ROYAUME DU MAROC
INSTITUT AGRONOMIQUE
ET VÉTÉRINAIRE HASSAN II

المملكة المغربية
معهد الحسن الثاني
للزراعة والبيطرة

Projet de Fin d'Etudes présenté pour l'obtention du diplôme d'Ingénieur en Topographie

THIS MY VERY LONG LONG LONG LONG LONG LONG LONG LONG TITLE

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To my mentors.

Acknowledgements

Thank you.

Abstract

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Chapter 1

INTRODUCTION

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1.1 Motivation

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1.2 Problem Framing

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1.3 Thesis Outline

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1.4 Host Institute

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Chapter 2

BACKGROUND

Contents

2.1 General introduction

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2.1.1 The electromagnetic spectrum

Light is usually interpreted as the *visible light*; that's because it is what can be perceived by the eye, but that changed in the 1800s when it was discovered that light was a more general phenomenon; and it is more common to use **electromagnetic radiation** when referring to light in its various forms (Ball, 2007).

The electromagnetic spectrum is the **range** of electromagnetic radiations.

The figure 2.1 shows important properties and relations between different radiations of the electromagnetic spectrum. The order of these radiations in increasing wavelength is: Gamma-rays γ, X-rays, Ultra-Violer, Visible, Infrared, Micro-waves, Radio-waves.

The infrared portion of the electromagnetic spectrum is usually divided into three sub-regions; the *near*-, *mid*- and *far*-infrared, named for their relation to the visible spectrum.

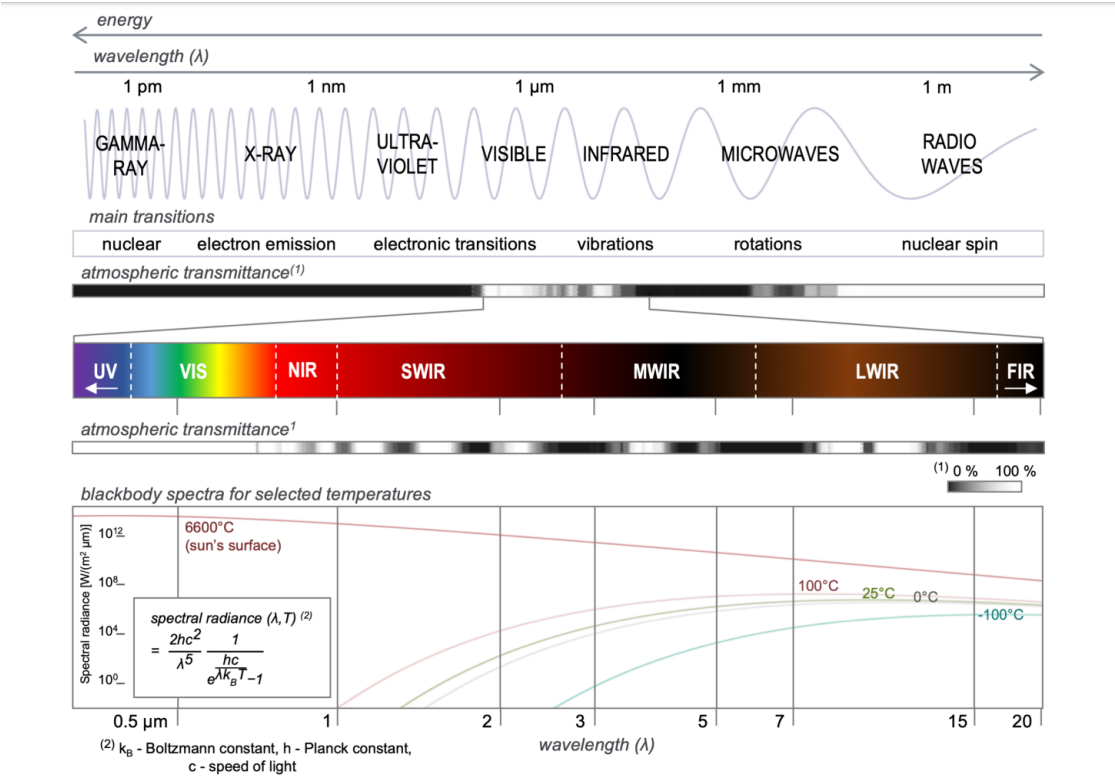

Figure 2.1: The electromagnetic spectrum (Lorenz, 2019)

