ECE/OPTI 531
LAB5 Spatial Transforms II

Report due: 10/27/05 (beginning of class)

Purpose: Learn about Fourier transforms and the spatial frequency coordinate system

Comments: Note, these images have a zero-byte header

Maximum number of report text pages (excluding graphs, pictures): 3

Images	header (B)	bands	lines	pixels	bits/pixel/band	format
noiseless	0	1	256	256	8	BSQ
noisy	0	1	256	256	8	BSQ

Plan:

• For both images, explain how major features in the image power spectrum frequency space are related to features in the image space, and relate their frequency coordinates and angles in frequency space to the size and angles of the corresponding features in the image space. In other words, *make measurements on the power spectrum and on the image, and relate the two sets of measurements to each other*.

• Design a noise removal filter with the aid of the power spectrum (see p302-307 in Chapter 7) and apply it to the noisy image. Compare to the noiseless image in a *quantitative* way. DO NOT use the noiseless image to design the noise filter - that would be cheating! You can use a manual design approach, or the semi-automated approach described in the text.

• Using the 3x3 Gaussian spatial window filter in Eq. 6-27, implement the procedure of Fig. 6-22 using individual steps in tclSADIE (NOT Filter/FFT Convolution) to apply it to "noiseless." Clearly document each step, linked to your tclSADIE session log. Compare the Fourier-filtered version to a convolution-filtered version using the 3x3 window in Eq. 6-27 and discuss/explain any differences. NOTE, do the complex multiplication in Fig. 6-22 correctly!