

In[*]:= **matrix** = {{1 + a, 1, 1, 1}, {1, 1 - a, 1, 1}, {1, 1, 1 + b, 1}, {1, 1, 1, 1 - b}}

Out[*]=

{{1 + a, 1, 1, 1}, {1, 1 - a, 1, 1}, {1, 1, 1 + b, 1}, {1, 1, 1, 1 - b}}

In[*]:= **Det[matrix]**
行列式

Out[*]=

$a^2 b^2$

In[*]:= **n** = 4
matrix = **Table**[(i + j - 1)ⁿ⁻², {i, 1, n}, {j, 1, n}]
表格

Out[*]=

4

Out[*]=

{{1, 4, 9, 16}, {4, 9, 16, 25}, {9, 16, 25, 36}, {16, 25, 36, 49}}

In[*]:= **Det[matrix]**
行列式

Out[*]=

0

In[62]:= **A** = {{1, 0, -1}, {0, 2, 3}};
B = {{2, -1, 4}, {1, 0, -2}, {0, 3, 1}};
c = {{0, 2}, {-1, 0}, {3, 1}};

In[65]:= **A.B**

Out[65]=

{{2, -4, 3}, {2, 9, -1}}

In[8]:= **A.c**

Out[8]=

{{-3, 1}, {7, 3}}

In[9]:= **c.A**

Out[9]=

{{0, 4, 6}, {-1, 0, 1}, {3, 2, 0}}

In[10]:= B^2

Out[10]=

 $\{\{4, 1, 16\}, \{1, 0, 4\}, \{0, 9, 1\}\}$ In[19]:= $\alpha = \{\{1, 0, 0, 0\}, \{0, 1, 0, 0\}, \{0, 0, 1, 0\}, \{0, 0, 0, 1\}\};$
 $\beta = \{\{1, 1, 1, 1\}, \{1, 1, -1, -1\}, \{1, -1, 1, -1\}, \{1, -1, -1, 1\}\}$

Out[20]=

 $\{\{1, 1, 1, 1\}, \{1, 1, -1, -1\}, \{1, -1, 1, -1\}, \{1, -1, -1, 1\}\}$ In[17]:= $A = \text{Transpose}[\alpha]$
转置
 $B = \text{Transpose}[\beta]$
转置

Out[17]=

 $\{\{1, 0, 0, 0\}, \{0, 1, 0, 0\}, \{0, 0, 1, 0\}, \{0, 0, 0, 1\}\}$

Out[18]=

 $\{\{1, 1, 1, 1\}, \{1, 1, -1, -1\}, \{1, -1, 1, -1\}, \{1, -1, -1, 1\}\}$ In[22]:= $\text{result} = \text{Inverse}[B].A$
逆

Out[22]=

 $\left\{ \left\{ \frac{1}{4}, \frac{1}{4}, \frac{1}{4}, \frac{1}{4} \right\}, \left\{ \frac{1}{4}, \frac{1}{4}, -\frac{1}{4}, -\frac{1}{4} \right\}, \left\{ \frac{1}{4}, -\frac{1}{4}, \frac{1}{4}, -\frac{1}{4} \right\}, \left\{ \frac{1}{4}, -\frac{1}{4}, -\frac{1}{4}, \frac{1}{4} \right\} \right\}$ In[23]:= $\text{MatrixRank}[\{\{2, 1, -1, 1, 1\}, \{3, -2, 1, -3, 4\}, \{1, 4, -3, 5, -2\}\}]$
矩阵的秩

Out[23]=

2

In[26]:= $n = 4;$
 $\text{Inverse}[\{\{x, 1, 0, 0\}, \{1, x, 1, 0\}, \{0, 1, x, 1\}, \{0, 0, 1, x\}\}]$
逆

