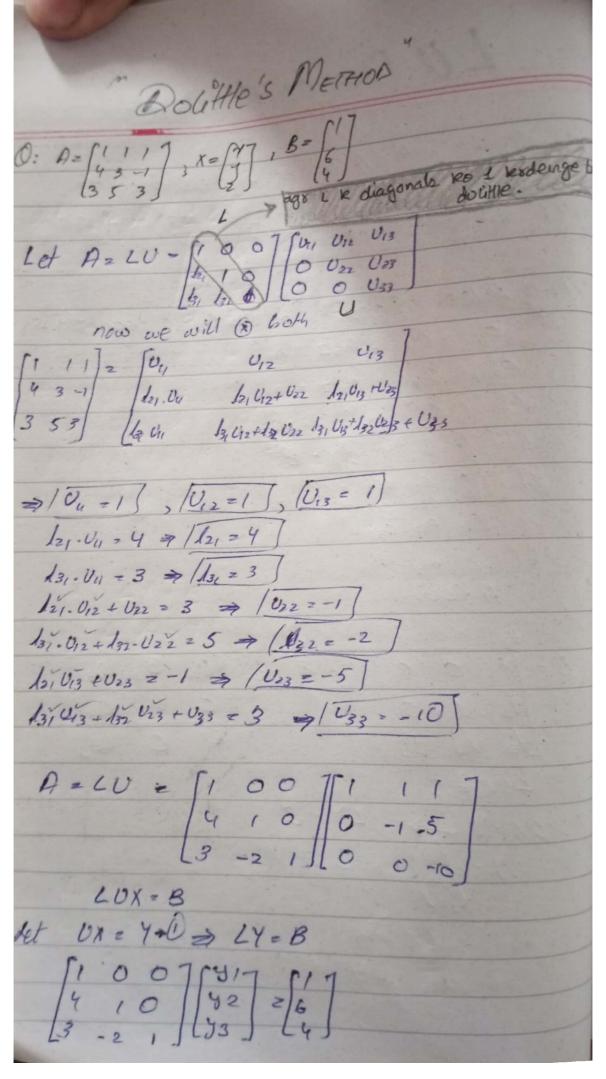
## LU DECOMPOSITION they agreese mitix A can be expressed as the upper triangular matrix. Working Rules - Consider a system of equations. anz + a,24 + a132 = b1 $a_{21}x + a_{22}y + a_{23}z = b_{2}$ $a_{31}x + a_{32}y + a_{33}z = b_{3}$ in patrix form 1 Ax = B $A = \begin{cases} a_{01} & a_{12} & a_{13} \\ a_{21} & a_{12} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{cases} \Rightarrow x = \begin{bmatrix} 777 \\ 727 \\ 2 \end{bmatrix}, B = \begin{bmatrix} b_{1} \\ b_{2} \\ b_{3} \end{bmatrix}$ det, A=LU An LUX = B det UX=Y -> LY=B then from UX = 4 we can find & (ie x, y, 2 xq soc)



By forward substitution we get,

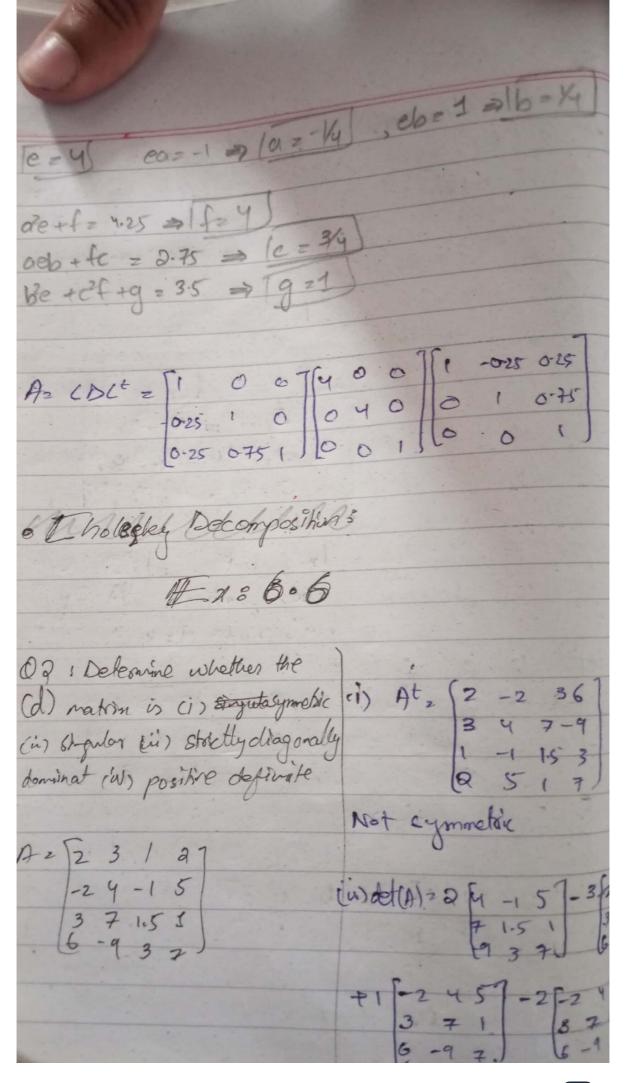
g, = 1, y2 = 2, y3 = 5 1. 42 /1 - By backward substitution we get,

