ECE 299 Holography and Coherent Imaging

Lecture 14. Midterm Review

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6 questions

1. Spatial resolution of a holographic image
2. Recording geometry for off-axis hologram
3. Reconstruction color and resolution of a display hologram
4. Bragg matching bandwidth, volume storage
5. OCT/time of flight imaging
6. Computer generated holograms
Question 1

• Spatial resolution of a holographic image

\[
\omega_x = \frac{\lambda \cdot \xi}{A}
\]

\[
\omega_x = \max \left\{ \frac{x^2}{A}, \frac{1}{2 \sin \theta} \right\} \cdot \frac{2}{U_{\max}}
\]

\[
u = \frac{s \cdot v_2}{\lambda}
\]
Question 2

Recording geometry for off-axis hologram
Question 3

Reconstruction color and resolution of a display hologram

[Diagram with annotations: "Bragg", "record in red", "reconstruct in blue"]
Question 4

Bragg matching bandwidth, volume storage

\[ U = \frac{2 \Delta \lambda}{\lambda^2} \]

Related problem: what is spectral resolution of holographic filter?
Angular Bragg matching
Question 5

OCT/time of flight imaging
Question 6

Computer generated holograms

\[ E = A \ e^{i \phi(x)} \]

Describe method to create CGH including phase and amplitude
resolution requirements