

20. Given $g = h * f$; G, F have given.

$$\Rightarrow G = HF ;$$

$$\text{if } H \neq 0 \quad F = \frac{G}{H} \Rightarrow f = F^{-1}\left(\frac{G}{H}\right)$$

now as h is a gradient ; H will be a low pass filter,
hence some of the higher frequencies of H will
be low ~~power~~, causing F to blow up.

21.

Now for 2D;

$$g_x = h_x * f \quad \text{and} \quad g_y = h_y * f$$

$$\Rightarrow G_x = H_x \cdot F \quad ; \quad G_y = H_y \cdot F$$

$$\text{if } H_x \text{ and } H_y \neq 0 \Rightarrow G_x = \frac{F}{H_x} \quad ; \quad G_y = \frac{F}{H_y}$$

$$\Rightarrow g_x = F^{-1}\left(\frac{F}{H_x}\right) \quad \text{and} \quad g_y = F^{-1}\left(\frac{F}{H_y}\right)$$

Here also we face the same problem as h_x and h_y
are gradient convolutions.