Semester Project Specifications

Title: *Chaotic systems for escape and exploration in robots*
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Period: *Winter 2007/2008*

Introduction

The goal of this project is to study the applicability of chaos for robot control. This will be implemented on a centipede robot. In particular, their behavior and adaptation to movement on unknown terrain should be thoroughly assessed. A benchmarking experiment will be defined to compare chaos to pure random movements.

Work demanded

- Literature review of chaotic controllers for robots. Update on oscillator theory, synchronization and chaotic systems
- Definition of the control problem, assumptions and experiments to validate the model
- Design of a model for the control of locomotion in a centipede robot with chaotic behavior.
- Theoretical study of synchronization and coupling in this model in Matlab.
- Design of a regular steady-state movement using limit cycles.
- Implementation in physical simulation of the controllers, for a centipede robot model.
- Comparison between full determinist controller, full random controller and chaotic controller in unknown terrain.
- Assessment of potential and applicability of chaotic controllers in robot control