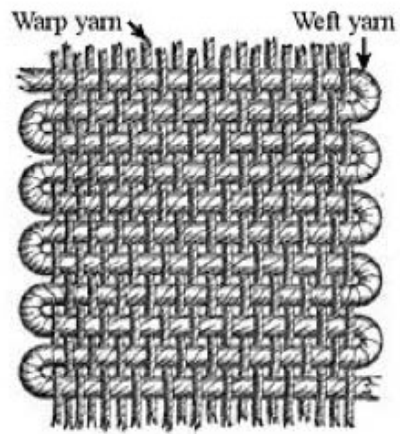# Computer Animation Cloth & Clothes

"Techniques for Animating Cloth"
M. Yalcin, C. Yildiz

Figure 1: Some yarn materials: wool, linen and cotton

(a) Warp and weft in plain weaving

(b) Stockinette stitch schema and actual material for knitting

(c) A crochet and hook

(d) Macramé and Square Knotting

(e) A selection of felt clothes
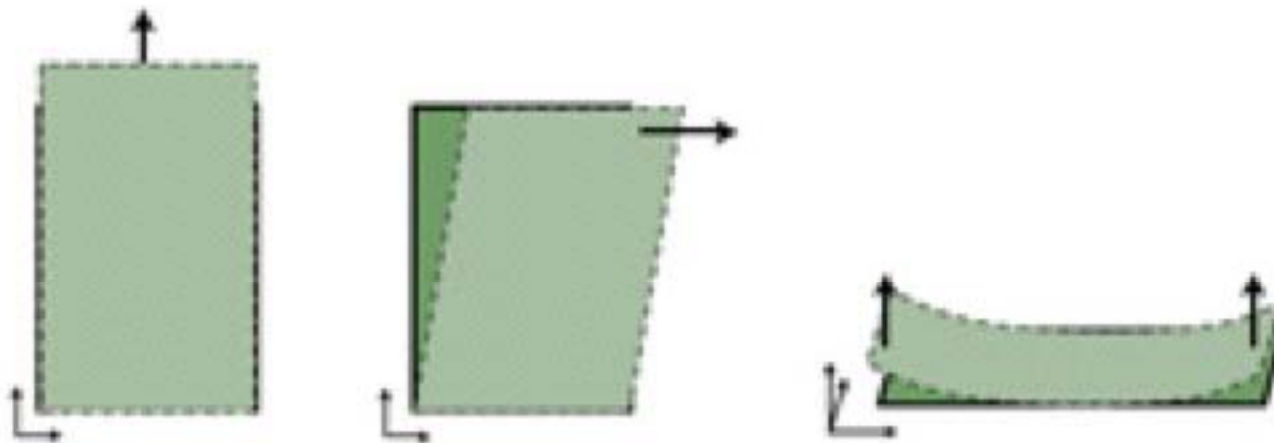
Figure 2: Different types of cloths

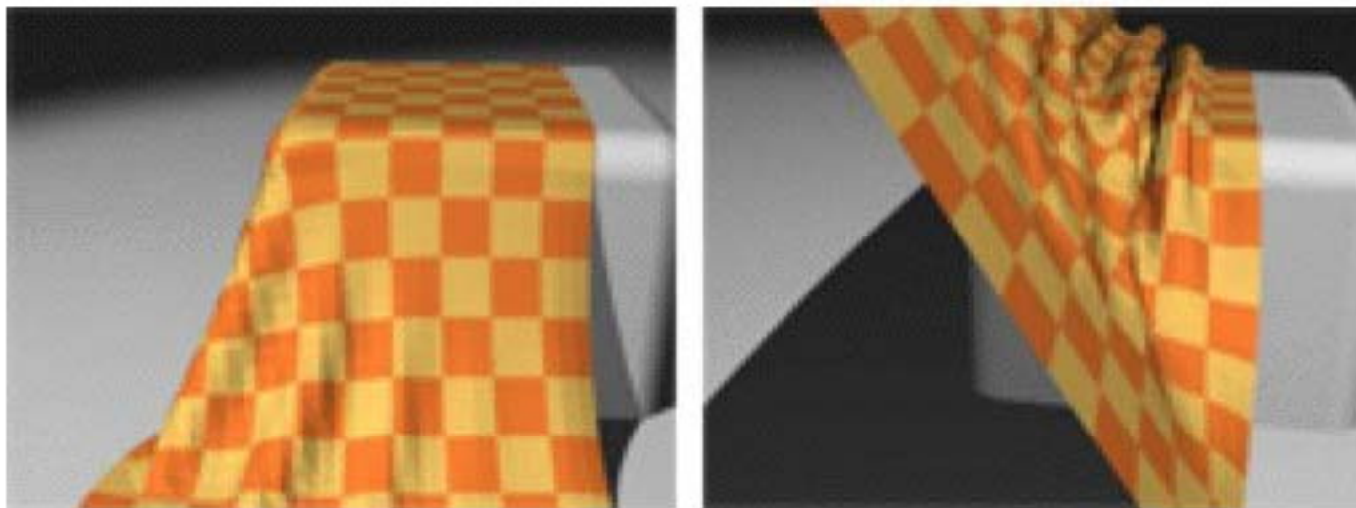Figure 3: Stretching, shearing and bending respectively
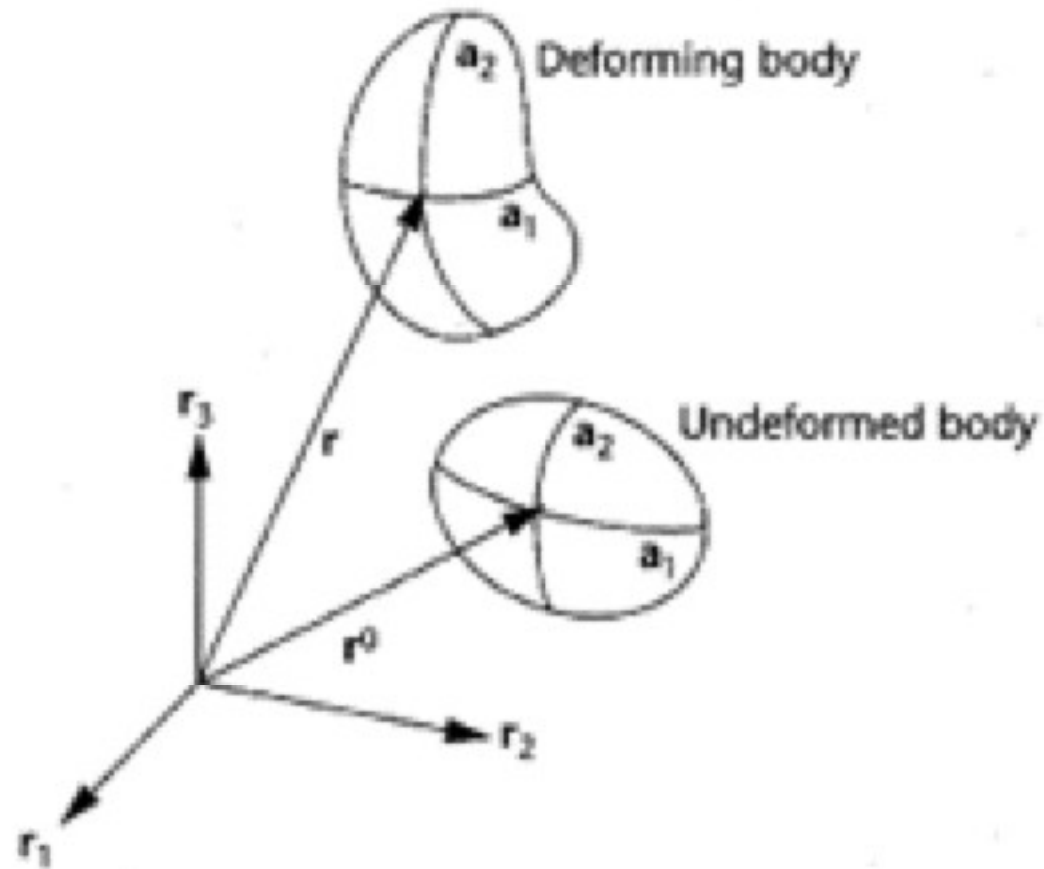

