Table of Contents


```
A=[1 -1 4; 2 8 2; 0 5 2]
B = [A eye(3)]
```

```
A =

     1    -1     4
     2     8     2
     0     5     2
```

```
B =

     1    -1     4     1     0     0
     2     8     2     0     1     0
     0     5     2     0     0     1
```

Row operations

```
 f21 = B(2,1) / B(1,1);
 B(2,:) = B(2,:) - f21*B(1,:)
 f32 = B(3,2) / B(2,2);
 B(3,:) = B(3,:) - f32*B(2,:);
B(2,:) = B(2,:) / B(2,2); B(3,:) = B(3,:)/B(3,3)
f23 = B(2,3) / B(3,3);
B(2,:) = B(2,:) - f23 * B(3,:)
f13 = B(1,3) / B(3,3);
B(1,:) = B(1,:) - f13*B(3,:)
B(1,:) = B(1,:) + B(2,:)
 Ainv = B(:,4:6)
format shorte
A*Ainv
format short
```

```
B =

     1    -1     4     1     0     0
     0    10    -6    -2     1     0
     0     5     2     0     0     1
```

```
B =

    1.0000   -1.0000    4.0000    1.0000         0         0
         0    1.0000   -0.6000   -0.2000    0.1000         0
         0         0    1.0000    0.2000   -0.1000    0.2000


B =

    1.0000   -1.0000    4.0000    1.0000         0         0
         0    1.0000         0   -0.0800    0.0400    0.1200
         0         0    1.0000    0.2000   -0.1000    0.2000


B =

    1.0000   -1.0000         0    0.2000    0.4000   -0.8000
         0    1.0000         0   -0.0800    0.0400    0.1200
         0         0    1.0000    0.2000   -0.1000    0.2000


B =

    1.0000         0         0    0.1200    0.4400   -0.6800
         0    1.0000         0   -0.0800    0.0400    0.1200
         0         0    1.0000    0.2000   -0.1000    0.2000


Ainv =

    0.1200    0.4400   -0.6800
   -0.0800    0.0400    0.1200
    0.2000   -0.1000    0.2000


ans =

   1.0000e+00            0            0
  -2.2204e-16   1.0000e+00  -1.1102e-16
  -5.5511e-17   2.7756e-17   1.0000e+00
```

LU Factorization

```
[L,U]=lu_wo(A)
f21, f32
b = [15;40;18];
x = U\(L\b)
b2 =[11;18;11];
x2 = U\(L\b2)
```

```
L =

    1.0000         0         0
    2.0000    1.0000         0
         0    0.5000    1.0000


U =

     1    -1     4
     0    10    -6
     0     0     5


f21 =

     2


f32 =

    0.5000


x =

    7.1600
    2.5600
    2.6000


x2 =

    1.7600
    1.1600
    2.6000
```

LU Problem

```
C = [3 2 1; 6 4 3; 1 2 9]; b3=[12;25;10];
[L,U] = lu_wo(C)
[L,U,P] = lu(C)
x3 = U\(L\(P*b3))


L =

    1.0000         0         0
    2.0000    1.0000         0
    0.3333       Inf    1.0000
```

```
U =

     3     2     1
     0     0     1
     0     0  -Inf


L =

    1.0000         0         0
    0.1667    1.0000         0
    0.5000         0    1.0000


U =

    6.0000    4.0000    3.0000
         0    1.3333    8.5000
         0         0   -0.5000


P =

     0     1     0
     0     0     1
     1     0     0


x3 =

    5.0000
   -2.0000
    1.0000
```

Cholesky

```
D = [10 2 4; 2 15 1; 4 1 20];
u = chol(D)
u'*u


u =

    3.1623    0.6325    1.2649
         0    3.8210    0.0523
         0         0    4.2892


ans =

   10.0000    2.0000    4.0000
    2.0000   15.0000    1.0000
```

```
    4.0000    1.0000   20.0000
```

Published with MATLAB® R2016b