

CONCEPT The Proportional Integral Derivative (PID) controller uses a feedback loop to control the speed, direction or angle of a mechanical process.

BACKGROUND

Originally used to control the speed of industrial steam engines and steering the course of ships in the ocean. The mathematical theory for PID was developed by watching experienced steersmen and how errors in position and rate of change were used to maintain the best course.

APPLICATION

SELF-DRIVING CAR

- Many decisions are made by the self-driving car
- PID systems will help smoothly achieve the short-term goals
- Speed up to and maintain the speed limit
- Stay in your lane without much weaving back and forth
- Change lanes smoothly or turn corners following lane markings
- Safely follow traffic ahead

REAL WORLD CONNECTIONS

- CRUISE CONTROL:** maintain the speed of an automobile under different road conditions
- MOTOR SPEED:** keep the output constant under different load conditions
- STEERING:** keep a large ship on course with changing current and wind conditions
- AIRPLANE AUTOPILOT:** keep airplane on course with air and wind conditions
- SECURITY CAMERA:** pan and zoom to position of interest

