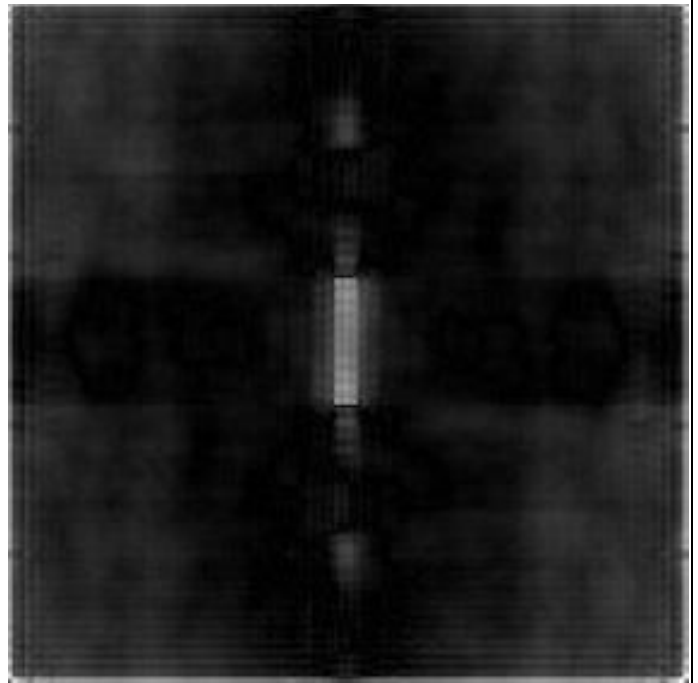


1. Verify Figure 4.27:



e. Reconstruction using the phase angle corresponding to the woman and the spectrum corresponding to the rectangle in Fig.4.24(a)



f. Reconstruction using the phase of the rectangle and the spectrum of woman

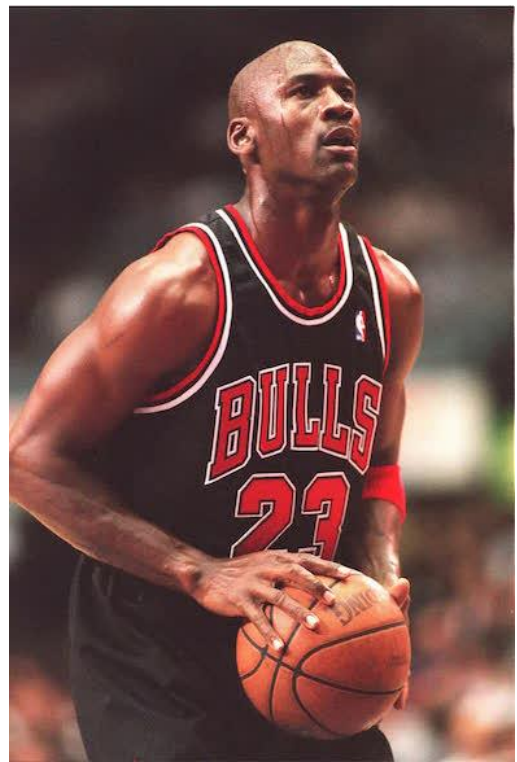
2. Repeat 1 with your choice of images:

先將兩張原圖轉為灰階，利用 `np.fft.fft2( )` function 對 image 1 和 image 2 做二維傅立葉轉換，並利用 `np.fft.fftshift( )`，調整中心位置，再分別將各別的的頻譜和相位分別取出，存在變數 `f1_A` , `f1_P` 和 `f2_A`, `f2_P` 中。分別取 `img1` 的頻譜(`f1_A`)和 `img2` 的相位(`f2_P`)利用二維傅立葉逆轉換形成 Pic 5，再取 `img1` 的相位(`f1_P`)和 `img2` 的頻譜(`f2_A`) 利用二維傅立葉逆轉換形成 Pic 6。可以發現所屬的相位，會影響最後的成像，而頻譜的加入會有 `noise` 的效果。

