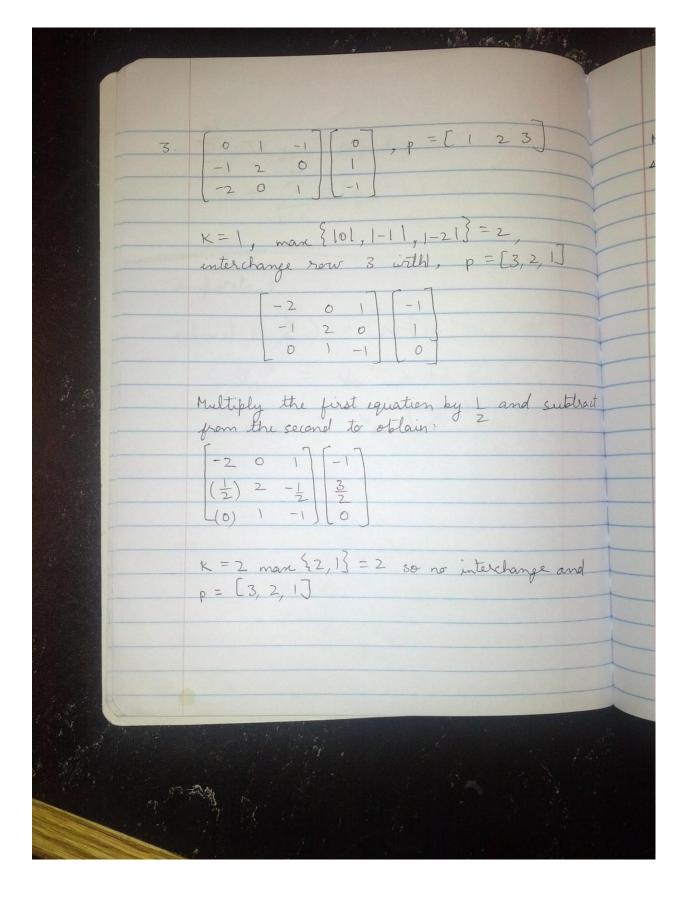
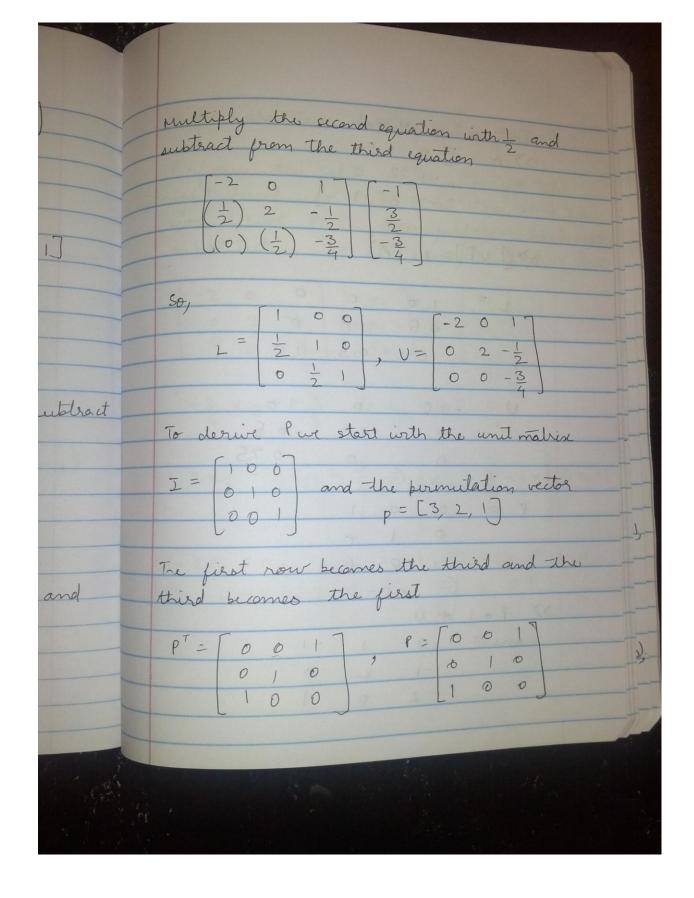
n = input ('n = 1); a = ones (n, n) + n \* eye (n, n); A = a; b = sum(a, 2)I = eye (n); for K=1:n-1 (K+1:n, K) = a(K+1:n, K)/a(K,K),for j = K: n for i = K+1:n a(i,j) = a(i,j) - a(i,K) \* a(K,j),end ind to ( V = a; L= I; Kjz 506 - 4.86 II) Kij 500 - 4.77 1000 - 38.87 1000 - 49.26 2000 - 317.08 2000 - 413.92 The program is cubic

iii) This has to do with how an allow 41) is stored in the memory, row was or columnwise In ease of Matlato the array is stored in a columnuse mannes because of which kis is better melhod

