

THE UNIVERSITY OF TEXAS AT AUSTIN
Dept. of Electrical and Computer Engineering

EE381K-14 Multidimensional Digital Signal Processing

Problem Set #7: Space-Time Signals, Beamforming, and Reconstruction from Projections

Date assigned: April 10, 2008

Date due: April 17, 2008

Reading: D&M, Sections 6.1–6.3 and 7.2–7.3

You may use any computer program to help you solve these problems, check answers, etc.

Homework is due on Thursday, April 17th, by 11:00 AM in class.

Regularly scheduled office hours for Prof. Evans are Wednesdays 10–11 AM, Thursdays 12:30–1:30 PM, and Fridays 9:00–10:00 AM in ENS 433B. Feel free to send questions by e-mail to bevans@ece.utexas.edu.

Be sure to submit your own independent homework solutions.

Problem 7.1 Wavelength

Dudgeon & Mersereau, problem 6.2.

Problem 7.2 Array Patterns

Dudgeon & Mersereau, problem 6.4.

In addition, please complete the following part:

- (c) Plot each array pattern for a particular choice of the slowness vector.

Note that the cube of sensors in arrangement III has 27 sensors.

Problem 7.3 Discrete-Time Delay-And-Sum Beamformer

Dudgeon & Mersereau, problem 6.12.

Problem 7.4 Projections

Dudgeon & Mersereau, problem 7.12

Problem 7.5 Rotation Operator

Dudgeon & Mersereau, problem 7.13