Figure 4: Draping and wrinkle patterns

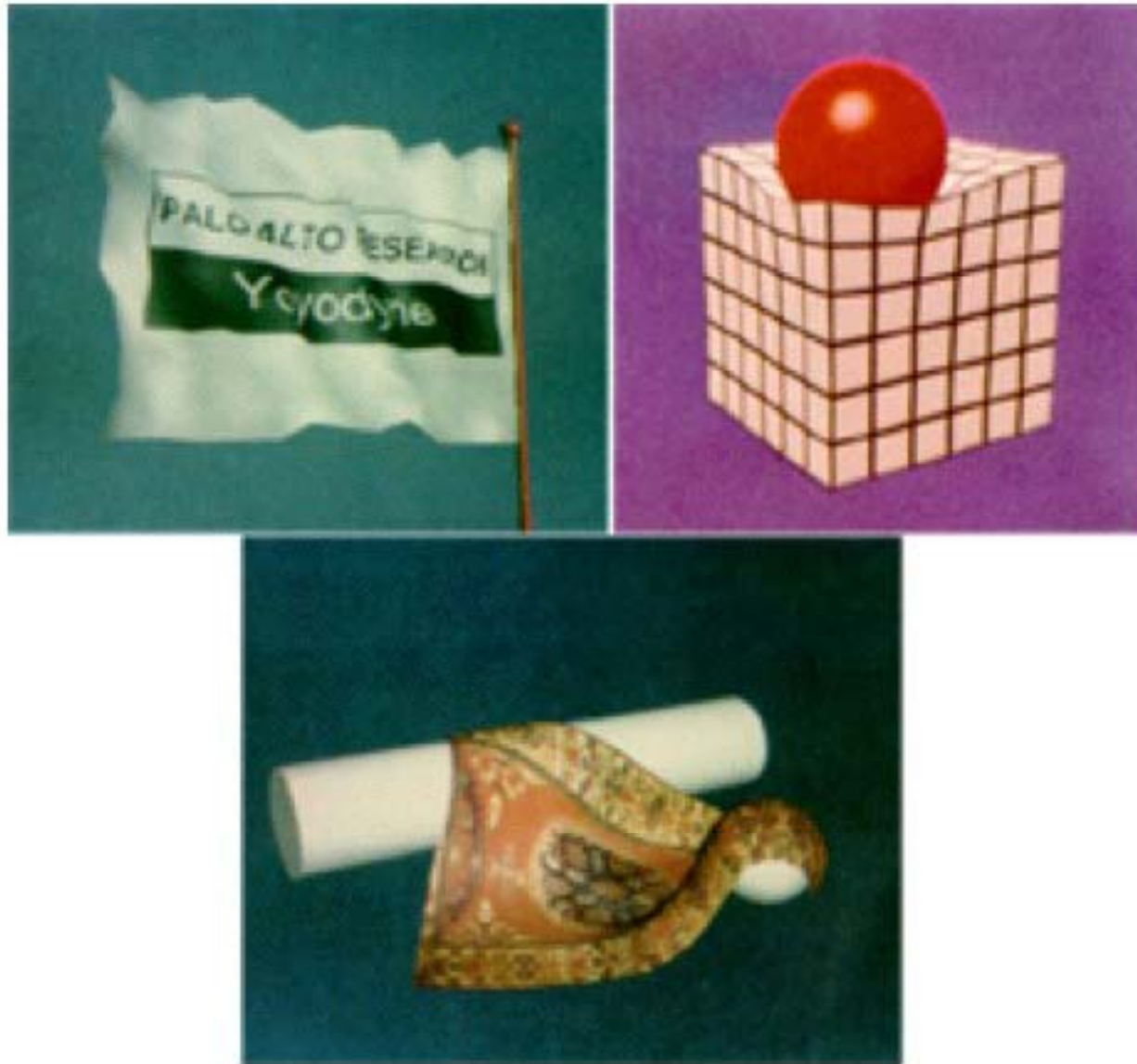Figure 5: Deformable body representation [23]

