
```
function [L,U,x]=simple_elimination_dolittle(A,b)
%EP501 Homework 2
%Ex. 1
%Part a

%This function provides a simple forward elimination method as already
%implemented in class examples that can be used with any matrix A and
any
%vector, using the dolittle method

nref=length(b);    %system size for reference problem
L=eye(nref);
%note that the elimination procedure coded below modifies the matrix B
Awork=cat(2,A,b);  %This is our working version of the matrix used to
perform elimination (i.e. it will be modified)
for ir1=2:nref      %loop over rows from 2 to n performing
elimination, this index marks what row we are starting the
elimination from (i.e. using) for this particular column
    for ir2=ir1:nref %this index marks the present position where
elimination is being performed - i.e. where we are applying the
elementary row operations
        fact=Awork(ir2,ir1-1)/Awork(ir1-1,ir1-1);    %multiplier of
the variable we are attempting to eliminate, its ir-1 column of this
row
        Awork(ir2,:)=Awork(ir2,:)-fact.*Awork(ir1-1,:); %subtract
off previous row modified by a factor that eliminates the ir-1 column
term in this row (so it has only super-diagonal elements), this is a
little bit wasteful as it uses entire row...
        L(ir2,ir1-1)=fact; %lower triangular matrix

    end %for
end %for
x=Awork(:,nref+1);    %final solution
U=Awork(1:nref,1:nref); %upper triangular matrix
end
```

Published with MATLAB® R2020a