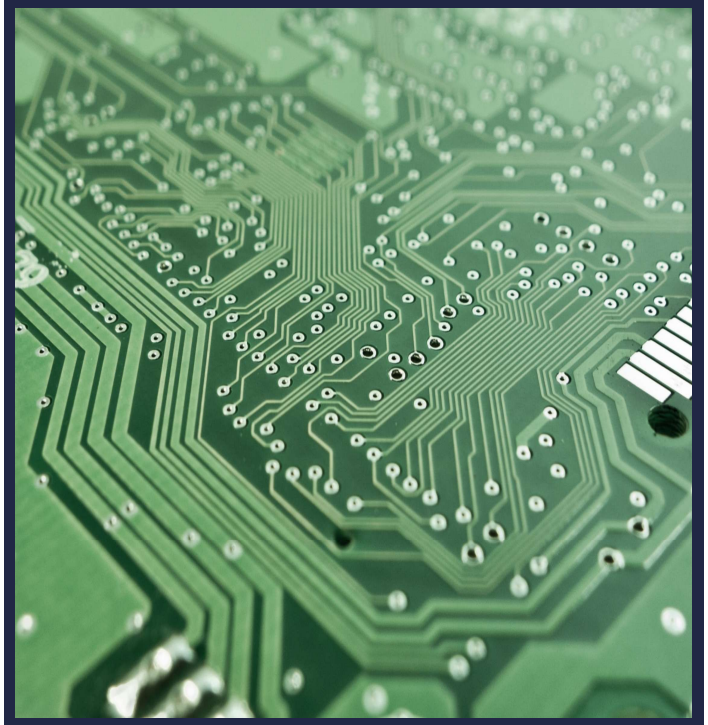
Heated Cage for a Rubidium Vapor Reference Cell

