Title of the document

TU Delft, Faculty of Applied Sciences,
BSc program Applied Physics

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Abstract

The report starts with a Samenvatting (Abstract). The abstract should be self-contained, i.e. a reader should be able to fully understand it without any prior knowledge about the research. Also, in the abstract there should be no references to (figures, tables, formulas etc. in) the remainder of the report, nor to the literature. The abstract tells the reader:
(1) which research question has been studied,
(2) what the research method/approach was,
(3) which results have been obtained, and
(4) what the main conclusions were.

Contents

1 List of symbols

bla bla bla bbb

2 Introduction

Microscopes are used extensively in natural sciences. They enable us to image small objects and structures which cannot be resolved by the human eye. The use of microscopes, could for example, aid in Studies of biological cells, molecule structures or object classification. To correctly conduct such microscopy studies, it is vital to know what the possibilities and limits are of the particular microscope in combination with image improvement techniques.

This experiment will focus on a Leica DM EP microscope in combination with a Color CCD and to what extent this set-up can be used to measure the size of small objects and find the birefringence of an unknown crystal. Furthermore, the possibilities of digital image improvement will be investigated.

After calibrating the pixels and finding the resolving power with the aid of respectively a microscopic ruler and a resolution target, images are made of a human hair, an optical glass fibre, starch particles, an unknown birefringent crystal and a biological sample of a fungus. To find the size of the human hair, optical fibre and starch particles, pixels are to be counted by a computer. By focussing on the different coloured layers of the crystal, it is possible to find the thickness of each layer and subsequently calculate the birefringence. Finally, some python algorithms are implemented on the image of the fungus to investigate improvements on contrast, colours and corrections.

In section 2 the theory regarding the experiment will be described, followed by the the experimental method in section 3. The results and discussion can be found in section 4. Lastly will be the conclusions in section 5.

3 Theory

In theTheorie (Theory) chapter, you describe all (and only!) the theory needed to understand and interpret the experiments in the remainder of the report. Explain to the reader why a piece of theory is relevant for your research. Equations should be numbered. If an equation cannot be assumed to be generally known by the readers (see General Hint 2 for the level of the audience), you should provide a reference to an accessible textbook or article (so not to the RP manual, lecture notes, Wikipedia etc.). In general, try to avoid referring to websites, online data or Wikipedia.

4 Experimental method

TheExperimentele opstellingor Experimentele methode (Experimental set up or Experimental method) chapter describes the experimental setup and the experimental methods used in sufficient detail such that a reader can judge the soundness and, in principle, may verify the conclusions of your research. Also, this chapter should be informative for a reader who wants to perform similar research. Preferably use clear sketches of the setup, rather than photographs. In this chapter you also describe the accuracywith which direct observables have been measured, and the accuracy of the important deduced quantities. Detailed accuracy calculations should be put in an Appendix

5 Results and discussion

In theResultaten en discussie (Results and discussion) chapter, you present your results, generally in the form of graphs, and you discuss them. A single small table (m aximum 10 rows x 5 columns) is acceptable, but large tables should be in an appendix. In deviation from what many students believe, it is not desirable to separate the presentation and the discussion of results from each other. In professional literature, this is most often done together.

•You should introduce each graph:

-Why has this graph been included in the report. (What do we want to learn from this graph?).

-Why have you plotted this Y-axis variable as a function of this X-axis variable (which theoretical/expected relationship is tested/demonstrated in this this graph?

•Then you tell the reader what (according to you) he/she should see in the graph, limiting yourself toconclusions that are relatively indisputable. The more speculative conclusions should be in the next chapter.

6 Conclusions

In theConclusies (Conclusions) chapter
-You give a clear and concise answer to the research question that was formulated in the Intrduction
-You discuss to what extent, and why, your findings do (not) agree with theory/expectations/earlier work, you discuss more speculative conclusions, ad you may do suggestions for further (improved/extended) research.The Conclusions should be self-contained and understandable for readers that have only read the introduction (and have not read the rest of your report, do not know the literature, do not know the experimental setup and have not read the RP manual). In the Conclusions chapter, you may not make references to graps, tables, equations etc. in the remainder of the report.