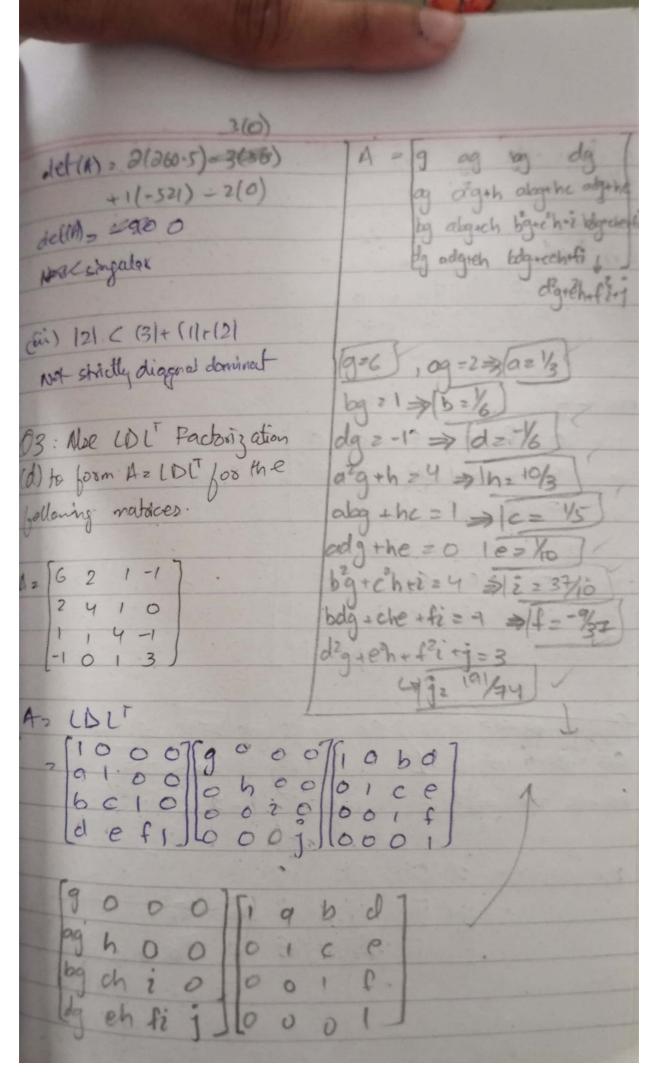
g/ 1/3 = -1/2/, /1/2 = 1/2/ /2/ /2/ " CROUT'S METHOD Let, A=LU= [41 00] [ 412 43] 610 k ags diagonal 1 broken to crout Bagi poora method same hi hai.

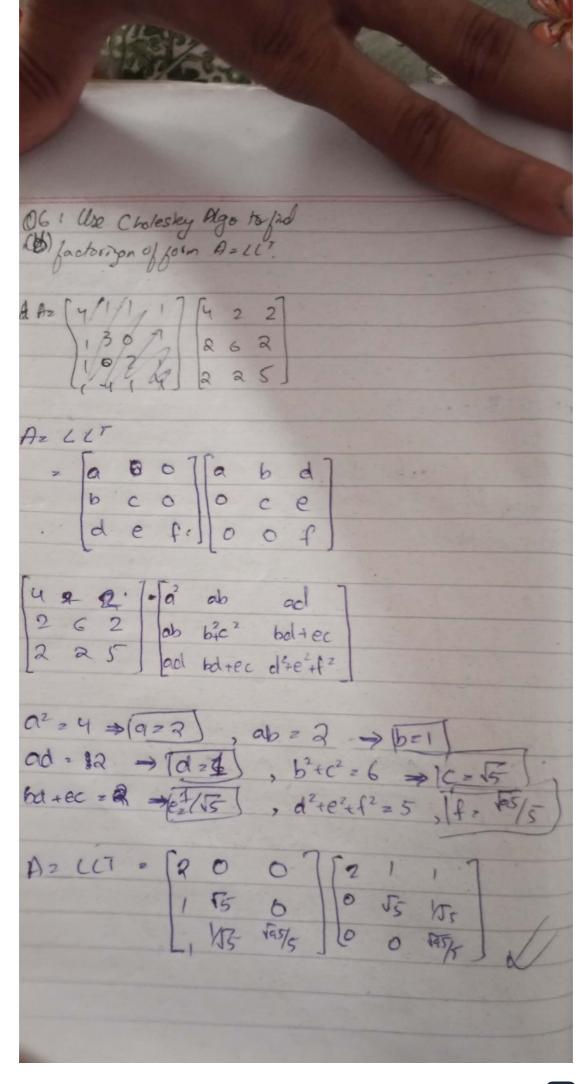
Cholesky's Method. det , to AZLL' [a 6 0] [a 6 d b c 0] [o c e la e f] [o o f] Pos cholesky A should be symetric & positive définités par la bier del so del so de la solicitation de la in greater from o. 2. LYZB 3. LTX=4 # x 8 6.5 Q1: Solve the following linear Sys. (6)  $\begin{cases} 2 & 0 & 0 \\ -1 & 1 & 0 \\ 3 & 2 & -1 \end{cases} \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 21 \\ 12 \\ 13 \end{bmatrix} = \begin{bmatrix} -1 \\ 3 \\ 0 \end{bmatrix}$ LUX=B L428 

