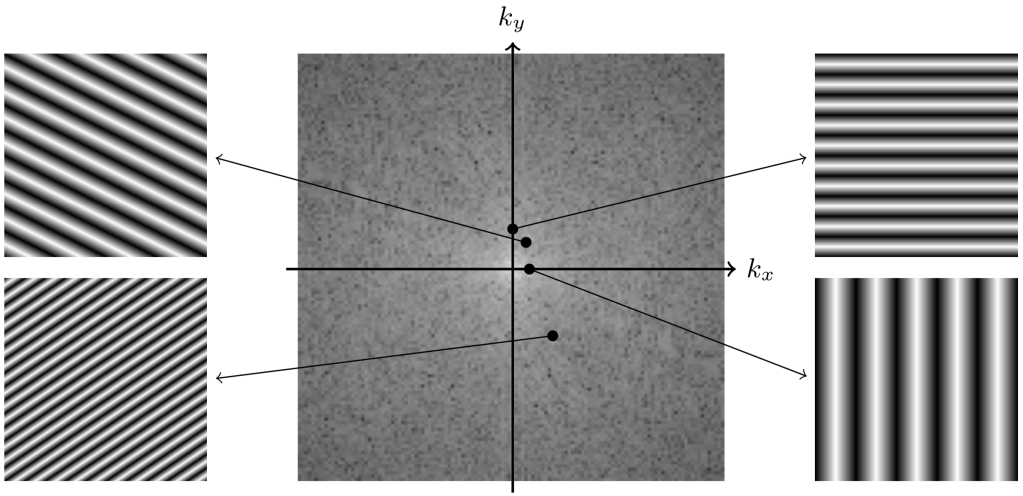
Department of Computer Science
University of Bristol

COMS30030 - Image Processing and Computer Vision



Problem Discussion - Week 02

Frequency Domain

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) scaling of elements
f) contrast
g) effects of low pass
h) effects of high pass
i) Power randomization

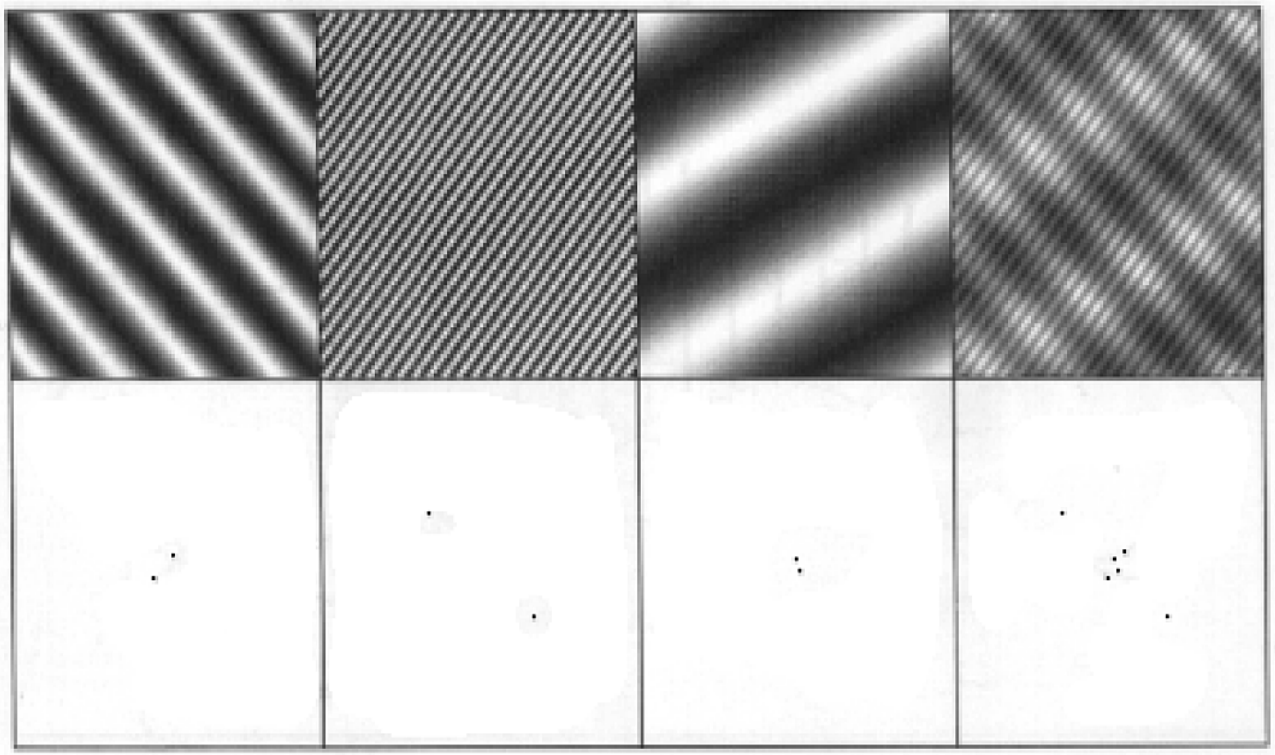
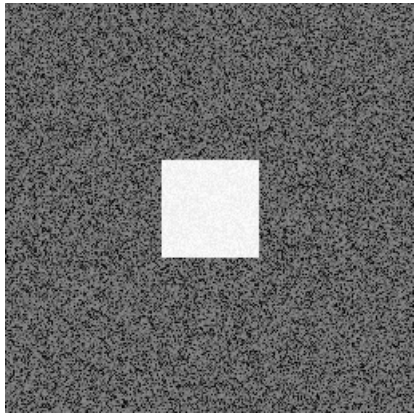


