

**Homework Set 4, Due Thursday, Feb. 10, 2005***(Late papers will be accepted until 4 PM on Fri., Feb. 11)*

All but the last of these problems are from our text by Strang (3rd edition).

1. Strang, p. 92-93, #7, #9, #13
2. Strang, p. 93 #15
3. Strang p. 94 #19-20 [tridiagonal matrices]
4. Strang p. 95 #29, 32, 33, 34 [MATLAB]
5. Strang p. 119 #10, 11, 12
6. Strang p. 120 #22, p. 121 #24, #29
7. Strang p. 133 #24, 25
8. Strang p. 143 #18, #20
9. Strang p. 153 #10, 12
10. Strang p. 154 #16, 17, 20, 22, 24, 25
11. Strang p. 171 #34, 36
12. Strang p. 172 #41
13. [from *Numerical Computing with MATLAB* by C. Moler; see Sections 3.1 and 3.2 of <http://www.mathworks.com/moler/interp.pdf> and, for the M files, <http://www.mathworks.com/moler/ncmfilelist.html>].

Consider the data (from problem #3.3 in Moler):

|   |         |         |        |        |        |        |
|---|---------|---------|--------|--------|--------|--------|
| x | -1.00   | -0.96   | -0.65  | 0.10   | 0.40   | 1.00   |
| y | -1.0000 | -0.1512 | 0.3860 | 0.4802 | 0.8838 | 1.0000 |

- a) Use `piecelin` to find a piecewise linear polynomial that interpolates this data. Plot the results for  $-1 \leq x \leq 1$ .
- b) Use `polyinterp` to find a polynomial that interpolates this data. Plot the results for  $-1 \leq x \leq 1$ .
- c) Use `splinetx` to find a cubic spline polynomial that interpolates this data. Plot the results for  $-1 \leq x \leq 1$ .
- d) What values do these three methods give for  $x = -0.3$ ? Which do you prefer? Why?