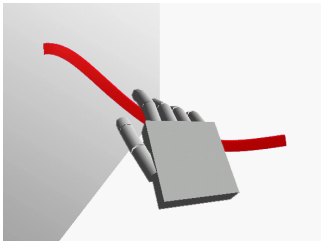
Haptic Interface 1
Chairs: John Canny, Tim Salcudean

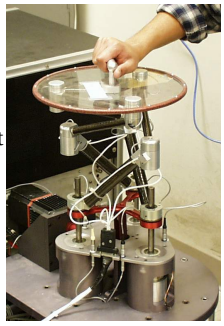
Haptic Interaction with Global Deformations
Y. Zhuang and J. Canny
University of California, Berkeley

- Global deformations
- Nonlinear FEM
- Efficient collision
- Haptic interpolation



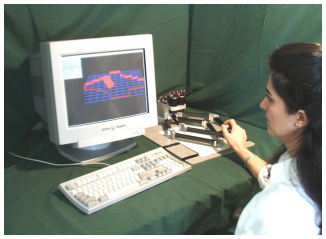
Environment Delay in Haptic Systems
B. Miller, E. Colgate and R. Freeman
Northwestern University

- Stable Haptic Systems with Environment Delay
- Admittance versus Impedance Environment Design
- Passive Display of Delayed Virtual Wall
- Optimal Virtual Coupling Design



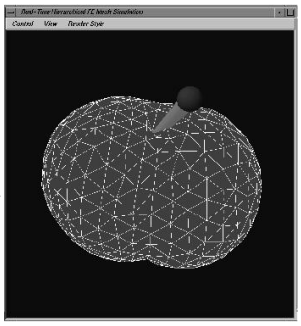
Haptic Rendering of Planar Rigid-Body Motion using a Redundant Parallel Mechanism
D. Constantinescu, I. Chau, S. P. DiMaio, L. Filipozzi, S. E. Salcudean and F. Ghassemi
University of British Columbia

- Haptic rendering of planar rigid body motion is considered.
- Two level collision detection with passive penalty methods are used.
- Various virtual walls and dry friction models were compared.
- Reset-integrator friction model successful at rendering dry friction.



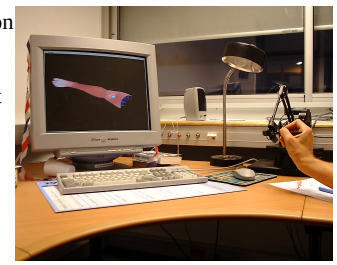
Design Constraints for haptic Surgery Simulation
O. Astley and V. Hayward
McGill University

- A fundamental challenge for haptic surgery simulation is to achieve update rates for the simulation of deformable objects that are acceptable to the human haptic system.
- Nine observations are made to motivate a hierarchical finite element mesh structure that relies on the notion of equivalent meshes.
- In essence, the update rate is a tradeoff problem. As an example, updates rates up to 100Hz were obtained for a 430 nodes mesh on a R10000.
- Future papers will describe these results in more detail.



A Haptic Interface for a Virtual Exam of the Human Thigh
D. d'Aulignac, R. Balaniuk and C. Laugier
INRIA, Rhone-Alpes

- Discordance between simulation and haptic frequency.
- Local approximation of contact through buffer model.
- Physical simulation can run at lower frequency.
- More realistic haptic sensation.



Multirate simulation for high fidelity haptic interaction with deformable objects in virtual environments
Murat Cenk Cavusoglu[1] and Frank Tendick[2]
[1]University of California at Berkeley and [2]University of California at San Francisco

- Application: Haptic interaction with deformable objects in virtual environments.
- Problem: Difference between the sampling rate requirements of the haptic interfaces (1kHz) and the update rates of the physical models being manipulated (10Hz).
- Method: Proposed a multirate simulation approach with a local linear approximation. Performed a detailed analysis and experimental verification of the approach.
- Results: Improved fidelity and stability.