

**Image Compression and Packet Video**  
**September 15, 2008**  
**Homework #2**  
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1. Read Chapter 5
2. Problems: (Due October 5, 2009)

1.0 2.1

2.0 2.2

3.0 2.5

4.0 **MATLAB Problem: The class web page will have a two data files that you should read into the computer. The files are NTSC images (640x480x24bit). For each data file: Show the complete image. Deinterlace the image and show the two fields as two separate images. Compare the two field images (compute a mean squared error measure). Discuss your observations. (Hint, these are two stationary scenes). Submit your MATLAB scripts and the print from each image.**

5.0 **MATLAB Problem: Calibration of a video system typically is performed by presenting the camera with targets of known patterns, where the signal response can be measured. Two targets: SMPTE Bars, and Multiburst are used to show the color calibration and frequency response of the system.**

The SMPTE bars image shown on the next pages is on the Resources html page of the class website. The Multiburst image (also on the web page is on the same web page. The Multiburst waveform can be simulated using:

```
for i=1:row
    th=1;
    th_mult=1;
    for j=1:cols
        testing(i,j)=sin(th*th_mult^2)+1;
        th_mult=th_mult+inc*multix;
    end
end
```

where row is the number of rows in the image, cols is the number of columns and multix is a frequency multiplier (I use 3 for 512x512).

**Inc is computed from:**  
 $inc=(2*\pi/(rows-1));$

**Generate a multiburst image (use 512x512) and compute and plot the FFT of a row from the image. Also compute and plot the 2D fft of the entire image.**

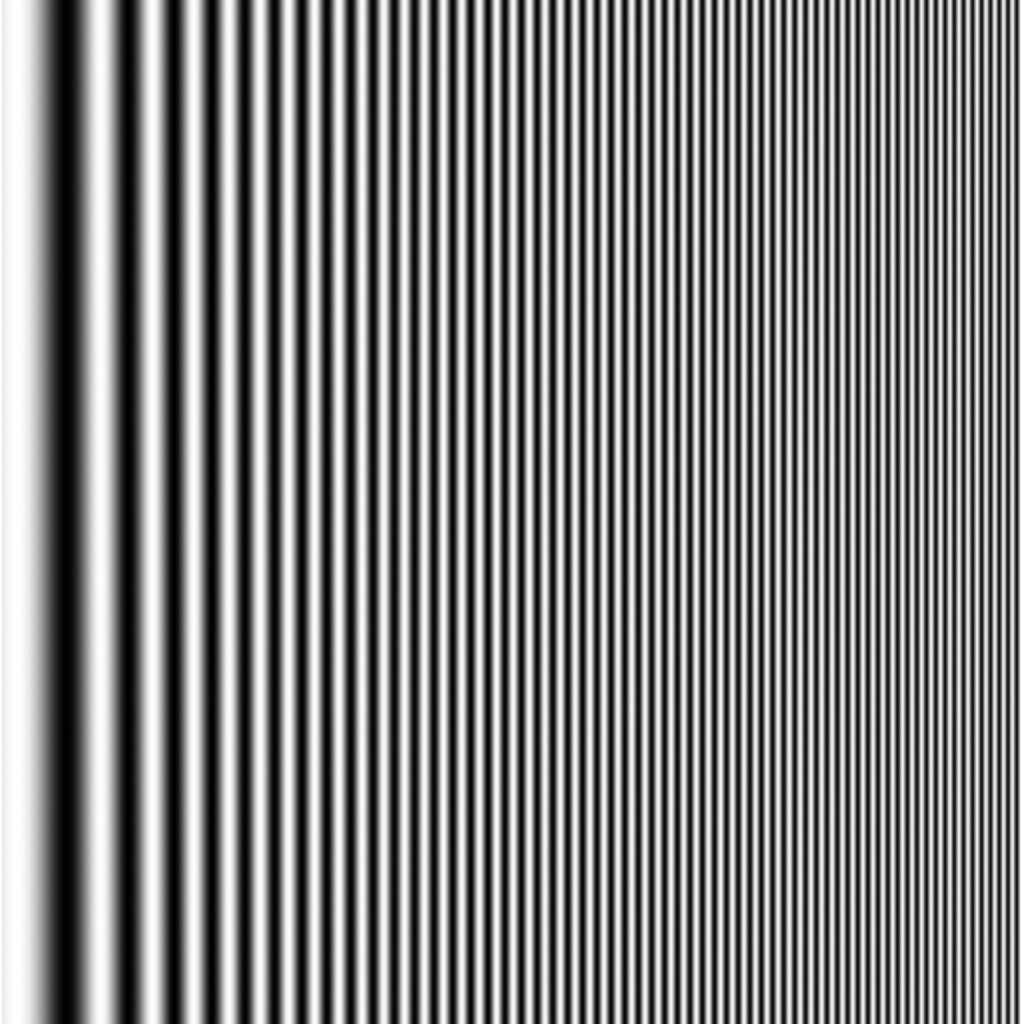
It may be easier to display by subtracting the mean of the row and mean of the image. Note, this image will be used in a later homework assignment, so save the image as a 16 bit, PNG file.

Hint: use `imwrite(uint16(img/max(max(img))), 'filename.png', 'png');`

Load the SMPTE Bars image into MATLAB from the YUV data file. Load the SMPTE Bars image into MATLAB from the RGB data file, and then perform a MSE error comparison of the two files by converting the YUV file to RGB. Do not round the RGB values to 8 bits in your conversion.



Figure 1 – SMPTE Bars Image (From <http://www.barney-wol.net/testpatterns/testpatterns.html>)



**Figure 2 – Multiburst Test Pattern**