

Serm Sak Chotana 2014: Automatic Tuning of PID Controller Using Extremum Seeking Applied to Engine Throttle. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Associate Professor Withit Chatlatanagulchai, Ph.D. 73 pages.

Throttle is a mechanism that controls the air flowing into intake manifold before into combustion chamber of engine, which affects the performance of vehicle such as idle speed, acceleration, and engine power. Automotive engine has many operating conditions that may be difficult to control throttle position as desired. Supplied voltage uncertainty from the battery results in more difficult control of the throttle position to the desired position.

Extremum seeking control is a control that does not require mathematic model, which is appropriate to be used with complex system. In this research, control of the throttle by extremum seeking to adjust gains of the PI controller in real-time is proposed. This real-time gain adjustment supports the uncertainty of the system from changing of the supplied voltage of the throttle.

The experimental results of changing supplied voltage of throttle show that the control system can adjust the PI gains when the supplied voltage is changed. The proposed technique handles the disturbance from the input voltage well. The throttle position is controlled to better accuracy causing decreasing in accumulated error.

Student's signature

_____ / /

Thesis Advisor's signature