2.1.2 Lorem Ipsum 1

2.1.3 Lorem Ipsum 1

2.1.4 Lorem Ipsum 1

2.2 Lorem Ipsum 1

2.2.1 Lorem Ipsum 1

2.2.2 Lorem Ipsum 1

2.3 Lorem Ipsum 1

2.3.1 Lorem Ipsum 1

Lorem Ipsum 1

2.4 Lorem Ipsum 1

2.4.1 Lorem Ipsum 1

2.4.2 Lorem Ipsum 1

Lorem Ipsum 1

2.5 Lorem Ipsum 1

2.6 Lorem Ipsum 1

Chapter 3

PREVIOUS WORKS

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Chapter 4

METHODOLOGY

Contents

4.1 General methodology

Table 4.1 is an example of a referenced LaTeX element.

Col1	Col2	Col2	Col3
1	6	87837	787
2	7	78	5415
3	545	778	7507
4	545	18744	7560
5	88	788	6344

Table 4.1: Table to test captions and labels.

4.1.1 Approach 1

4.1.2 Approach 2

4.1.3 Approach 3

4.2 Equipment

4.2.1 Lorem Ipsum 1

Technical specifications

Output files

Working principle

4.2.2 Lorem Ipsum 1

4.2.3 Lorem Ipsum 2

4.2.4 Lorem Ipsum 3

4.3 Software

4.3.1 Lorem Ipsum 2

Lorem Ipsum 2.1

Lorem Ipsum 2.2

Lorem Ipsum 2.3

Lorem Ipsum 2.4

4.3.2 Lorem Ipsum 3

4.3.3 Lorem Ipsum 4

4.3.4 Lorem Ipsum 5

Chapter 5

IMPLEMENTATION & RESULTS

Contents

5.1 Lorem Ipsum 0

5.2 Lorem Ipsum 1

5.3 Lorem Ipsum 2

5.4 Lorem Ipsum 3

5.5 Lorem Ipsum 4

5.6 Lorem Ipsum 5

5.7 Lorem Ipsum 6

Chapter 6

CONCLUSIONS

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```
import numpy as np

def incmatrix(genl1,genl2):
    m = len(genl1)
    n = len(genl2)
    M = None #to become the incidence matrix
    VT = np.zeros((n*m,1), int)  #dummy variable

    test = "String"

    #compute the bitwise xor matrix
    M1 = bitxormatrix(genl1)
    M2 = np.triu(bitxormatrix(genl2),1)

    for i in range(m-1):
        for j in range(i+1, m):
            [r,c] = np.where(M2 == M1[i,j])
            for k in range(len(r)):
                VT[(i)*n + r[k]] = 1;
                VT[(i)*n + c[k]] = 1;
                VT[(j)*n + r[k]] = 1;
                VT[(j)*n + c[k]] = 1;

                if M is None:
                    M = np.copy(VT)
                else:
                    M = np.concatenate((M, VT), 1)

                VT = np.zeros((n*m,1), int)