Image Pairs 1,2,3 and 4

Image Pair 5



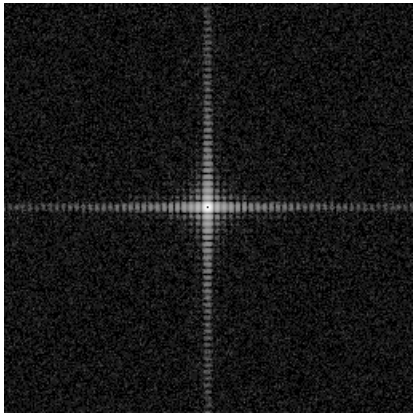
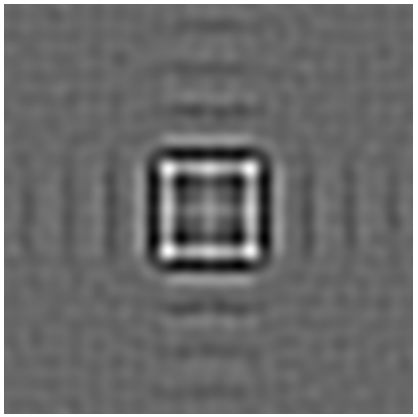
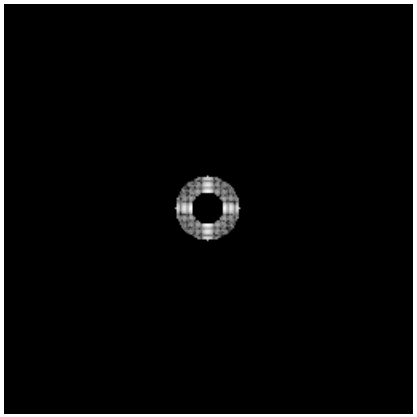


Image Pair 7





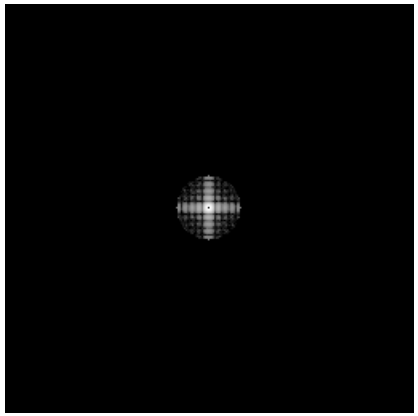
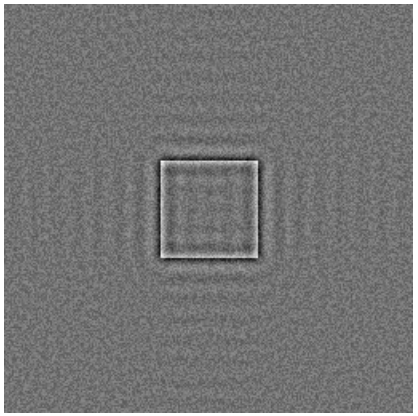


Image Pair 6



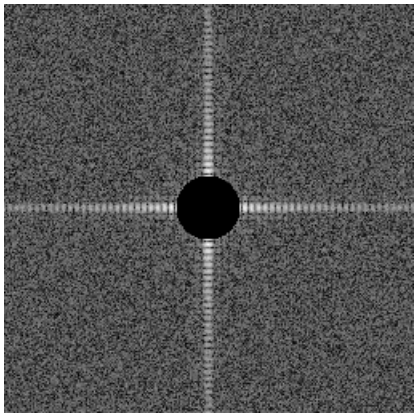
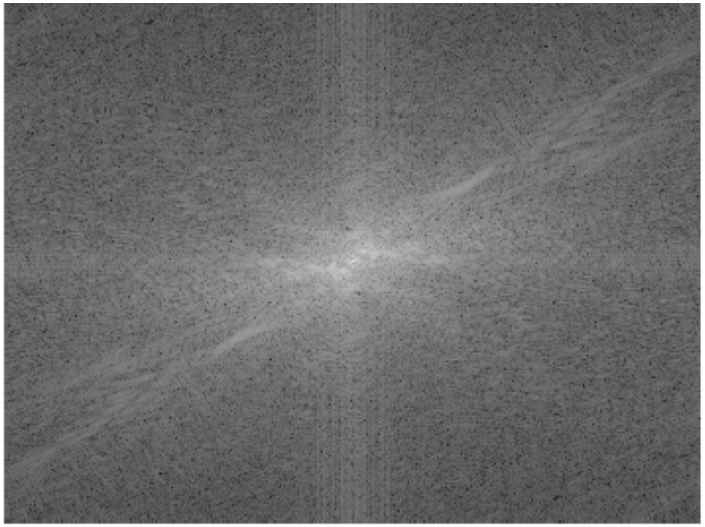


