

Department of Computer Science
University of Bristol

COMS30121 - Image Processing and Computer Vision

www.cs.bris.ac.uk/Teaching/Resources/COMS30121



Seminar Week 03

Frequency Domain

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Challenge: Interpretation of the Power Spectrum

You are given a number of image pairs that show the same content in the spatial domain and the frequency domain. Discuss these pairs and find the relationships between the characteristics of the image and its frequency representation. Comment specifically on how the following spatial elements and properties are represented in the power spectrum:

- a) Ideal sine waves in the image, their spatial frequency and their orientation
- b) line structures, edges and their orientation
- c) shift of elements
- d) rotation of elements
- e) location of elements
- f) scaling of elements
- g) contrast
- h) effects of low pass
- i) effects of high pass
- j) power randomization

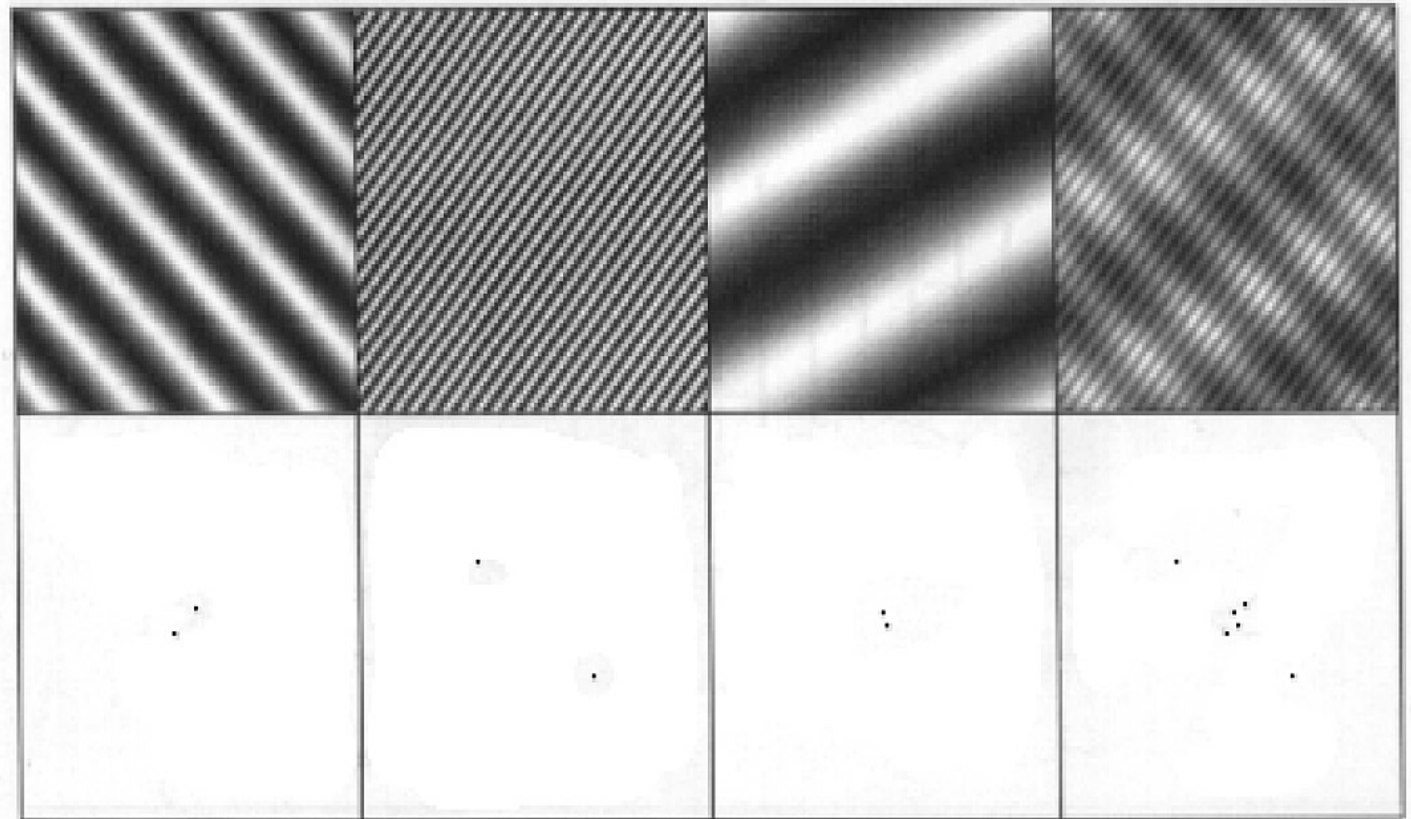


Image Pairs 1,2,3 and 4

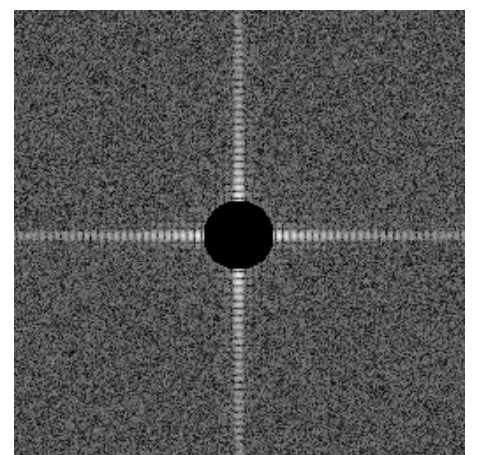
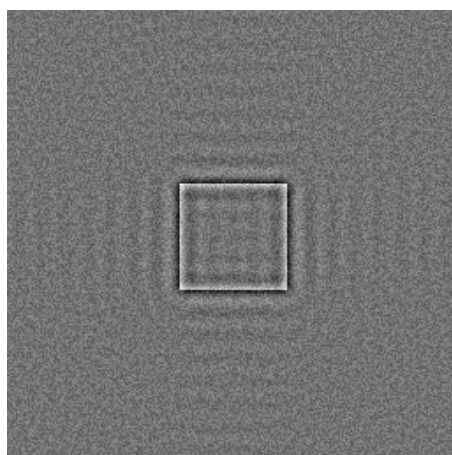
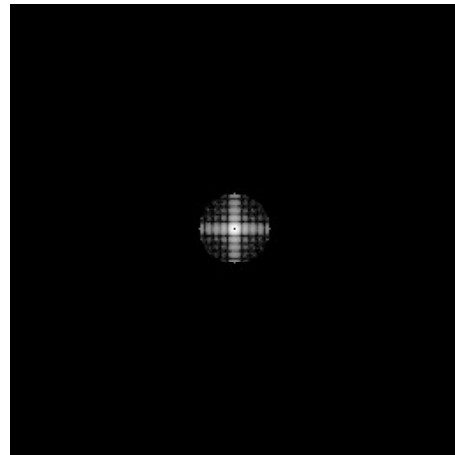
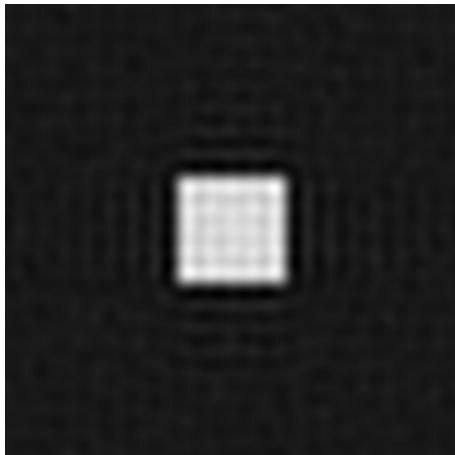
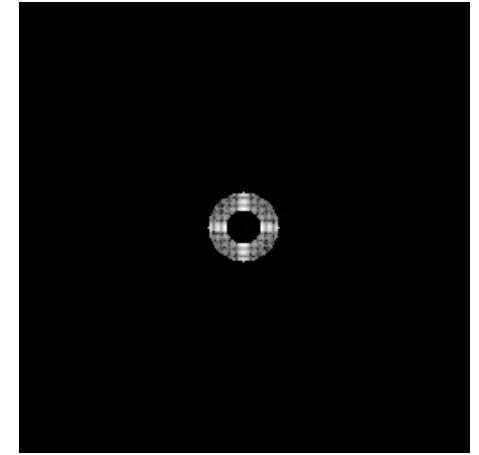
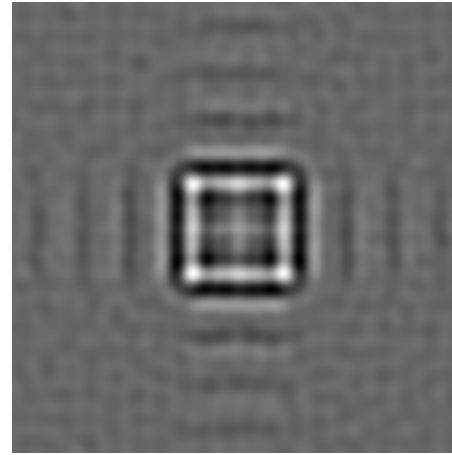
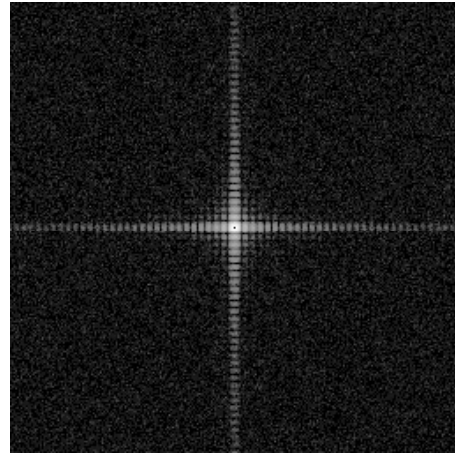
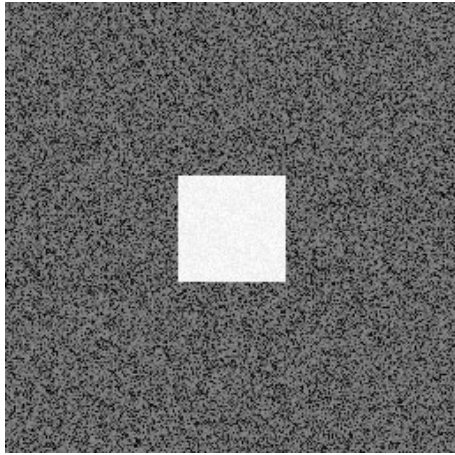
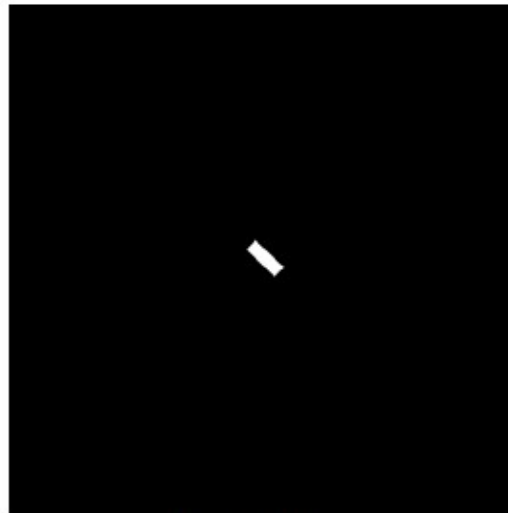