2i) function [1, U, P] = lup (A) n = size (A, 1); l = zeroes (n) for k=1:n-1 a(50) loc = a(1:n, x); if ("isempty (idx) loc (idx) = 0; ~ [] = mark ( abs (loc)); idse = [idse; I]; for i = 1:nif  $j = -K \perp k$  isempty (find (idx==), 1)  $J(i, K) = \alpha(i, K) / \alpha(\Xi, K);$ end
if isempty (find (idx = = 1, 1))  $\alpha(i, j) = \alpha(i, j) - I(i, k) * \alpha(i, j);$ end

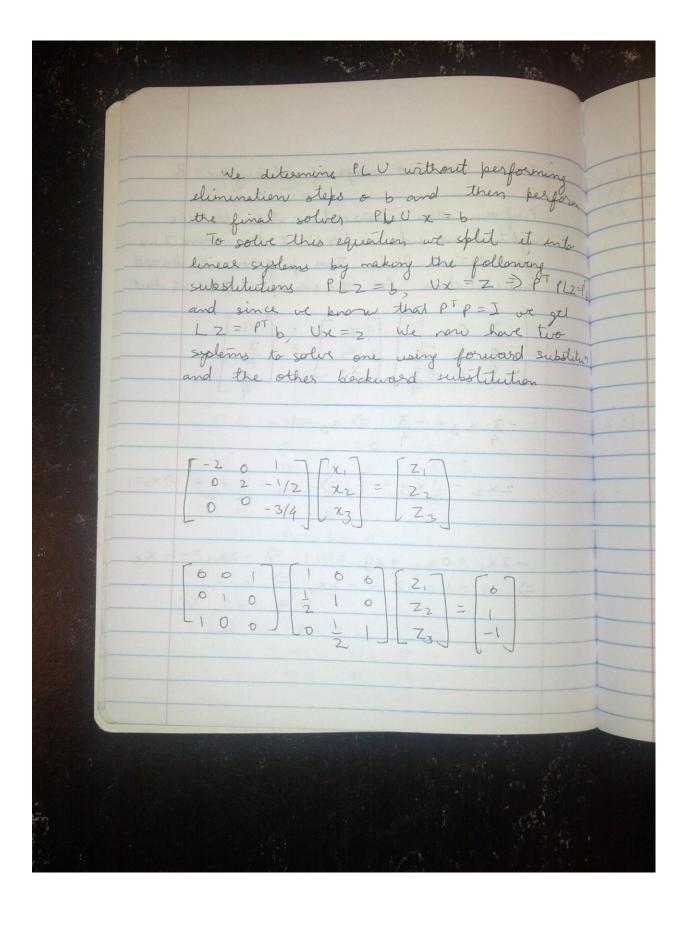
for its 2 = 1: n if isempty (find (idx = = trz 1))
ids = Cidx; trz]; L = I ( whx, : ) + eye (n); 2 ii ) Procedure described below - Factorize & A = Polu - Let Ux = Z, solve LZ = Pb by forward substitution. Then solve, Ux = 2 by backward substitution For large matrices the condition number, and (A) = 11A, 11 | A | becomes large Hence, the solution becomes progressively inaccurate

