, O'Brien JF. Near-exhaustive precomputation of secondary cloth effects. ACM Transactions on Graphics (TOG). 2013 Jul 21;32(4):87. http://graphics.berkeley.edu/papers/Kim-NEP-2013-07/

We also took a look at a couple of papers having to do with yarn level simulations of knitted cloth, with visually appealing results.

Kaldor JM, James DL, Marschner S. Simulating knitted cloth at the yarn level. InACM Transactions on Graphics (TOG) 2008 Aug 11 (Vol. 27, No. 3, p. 65). ACM. http://dl.acm.org/citation.cfm?id=1360664

Yuksel C, Kaldor JM, James DL, Marschner S. Stitch meshes for modeling knitted clothing with yarn-level detail. ACM Transactions on Graphics (TOG). 2012 Aug 5;31(4):37. http://dl.acm.org/citation.cfm?id=2185533

We then shifted to a completely different topic – how to use shape matching to simulate rigid and deformable bodies by simulating a collection of particles independently and then effectively pulling them back together into a coherent shape using a process called shape matching.

Müller M, Heidelberger B, Teschner M, Gross M. Meshless deformations based on shape matching. ACM transactions on graphics (TOG). 2005 Jul 1;24(3):471-8. http://dl.acm.org/citation.cfm?id=1073216

If you are interested to follow on this line of research, here are some additional references.

Müller, Matthias, Bruno Heidelberger, Marcus Hennix, and John Ratcliff. "Position based dynamics." *Journal of Visual Communication and Image Representation* 18, no. 2 (2007): 109-118. https://www.youtube.com/watch?v=j5igW5-h4ZM

Macklin, Miles, Matthias Müller, Nuttapong Chentanez, and Tae-Yong Kim. "Unified particle physics for real-time applications." *ACM Transactions on Graphics (TOG)* 33, no. 4 (2014): 153. http://blog.mmacklin.com/flex/

Houdini Position Based Dynamics:
http://www.sidefx.com/index.php?option=com_content&task=view&id=3042&Itemid=66

Where do the skeletons come from? Ray Harryhausen -- Jason and the Argonauts
https://www.youtube.com/watch?v=pF_Fi7x93PY