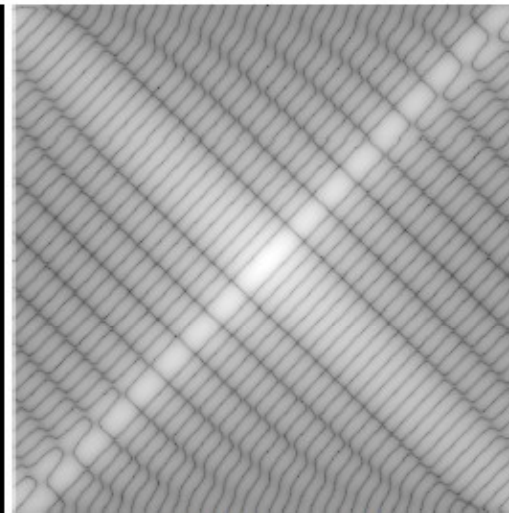
Image Pairs 5 and 6

Image Pairs 7 and 8

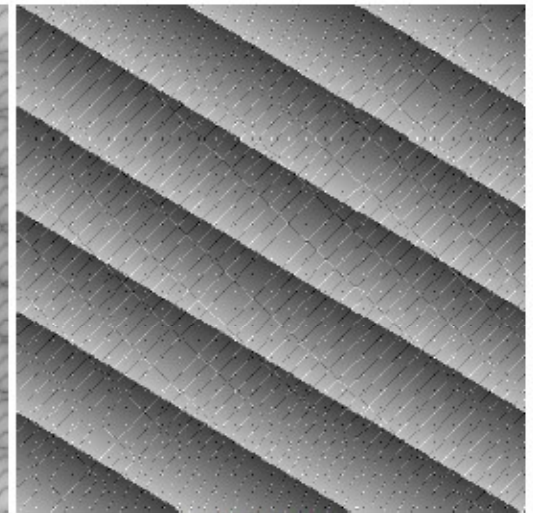
Image Group 9



(a) Rectangle Image

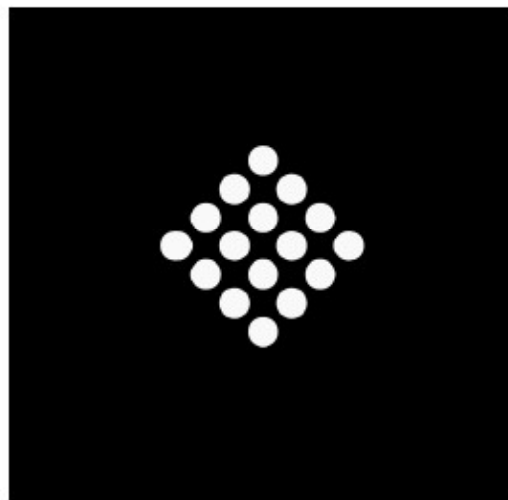


(b) FFT magnitude

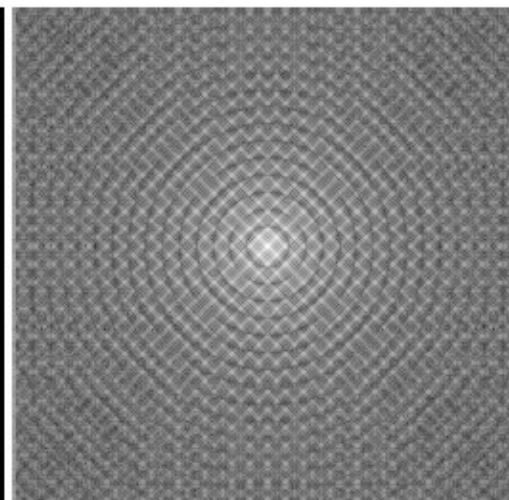


(c) FFT Phase

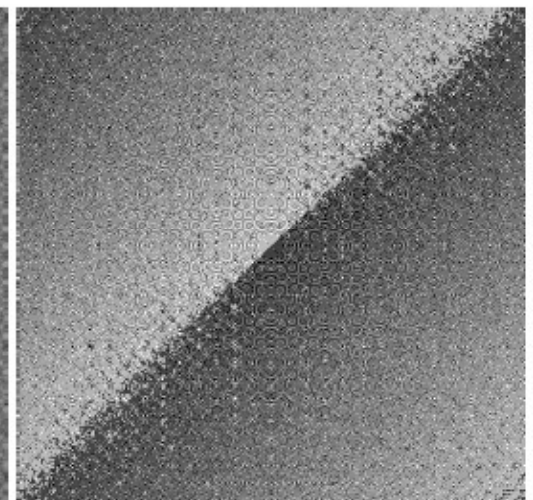