Author: James Deromedi

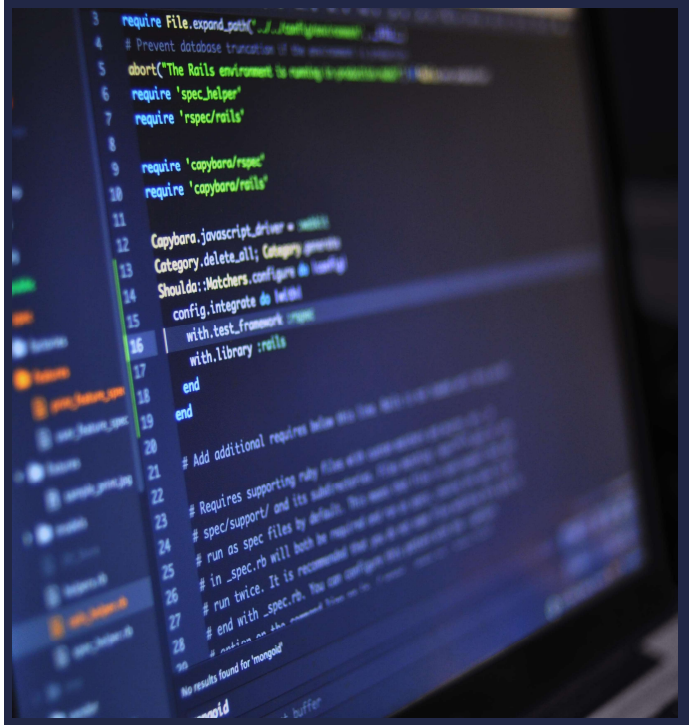
Mentor: Jonathon Newport

Why

Technical

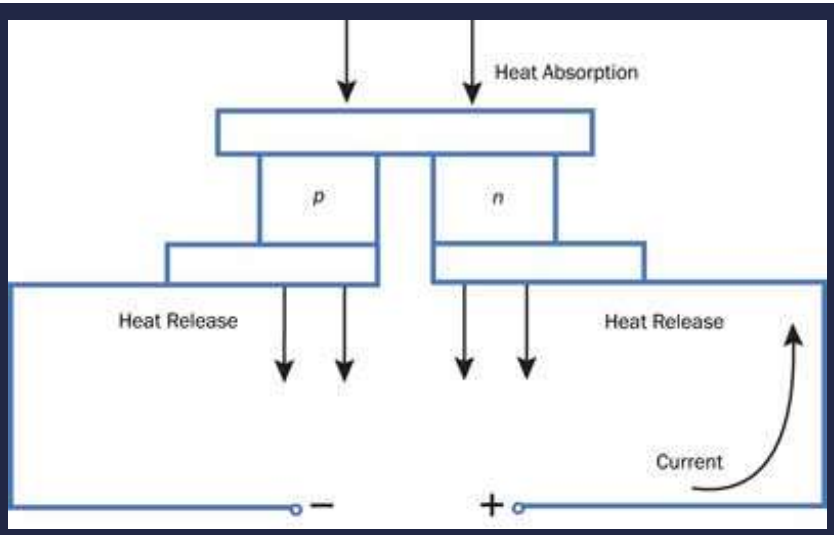


Analysis



Terminology

- Rubidium [Rb]
  - Highly reactive to air and water
  - Must be kept at 100±0.1°F
- PID Algorithm
  - Control algorithm based of three parameters
- TEC
  - Thermoelectric Cooler