Image Pair 8

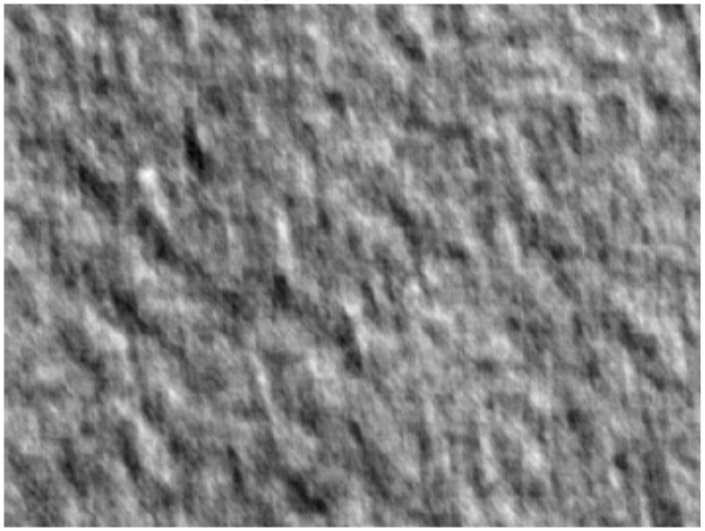
Image Group 9

(a) Zebra Image



(b) FFT magnitude

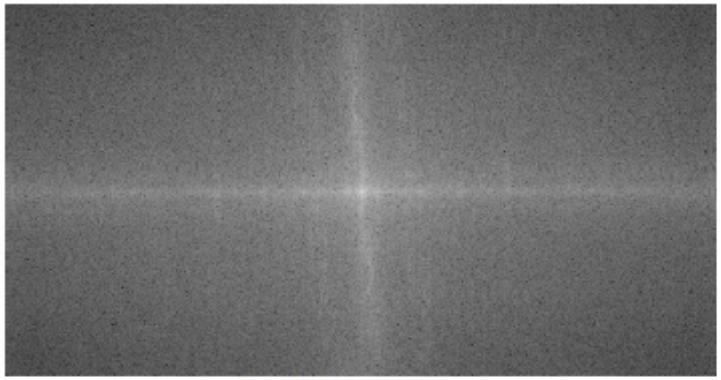
(c) FFT with power component randomised



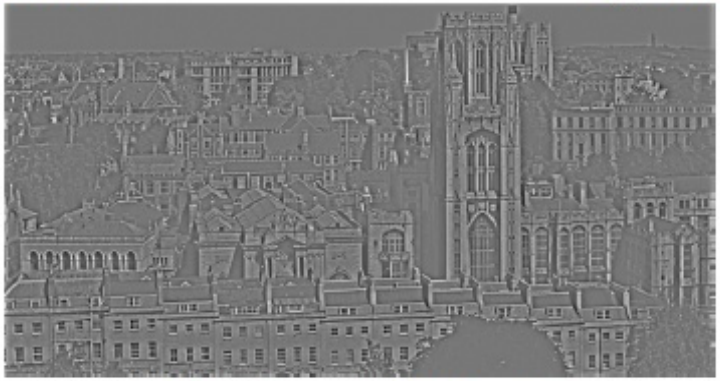
(d) FFT with phase component randomised

Image Group 10

(a) Bristol Image



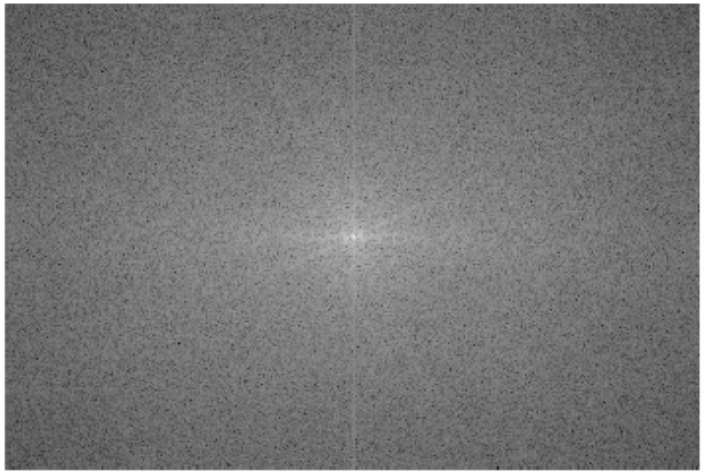
(b) FFT magnitude



(c) Bristol image after high pass filter

Image Group 11

(a) Natural Image



(b) FFT magnitude

(c) Natural image after low pass filter