Computational Maths: Assignment 2

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March 15, 2020

1 Question 4.23

My answer: **(ii)** $L = \begin{bmatrix} 1 & 0 & 0 & 0 \\ -2 & 1 & 0 & 0 \\ 0.5 & 1.5 & 1 & 0 \\ -2 & 3 & -0.5 & 1 \end{bmatrix}$ $U = \begin{bmatrix} 4 & -1 & 3 & 2 \\ 0 & -2 & 3 & 0.5 \\ 0 & 0 & 4 & 2 \\ 0 & 0 & 0 & 3 \end{bmatrix}$

1.1 Matlab code

```matlab
function [L, U] = LUdecompgauss(A)
% Get m * n dimensions
[m, n] = size(A);

if (m~=n)
    disp("Matrix is not square!");
end
% Set up for LU decomposition
L = zeros(m);
for i = 1:m
    L(i, i) = 1;
end
U = A;

d = 1;
for i = 1:m
    for j = 1:n
        if i == j
            tmp = d;
            while tmp < m
                tmp = tmp + 1;
                const = U(tmp, j) / U(i, j);
                for x = 1:m
                    U(tmp, x) = U(tmp, x) - (const * U(i, x));
                end
                L(tmp, j) = const
            end
        end
    end
    d = d + 1
end

disp(L);
disp(U);
```