

Week 8 study sheet: Visual Perception and Color

Problem 1 (12 points) True or false:

- a) (2 points) As an object moves closer, the ciliary muscles of the eye must contract to keep the object in focus.
- b) (2 points) Far-sightedness results if the eye is too elongated from front to back.
- c) (2 points) Rods are responsible for color vision.
- d) (2 points) The “blind spot” contains cones but no rods.
- e) (2 points) Monochromatic yellow light has higher energy than monochromatic green light.
- f) (2 points) For every monochromatic color A , there exists a complementary monochromatic color \bar{A} , such that some mixture of A and \bar{A} makes white.

Problem 2 (4 points) Why might there be fewer types of color receptors at the center of the fovea?

Problem 3 (6 points) Label the six outer vertices of the RGB cube and of the HSV hexcone, with each one viewed along the line from black to white:

Problem 4 (10 points) Suppose we have a monitor whose red, green, and blue phosphors have colors (x_r, y_r, z_r) , (x_g, y_g, z_g) , and (x_b, y_b, z_b) , respectively, in the XYZ color system. How brightly must each of these phosphors be illuminated to display the XYZ color (x, y, z) ?