

Bundit Inseemeeesak 2009: Design of an Intelligent Two Wheeled Robot. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Mr. Withit Chatlatanagulchai, Ph.D.
100 pages.

An intelligent two wheeled robot is independently driven by two concentric motors. Each motor has an encoder connected to its shaft to measure angle when it moves. The intelligent two wheeled robot is a marginally stable plant that avoids obstacles autonomously. Control of the robot for stabilizing and meeting some desired responses is complicated because the plant is nonlinear and non-minimum phase. Moreover, the number of inputs is lower than the number of outputs.

In this research, we use the LQR control and LQR control with augmented integrator, including state observer in order to estimate states. Vision Builder software is used to capture image and send to Lab View to implement.

Both simulation and experimental results of tilt angle estimation are accurate over a wide frequency range. Simulation and experimental results also demonstrate the reliability and effectiveness of the proposed control scheme even if oscillation occurs in experiment due to friction and oscillated electrical wire. Robot can still turn with high accuracy. Camera can capture high-accuracy image in the presence of obstacles enabling the robot to avoid the obstacles well.

Student's signature

Thesis Advisor's signature