Thesis Structure

abstract

Chapter INTRODUCTION

1 the problem of motion perception and motion synthesis

2 rethink about motion synthesis research

memory or thinking

feedback or feedforwrd

disadvantage or advantage

4 a different motor control idea

3 overview of a different motor control framework

4 a simple example

* 1. the ship example for qualitative dynamics
  2. the mass-spring example for symmetry.

5 Contribution

Chapter 2 BACKGROUND

1 problems of current motion synthesis research

1. biological motor constraints.
2. Motor primitives
3. Motor tweaking
4. Theory of Motor control
   1. uncontrolled manifold hypothesis
   2. equilibrium point hypothesis and ramda model
   3. impedance control
   4. symmetry based method

Chapter 3 Qualitative Properties of motion:

1 geometrical description of dynamics system.

2 topology and qualitative dynamics

4 structural perturbation and bifurcation

3 qualitative property of motion

4 qualitative motor property control

Chapter 3 Symmetry of Motion Dynamics

1 group and Symmetry

2 Lie group and Differential Equation

3 Symmetry and Mechanics Properties.

4 Controlled Symmetry.

5 simple example

Chapter 4 Motor Invariant Based Dynamic Synthesis

1 global motor invariant

2 local motor invariant

3 invariant base motion adaptation framework

4 an example

5 motion primitive connection

Chapter 6 Bipedal Walking Motion Synthesis

1 global motor invariant

2 motion style and motion retargeting

3 local motion invariant

4 motion adaptation

5 comparison with other method.

Chapter 7 Balancing Motion Synthesis

1 global motor invariant

2 local motor invariant

3 Approximate Discrete Motion via Periodic Motion

4 walk stance transition

Chaper 8 Towards Hyper Degree of Freedom

1 Symmetrical Reduction

2 mechanical coupling

3 ad hoc base motor Control

Chaper 9 Conclusion and Future Work

A rethinking about biological control

feedfoward vs feedback

muscle vs joint

1 fix frame vs local frame

2 Ode vs PDE

3 Symbolic vs Data Driven

4 Joint or Muscle

append

dynamic model of walking

2D

2D with knee

2D with 3D motion effect.

dynamic model of balancing

deduce of the symmetry control operator

parameters of neural controller

Sample Code