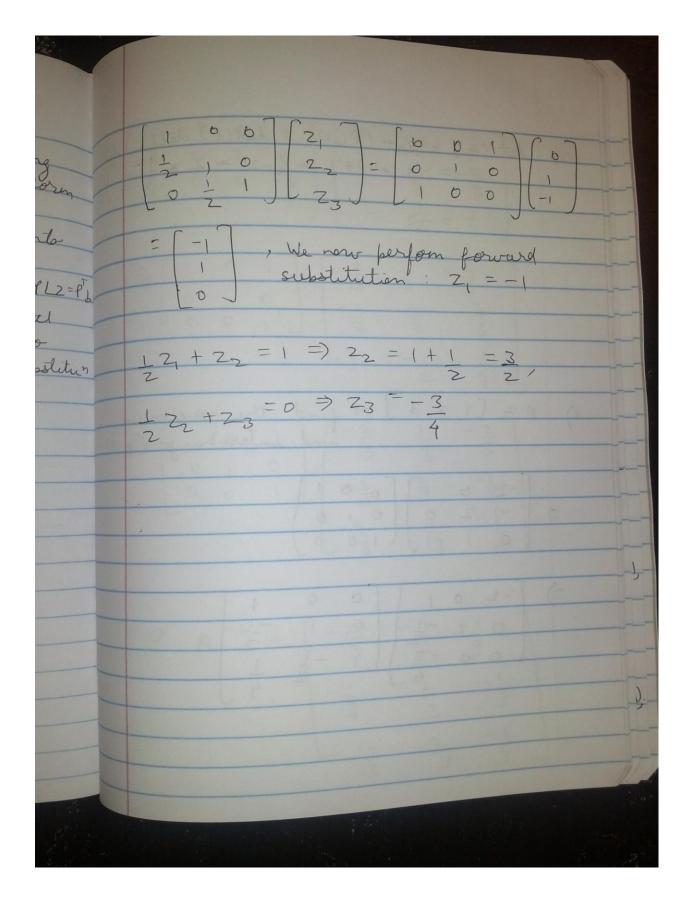




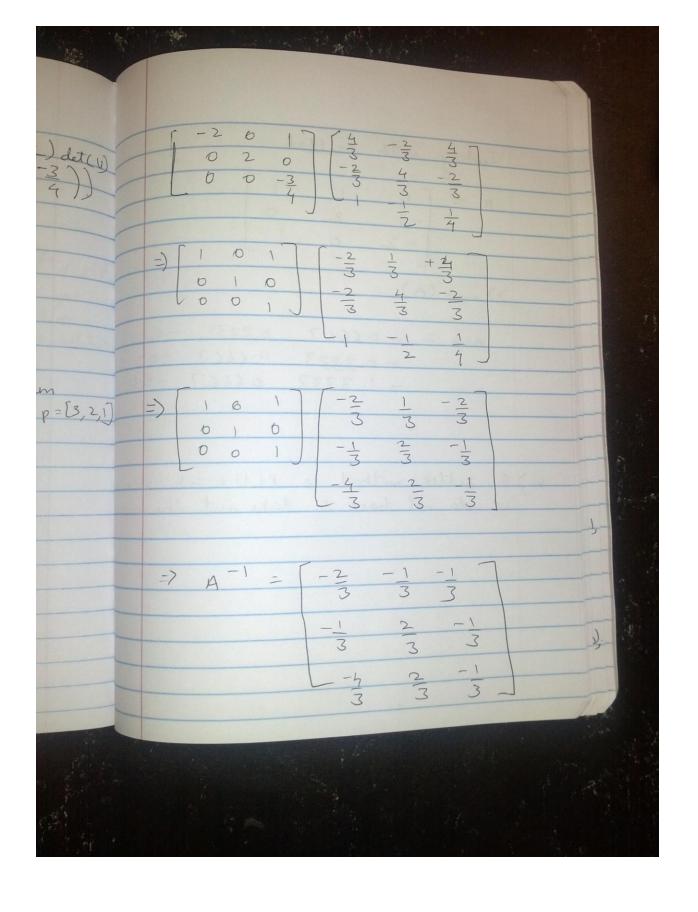
a Maria Maria Maria Test using Matlab: -120 -201 >> (LUPJ= lu (A) L= 1.0 0 0.5 1.0 0 U = -2.0 0 1.0 10 120 -0.8 0 0 -0.75 P = 0 0 1 010 10 6 >> |\* | \* | ans = 0 0 1 -1 2 0 1001-2010

M. C. Alex There are two ways of solving Ax= B Perform the elimination steps for the right hand side vectors be at the same time you derive PLU Then perform Backward substitution for the example above we have -3 x3 = -3 => x3 = 1  $2x_2 - \frac{1}{2}x_3 = \frac{3}{2} \Rightarrow 2x_2 = \frac{3}{2} + 1 \times 1 \Rightarrow x_2 = 1$  $-2x_1 + 0x_2 + x_3 = -1 = -2x_1 = -1 - x_3$ =  $-1 - 1 = -2 = -2x_1 = x_1 = 1$ 



