

# Study Record on CGH

Rkka

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## Abstract

This is a record of the problems I encountered while studying computer-generated holography (CGH) and my attempts to solve them.

## 1 Hologram Calculation

**Q1.1** (2024.07.25) How to calculate a hologram that successfully reconstructs a desired size and resolution 3D image at a desired distance? To display the hologram on a Digital Micromirror Device (DMD), hologram resolution should be fixed to  $5\mu m$ .

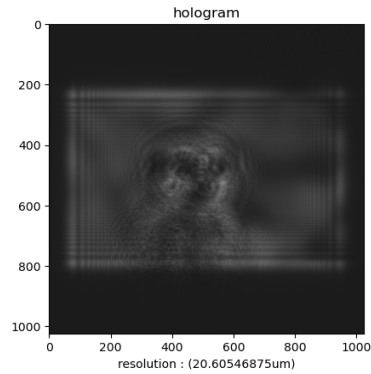


Figure 1: Hologram

## 2 Aliasing

**Q2.1** (2024.07.25) When performing a Fourier transform on a hologram, weird aliasing occurs as shown below. Why does this happen, and how can it be fixed?

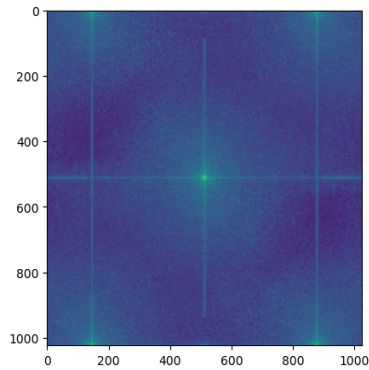


Figure 2: Fourier transform of the hologram

**Q2.2** (2024.07.25) When simulating hologram reconstruction on a computer, aliasing occurs. Why does this happen, and how can it be fixed?

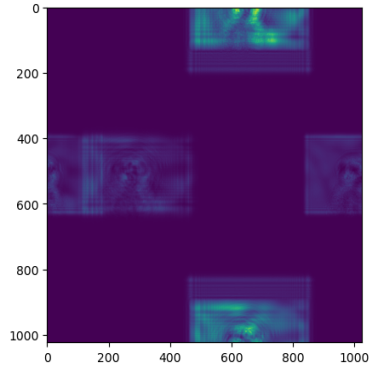


Figure 3: Aliasing in reconstructed image ( $\theta = \pi/5$ )