

**PSY 628: Perceptual Processes**  
**Homework 3: Fourier Transform Playground**  
**Due: Tuesday, 01 October at 5 pm**

This homework has you interact with Fourier analysis for various images. There is a nice interactive web page, the Fourier Transform Playground, for Fourier analysis of an image at

<https://monman53.github.io/2dfft/>

Use it to do the following.

1. On the class web page, the homework assignment includes links to small image files: Gabor0.png, Gabor32.png, Gabor64.png, and Gabor90.png. Upload each image to the Fourier analysis and observe the resulting “spectrum” of the Fourier analysis. How does the orientation of the Gabor image relate to the appearance of the spectrum.
2. On the class web page, the homework assignment includes a link to an image of a bright square on a dark background: square.jpg. Upload this image to the Fourier Transform Playground. Use your mouse to hover over different locations in the resulting Spectrum image. The bottom image of the “Result” column shows the sine wave that corresponds to the hover location of your mouse on the Spectrum. Are the results consistent with what you observed for the Gabor stimuli in 1)?
3. On the class web page, the homework assignment includes a link to a file called: GappedVerticalLine.jpg. Download it and then upload it to the “Mask” under the Spectrum column of the Playground. Using the square image from 2), describe the inverse Fourier transform (top image of the Result column). Where are the strongest responses? How does this relate to the observations in 1)?
4. On the class web page, the homework assignment includes a link to a file called: Mountains.jpeg. Use the playground to apply the Fourier transform and observe the reverse Fourier transform after applying the mask in 3). What happens? Why?
5. What kind of mask would tend to select only the vertical components of an image?

Send your completed homework to Dr. Francis at [gfrancis@purdue.edu](mailto:gfrancis@purdue.edu)