Mathematical Models, Analysis and Simulation
Part I, Fall 2009

August 21, 2009

Homework 1, Strang Ch. 1. Max. score 3.0, Deadline Sun Sep. 6

1. **1.1:**1,2,27(p9-12);**1.2:**20*(p25);**1.3:**11**,15,16,17(p33);**1.6:**3,4,6,15(p73ff);

2. *
   The formula for summation by parts is

   $$s = f^T(Ag) = g^T(A^T f)$$

   Choose some suitable difference matrix A, explain the formula above and write out the formula in terms of f_i, g_i. Note especially the boundary terms (which don't appear in prob. 1.2.20).

3. **
   Look at p. 43 about the Sherman-Morrison formula, and use the technique (not the formula itself!) to i) prove definiteness of `ones(n)+a eye(n)` for any n and $a > 0$, and ii) to write the formula for the inverse.