Homework 2: Contrast Sensitivity
20 Points: Due at the beginning of class, Thursday, 6 October 2005

There are two parts to this homework assignment. Each part counts 10 points. Late homework will receive a grade of zero.

Part 1:

Download the data file for this homework from my web site: http://psych.colorado.edu/~lharvey/. Navigate to the course by clicking on Courses in the navigation menu. The file is named "csf_homework_data.txt". There are 67 rows of data in the file. There are three columns for each row in the file:

1. The Spatial frequency in cycles per degree of 67 different sinusoidal grating patterns (ranging from 0.5 to 30.3 cpd)

2. Threshold contrasts (C) for detecting each of the spatial frequencies

3. Contrast sensitivities (S = 1 / C) for each of the spatial frequencies.

Assume that stimuli having amplitude less than these values would not be visible. Answer the following two questions:

a. Will a 3.0 cpd sine wave grating with contrast of 0.005 be visible? Why?

b. Will a square wave grating with a period of 0.3333 degrees, having a fundamental Fourier component with contrast of 0.001 be detectable? Why?

Part 2:

Use the contrast threshold data in the table and plot a graph of the contrast sensitivity function with contrast sensitivity (S=1/C) on the vertical axis and spatial frequency on the horizontal axis. The graph should have both axes in logarithmic coordinates. Compare your graph to those in the textbook. Are they similar?