



**FACULTY  
OF MATHEMATICS  
AND PHYSICS**  
Charles University

**MASTER THESIS**

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# **Constrained Spectral Uplifting**

Department of Software and Computer Science Education

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Study programme: Computer Science

Study branch: Computer Graphics and Game  
Development

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Dedication.

Title: Constrained Spectral Uplifting

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Abstract: Abstract.

Keywords: key words

# Contents

<b>Introduction</b>	<b>2</b>
<b>1 Color Science</b>	<b>3</b>
1.1 Spectral color representation . . . . .	3
1.2 Tristimulus representation . . . . .	3
1.3 Rendering . . . . .	3
<b>2 Spectral Uplifting</b>	<b>4</b>
2.1 Available methods . . . . .	4
2.2 Trigonometric moment method . . . . .	4
2.2.1 Evaluation of various parameters . . . . .	4
2.2.2 Reconstruction results . . . . .	4
<b>3 Implementation</b>	<b>5</b>
3.1 Borgtool . . . . .	5
3.1.1 Optimizer . . . . .	5
3.1.2 Choice of parameters . . . . .	5
3.2 Cube constraints . . . . .	5
3.3 Filling the cube . . . . .	5
<b>4 Results</b>	<b>6</b>
<b>Conclusion</b>	<b>7</b>
<b>Bibliography</b>	<b>8</b>

# Introduction

# 1. Color Science

What is color, multiple ways of representing colors

## 1.1 Spectral color representation

Wavelengths, sampling of spectra, metamerism, reflectance/emissive spectrum

## 1.2 Tristimulus representation

We want to represent color by fewer values RGB, LAB, CIE XYZ spaces, conversions, matching functions etc.

## 1.3 Rendering

RGB vs Spectral renderers, their pros&cons, examples

## 2. Spectral Uplifting

Maybe add a sections as an intro? Depending on the text

### 2.1 Available methods

(with regard to reflectance spectra) Maybe separate them into subsections, or add a subsection for comparing the results

### 2.2 Trigonometric moment method

#### 2.2.1 Evaluation of various parameters

#### 2.2.2 Reconstruction results



## **3. Implementation**

### **3.1 Borgtool**

Mention what it does, how it works, what was it missing (constrained spectral uplifting)

#### **3.1.1 Optimizer**

Maybe the optimizer could be mentioned before in the cube constraints section, or it can have a special section?

#### **3.1.2 Choice of parameters**

### **3.2 Cube constraints**

Color atlases that might be provided, if not then the cube is seeded from the middle (use Munsell N5), mention how it is seeded

### **3.3 Filling the cube**

## 4. Results

# Conclusion

# Bibliography

J. Anděl. *Základy matematické statistiky*. Druhé opravené vydání. Matfyzpress, Praha, 2007. ISBN 80-7378-001-1.