TEC Schematic

Optical Reference Cell

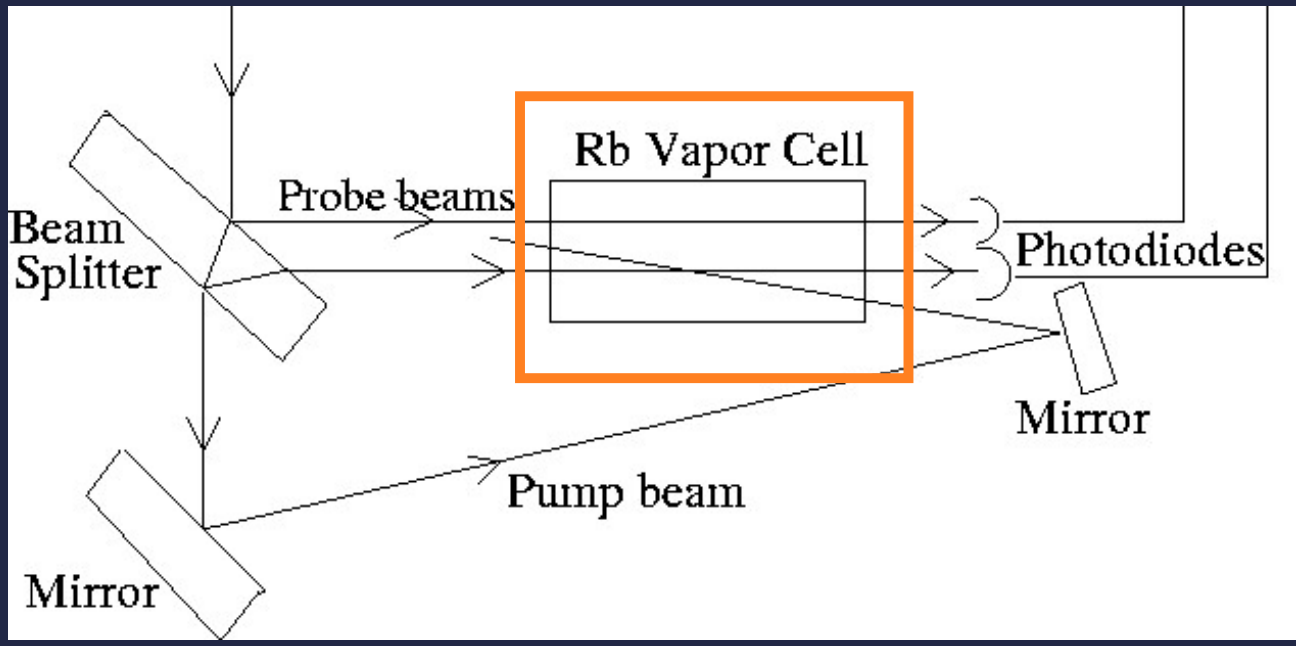
Why

Exploring

Nature of PID Algorithms
Basics of Op-Amps

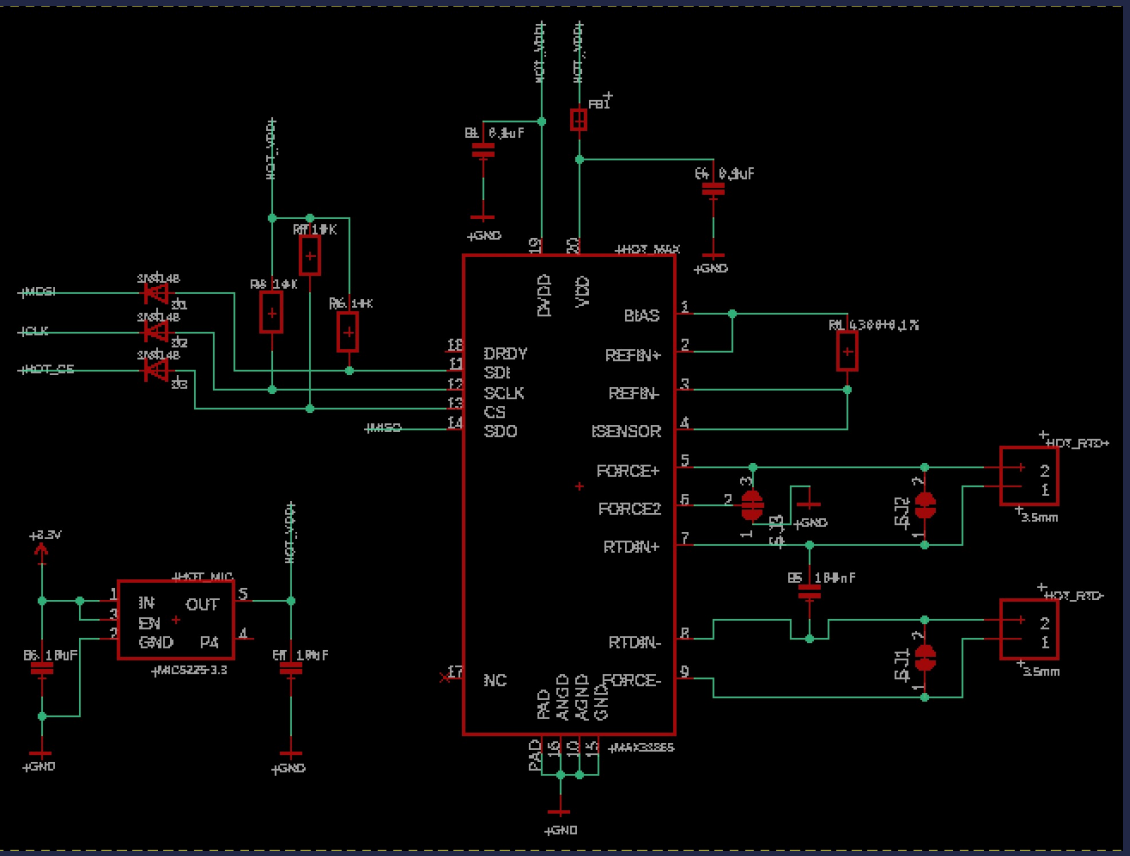
Engineering

Industrial Grade Hardware
Academic Research Potential
High Current Applications

