

## A NEW GAIT GENERATION METHOD ON SLOPES FOR THE COMPASS-TYPE BIPED ROBOT

TATSUYA KAI<sup>1</sup> AND TAKESHI SHINTANI<sup>2</sup>

<sup>1</sup> Department of Applied Electronics,  
Faculty of Industrial Science and Technology, Tokyo,  
University of Science,  
6-3-1 Niijuku, Katsushika-ku, Tokyo 125-8585, Japan

<sup>2</sup> Kyocera Corporation, Japan

### Abstract

This paper develops a discrete mechanics approach to gait generation on slopes for the compass-type biped robot. We first formulate an optimal gait generation problem for the discrete compass-type robot and show a method that solves the optimization problem from the standpoint of the sequential quadratic programming for computation of a discrete control input. Then, we introduce a transformation method from a discrete control input into a continuous zero-order hold input based on the discrete Lagrange-d'Alembert principle. As a result of some numerical simulations, it is confirmed that stable gaits on a flat, a downward slope, and an upward slope can be generated for the continuous compass-type robot by our new method.

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Key Words : *Compass-type biped robot, Gait generation on slopes, Discrete mechanics, Finite dimensional constrained nonlinear optimization problem, Sequential quadratic programming.*

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