Due: Thursday February 24th 2005
Problems to be turned: 3

1. Read code of the `lupiv` function in the NMM toolbox and explain how you will use it to solve $Ax = b$.
2. Starting with the code `GEshow` in the NMM toolbox develop a `GErectangular` function that performs Gaussian elimination only for a $m \times n$ matrix. The function should return $\tilde{A}$, the triangularised coefficient matrix, and $\tilde{b}$ the corresponding right hand side vector.
3. Start with the `pumpcurve` code in the NMM toolbox. It is modelling the relationship between the pressure head h of the pump and q the flow rate. Add the following features:
   (a) Modify the `pumpcurve` function to accept q and h vectors of arbitrary length as input.
   (b) Consider q and h from the following table:

q(m^3/s)	0.0001	0.00025	0.0008	0.001	0.0014
h(m)	115	114.2	110	105.5	92.5

   Using all data points above except the fourth, use your function to find the cubic polynomial interpolant. Let c be the coefficents of the polynomial.
   (c) Replace the second point to 114 from 114.2. Do as in previous part to get $\tilde{c}$.
   (d) Compute
      i. the relative difference vector $d = \frac{\tilde{c}-c}{c}$ for all i. Plot h vs q,
      ii. largest difference in the value of h from 100 points between $\min(q)$ and $\max q$ in both the cases.
      iii. Plot h vs q in both the cases for the 100 points.
      iv. Discuss the practical significance on the pertubation of h values on the coefficient c and the values of h obtained by the interpolation function.