

```

1 A = input("What is A in Ax=b?");
2 n = size(A);
3 n = n(1);
4 b = input("What is b in Ax=b?");
5
6 %Doolittle, solve A=LU
7 L = zeros(n);
8 U = zeros(n);
9
10 for k = 1:n
11     L(k,k) = 1;
12     for j = k:n
13         A_kj_Old = A(k,j);
14         for s = 1:k-1
15             A_kj_Old = A_kj_Old - L(k,s) * U(s,j);
16         end
17         U(k,j) = A_kj_Old;
18     end
19
20     for i = k+1:n
21         A_ik_Old = A(i,k);
22         for s = 1:k-1
23             A_ik_Old = A_ik_Old - L(i,s) * U(s,k);
24         end
25         L(i,k) = A_ik_Old / U(k,k);
26     end
27 end
28
29
30 %Fwd substitution, solve Lz=b
31 z = zeros(n,1);
32
33 for i=1:n
34     b_i_Old = b(i);
35     for j = 1:i-1
36         b_i_Old = b_i_Old - L(i,j) * z(j);
37     end
38     z(i) = b_i_Old;
39 end
40
41 %Bwd substitution, solve Ux=z
42 x = zeros(n,1);
43
44 for i = 0:n-1
45     z_i_Old = z(n-i);
46     for j = n+1-i:n
47         z_i_Old = z_i_Old - U(n-i,j) * x(j);
48     end
49     x(n-i) = z_i_Old / U(n-i,n-i);
50 end
51
52 clearvars -except A L U x b

```

```

1 A = input("What is A in Ax=b?");
2 n = size(A);
3 n = n(1);
4 b = input("What is b in Ax=b?");
5
6 %Doolittle, solve A=LU
7 L = zeros(n);
8
9 for k = 1:n
10     a_kk_Old = A(k,k);
11     for s=1:k-1
12         a_kk_Old = a_kk_Old - L(k,s)^2;
13     end
14     L(k,k) = sqrt(a_kk_Old);
15
16     for i = k+1:n
17         a_ik_Old = A(i,k);
18         for s = 1:k-1
19             a_ik_Old = a_ik_Old - L(i,s) * L(k,s);
20         end
21         L(i,k) = a_ik_Old / L(k,k);
22     end
23 end
24
25 U = transpose(L);
26
27 %Fwd substitution, solve Lz=b
28 z = zeros(n,1);
29
30 for i=1:n
31     b_i_Old = b(i);
32     for j = 1:i-1
33         b_i_Old = b_i_Old - L(i,j) * z(j);
34     end
35     z(i) = b_i_Old / L(i,i);
36 end
37
38 %Bwd substitution, solve Ux=z
39 x = zeros(n,1);
40
41 for i = 0:n-1
42     z_i_Old = z(n-i);
43     for j = n+1-i:n
44         z_i_Old = z_i_Old - U(n-i,j) * x(j);
45     end
46     x(n-i) = z_i_Old / U(n-i,n-i);
47 end
48
49 clearvars -except A L U x b

```