Which of the following space-domain images can be constructed by filtering one of the other images by the DFT of another of them?
Filtering Images

Filter model:

\[\text{input image} \rightarrow \text{filter} \rightarrow \text{output image}\]

Space-domain interpretation:

\[x[r, c] \rightarrow h[r, c] \rightarrow y[r, c] = (x \odot h)[r, c]\]

Frequency-domain interpretation:

\[X[k_r, k_c] \rightarrow H[k_r, k_c] \rightarrow Y[k_r, k_c] = X[k_r, k_c]H[k_r, k_c]\]

We should be able to understand the previous problem both ways.
Filtering Images

Which of the following images can be constructed by

- circularly convolving two of the other images
- inverse transforming the product of the DFTs of two images
Filtering Images

Try the transform method.
Filtering Images

Try the transform method.
2-D Patterns

Match each 2-D signal below (each 32\times32 pixels) with its DFT magnitudes. In each image, black represents 0 and white represents the most positive value in that panel (not necessarily 1).

\[ f_0[r, c] \quad f_1[r, c] \quad f_2[r, c] \quad f_3[r, c] \]

\[
\begin{align*}
|F_0[k_r, k_c]| & = \quad |F_1[k_r, k_c]| & = \quad |F_2[k_r, k_c]| & = \quad |F_3[k_r, k_c]| = \\
|F_4[k_r, k_c]| & = \quad |F_5[k_r, k_c]| & = \quad |F_6[k_r, k_c]| & = \quad |F_7[k_r, k_c]| =
\end{align*}
\]
2-D Patterns

DFT Magnitude Graphs: