

Stabilization of the Equilibrium Position of Mechanical Systems using a Drive that Monitors a Reference Speed

Ivan Tarabukin, Sergei Gusev

Sirius University, Sochi, Russia

The report is devoted to the task of stabilizing the equilibrium position of underactuated mechanical systems. In numerous publications devoted to the management of such systems, the force or moment of force applied by the actuator is used as a control action. In practice, the control action is usually the linear or angular velocity of the axis of rotation of the servo. So on industrial manipulators, the control signal is the linear or angular speeds of the links.

The paper proposes a method for stabilizing control of mechanical systems, where servos provide tracking of a given speed, rather than applied forces or moments of force.

The theoretical results are illustrated by an experiment with a ball-and-disk system. The task is to stabilize the ball on the disk in an unstable equilibrium position. The disk is attached to the last link of the ABB IRB 1600 manipulator. The control is the speed of rotation of the manipulator link.

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