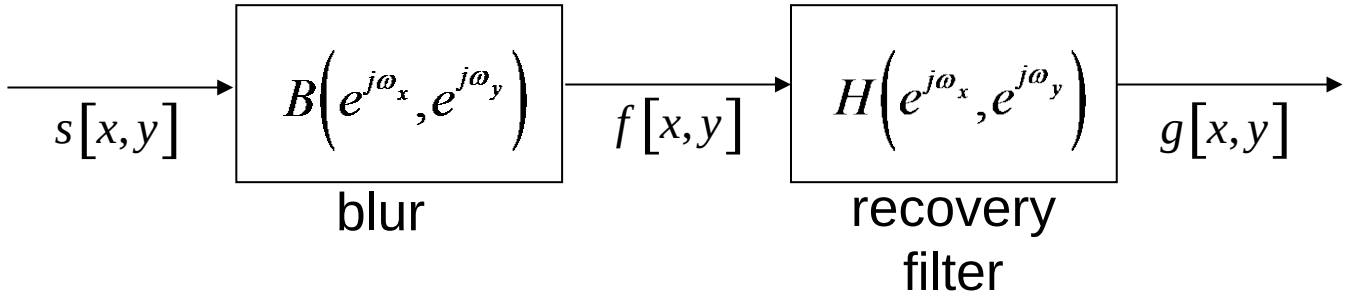
Image deconvolution

- Given an image $f[x,y]$ that is a blurred version of original image $s[x,y]$, recover the original image.
- Assume linear shift-invariant blur, transfer function $B\left(e^{j\omega_x}, e^{j\omega_y}\right)$



- Naive solution: inverse filter

$$H\left(e^{j\omega_x}, e^{j\omega_y}\right) = \frac{1}{B\left(e^{j\omega_x}, e^{j\omega_y}\right)}$$

- Problem: $B\left(e^{j\omega_x}, e^{j\omega_y}\right)$ might be zero, noise amplification

Naïve deconvolution

Original

Blurred w/ $B\left(e^{j\omega_x}, e^{j\omega_y}\right)$

Deblurred w/ $B^{-1}\left(e^{j\omega_x}, e^{j\omega_y}\right)$

+ white noise $rms = 2.5$