

Mathematical Models, Analysis and Simulation

Part I, Fall 2008

August 29, 2008

Homework 1, Strang Ch. 1. Max. score 3.0

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 that to i) prove definiteness of $\text{ones}(n) + a \text{eye}(n)$ for any n and $a > 0$, and ii) to write the formula for the inverse.