#include<avr/io.h>

#include<avr/interrupt.h>

int x,e1,ie1=0,de1=0,le1=0,pid1=0;

int p1,i1,d1;

int y,e2,ie2=0,de2=0,le2=0,pid2=0;

int p2,i2,d2;

float i,ct1,ho=20,rpm1,c,n;

float ct2,rpm2,set,o ;

int k1=0;

int k2=0;

void usart\_init(void)

{

UCSR0A = 0x00;

UCSR0B = (1<<RXEN0)|(1<<TXEN0);

UCSR0C = (1<<UCSZ00)|(1<<UCSZ01);

UBRR0L = 103;

}

void usart\_send(unsigned char n )

{

while(UCSR0A!=(UCSR0A|(1<<UDRE0)));

UDR0=n;

}

unsigned char usart\_recieve(void)

{

while(UCSR0A!=(UCSR0A|(1<<RXC0)));

return UDR0;

}

unsigned int usart\_available()

{

return (UCSR0A==(UCSR0A|(1<<RXC0))) ;

}

void pid\_init1() //pin 6,9

{

e1=set-rpm1; //n==set value rpm==encoder value

ie1+=e1; //ie==integrate value

de1=e1-le1;

le1=e1; //le== last error

pid1=(p1\*e1)+(i1\*ie1)+(d1\*de1);

Serial.print("k1=");

Serial.println(k1);

k1+=pid1;

if (k1>=255){k1=255;}

else if(k1<=0){k1=0;}

}

void pid\_init2()// pin 5,10

{

e2=set-rpm2; //n==set value rpm==encoder value

ie2+=e2; //ie==integrate value

de2=e2-le2;

le2=e2; //le== last error

pid2=(p2\*e2)+(i2\*ie2)+(d2\*de2);

Serial.print("k2=");

Serial.println(k2);

k2+=pid2;

if (k2>=255){k2=255;}

else if(k2<=0){k2=0;}

}

int main()

{

DDRB=0b00000000;

DDRD=0b11111100;

TCCR1A=(1<<WGM12);

TIMSK1=(1<<OCIE1A);

OCR1A=62500 ;

TCCR0A|=(1<<COM0A1)|(1<<COM0B1)|(1<<WGM01)|(1<<WGM00);

p1=4;

i1=0.5;

d1=0.04;

p2=4;

i2=0.5;

d2=0.04;

TCCR1B=(1<<CS12);

TCCR0B|=(1<<CS02);

usart\_init();

sei();

while(1)

{

/\*if(usart\_available()){

n=usart\_recieve();

n-='0';

set=n;

n=0;

}

\*/

set=180;

if((PINB & 0x02)==0b00000010 && x==1)

{

ct1++;

x=0;

}

else if ((PINB & 0x02)==0b00000000){x=1;}

if((PINB & 0x04)==0b00000100 && y==1)

{

ct2++;

y=0;

}

else if ((PINB & 0x04)==0b00000000 ){y=1;}

if(set>0){

PORTD=0b01101111;

OCR0A=k2;

OCR0B=k1;}

}

}

ISR(TIMER1\_COMPA\_vect)

{

rpm1=(ct1/ho)\*60;

Serial.print("rpm1=");

Serial.println(rpm1);

rpm2=(ct2/ho)\*60;

Serial.print("rpm2=");

Serial.println(rpm2);

ct1=0;

ct2=0;

pid\_init1();

pid\_init2();

}