Continuum model for objects

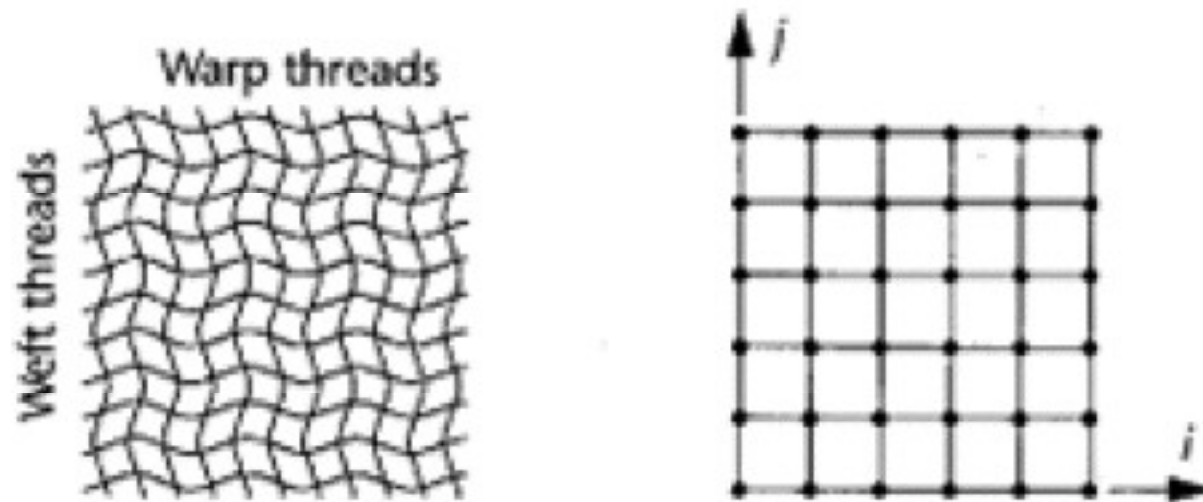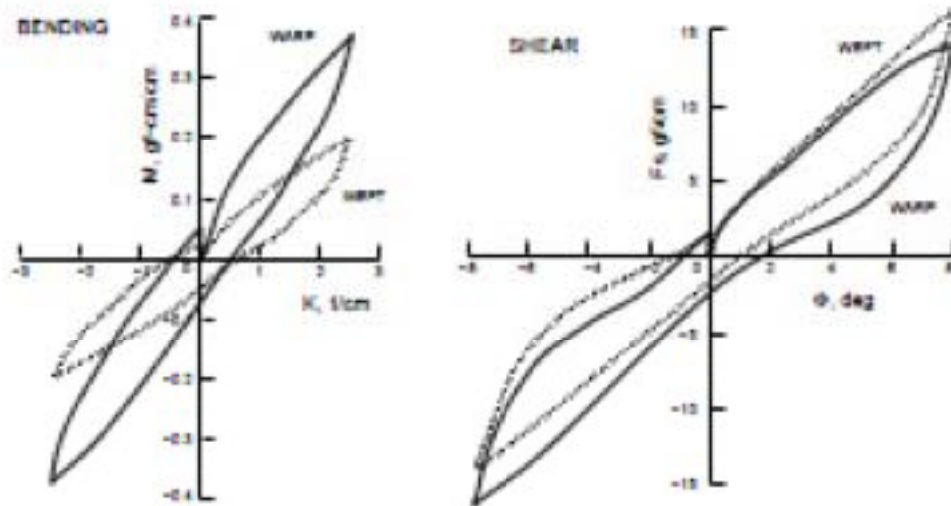Figure 6: A flag, a soft object and a carpet from Terzopoulos'
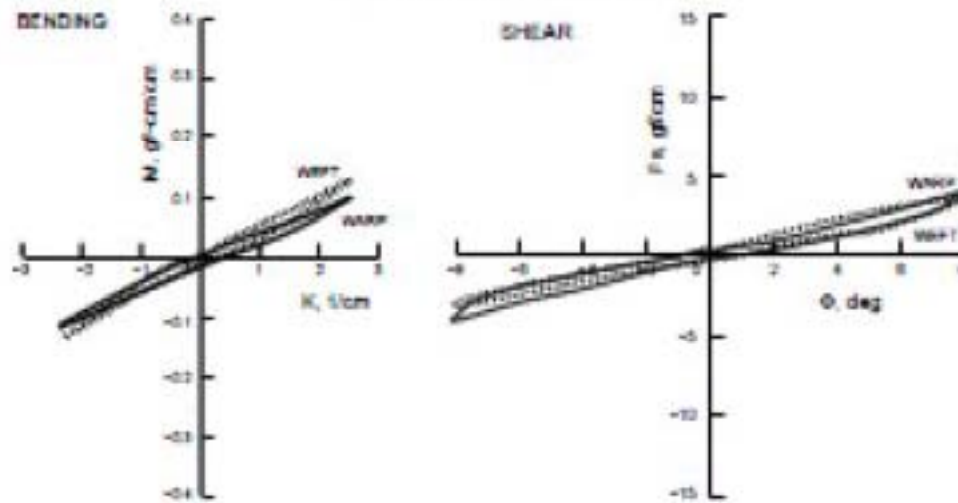work

