ROYAUME DU MAROC
INSTITUT AGRONOMIQUE
ET VÉTÉRINAIRE HASSAN II

المملكة المغربية
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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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Contents in a glance

Contents

List of Tables

List of Figures

Listings

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.

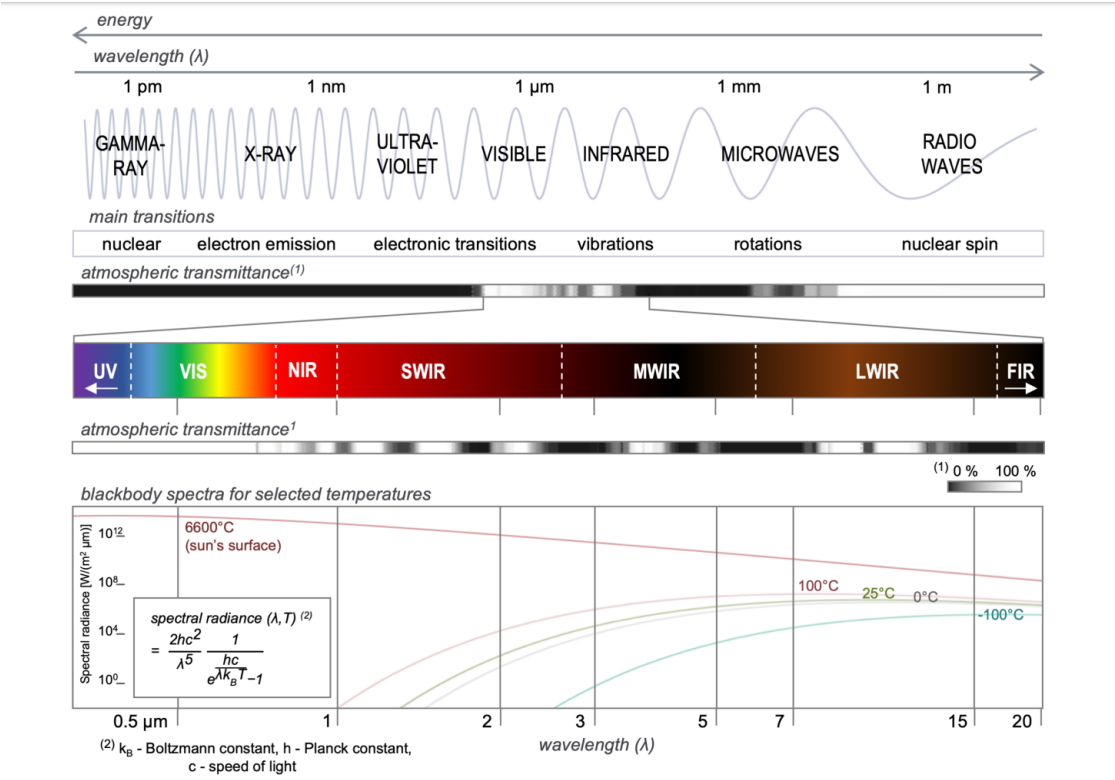

Figure 2.1: The electromagnetic spectrum (Lorenz, 2019)

