Abstract

This paper describes a new approach allowing the generation of a simplified Biped gait. This approach combines a classical dynamic modeling with an inverse kinematics' solver based on particle swarm optimization, PSO. First, an inverted pendulum, IP, is used to obtain a simplified dynamic model of the robot and to compute the target position of a key point in biped locomotion, the Centre Of Mass, COM. The proposed algorithm, called IK-PSO, Inverse Kinematics PSO, returns and inverse kinematics solution corresponding to that COM respecting the joints constraints. In This paper the inertia weight PSO variant is used to generate a possible solution according to the stability based fitness function and a set of joints motions constraints. The method is applied with success to a leg motion generation. Since based on a pre-calculated COM, that satisfied the biped stability, the proposal allowed also to plan a walk with application on a small size biped robot.

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Keywords
Biped robotics  Gait generation  Particle Swarm Optimization  Inverse kinematics.  Inertia weight PSO

Index Terms
Computer Science  Robotics