Figure 7: A woven cloth and its particle representation from Breen's work

Total energy = repel + stretch + shear + bend + gravity

a) 100% cotton

b) 100% wool

Figure 8: Kawabata Bending and Shear Plots from Breen's work

a) actual   b) simulation

Figure 7: 100% Cotton Draping Over a Cube

a) actual   b) simulation

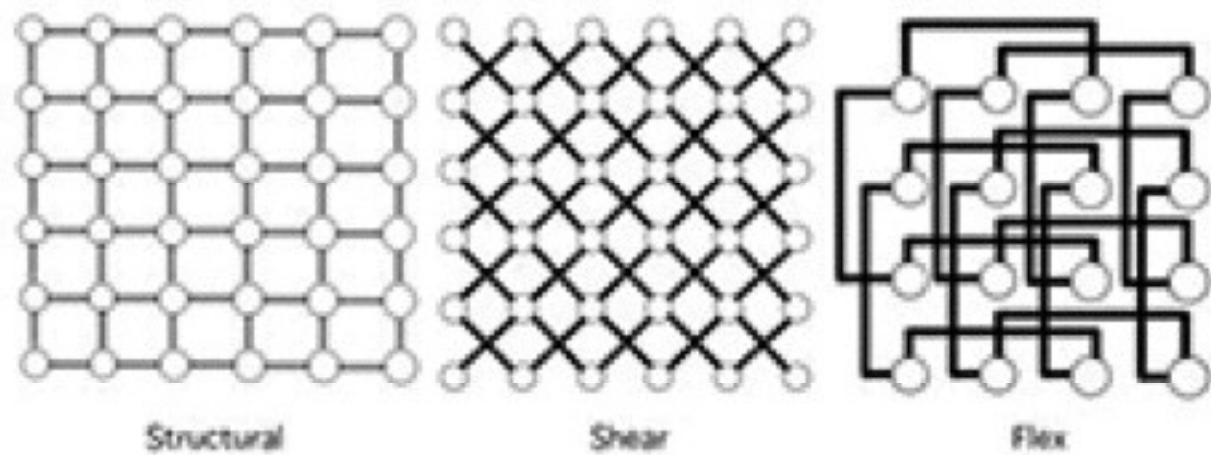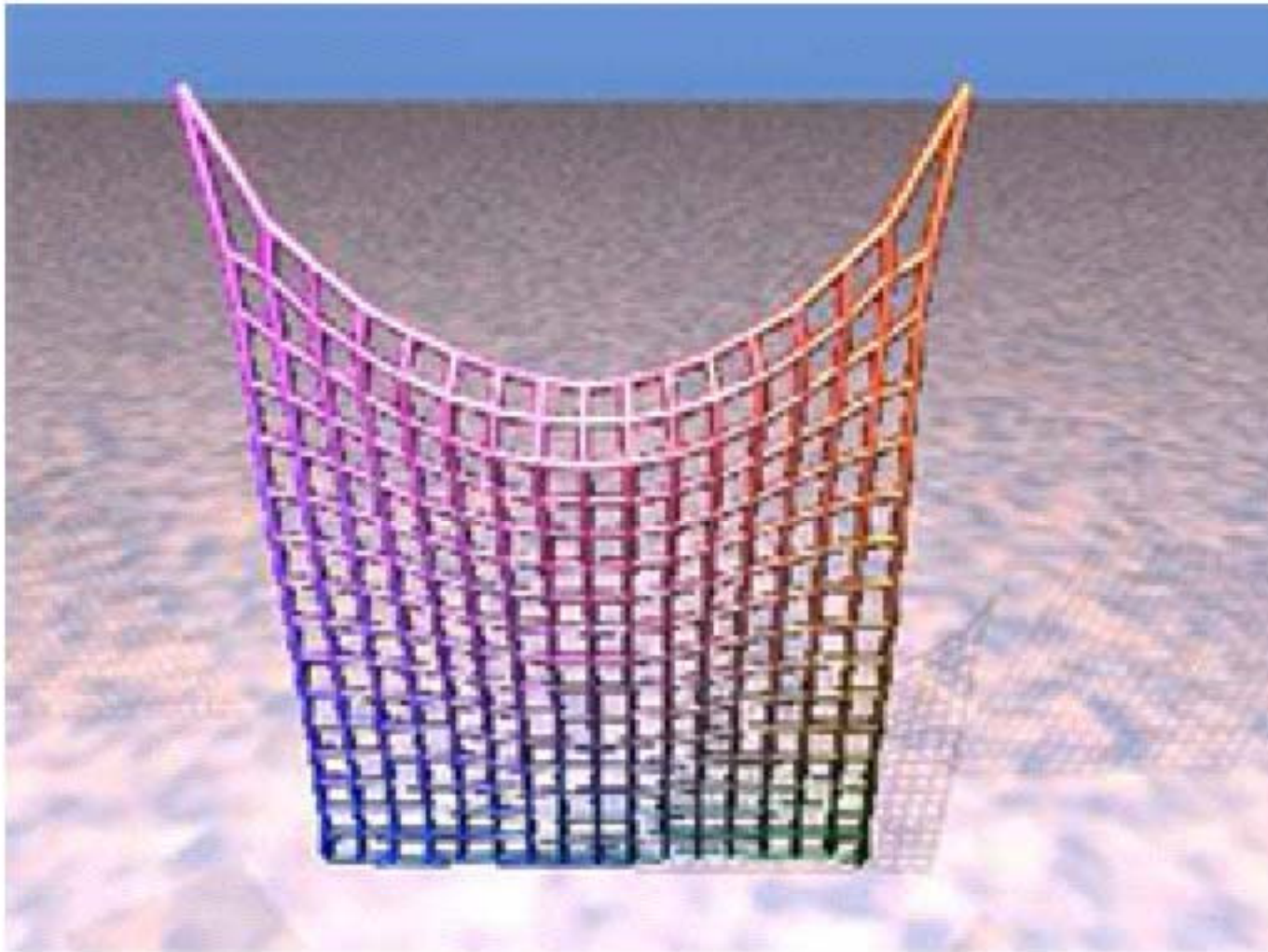Figure 9: Actual vs. simulated cloth drapes from Breen's work
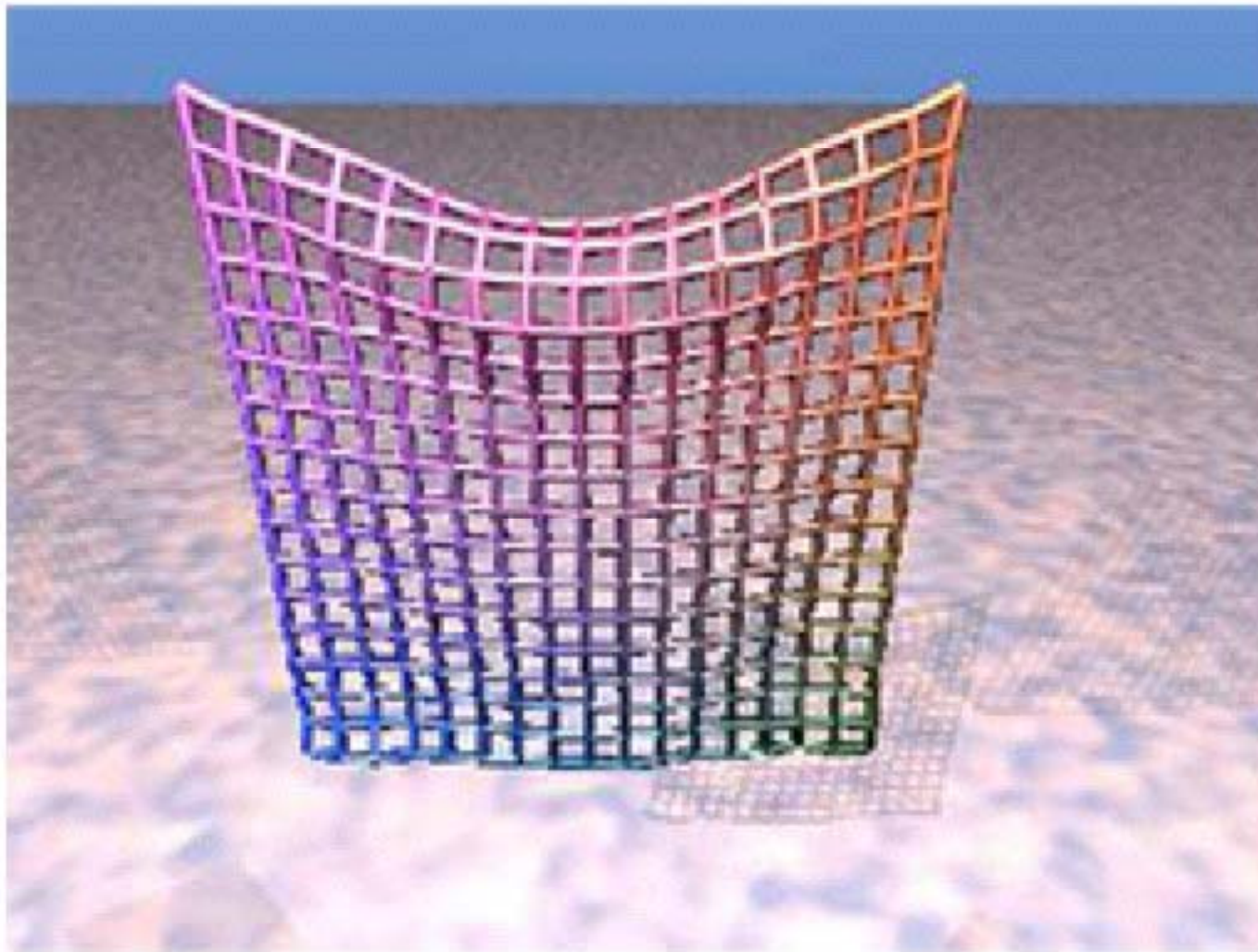
Figure 10: Structural, shear and flex springs [20]

