C315600 : MAJOR ELECTRICAL ENGINEERING
KEY WORD: OPTIMAL / DIRECT ADAPTIVE / ROBOT CONTROL

SIRI SUPPAPAT : AN OPTIMAL DIRECT ADAPTIVE CONTROLLER FOR ROBOTIC MANIPULATORS. THESIS ADVISOR : BOONMEE YANGTHARA, Ph. D.

184 pp. ISBN 974-584-424-1

The thesis presents a method of designing an optimal direct adaptive controller for motion control of robotic manipulators. This controller, based on the Lyapunov's second law, estimates the robotic system parameters and uses them to calculate the main torques which will keep the errors in joint positions and joint velocities within a bound. Next, the gains of a P.D. controller are determined via a dynamic programming approach such that the quadratic terms of the foregoing errors are minimized. Then, the P.D. gains are used to calculate the perturbation torques. Finally, the sum of the main torques and the perturbation torques is used as inputs to the robotic manipulator in order that the errors will be driven to zero after a period of time.

The results of the digital simulation of the 3-joint manipulators, namely the articulated robot, SCARA robot, and spherical robot, reveal that the proposed controller performs well.