

3970876621 : MAJOR Mechanical Engineering

KEY WORD: Hybrid / Implicit / Stiffness / Force control / Manipulator

Boworn Panyavoravajin : Hybrid Control with An Implicit Force for A Manipulator

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82 pp. ISBN 974-334-519-1.

This thesis is to study the implementation techniques of Hybrid force/position control for a manipulator arm, the Chula II. The Chula II, the five-axis SCARA type robot, is developed in the Laboratory. Not only Implicit Force control is carried out in this thesis, the Explicit Force control is also used as the reference for comparison. The identification of the stiffness between manipulator and environment is included in the Implicit Force control technique. This method will improve the system's stability as shown in the experiments.

The experiments have been done with various types of environment, such as rigid steel plate, soft material, flexible steel plate and discontinuous surface. The results shown that the implicit force control gives better force response performance compare to the explicit force control for soft material and flexible steel plate. And the implicit force control can maintain the contact stability while moving on the discontinuous surface in contrast to the explicit force control.

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