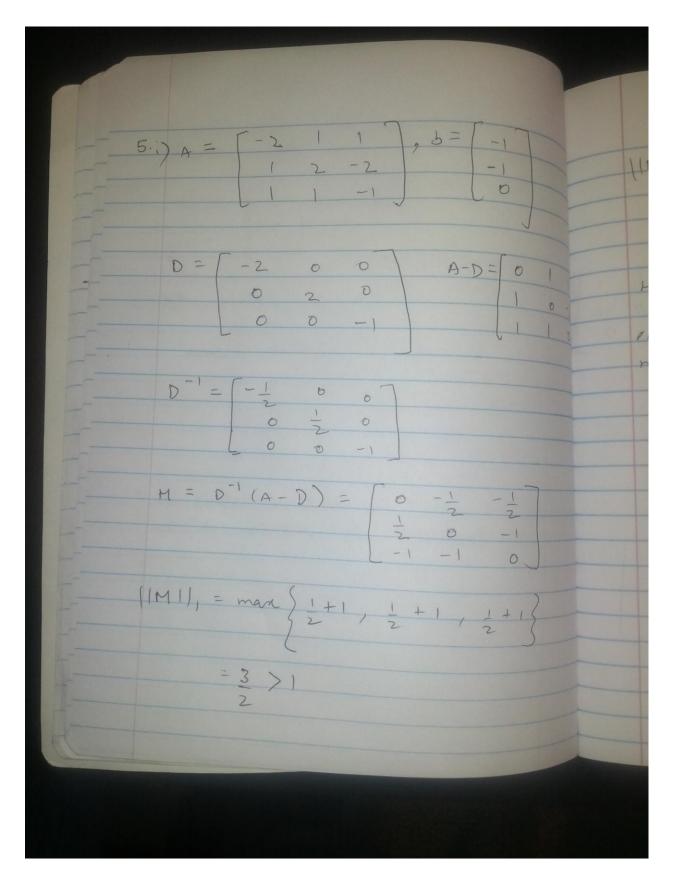


(V) det (A) = det (PLU) = det(B) det(L) det( = -3v) p = (1, 2, 3) - find the maximum and interchange + p=[3,2] -2017/001 -120 0 10 0 1 -1 1100 -201 0 0 0 2 -1 0 1 -1 2 1 4



Testing with Matlab -1 2 0 -2 0 1 >) inv (A) ans = -0.6667 0.3333 -0.666) -0.3333 0.6667 -0.3333 -1.3333 0.6667 -0.3333 vi) The bettles method is PLUx = b because we do not have to take out the inverse

4i) function [LVa] = kij(a) m = size (a); // suze of a n = m(1); // number of columns for k=1:n // Kij loop 4 4 a(i, K) = a(i, K)/a(K, K);for j = K+1:n  $a(i,j) = a(i,j) - a(i,k) \star a(k,j),$ end L = tril (a, -1) Mextract lower U = a - L // triangular matrix L = L + eye (N) // add identity end matrix 4ii) function (LVa) = Kjila) m = size (a); n = m(1)a(k+1:n, k) = a(k+1:n, k)/a(k)for i = K + 1:n a(i,j) = a(i,j) - a(i,k) \* a(k)end L = tril (a, -1); U = a - L; L = L + eye(n);



HM1100 = max \ 1 + 1 \ 1 + 1 \ 1 + 1 \} = 2 > 1 Hence the method does not converge. not converge. MATLAB the method did )

| 5 ii) A = | [-6 ]<br>[ 1 4<br>] 1  | 1 7 -2 3 | b = \begin{cases} -4 \\ 3 \\ 5 \end{cases} |            |
|-----------|------------------------|----------|--|------------|
| D =       | -6 0<br>0 4<br>0 0     |          | A-D=[                                      | 0 1 1 0 -2 |
| D-1 = (   | -1/6 0<br>0 1/4<br>0 0 | 0 0 -13  |  |            |
| M = D     | -1 (A-D)               |          | 0 -1 6                                     | -17        |
|           |                        | L        | 1 3 3                                      | 2 0        |
|           |                        |          |  |            |

