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## REAL-TIME CONTROL OF A 3D SPACE ROBOT WITH AN INITIAL ANGULAR MOMENTUM

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### Abstract

In this paper, two kinds of control problems for a 3D space robot of two rigid bodies connected by a universal joint with an initial angular momentum are dealt with. First, a mathematical model and control problems for the 3D space robot are shown. Next, a numerical simulation on attitude stabilization control of the 3D space robot is performed by using nonlinear model predictive control. Then, another numerical simulation on trajectory tracking control is carried out. As a results, it turns out that this approach can realize both attitude stabilization control and trajectory tracking control for the 3D space robot. In addition, computation amount is reduced by this approach and real-time control of the 3D space robot can be achieved.

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Key Words : *3D space robot, Universal joint, Initial angular momentum, Attitude stabilization, Trajectory tracking control, Nonlinear model predictive control.*

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