# PID

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## 1 (Introduction)

PIDPID

## 2 PID (Theoretical Background)

### 2.1 PID

PID $u(t)$ $e(t)$

$$u(t) = K_p e(t) + K_i \int_0^t e(\tau)d\tau + K_d \frac{de(t)}{dt} \tag{1}$$

$K_p$ $K_i$ $K_d$

## 3 (Circuit Design)

### 3.1 (Proportional Stage)

$A_p = -\frac{R_f}{R_{in}}$

### 3.2 (Integral Stage)

$v_o = -\frac{1}{RC}\int v_{in}dt$

### 3.3 (Derivative Stage)

$v_o = -RC\frac{dv_{in}}{dt}$

### 3.4 (Summing and Inverting Stage)

PID

# 4 (Simulation and Results)

## 4.1

$K_p, K_i, K_d$

## 4.2

PID

# 5 (Conclusion)

# References

[1] .

[2] .