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EEEE2045:

Control Coursework

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Contents

1 Abstract

In the optical absorption of semiconductor experiment, we discovered the Urbach slope, the band gap energy for both; direct and indirect band gap semiconductor. The experiment was carried out using Matlab to automate the wavelengths by outputting a signal through a stepper motor to the monochromator and analysing the data inputted back in through plotting graphs. The Urbach slope was found to be (0.182 ± 0.008) eV, the band gap energy for a direct band gap semiconductor to be (1.431 ± 0.002) eV and the band gap energy for an indirect band gap semiconductor to be (1.8305 ± 0.0146) eV.

2 Introduction

testZ [1]

3 Theory

hello123

Sign type	Sign Observed
Distance Measurement	yes
Green Short Cut	yes
Red Short Cut	yes
Blue Short Cut	yes
Follow Black	yes
IMU Measurement	yes
Shape Counter	yes
Stop Light	yes
Yellow Short Cut	yes

Table 1: Table to show success of identifying a sign within a frame

table 1

3.1 Code Overview

```
            return 0;
    };
}

TWCR = (1 << TWINT) | (1 << TWEN) | (1 << TWEA);
while (!(TWCR & (1 << TWINT)))
{
    if (start + timeout < micros())
        return 0;
};

TWCR = (1 << TWINT) | (1 << TWEN) | (1 << TWEA);
while (!(TWCR & (1 << TWINT)))
{
    if (start + timeout < micros())
        return 0;
};

TWCR = (1 << TWINT) | (1 << TWEN) | (1 << TWEA);
while (!(TWCR & (1 << TWINT)))
{
    if (start + timeout < micros())
        return 0;
};

TWDR = *(uint8_t *)(&distance);
TWCR = (1 << TWINT) | (1 << TWEN) | (1 << TWEA);
while (!(TWCR & (1 << TWINT)))
{
    if (start + timeout < micros())
        return 0;
};

TWDR = *((uint8_t *)(&distance) + 1);
TWCR = (1 << TWINT) | (1 << TWEN);
while (!(TWCR & (1 << TWINT)))
{
    if (start + timeout < micros())
        return 0;
```

Figure 1: Handler routine for the Arduino nano written to communicate to I2c with the EPS32

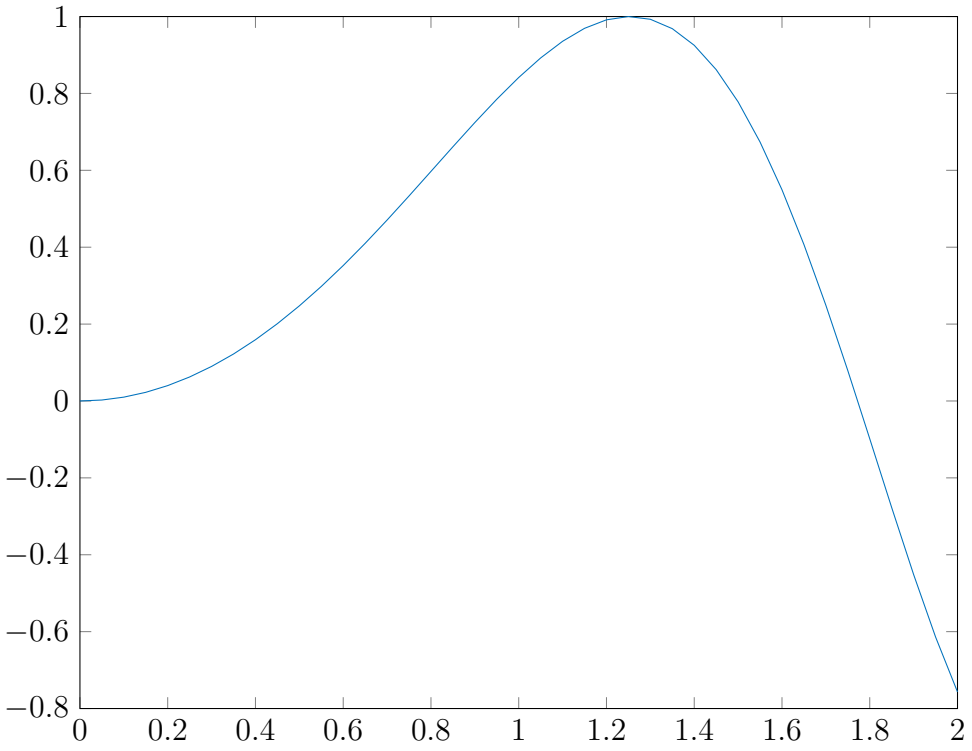

Figure 2: test

References

[1] M. K. Pratt, "How big data collection works: Process, challenges, techniques," 2022. [Online]. Available: https://www.techtarget.com/searchdatamanagement/feature/Big-data-collection-processes-challenges-and-best-practices