

Trabalho Prático 1 - Cálculo Numérico (Questão 2)

Método: Eliminação de Gauss com Pivoteamento Parcial
Sistema de 7 equações lineares baseado no balanço de voos.

Critério: sistema completo e determinado (7×7).

Iteração 1 - Após pivoteamento

Iteração 1 - Após pivoteamento

x1	x2	x3	x4	x5	x6	x7	b
-1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
1.0	-1.0	0.0	0.0	0.0	0.0	0.0	-130.0
0.0	1.0	-1.0	0.0	0.0	0.0	0.0	102.0
0.0	0.0	1.0	-1.0	0.0	0.0	0.0	22.0
0.0	0.0	0.0	1.0	-1.0	0.0	0.0	-1.0
0.0	0.0	0.0	0.0	0.0	1.0	0.0	29.0
0.0	0.0	0.0	0.0	1.0	1.0	-1.0	38.0

Iteração 1 - Após eliminação

Iteração 1 - Após eliminação

x1	x2	x3	x4	x5	x6	x7	b
-1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
0.0	-1.0	0.0	0.0	0.0	0.0	2.0	-130.0
0.0	1.0	-1.0	0.0	0.0	0.0	0.0	102.0
0.0	0.0	1.0	-1.0	0.0	0.0	0.0	22.0
0.0	0.0	0.0	1.0	-1.0	0.0	0.0	-1.0
0.0	0.0	0.0	0.0	0.0	1.0	0.0	29.0
0.0	0.0	0.0	0.0	1.0	1.0	-1.0	38.0

Iteração 2 - Após pivoteamento

Iteração 2 - Após pivoteamento

x1	x2	x3	x4	x5	x6	x7	b
-1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
0.0	-1.0	0.0	0.0	0.0	0.0	2.0	-130.0
0.0	1.0	-1.0	0.0	0.0	0.0	0.0	102.0
0.0	0.0	1.0	-1.0	0.0	0.0	0.0	22.0
0.0	0.0	0.0	1.0	-1.0	0.0	0.0	-1.0
0.0	0.0	0.0	0.0	0.0	1.0	0.0	29.0
0.0	0.0	0.0	0.0	1.0	1.0	-1.0	38.0

Iteração 2 - Após eliminação

Iteração 2 - Após eliminação

x1	x2	x3	x4	x5	x6	x7	b
-1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
0.0	-1.0	0.0	0.0	0.0	0.0	2.0	-130.0
0.0	0.0	-1.0	0.0	0.0	0.0	2.0	-28.0
0.0	0.0	1.0	-1.0	0.0	0.0	0.0	22.0
0.0	0.0	0.0	1.0	-1.0	0.0	0.0	-1.0
0.0	0.0	0.0	0.0	0.0	1.0	0.0	29.0
0.0	0.0	0.0	0.0	1.0	1.0	-1.0	38.0

Iteração 3 - Após pivoteamento

Iteração 3 - Após pivoteamento

x1	x2	x3	x4	x5	x6	x7	b
-1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
0.0	-1.0	0.0	0.0	0.0	0.0	2.0	-130.0
0.0	0.0	-1.0	0.0	0.0	0.0	2.0	-28.0
0.0	0.0	1.0	-1.0	0.0	0.0	0.0	22.0
0.0	0.0	0.0	1.0	-1.0	0.0	0.0	-1.0
0.0	0.0	0.0	0.0	0.0	1.0	0.0	29.0
0.0	0.0	0.0	0.0	1.0	1.0	-1.0	38.0

Iteração 3 - Após eliminação

Iteração 3 - Após eliminação

x1	x2	x3	x4	x5	x6	x7	b
-1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
0.0	-1.0	0.0	0.0	0.0	0.0	2.0	-130.0
0.0	0.0	-1.0	0.0	0.0	0.0	2.0	-28.0
0.0	0.0	0.0	-1.0	0.0	0.0	2.0	-6.0
0.0	0.0	0.0	1.0	-1.0	0.0	0.0	-1.0
0.0	0.0	0.0	0.0	0.0	1.0	0.0	29.0
0.0	0.0	0.0	0.0	1.0	1.0	-1.0	38.0

Resultados Finais

Variável / Voo	Número de voos por dia
x1 (IGU→GRU)	4.0
x2 (GRU→Outros)	134.0
x3 (Outros→GIG)	32.0
x4 (GIG→POA)	10.0
x5 (POA→CGH)	11.0
x6 (SDU→CGH)	29.0
x7 (CGH→IGU)	2.0

Conclusão:

O método de eliminação de Gauss com pivoteamento parcial foi aplicado com sucesso.

As três primeiras iterações mostraram o processo de redução da matriz aumentada.

Os resultados finais apresentam o número de voos diários em cada trecho.