

Lecture 26 - Review topics for Exam 2

Lecture 15 - Spatial vision

- A spatial image can be treated as a 2-D array
- Why use sine wave gratings to evaluate optics and vision?

Lab 5 - Fourier analysis of 1- and 2-D functions

- Know basic parameters of sine waves and sine wave gratings
- Example of a square wave; made up of certain sine waves
- Understand the relationship between an image and its spatial frequency spectrum
- How can you know the spatial frequency, orientation and contrast from the spatial frequency spectrum?
- High and low pass spatial filtering

Lecture 16 - Fourier optics

- Same as Lab 5 topics
- Why is Fourier transformation relevant to vision?

Lecture 17 - MTF

- Property of sine wave gratings: image has same frequency but lower contrast
- What does the MTF tell?
- Characteristics of a typical ocular MTF
- Affect of defocus and scatter on the MTF

Lecture 18 - Spatial filtering

- Clinical application of Fourier transform: interferometry
- What high, mid and low spatial frequencies contribute to an image
- Understand the Shack-Hartmann image spatial filtering example
- Difference between the MTF and the CSF
- What does the CSF tell you?
- Characteristics of a typical CSF
- Sine wave components contained in a square wave grating

Lecture 19 - Contrast sensitivity

- How do defocus and scatter affect the CSF?
- Meaning of the CSF and how visibility changes in different parts of the plot
- Clinical applications of contrast sensitivity
- What limits the high frequency?
- Computing the Nyquist limit
- Spatial frequency/Snellen size equivalent

Lab 6 – Contrast sensitivity

- Difference between HCVA, LCVA and CS as vision tests
- Boxer-Wachler normalized scores

Lecture 20 – Contrast sensitivity2

- How to move objects from outside to inside the CSF

- Low frequency drop off due to lateral inhibition and image processing
- Blakemore's experiment with sine and square wave gratings
- What are Mach bands?

Lecture 21 – Visual acuity

- Definitions of the different kinds of visual acuity
- Clinical application of vernier acuity

Lecture 22 – Temporal MTF

- Percent depth modulation
- Basic meaning of the TMTF
- Basic features of the TMTF
- Definition of the CFF and how to find it on the TMTF graph
- Decreased sensitivity for low temporal frequencies, and applications
- Understand the reason for the illusion in Figure 4.

Lab 7 – Visual illusions

- What do these illusions tell us about the visual system and our sense of vision?

Lecture 23 – Temporal Vision phenomena

- Ferry-Porter law
- Granit-Harper law
- Broca-Sulzer effect
- Brücke-Bartley effect
- Talbot-Plateau law

Lecture 24 - Masking, Motion

Also, Schwartz Chapter 10 - Depth perception, illusions