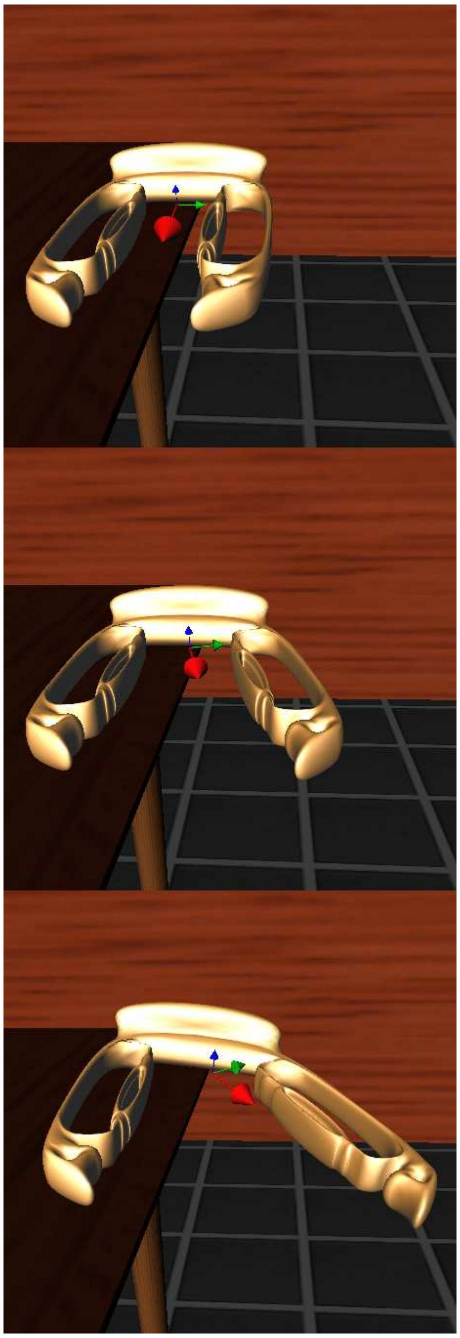

Figure 7: Determining the point of instability while increasing the opening angle.

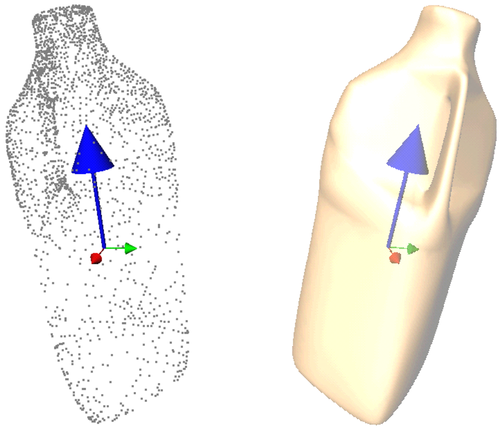

Figure 8: Using the inertia frame to match an object to a cloud of sample points.

the given model and was vastly faster than sampling the surface model and attempting a least-squares fit of the two point clouds.

7 Conclusion

Moment-based tools will give animators and designers a much better feel for the objects they are working with and undoubtedly inspire innovative uses. A likely application, hinted at in Figure 8, is physics-based animation. Mechanical engineers for their part may appreciate exact moment information for complex free-form objects. One of the referees suggested preserving moments during multi-resolution modeling.

As mentioned in Section 6, automatic shape modification based on matching moments is an intriguing though underconstrained problem. For a low degree representation like surface splines, it is actually possible to relate a change of the moments explicitly to a change of the spline parameters, so that variational criteria more complex than generic least-squares minimization may be well-defined and computationally tractable.