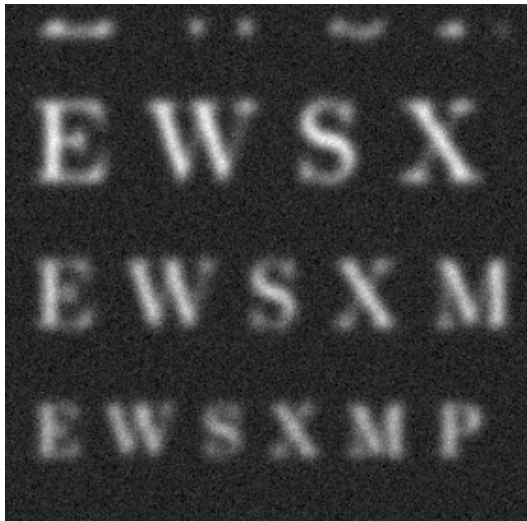




Example 10-7: Deconvolution using Wiener Filter.

Purpose: To study why deconvolution by simply dividing by the DFT of the PSF doesn't work with any noise added to the blurred image. Instead, the Wiener filter must be used. The Wiener filter minimizes the Tikhonov criterion and produces an acceptable reconstruction.'

Inputs: Tikhonov tradeoff parameter, PSF size.

Outputs: Blurred image, Tikhonov regularization, Divided by DFT of PSF (Tikhonov regularization of zero)

Program:

```
clear;load letters.mat;
H=exp(-[-10:10].*[-10:10]/20);
FH=fft2(H',280,280);
FX=fft2(X,280,280);FY=FH.*FX;
Y=real(ifft2(FY));
Y=Y+500*randn(280,280);
```



```
    figure,imagesc(Y),colormap(gray),axis
off
    FY=fft2(Y);Z=real(ifft2(FY./FH));
    figure,imagesc(Z),colormap(gray),axis
off
    FW=conj(FH)./(abs(FH).*abs(FH)+5);
    W=real(ifft2(FY.*FW));
    figure,imagesc(W),colormap(gray),axis
off
```