

Biomedical Computation Review

Simbios A NATIONAL CENTER FOR BIOMEDICAL COMPUTING

Stanford University

318 Campus Drive

Clark Center Room S231

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seeing science

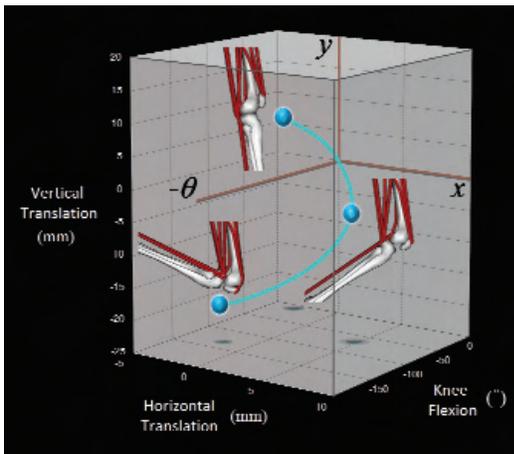
SeeingScience

BY JOY KU, PhD

Simulation Simplified

Typically, researchers who simulate life in motion—from particles to people—start by describing the motion of each part of an object independently of the other parts. Additional equations then limit the motion of one part relative to another. The result: Computers must then solve a large number of awkwardly coupled equations. That often means long simulation times or, worse, equations that won't converge to a solution.

To sidestep these problems, **Michael Sherman** and his team at Simbios, a National Center for Biomedical Computing based at Stanford University, developed a multi-body dynamics software toolset called Simbody. Simbody introduces the concept of a “mobilizer,” which directly expresses a part's movement, however complex, purely in relation to another part. In this way, fewer and simpler equations are needed to simulate the part's motion. □



Traditionally, researchers have used five equations to describe knee motion—one equation for each of the ways a knee can move (forward and back; side-to-side; and rotational) and two equations to relate the translation of the knee to its rotation. With Simbody, a single equation, represented by the blue line, can simulate the complex motion of the knee. Courtesy of Ajay Seth, PhD, of Stanford University.

DETAILS

Simbody is part of the SimTK Core toolkit, an open-source C++ application programming interface (API) to computational tools and algorithms for biological simulations. A workshop on using Simbody and the SimTK Core will be held at Stanford University on March 20-21, 2008. For more information, contact Blanca Pineda, bpineda@stanford.edu.

Pre-release source code for the SimTK Core toolkit, including Simbody, can be freely accessed at <http://simtk.org>. A full release is planned for March 2008.