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ECE472

HW9: Butterworth Notch Filter Plugin

The purpose of this assignment was to get rid of the sinusoidal wave pattern in Bikes_sinewave.gif. To accomplish this, ImageJ's FFT (Fast Fourier Transform) needed to be applied before all else. This returns a 1024x1024 power spectrum of the image. The interference could be noted at a radius of 2.73 from center and 375 pixels per cycle at an angle of 340 degrees. These polar coordinates were then converted to Cartesian and a scale was applied to work with the original 640x480 image. After performing the given equation, the wave patterns significantly decreased. See the difference between Figure's 1 and 2:

Figure 1: Sinusoidal waves present throughout image

Figure 2: After Butterworth Notch filter applied

Here, lowpass filter was applied with a filter order of 3 along with a normalized cutoff of .3, with waves consequently removed from the image. See the difference in power spectrums below:

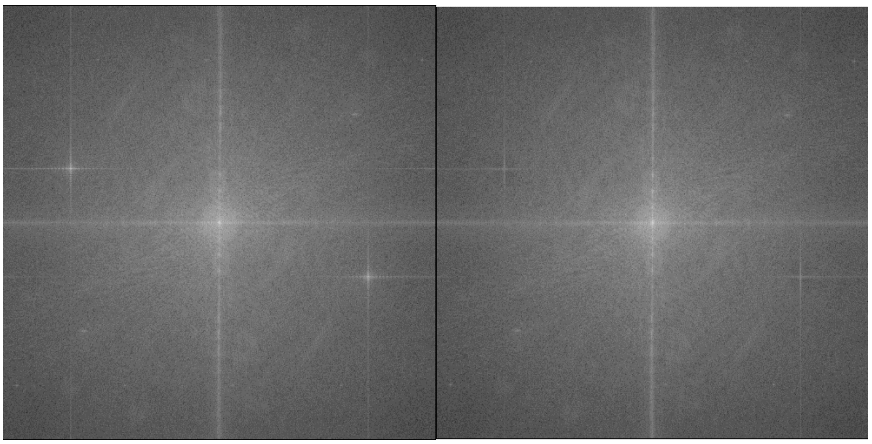

Figure 3: Original power spectrum on the left, notched spectrum on the right. Note the significant clamp on the interference.