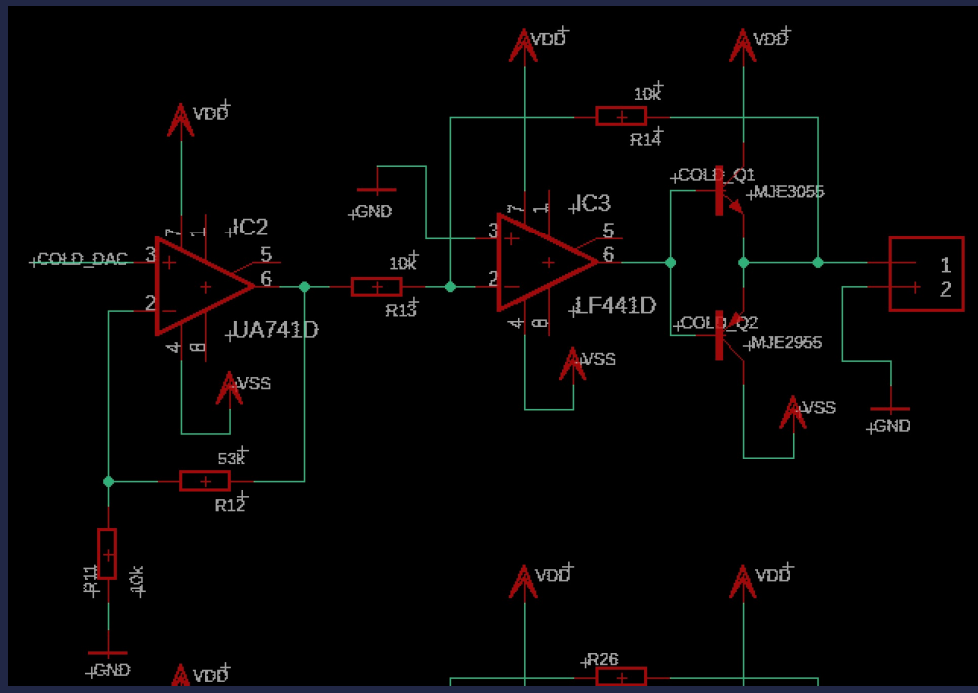


Rubidium Optical Cell within a laser setup

Schematic

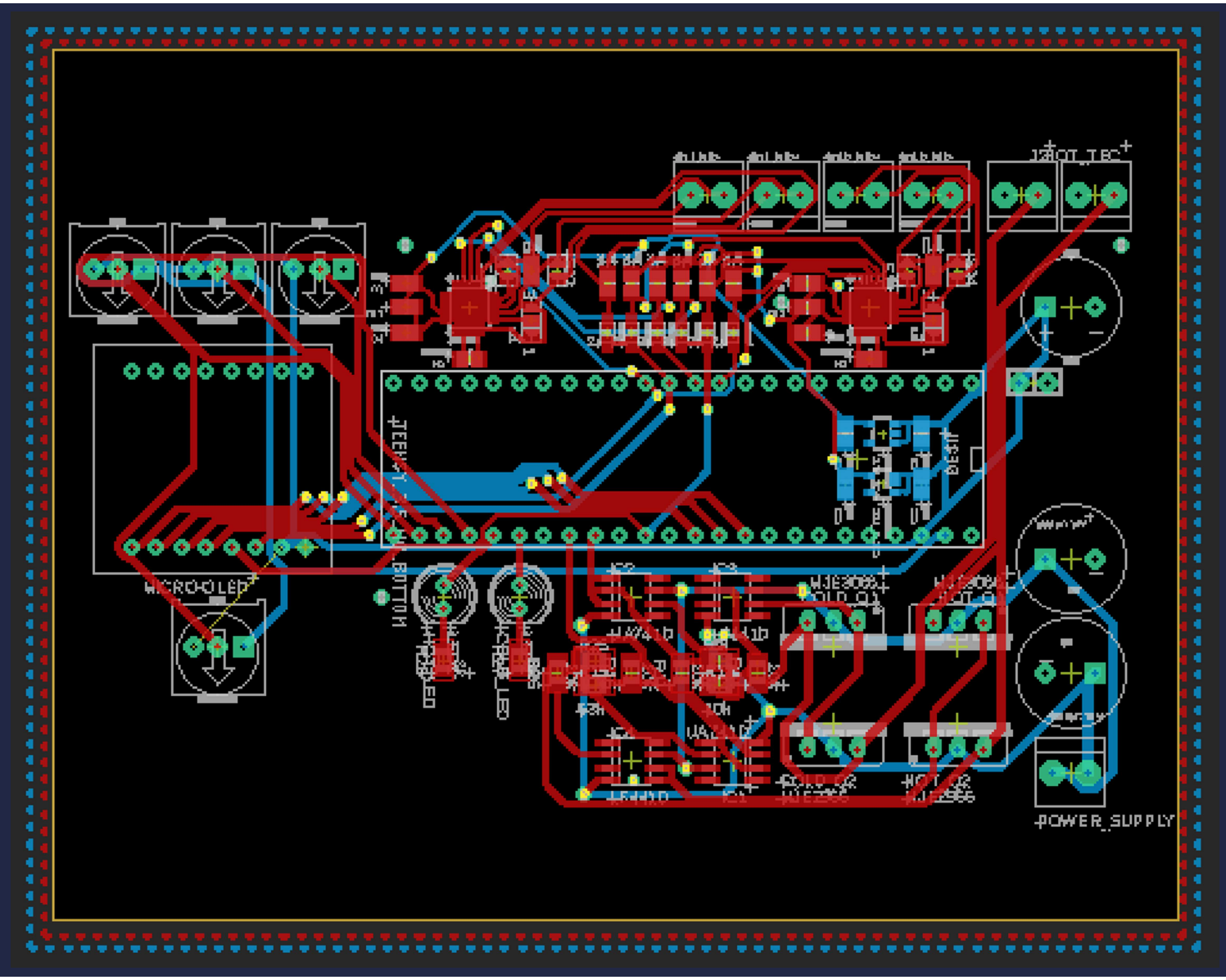


RTD Temperature Converter

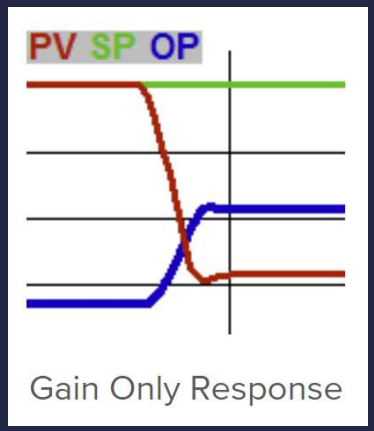


PID Amplifier

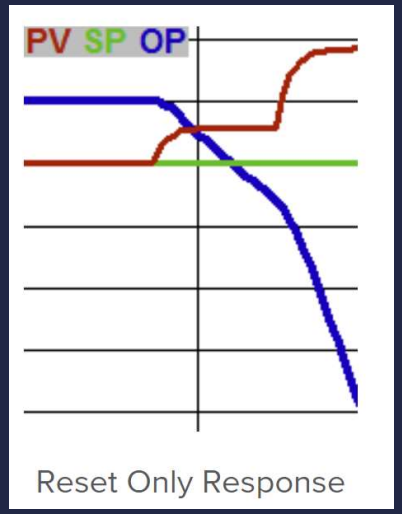
Technical



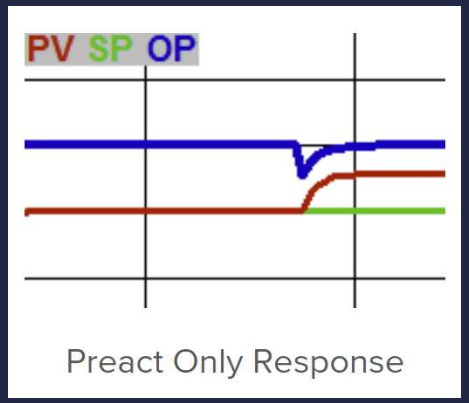
