

MATH 566 – Homework #1

due 11 September 2007

1) Consider the problem we discussed in class, namely that of solving

$$G\mathbf{y} = \mathbf{b}$$

for \mathbf{y} , where G is a given $n \times n$ lower triangular matrix and \mathbf{b} is a given n -vector.

Write a computer program in Matlab to solve this problem. As we discussed in class, the array containing the vector \mathbf{b} should be overwritten by the vector \mathbf{y} .

Your Matlab program should read the data from a file called `hw1.dat`. This data file must be organized in this order:

- the size n of the problem
- the non-zero entries of matrix G , one row at a time, starting with the top row
- all entries of vector \mathbf{b} , starting from the top

Your program must also efficiently handle the case where the first k entries of \mathbf{b} are all zero.

Email your computer code to me at stephenbrill@yahoo.com

2) Suppose we consider the same problem, but now where G is upper triangular. Describe (in prose and mathematics, not in a computer program) what changes should be made to your algorithm in this new setting. Does the case of leading zeros in \mathbf{b} make sense in this new setting? If yes, explain why. If no, what changes would you make to the statement of the problem so that it would make sense?