

Roosa Kuusivaara & Väinö-Waltteri Granat

Characterizing holographic displays via numerical simulations - Report

September 2023

Abstract

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Laboratory Report

Tampere University

Master's Degree Programme in Signal Processing

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The abstract is a concise 1-page description of the work: what was the problem, what was done, and what are the results. Do not include charts or tables in the abstract.

These instructions are intended for students of Computer Sciences at the Tampere University. They cover questions of writing a thesis, such as use of the literature, structure of the thesis and style, the external appearance of the thesis and the use of tools. These instructions do not cover the scientific content of the thesis.

Keywords: M.Sc. thesis, layout, writing style.

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1 Introduction

In this report we describe our work with the ‘Characterizing holographic displays via numerical simulations’ exercise, for the Advanced Signal Processing Laboratory Course.

In this project we familiarized ourselves with the basics of holographic display, by implementing a part of a holographics display viewing simulation. We implemented two holographic synthesis methods and a retinal image formation model, by contributing code to a codebase given by the course faculty.

1.1 Hologram synthesis

Hologram synthesis describes the method for forming holographic images in 3d space from a given image.

1.2 Retinal Image Formation

2 Methodology

2.1 Implementing Hologram Synthesis

Our implementation of the holographic image viewer included 3 different methods of holographic image synthesis, one of which was provided in the code base given to us. The ready made synthesis method was holographic stereograph synthesis, which [TODO: explain hss here]. The first synthesis method we implemented was a Fresnel hologram syntheis which, [TODO: explain Fresnel here]. The second method we implemented was Rayleigh-Sommerfeld synthesis which, [TODO. explain RSS here].

2.2 Field Propagation

3 Results

4 Conclusions