

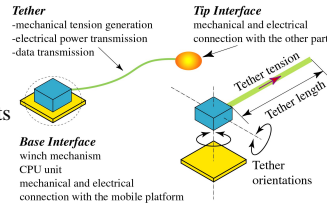
Legged Locomotion 1

Chairs: H. Kimura, Dan Koditschek

A New Flexible Component for Field Robotic System

E. F. Fukushima, N. Kitamura and S. Hirose
Tokyo Institute of Technology

- Tethers have been used for a long time.
- Basic hardware device shown in Figure is introduced.
- A tether/winch basic experiments were conducted.
- A multi-purpose hyper-tether basic device is to be available soon.



Design, Modeling and Preliminary Control of a Compliant Hexapod Robot

U. Saranli¹, M. Buehler² and D. E. Koditschek¹
¹University of Michigan and ²McGill University

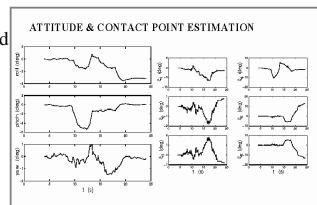
- Biomimetic control of a hexapod robot under dynamically dextrous operation
- Open-loop control strategies implement an alternating tripod gait
- Stable running and turning both in simulation and experiments at speeds up to 0.5 m/s
- Autonomous and fast locomotion over rough terrain achieved even without feedback



Kinematic Observers for Articulated Rovers

J. Balaram
California Institute of Technology

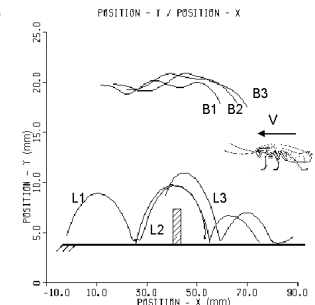
- Improved State Estimation
- Nonlinear Kinematics; Wheel-Ground Contact Point Estimation; Complementary Filtering
- Results from Simulation & Mars Yard Experiments
- Refined State Estimation Using Nonlinear Kinematics



Kinematographic Experiments on Leg Movements and Body Trajectories of Cockroach Walking on Different Terrain

S. Bai, K. H. Low and W. Guo
Nanyang Technological University

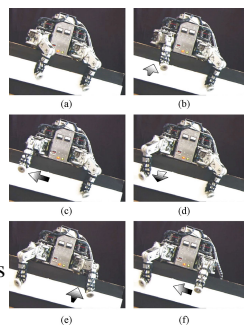
- Moving patterns of cockroaches walking on un-even terrains
- Filming the movement of cockroaches by two sets of high speed cameras
- Identification of the changes in body and leg position.
- Potential application in gait planning and motion control of walking machines.



Hugging Walk

M. Kaneko, T. Shirai and T. Tsuji
Hiroshima University

- Motivation: Proposing hugging style walk with multiple contacts
- Problem: For a given set of joint torque, obtain resultant force sets.
- Result: Two indices for evaluating robustness against disturbance.
- Conclusion: Hugging walk contributes to increasing robustness.



Nonlinear Pitch and Roll Estimation for Walking Robots

H. Rehlinger and X. Hu
Royal Institute of Technology

- The problem of drift free pitch and roll estimation for a walking robot is studied.
- An exponentially convergent high-gain observer is used to fuse sensor data from a two-axis inclinometer and three rate gyros.
- The observer is evaluated with a tailor-made rotating test platform capable of 3DOF rotations.
- The drift of integrated gyros and the low bandwidth of inclinometers can be compensated for by a theoretically sound algorithm.