    return M
```

Listing 6.1: Code snippet example

```
for i in range(10):
    print(i)
    break
```

APPENDICES

Appendix A

Camera Mounting System

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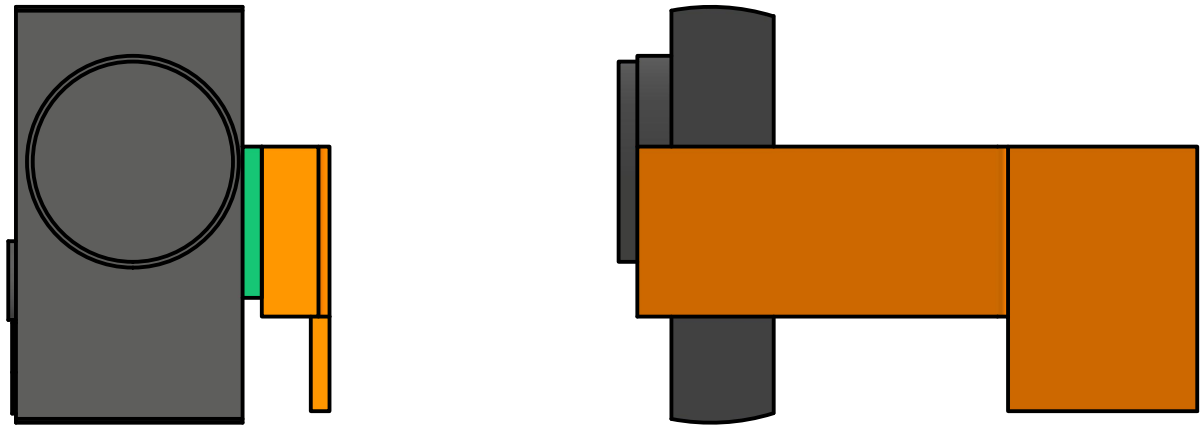
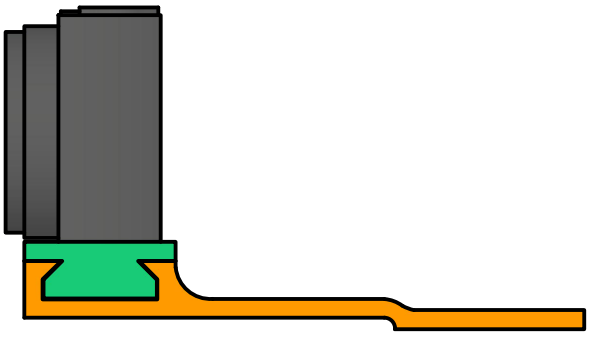
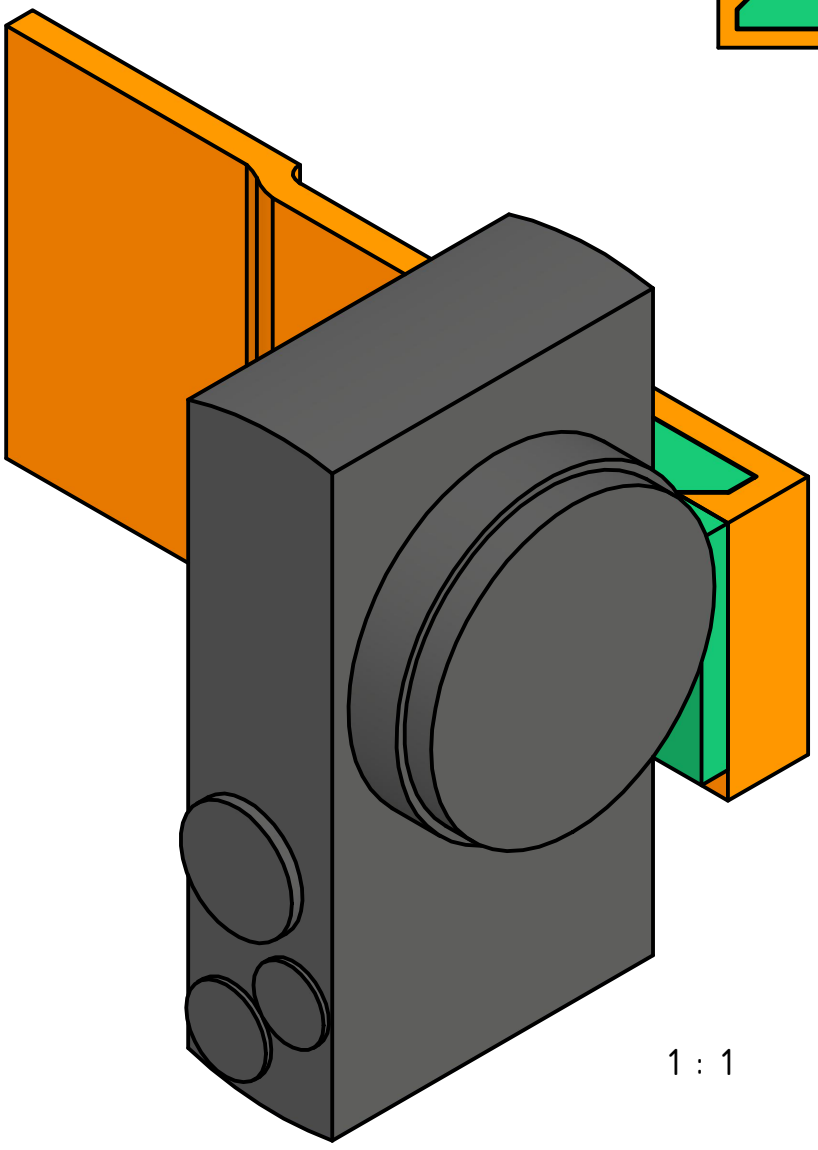


1 : 2





1 : 1

Camera mounting system

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Lorenz, S. (2019). *The Need for Accurate Pre-processing and Data Integration for the Application of Hyperspectral Imaging in Mineral Exploration.* PhD thesis.