|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A= | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | 2,57 | -2,57 | 3,29 | 0,14 | | 0 | -1 | 4 | 0 | | -1 | -4 | 8 | 1 | | -0,29 | -7,71 | 4,86 | 6,43 | |  | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| R= | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | |  | | --- | | 4,87 | | 9 | | 12 | | -2,41 | |  | |

Алгоритм декомпозиции основан на идее представления исходной матрицы в виде произведения двух треугольных матриц. Пусть задана квадратная матрица:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A= | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | 2,57 | -2,57 | 3,29 | 0,14 | | 0 | -1 | 4 | 0 | | -1 | -4 | 8 | 1 | | -0,29 | -7,71 | 4,86 | 6,43 | |  | |

Представим A в виде: A=BxC  
Покажем пример вычислений нескольких значений матриц *B* и *C*.  
b11=2.57  
c11=2.57/2.57=1  
c12=-2.57/2.57=-1  
c13=3.29/2.57=1.28  
c14=0.14/2.57=0.0545  
b21=0  
Вычисляем значение элемента b22=-1 - (0\*(-1))=-1  
c22=-1/(-1)=1  
c23=4/(-1)=-4  
c24=0/(-1)=0  
b31=-1  
Вычисляем значение элемента b32=-4 - (-1\*(-1))=-5  
Вычисляем значение элемента b33=8 - (-1\*1.28 -5\*(-4))=-10.72  
c33=-10.72/(-10.72)=1  
c34=1.054/(-10.72)=-0.0984  
b41=-0.29  
Вычисляем значение элемента b42=-7.71 - (-0.29\*(-1))=-8  
Вычисляем значение элемента b43=4.86 - (-0.29\*1.28 -8\*(-4))=-26.77  
Вычисляем значение элемента b44=6.43 - (-0.29\*0.0545 -8\*0 -26.77\*(-0.0984))=3.81  
c44=3.813/3.813=1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| B= | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | 2,57 |  |  |  | | 0 | -1 |  |  | | -1 | -5 | -10,72 |  | | -0,29 | -8 | -26,769 | 3,813 | |  | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C= | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | 1 | -1 | 1,28 | 0,0545 | |  | 1 | -4 | 0 | |  |  | 1 | -0,0984 | |  |  |  | 1 | |  | |

Вычисляем значения yi  
y1 = r1/b11 = 4.87/2.57 = 1.895  
y2 = (9 - 0\*1.895 )/(-1) = -9  
y3 = (12 - -1\*1.895 -5\*(-9) )/(-10.72) = 2.902  
y4 = (-2.41 - -0.29\*1.895 -8\*(-9) -26.769\*2.902 )/3.81 = 1  
Вычисляем значения xi  
x4 = y4 = 1  
x3 = 2.9 - (-0.0984\*1 ) = 3  
x2 = -9 - (-4\*3 + 0\*1 ) = 3  
x1 = 1.89 - (-1\*3 + 1.28\*3 + 0.0545\*1 ) = 1

Ответ: [1, 3, 3, 1]