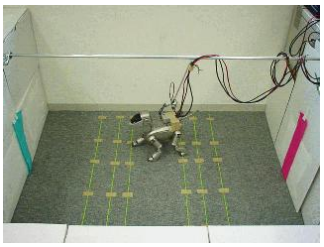
Legged Locomotion 2
Chairs: Marco Ceccarelli, Eiji Nakano

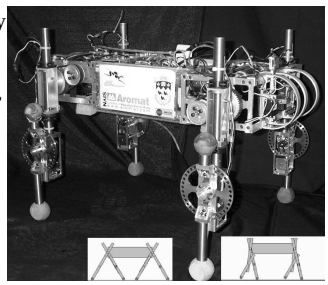
Evolving Robot Gaits with AIBO
G. S. Hornby[1], S. Takamura[2], J. Yokono[2], O. Hanagata[2], T. Yamamoto[2] and M. Fujita[2]
[1]Brandeis University and [2]Sony Corporation

- Gaits are generated by an evolutionary algorithm.
- By sculpting the environment, robust gaits are found.



Quadruped Trotting with Passive Knees - Design, Control, and Experiments
G. Hawker and M. Buehler
McGill University

- Single leg model for leg trajectory parameters and initial conditions
- Mechanical design of unactuated, locking knee
- Experimental implementation of single leg control
- Experimental trotting gait on Scout II quadruped

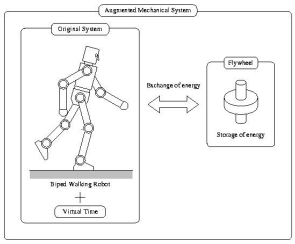


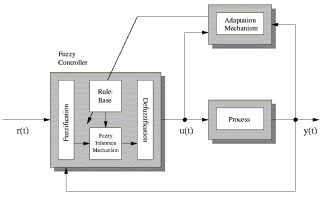
Motion Analysis and Experiments of Passive Walking Robot QUARTET II
K. Osuka[1] and K. Kirihara[2]
[1]Kyoto University and [2]JR West

- It is well known that, in passive walking simulations, we can observe a bifurcation or chaotic phenomenon. Here, we had a question. Can we observe such a phenomenon in passive walking experiments?
- We developed a passive walking robot QUARTET II and carried out passive walking experiments and tried to show the occurrence of the behaviors.
- We could show that a bifurcation phenomenon can be observed in the real world. We could observe a two-period walking in passive walking.
- In this paper, at first, we introduced our developed passive walking robot QUARTET II. Then, we confirmed that, in passive walking, a gait recovery and a bifurcation were observed via some numerical simulations. And finally, we showed that those behaviors occur in walking experiments.

Passive velocity field control of Biped Walking Robot
Masaki Yamakita, Fumihiko Asano and Katsuhisa Furuta
Tokyo Institute of Technology

- Realization of safe and energy-effective control for biped walking robots.
- Passive Velocity Field Control (PVFC) and Virtual Passive Dynamic Walking
- The validity of proposed method has been confirmed by compass-like biped robot.
- Passivity based control of biped walking robots on the floor is realized without any gait design.



Fuzzy Control of Quadrupedal Running
D. W. Marhefka and D. E. Orin
Ohio State University

- Direct adaptive fuzzy controller developed.
- Learns necessary leg touchdown angles and leg thrusts.
- Can shift to desired running height and velocity change in only one stride.
- Good performance with modeling errors.