

## MATH 2360-D01 WEEK 14

SECTIONS 5.4; PAGES 259–270

ABSTRACT. The problem of finding the straight line that best fits a number  $n > 2$  of sample points has a simple solution. The sample points yield  $n$  equations in 2 variables, and this system will, in general, be inconsistent. However, thinking of it as a matrix equation  $AX = B$  and using the notion of distance in  $\mathbb{R}^n$ , we can still look for the  $X$  that minimizes the distance  $\|AX - B\|$ .

### SECTION 5.4

**Reading.** Make sure that you understand the following:

- (1) What orthogonal complements and direct sums of vector spaces are.
- (2) How to project a vector in a space  $V$  onto a subspace  $W$  of  $V$ .
- (3) The four fundamental subspaces associated to a matrix.
- (4) How to set up a least squares problem and solve it.

**Suggested problems.** To verify that you have understood the material, solve the following problems at the end of the section: 5, 11, 17, 23, and 25.