(a) 200 iterations with the basic algorithm

(a) Stiffness algorithm is applied to structural and shear springs.

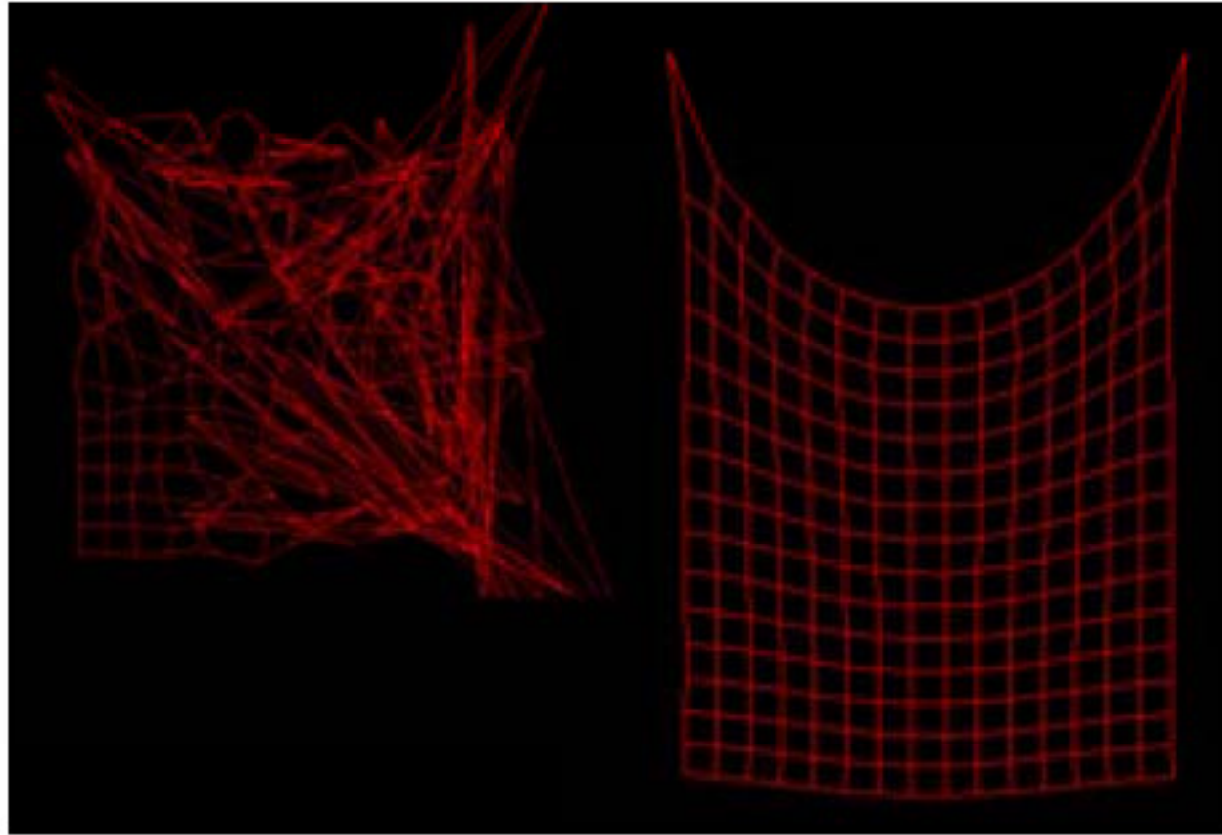Figure 11: Applying stiffness to cloth [20]

Figure 12: Large vs. Small Time Steps of a Cloth Simulation [15]

Implicit Euler integration + adaptive time steps

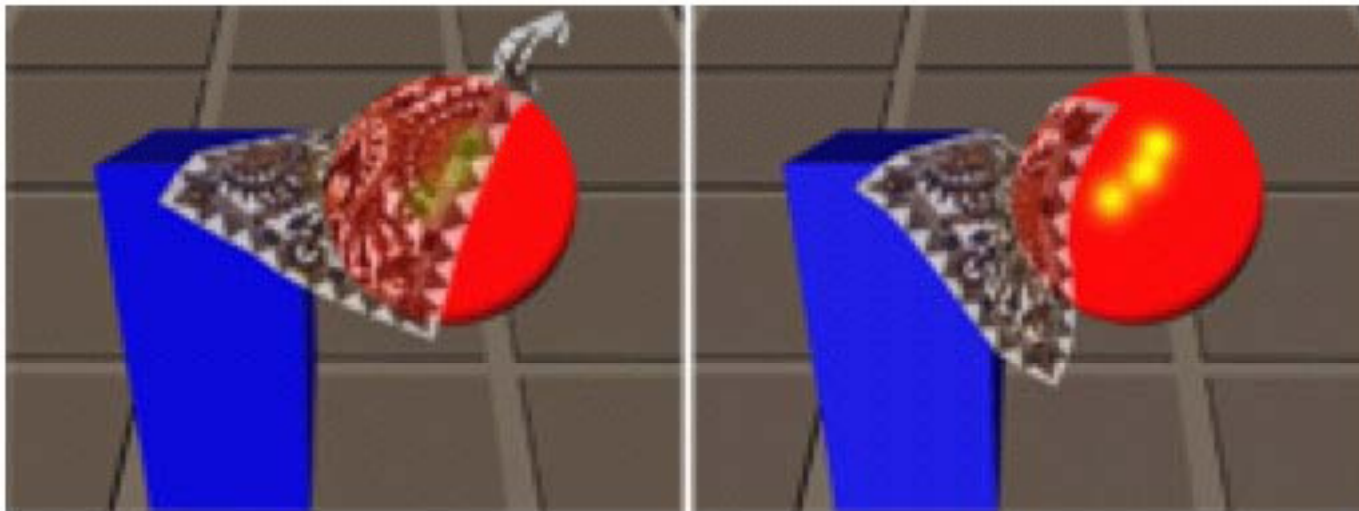Figure 13: Results of Baraff and Witkin's work [3]

Figure 14: Real-time results from Barr's work [11]

Figure 15: Collision detection as applied in industry production animations.

Figure 16: Boo's cloth may intersect itself, but can recover gracefully later.

