

## CS663 Assignment-4 Question-2

KOTWAL ALANKAR SHASHIKANT

October 20, 2014

We have the following relations:

$$g_1 = f_1 + f_2 * h_2$$

$$g_2 = f_1 * h_1 + f_2$$

In the Fourier domain this means

$$G_1 = F_1 + F_2 H_2$$

$$G_2 = F_1 H_1 + F_2$$

Solving these equations simultaneously for  $F_1$  and  $F_2$  yields:

$$F_1 = \frac{H_2 G_2 - G_1}{H_1 H_2 - 1}, F_2 = \frac{H_1 G_1 - G_2}{H_1 H_2 - 1}$$

and

$$f_1 = \mathcal{F}^{-1}(F_1), f_2 = \mathcal{F}^{-1}(F_2)$$

These inverse filters will blow up wherever  $H_1 H_2$  is close to 1. This is one problem with this technique for reflection removal.

Now the problem here is that the actual images we have will be

$$g_1 = f_1 + f_2 * h_2 + n_1$$

$$g_2 = f_1 * h_1 + f_2 + n_2$$

where the added terms are additive noise. Each image has a different, and independent, noise image and hence it is impossible to estimate both  $n_1$  and  $n_2$  given just these two images.