o Strictly Diagonally Dominants
- A metin is aliagenally dominant ago tomain
oliagonals hi value unke corresponding raws k sum a
I greater or equal ho
A= ( 2 0 7 171 > 121+101
13 (5)
0 5 0
6 1 1-61 7 101 + 151
il the well .
Strict 1: one greater them its culted
- ne diagonly dominant materia.
so not strictly diagonal otominant be
Strictly diagonly dominant matrix.  The values one [greater] them its culted  Strictly diagonally dominant matrix.  The is not strictly diagonal obtainment bez  [2 5 5] = 151 < 121+151
0 01 0
Positive Definite.  The determinants of all & leading poincipal subm  of A must be > 0.
- The determinants of all alfording of
of A must be 50. Thing poincipal subm
H 9 A
-1 2 -1 det A, = det [2] = 2 >0
[0 -1 2] det 1/2 = det [2 -1] = 370
det Azzdet sz
det A3 = det [2 -1 0] 24 70
[0-(2)

· Symmetric Matrixs A square matrix whose D. A+ is called symmetric nation. · LDL Factorization: L = lower toungular with I's in the diagonal. 0 = Diagonal matoria L+ = Transpose of Contribugules. a A matrix need to be the definite for LDL+ factorization. Example: 4= 54 -1 1 A= 100 0 fe 00 7 [1 a b] [b c 1 1 [0 0 9] [0 0 1] be cf 9 0 0 1 c







"GAUSS JACOBI METHOD ineax or of linear agn of system O: Solve the following system of ears by Gaven Jackin 6x+2y-2=4 6x + 2y - 2 = 4 x + 5y + 2 = 3 2x + y + 42 = 27- Har ek egn se ny, z ki valver nikael lenge. n=114-2y+2) y = 1(3-5y-2) 8 = 1(27-2x-y) Theration#01: 91=20=0, y=y0=0, 2=20=0 du 0 A, = 1 (4-240+20) = 0.6667 y, = 1 (3-10-20) = 0.6 21 = 1 (27-200-90)= 6.75 Theration#02, 92 = 16 (4-2y,+2,) 2 1.5917 Jz = 1513-76-20) = -0.8833

Resolven \$03, 6=16 (4-2y2+2e)=2.0055 4: 15 (3- 72-22) = -0-9717 2= 14 (27-242-42) = 6-1750 ore will continue till are get two same volves for all 7,4,2. M : 7.3 It: BA Find Ist now iterations 7, 2 ho (6-5 mg) 2 0.6 (c) of the Jacobi method for 122 /10(25-52,00+4/23) 22-5 following linear system . N'=0 \$3 2 /8 (-11+4x 10) 2 -1-135 10m, + 5m2 = 6 ny = 1/5(-11+x3) = -22 34, + 10x2 - 4x3 = 25 -4x2 +8x3 -x4 =-11 41, 2 /10 (6-5×2") 2 - 0-65 -13 +5x4 = -11 712 = 1/10 (25-57,11) + 472) 2 2 1-65 7/3 = 1/2 (-11+ 4x2+ 79(1)) 2-0.4 71=16-572) Ny = 1/5 (-11+ x3(1)) 2-2.475 122 1 (25-52, +423) 13 2 1 (-11 + 472+ 74) 1421(-11+73)

4 JAUSS - SEIDEL - Applied only on streetly diagnally dominant areas system of egns. Hat has ilevation only mein no me secent volus ko lenge. 274+64-2=85 6x +15y +22 = 72 x + y + 542 = 110 × = /27 (85-64+2) 7 = 1/15 (72-6x-22) Z = 184 (110-71-7) Iteration # 01: 11 = /27 (85-640 -20)= 3-1481 9, = 1/15 (+2 - 6x, - 220) = 3.5408 2, = 1/54 (110-21-41)=1-9132 Meration # 02: ×2 = 1/27 (85-64,+21)=2.4322 42 = 1/27 (85 - 6×2 - 224) = 3.5720 22 2/54 (110- 12 - 42) = 1.928

A DINER IN LEGATOR (Ex: 9.3) Lis an iterative method used to find dominount sigenvalue of a matrix-that is, the eigen value with the largest magnitude. 01: Fird the first 3 ilerations (d) Obtained by the Power Method applied to the folloing mation. . WX X(0)(1,-2,0,3) t N2 = 14-45+3/5+1 26/5 1-120 1102 d, = A 20 = 4 1 1 1 1 1 7/232 AN, 2/4111 13-11 /26 /2 /2 1-2+6 9-136-1/3 13/36 1-126+1 53/26 1-126+1 53/26 1-126+1 53/26 Seigen vector 2 31 29/31

