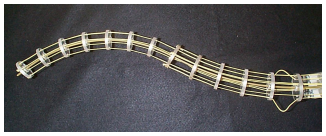
Redundancy
Chairs: Greg Chirikjian, Ian D. Walker

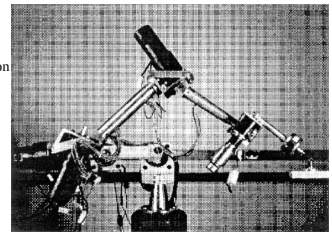
On the kinematics of remotely-actuated continuum robots
Ian A. Gravagne and Ian D. Walker
Clemson University

- Investigate the Kinematics of Trunk and Tentacle-like Robots
- Concentrate on Manipulators with Continuous Backbones
- Discuss Intricacies of Remote Actuation
- Images of Prototype Robots in the Laboratory



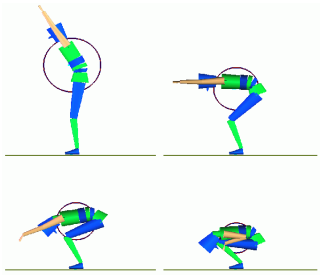
A Numerical Evaluation of the Workspace of Rediestro, A Redundant Manipulators
Marco Ceccarelli[1] and Jorge Angeles[2]
[1]Universit degli Studi di Cassino and [2]McGill University

- What is the effect of kinematic isotropy conditions on the workspace capability of a manipulator
- The workspace of Rediestro, a redundant manipulator, has been analyzed using transformation matrices and a binary representation of the scanning mobility.
- The workspace of Rediestro has been determined and the effect of design parameters has been evaluated
- The paper focuses on Rediestro, but gives insight on the relations between workspace and kinematic isotropy of a much broader scope.



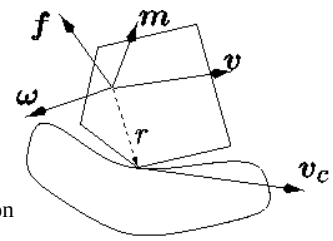
Kinematic Control of the Mass Properties of Redundant Articulated Bodies
P. Baerlocher and R. Boulic
EPFL

- Control of the center of mass and moments of inertia.
- Inverse kinematics is applied to these mass properties.
- Simulation examples with 2D chains and a human figure.
- Useful for static balance and mass distribution control.



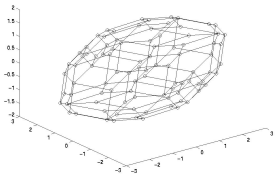
Gauss' Principle and the Dynamics of Redundant and Constrained Manipulators
Herman Bruyninckx[1] and Oussama Khatib[2]
[1]Katholieke Universiteit Leuven and [2]Stanford University

- More efficient algorithm for constrained robots
- Based on Gauss' Principle of Least Constraint
- Allows linear-time algorithms
- Applicable to compliant motion and redundant robots



A Recursive Dimension-Growing Method for Computing Robotic Manipulability Polytope
Y. S. Hwang[1], J. Lee[2] and T. C. Hsia[1]
[1]University of California, Davis and [2]Chung-nam University, Korea

- Efficient computing of robotic manipulability polytope
- A recursive algorithm based on Dimension-Growing
- Substantial computation time reduction for higher DOF robot
- Can extend the method to compute robot dynamics for real time control



Instability of pseudoinverse acceleration control of redundant mechanisms
Y. C. Chen and Kevin O'Neil
University of Tulsa

- Min. norm acceleration control of redundant mechanisms:
- unstable near kinematic singularities
- Characteristics of the instability are analyzed
- Stabilization by nullspace accelerations possible