

**ALGORITHMS FOR IMAGING SPECTROSCOPY
HOMEWORK 4, SPRING 2017**

DUE DATE: MONDAY, FEB 13.

Name: _____

- (1) Write a MATLAB function `[Y, Cn] = MyMNF(X, NumComps, NoiseMask)` that calculates and returns the Minimum Noise Fraction transform of \mathbf{X} in the variable \mathbf{Y} . The size of \mathbf{X} should be $N_r \times N_c \times B$ and the size of \mathbf{Y} should be $N_r \times N_c \times NumComps$. The function should also return the noise covariance. The input variable `NoiseMask` should be the convolution mask used to estimate the noise. Alternatively, you can pass in a pointer to a function as the third argument.
 - (a) Run your function on the fake images discussed in class. A script will be given to generate them. Define one or more quantities for that can be used to measure the error in the true noise covariance and the estimated noise covariance. Make observations on how the error changes as a function of the size of the eigenvalues of true noise covariance.
 - (b) Run your function on the MUFLAG image and subjectively evaluate how well the noise can be removed, particularly at the ends of the spectra. Compare the MNF to the PCA when reducing to 3 dimensions.