Out[27]=

$$\left\{ \left\{ \frac{-2x + x^3}{1 - 3x^2 + x^4}, \frac{1 - x^2}{1 - 3x^2 + x^4}, \frac{x}{1 - 3x^2 + x^4}, -\frac{1}{1 - 3x^2 + x^4} \right\}, \right.$$
$$\left\{ \frac{1 - x^2}{1 - 3x^2 + x^4}, \frac{-x + x^3}{1 - 3x^2 + x^4}, -\frac{x^2}{1 - 3x^2 + x^4}, \frac{x}{1 - 3x^2 + x^4} \right\},$$
$$\left\{ \frac{x}{1 - 3x^2 + x^4}, -\frac{x^2}{1 - 3x^2 + x^4}, \frac{-x + x^3}{1 - 3x^2 + x^4}, \frac{1 - x^2}{1 - 3x^2 + x^4} \right\},$$
$$\left\{ -\frac{1}{1 - 3x^2 + x^4}, \frac{x}{1 - 3x^2 + x^4}, \frac{1 - x^2}{1 - 3x^2 + x^4}, \frac{-2x + x^3}{1 - 3x^2 + x^4} \right\} \}$$

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In[32]:= n = 4;
Table[If[j ≥ i, j - i + 1, 0], {i, 1, n}, {j, 1, n}]
|表格 |如果
Inverse[Table[If[j ≥ i, j - i + 1, 0], {i, 1, n}, {j, 1, n}]]
|逆 |表格 |如果
```

```
Out[33]= { {1, 2, 3, 4}, {0, 1, 2, 3}, {0, 0, 1, 2}, {0, 0, 0, 1} }
```

```
Out[34]= { {1, -2, 1, 0}, {0, 1, -2, 1}, {0, 0, 1, -2}, {0, 0, 0, 1} }
```

```
In[54]:= A = {{1, -2, 1, 1}, {1, -2, 1, -1}, {1, -2, 1, 5}};
b = {1, -1, 5};
{x1, x2, x3, x4} = Array[x, 4]
|数组
```

```
Out[56]= {x[1], x[2], x[3], x[4]}
```

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In[57]:= eqn = A.{x1, x2, x3, x4} == b
```

```
Out[57]= {x[1] - 2 x[2] + x[3] + x[4],
x[1] - 2 x[2] + x[3] - x[4], x[1] - 2 x[2] + x[3] + 5 x[4]} == {1, -1, 5}
```

```
In[59]:= Solve[eqn, {x1, x2, x3, x4}]
|解方程
```

 **Solve:** 方程可能无法给出所有 "solve" 变量的解.

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Out[59]= { {x[3] → -x[1] + 2 x[2], x[4] → 1} }
```

```

In[66]:= (*Ta_1 = 2a_1+0a_2
          Ta_2 = 3a_1+1a_2
          T(a_1,a_2)=(a_1,a_2)A
          T(b_1,b_2)=(b_1,b_2)B
          (a_1,a_2)=(b_1,b_2)C
          B = CAC-1*)
A1 = Transpose[{{1, -1}, {1, 1}}];
B1 = Transpose[{{2, 0}, {-1, 1}}];
c = Inverse[B1].A1;
B = c.A1.Inverse[c]

```

Out[69]=

```

{{0, 1}, {-2, 2}}

```

```

In[71]:= A = {{1, 1, 1, 1}, {1, 1, -1, -1}, {1, -1, 1, -1}, {1, 1, -1, 1}};
Eigvals = Eigenvalues[A]
Eigvec = Eigenvectors[A]

```

Out[72]=

```

{2, 2, -√2, √2}

```

Out[73]=

```

{{1, 0, 0, 1}, {1, 0, 1, 0},
 { - (3+2√2)/(1+√2), 1+√2, - (3-2√2)/(1+√2), 1 },
 { - (-3+2√2)/(-1+√2), 1-√2, - (3-2√2)/(-1+√2), 1 }}

```

```

In[74]:= A = {{2, -1, 1}, {2, 2, -1}, {1, 2, -1}};
{jordanform, transformation} = JordanDecomposition[A]

```

Out[75]=

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{{{0, 1/3, 2/9}, {1, 1/3, -1/9}, {1, 0, 0}}, {{1, 1, 0}, {0, 1, 1}, {0, 0, 1}}}

```