

Chawalit Narumitbowornkul 2012: Robust Position Controller Design of Robot Arm with Parametric Uncertainty Using Quantitative Feedback Theory (QFT). Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Associate Professor Peerayot Sanposh, D.Sc. 104 pages.

This research proposes a robust control system design using quantitative feedback theory for two types of robots: one-link robot and two-link SCARA robot. One-link robot is a Single-Input Single-Output (SISO) system with parametric uncertainty because load installations and load sizes are different. Two-link SCARA robot is a Multiple-Input Multiple-Output (MIMO) system since it is nonlinear. Thus, it is difficult to find accurate robot mathematical model because of uncertainty in the plant, disturbance at the plant input, disturbance in the plant output, and measurement noise. Therefore, the robust control using quantitative feedback theory is applied to cope with these problems. Both simulation and experimental results show that the designed controllers can control both types of the manipulators to desired responses. Moreover, the quantitative feedback controllers are more accurate and more efficient than PID controllers.

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Thesis Advisor's signature