

ECE/OPTI 533 Digital Image Processing
Homework 7
Due in-class April 15, 2003

Spring Semester, 2003

1. The PCT is applied to a multispectral image \mathbf{DN}_{mn} and to the zero-mean version of the image, $\mathbf{DN}'_{mn} = \mathbf{DN}_{mn} - \boldsymbol{\mu}$. Show that \mathbf{W}_{PC} is the same for the two cases. (20%)

- 2.a. Find the spectral eigenvectors of a 2-band multispectral image in terms of the elements of its spectral covariance matrix \mathbf{C} . (30%)
- 2.b. Find the angles between each eigenvector and the original data axes for your answer to Prob2.a. (10%)

3. Prove that $\mathbf{C}_{PC} = \mathbf{W}_{PC} \mathbf{C} \mathbf{W}_{PC}^T$ and that \mathbf{C}_{PC} is diagonal. (40%)