Tuning



Proportional Band



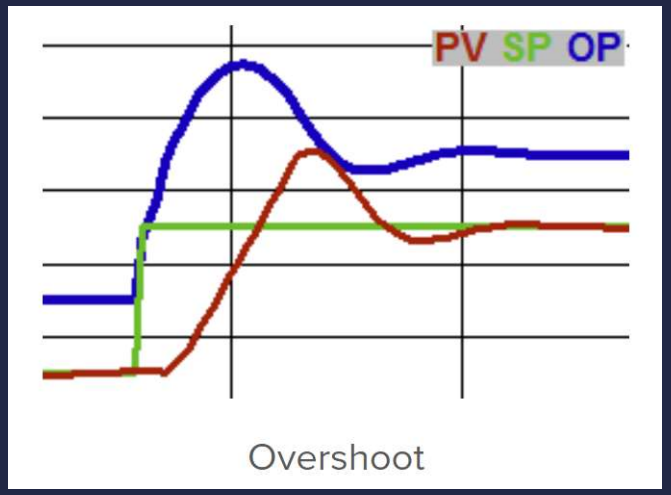
Integral



Derivative

PV: Input
SP: Setpoint
OP: Output

- P: Reaction to a change in error
- I: Reaction to change in error over time
- D: Reaction to change in setpoint



Avoid This

Thank You

Any Questions?