

$$A = [1,2;3,4]$$

$$A =$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

$$L = [1,0;3,1]$$

$$L =$$

$$\begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$$

$$U = [1,2;0,-2]$$

$$U =$$

$$\begin{bmatrix} 1 & 2 \\ 0 & -2 \end{bmatrix}$$

$$L*U$$

$$\text{ans} =$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

$$A = [2,3,3;0,5,7;6,9,8]$$

$$A =$$

$$\begin{bmatrix} 2 & 3 & 3 \\ 0 & 5 & 7 \\ 6 & 9 & 8 \end{bmatrix}$$

$$E31 = [1,0,0;0,1,0;-3,0,1]$$

$$E31 =$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -3 & 0 & 1 \end{bmatrix}$$

$$L = E31^{-1}$$

$$L =$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 3 & 0 & 1 \end{bmatrix}$$

$$U = E31*A$$

$$U =$$

$$\begin{bmatrix} 2 & 3 & 3 \\ 0 & 5 & 7 \\ 0 & 0 & -1 \end{bmatrix}$$

$$c = L^{-1}*[2;2;5]$$

```
c =
     2
     2
    -1
```

## P27

```
clear
A = [1,0,0;2,1,0;-1,-3,1]*[2,1,1;0,-1,-2;0,0,-4]
```

```
A =
     2         1         1
     4         1         0
    -2         2         1
```

```
L = [1,0,0;2,1,0;-1,-3,1]
```

```
L =
     1         0         0
     2         1         0
    -1        -3         1
```

```
U = [1,1/2,1/2;0,1,2;0,0,1]
```

```
U =
     1        1/2        1/2
     0         1         2
     0         0         1
```

```
D = [2,0,0;0,-1,0;0,0,-4]
```

```
D =
     2         0         0
     0        -1         0
     0         0        -4
```

```
L*D*U
```

```
ans =
     2         1         1
     4         1         0
    -2         2         1
```

## 1.4.5

```
clear
A = [2,-1,0;-1,2,-1;0,-1,2]
```

```
A =
     2        -1         0
    -1         2        -1
     0        -1         2
```

$$b = [6; 2; -6]$$

$$b =$$

$$\begin{bmatrix} 6 \\ 2 \\ -6 \end{bmatrix}$$

$$E21 = [1, 0, 0; 1/2, 1, 0; 0, 0, 1]$$

$$E21 =$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 1/2 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$U = E21 * A$$

$$U =$$

$$\begin{bmatrix} 2 & -1 & 0 \\ 0 & 3/2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

$$E32 = [1, 0, 0; 0, 1, 0; 0, 2/3, 1]$$

$$E32 =$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 2/3 & 1 \end{bmatrix}$$

$$U = E32 * U$$

$$U =$$

$$\begin{bmatrix} 2 & -1 & 0 \\ 0 & 3/2 & -1 \\ 0 & 0 & 4/3 \end{bmatrix}$$

$$L = E21^{-1} * E32^{-1}$$

$$L =$$

$$\begin{bmatrix} 1 & 0 & 0 \\ -1/2 & 1 & 0 \\ 0 & -2/3 & 1 \end{bmatrix}$$

$$c = L^{-1} * b$$

$$c =$$

$$\begin{bmatrix} 6 \\ 5 \\ -8/3 \end{bmatrix}$$

```
% 要 Symbolic Math Toolbox
syms x y z;
eqn = U * [x;y;z] == c;
solx = solve(eqn, x,y,z);
Answer = [solx.x;solx.y;solx.z]
```

$$\text{Answer} =$$

$$\begin{pmatrix} 4 \\ 2 \\ -2 \end{pmatrix}$$

### 1.4.7

```
clear
L = [1,0,0;-1,1,0;0,-1,1]
```

```
L =
```

1	0	0
-1	1	0
0	-1	1

```
U = [1,-1,0;0,1,-1;0,0,1]
```

```
U =
```

1	-1	0
0	1	-1
0	0	1

```
b = [2;-3;4]
```

```
b =
```

2
-3
4

```
c = L^-1 * b
```

```
c =
```

2
-1
3

```
% 要 Symbolic Math Toolbox
syms x y z;
eqn = U * [x;y;z] == c;
solx = solve(eqn, x,y,z);
Answer = [solx.x;solx.y;solx.z]
```

```
Answer =
```

$$\begin{pmatrix} 4 \\ 2 \\ 3 \end{pmatrix}$$