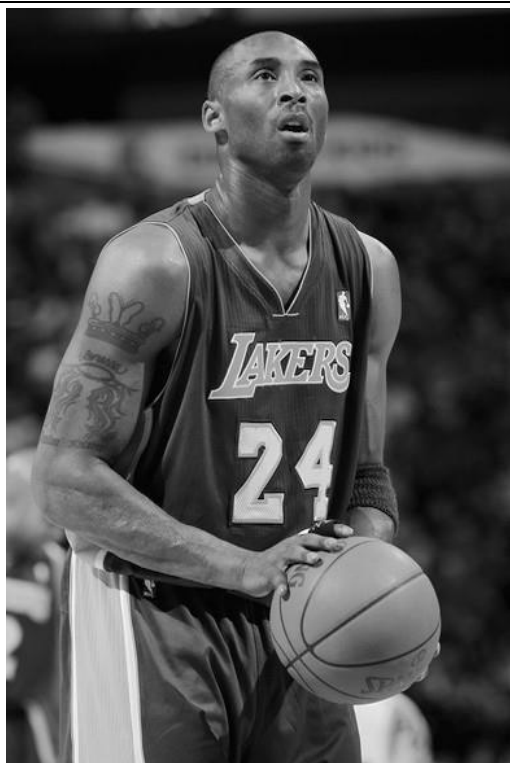
(1)



