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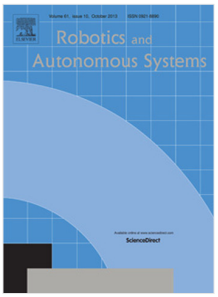

Adaptive position/force control for robot manipulator in contact with a flexible environment

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Title. Adaptive position/force control for robot manipulator in contact with a flexible environment

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Abstract. The subject of the article is the adaptive position and force control of a robotic manipulator in interaction with flexible environment. The aim of the study is to provide a solution that takes into account the essential aspects of operation of the manipulator with the environment and at the same time can be actually implemented. A manipulator-environment system model taking into account motion resistance and environment elasticity. The position and force control task has been defined considering the manipulator and environment models. Asymptotic stability of the control system has been demonstrated considering the adaptation of parameters of the manipulator and the environment. Practical stability of the system has been demonstrated in the case of interference with the guaranteed stability of the adaptation of parameters without requiring persistence of excitation. Numerical analysis and experimental study of the issue has been presented.

Keywords. manipulator modelling, flexible environment, adaptive control, position/force control, stability

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