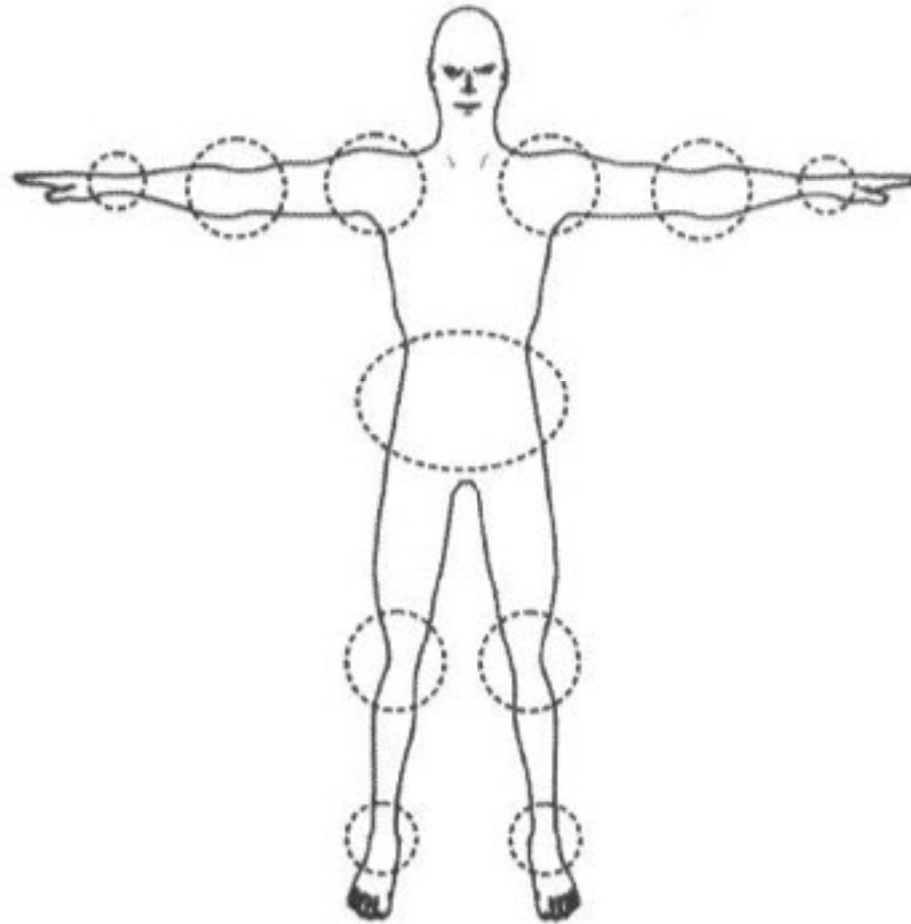# Put wrinkle patters at joints
Level of abstraction

Figure 17: Candidate joint locations of a human skeleton, as usual
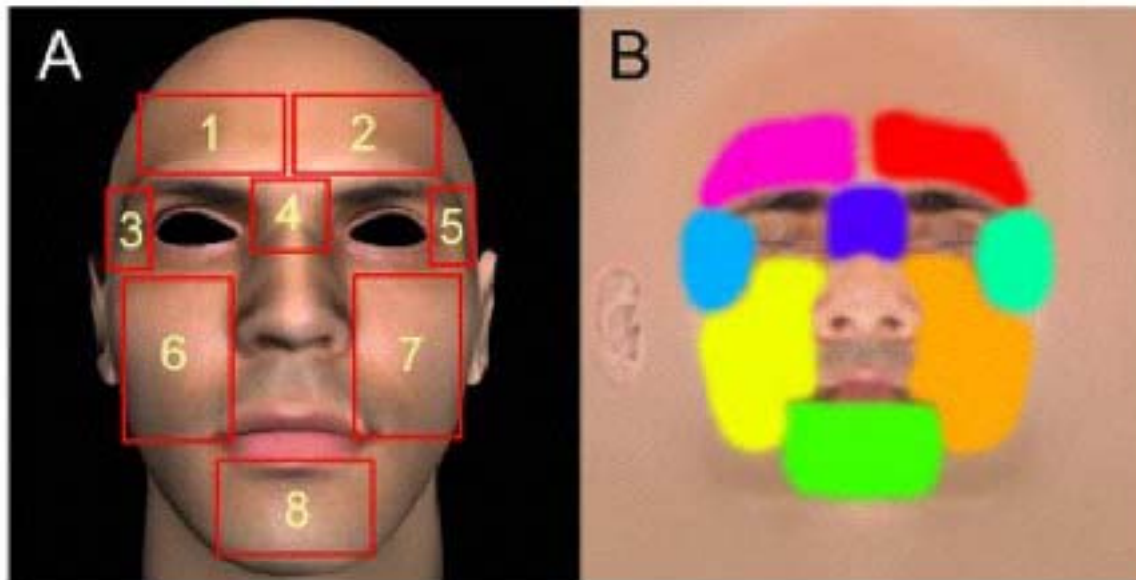
Put wrinkle patters at facial areas

Figure 18: Proposed influence regions over a human face model [22]