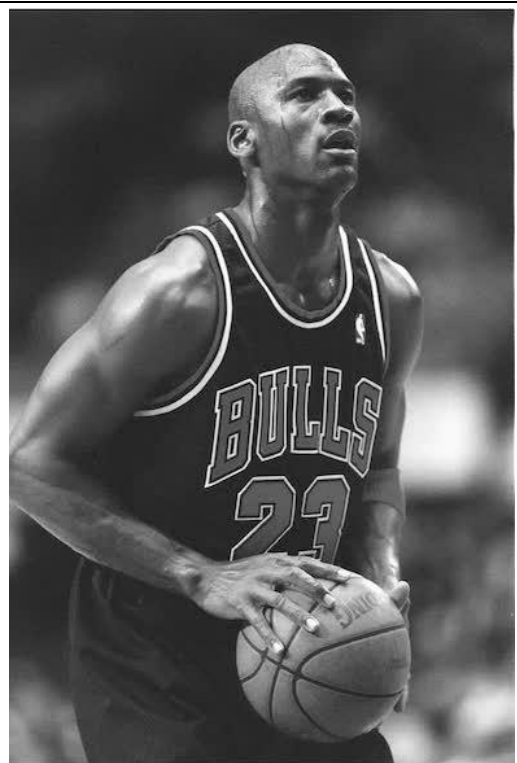
Pic1. Image 1



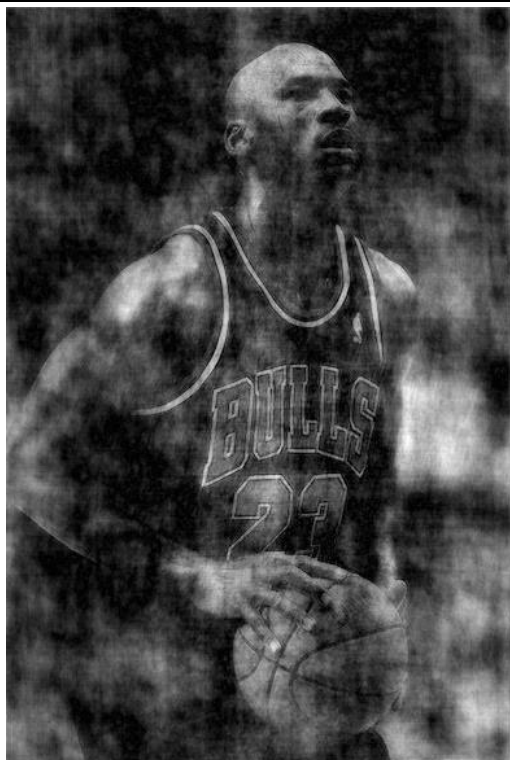
Pic2. Image 2



Pic3. Image 1 in grayscale



Pic4. Image 2 in grayscale



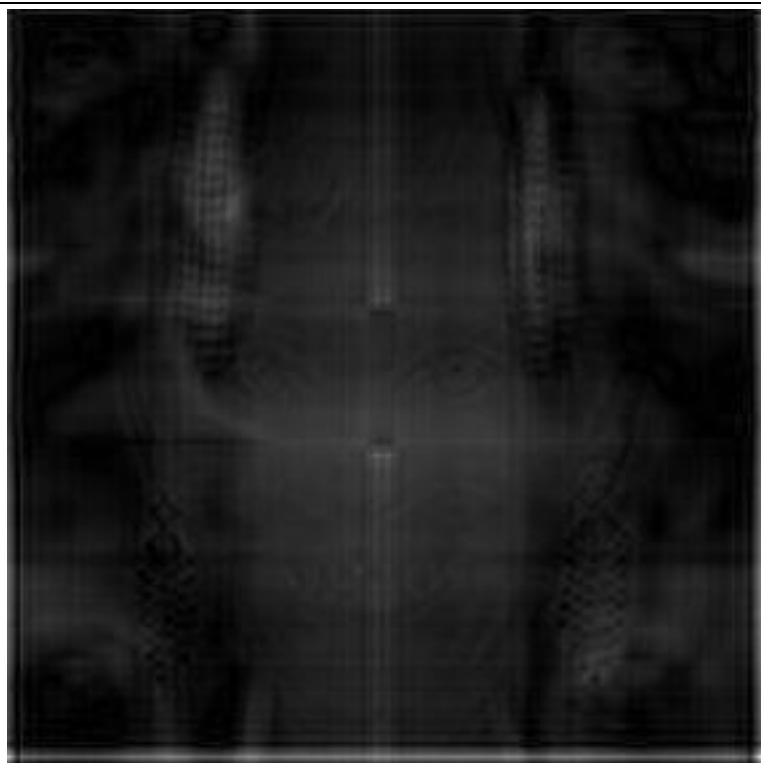
Pic5. Reconstruction using spectrum corresponding to image 1 and using phase angle corresponding image 2



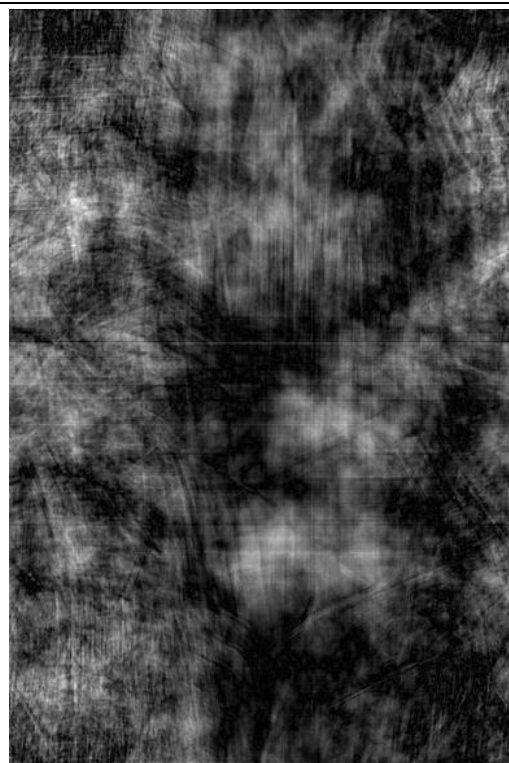
Pic6. Reconstruction using phase angle corresponding to image 1 and using spectrum corresponding image 2

(2) 嘗試將兩張 `img` 的相位相加和兩張 `img` 的頻譜相加，再逆轉換回照片。

左圖 Pic7 還依稀看得出女人的眼睛和牙齒以及中間的矩陣形狀，但右圖 Pic8 就看不出原本照片的輪廓了。



Pic7. Reconstruction using phase corresponding to the Woman plus phase corresponding to the 4.24(a) and spectrum corresponding to the Woman plus spectrum corresponding to the 4.24(a)



Pic8. Reconstruction using phase corresponding to `img1` plus phase corresponding to `img2` and spectrum corresponding to `img1` plus spectrum corresponding to `img2`