Image Group 10



(a) Dots Image



(b) FFT magnitude

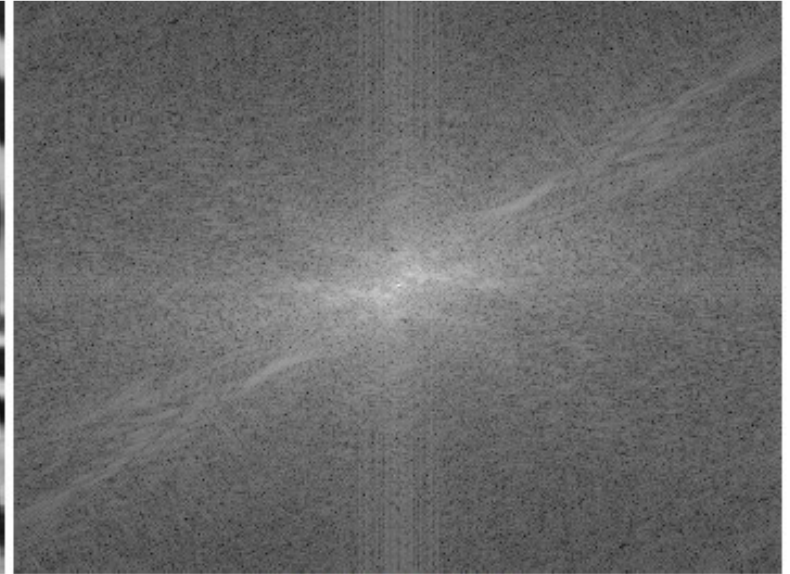


(c) FFT Phase

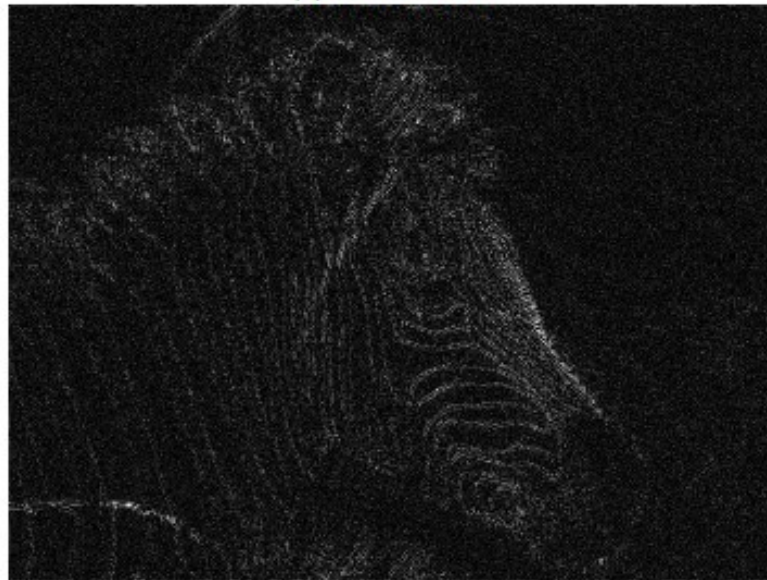
Image Group 11



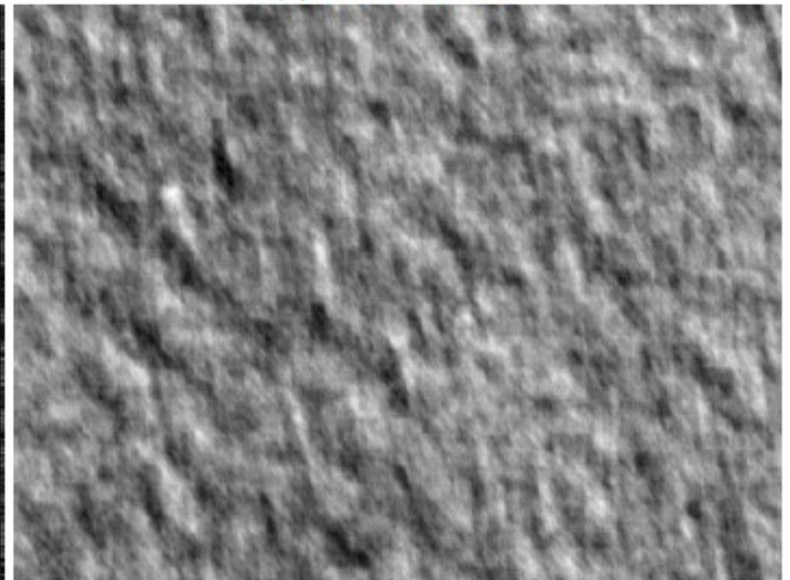
(a) Zebra Image



(b) FFT magnitude



(c) FFT with power component randomised

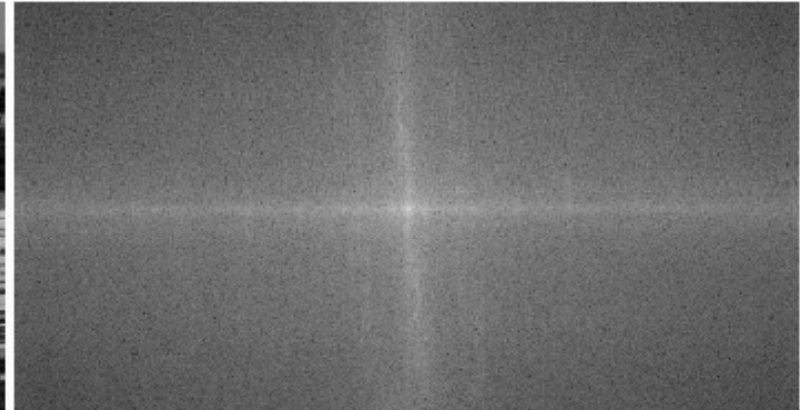