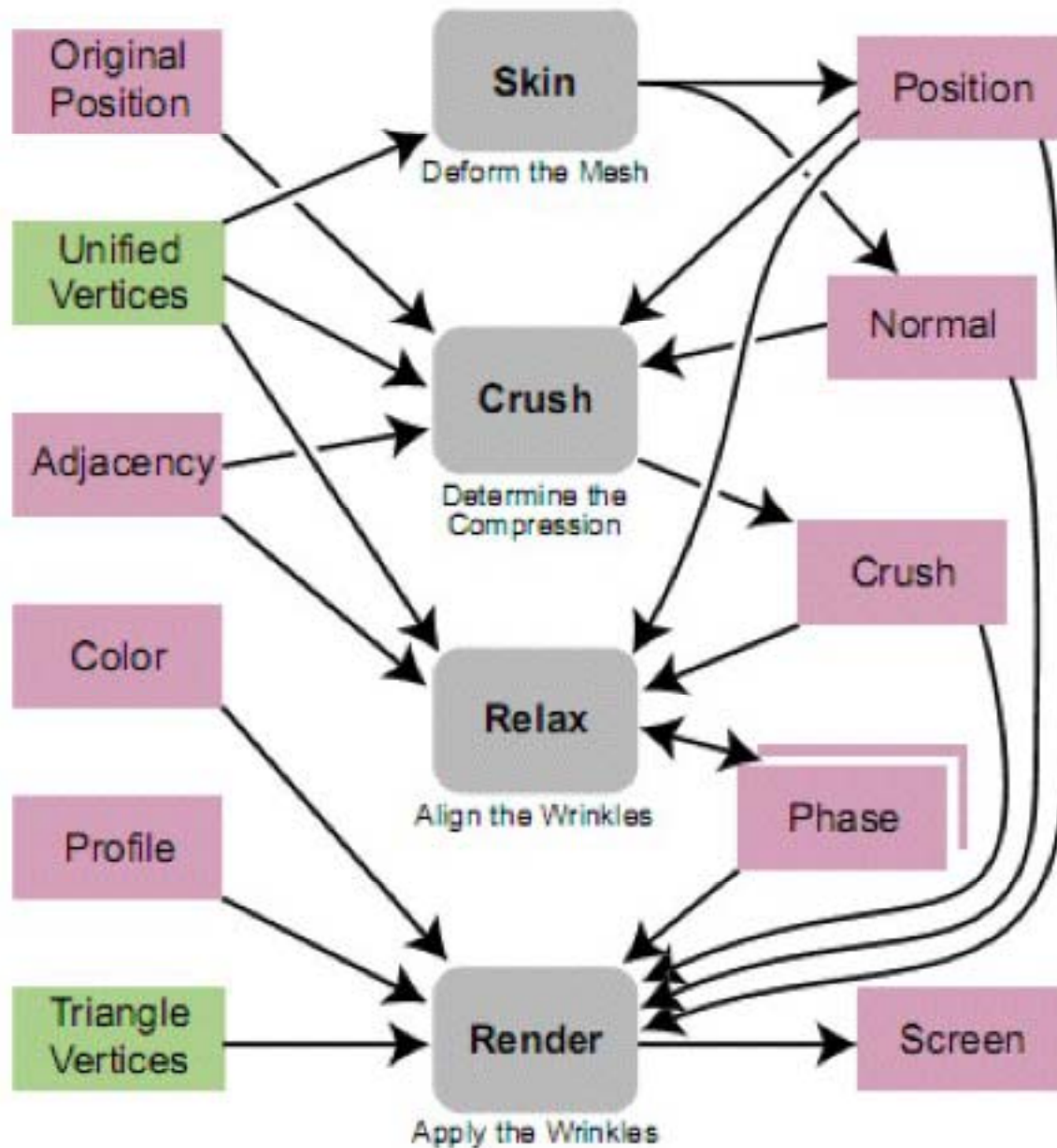Figure 19: Wrinkle patterns as computed by the method in [16]

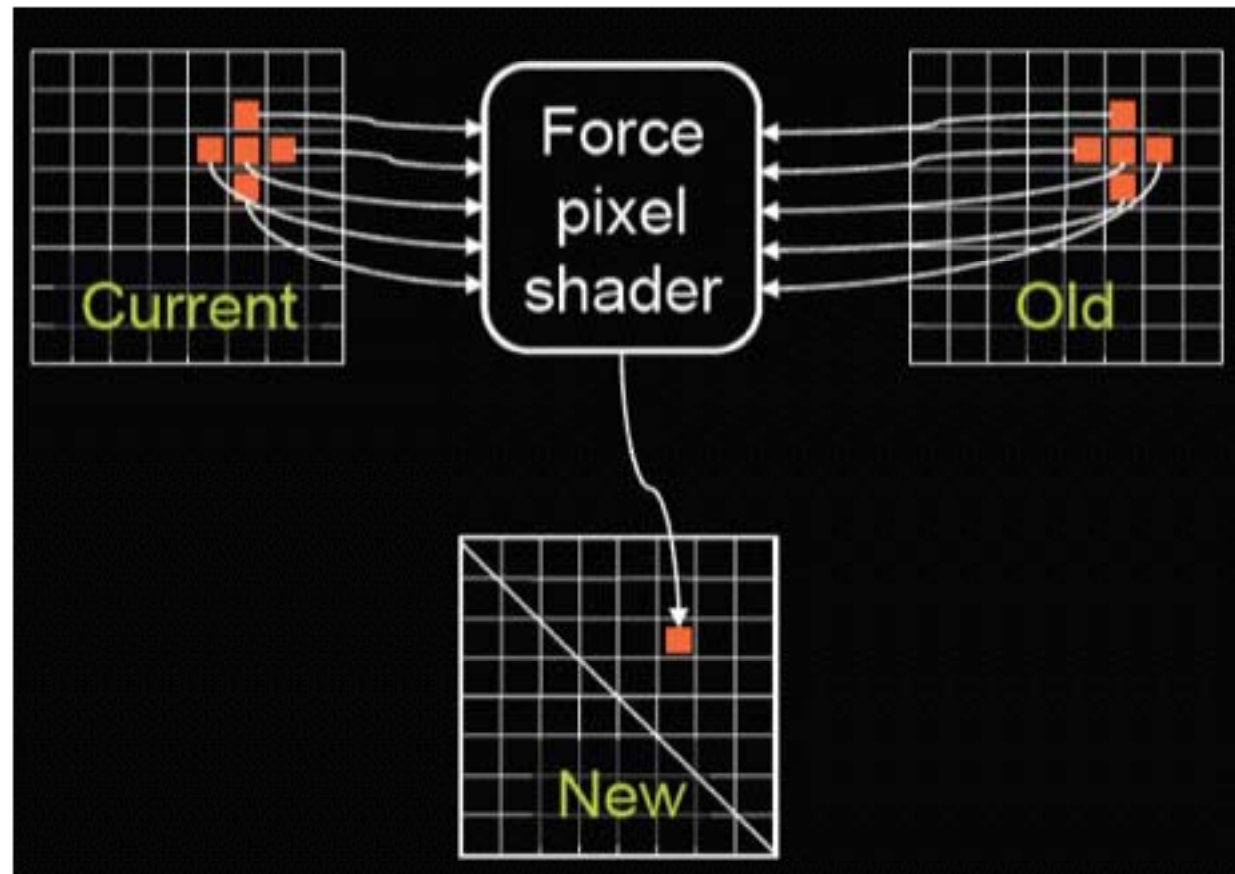Figure 20: Steps of cloth deformation on the GPU [16]

Figure 21: Performing the integration, for each global spring type

Figure 22: Havok cloth working on AMD hardware through OpenCL API