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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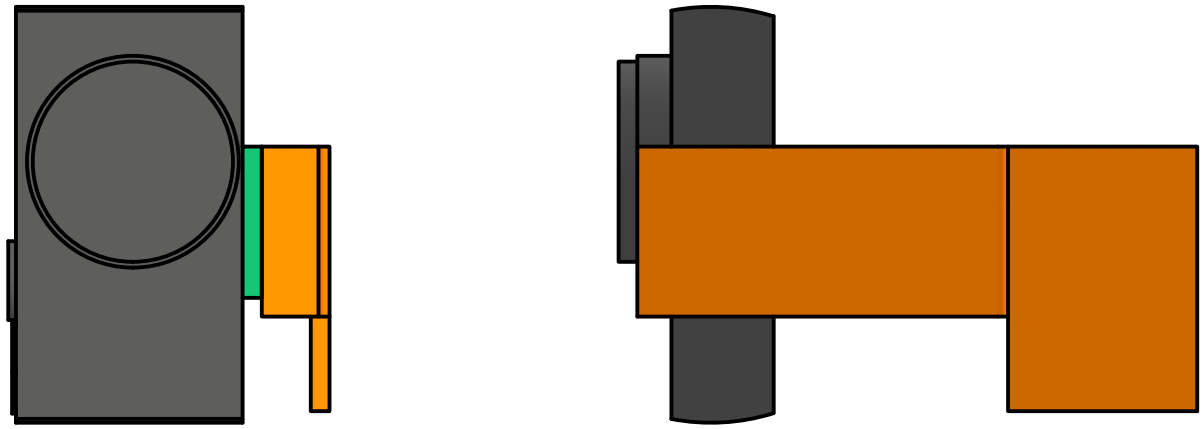
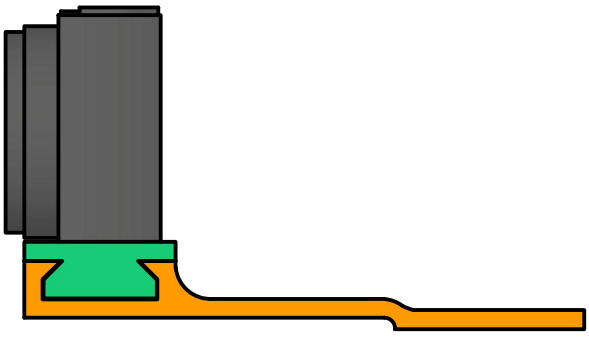
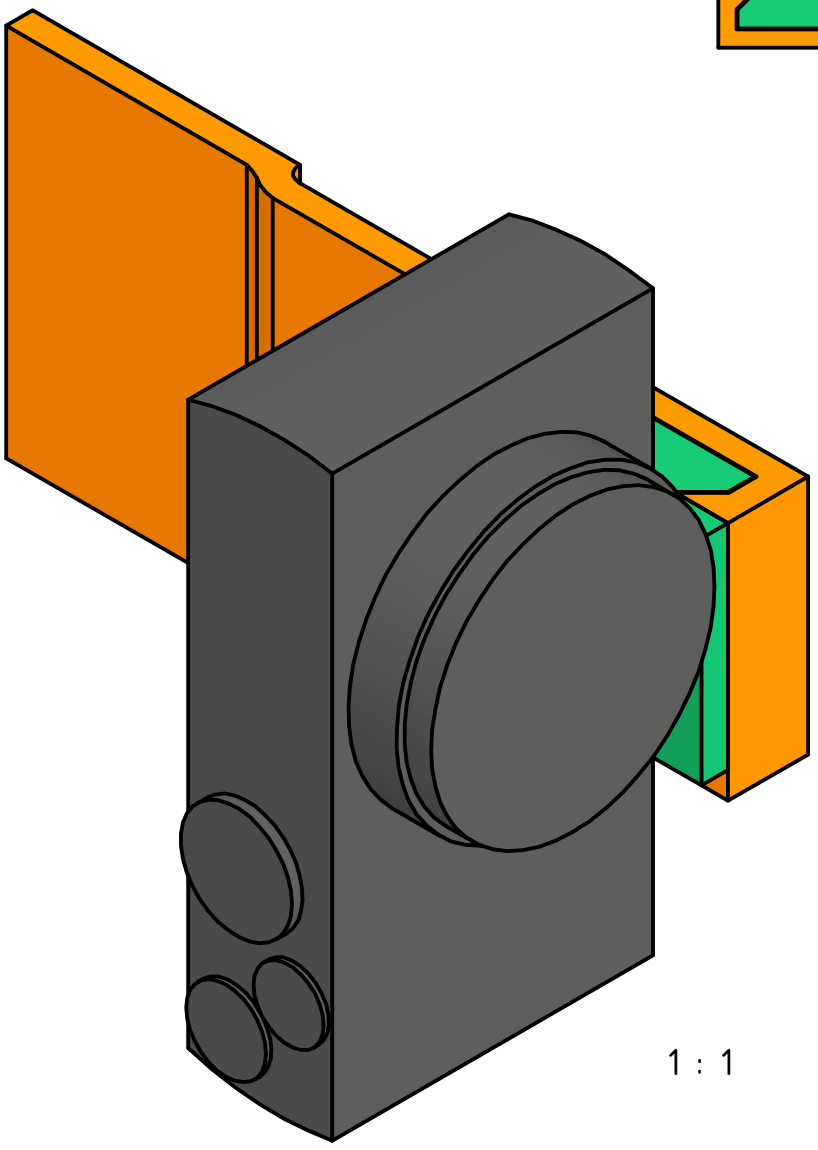


1 : 2





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.

Acronyms

RTFM Read The Flying Manual