(d) FFT with phase component randomised

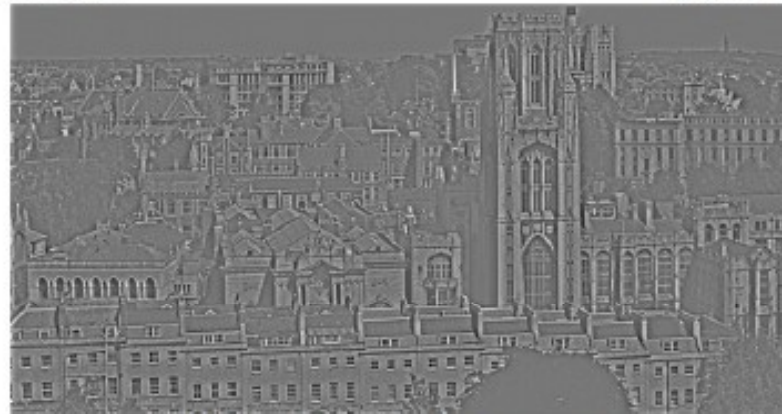
Image Group 12



(a) Bristol Image



(b) FFT magnitude

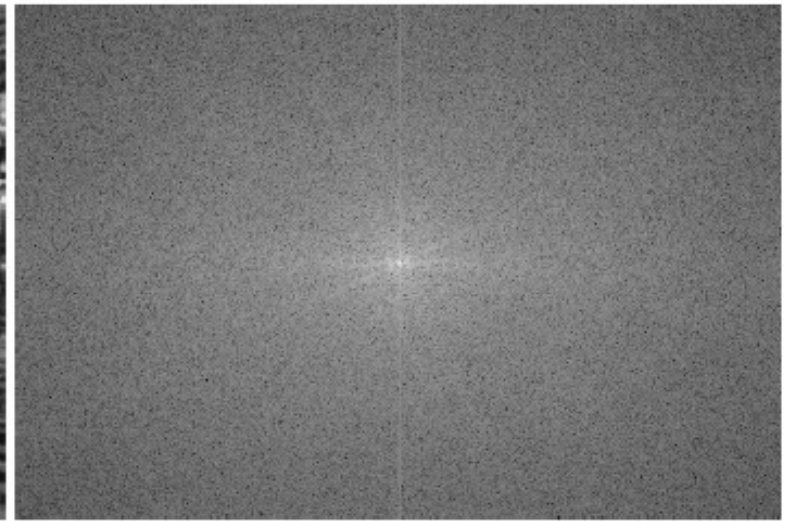


(c) Bristol image after high pass filter

Image Group 13



(a) Natural Image



(b) FFT magnitude



(c) Natural image after low pass filter