ESCUELA POLITÉCNICA NACIONAL

FACULTAD DE INGENIERÍA EN SISTEMAS

METODOS NUMERICOS ICCD412

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Taller de Eliminación gaussiana vs Gauss-Jordan

GR1CC

FECHA DE ENTREGA 25 DE DICIEMBRE DEL 2025

Eliminación Gaussiana con sustitución hacia atrás

In [5]:
```
%load_ext autoreload
```

In [6]:
```
%load_ext autoreload
from src import eliminacion_gaussiana

Ab = [[1, 1, 0, 3, 4], [2, 1, -1, 1, 1], [3, -1, -1, 2, -3], [-1, 2, 3, -1, 4]]

eliminacion_gaussiana(Ab)
```

```
[12-25 15:39:08][INFO] 2025-12-25 15:39:08.300658
The autoreload extension is already loaded. To reload it, use:
  %reload_ext autoreload
[12-25 15:39:08][INFO]
[[ 3.         -1.         -1.          2.         -3.        ]
 [ 0.          1.66666667 -0.33333333 -0.33333333  3.        ]
 [ 0.          1.33333333  0.33333333  2.33333333  5.        ]
 [ 0.          1.66666667  2.66666667 -0.33333333  3.        ]]
[12-25 15:39:08][INFO]
[[ 3.00000000e+00 -1.00000000e+00 -1.00000000e+00  2.00000000e+00
  -3.00000000e+00]
 [ 0.00000000e+00  1.66666667e+00  2.66666667e+00 -3.33333333e-01
   3.00000000e+00]
 [ 0.00000000e+00  0.00000000e+00 -1.80000000e+00  2.60000000e+00
   2.60000000e+00]
 [ 0.00000000e+00  0.00000000e+00 -3.00000000e+00  5.55111512e-17
   4.44089210e-16]]
[12-25 15:39:08][INFO]
[[ 3.00000000e+00 -1.00000000e+00 -1.00000000e+00  2.00000000e+00
  -3.00000000e+00]
 [ 0.00000000e+00  1.66666667e+00  2.66666667e+00 -3.33333333e-01
   3.00000000e+00]
 [ 0.00000000e+00  0.00000000e+00 -3.00000000e+00  5.55111512e-17
   4.44089210e-16]
 [ 0.00000000e+00  0.00000000e+00  0.00000000e+00  2.60000000e+00
   2.60000000e+00]]
```

Out[6]:
```
array([-1.0000000e+00,  2.0000000e+00, -1.2952602e-16,  1.0000000e+00])
```

In [7]:
```
%autoreload 2
from src import eliminacion_gaussiana

Ab = [[1, -1, 2, -1, -8], [2, -2, 3, -3, -20], [1, 1, 1, 0, -2], [1, -1, 4, 3, 4]]

eliminacion_gaussiana(Ab)
```

```
[12-25 15:39:14][INFO]
[[  2.   -2.    3.   -3.  -20. ]
 [  0.    0.    0.5   0.5   2. ]
 [  0.    2.   -0.5   1.5   8. ]
 [  0.    0.    2.5   4.5  14. ]]
[12-25 15:39:14][INFO]
[[  2.   -2.    3.   -3.  -20. ]
 [  0.    2.   -0.5   1.5   8. ]
 [  0.    0.    0.5   0.5   2. ]
 [  0.    0.    2.5   4.5  14. ]]
[12-25 15:39:14][INFO]
[[  2.   -2.    3.   -3.  -20. ]
 [  0.    2.   -0.5   1.5   8. ]
 [  0.    0.    2.5   4.5  14. ]
 [  0.    0.    0.   -0.4  -0.8]]
```

Out[7]:
```
array([-7.,  3.,  2.,  2.])
```

Soluciones infinitas

El siguiente sistema de ecuaciones tiene soluciones infinitas:

1	1	1	4
2	2	1	6
1	1	2	6

In [31]:
```
%load_ext autoreload
%autoreload 2
from src import eliminacion_gaussiana

Ab = [[1, 1, 1, 4],
      [2, 2, 1, 6],
      [1, 1, 2, 6]]

try:
    eliminacion_gaussiana(Ab)
except ValueError as e:
    print("el sistema no tiene solucion unica:", e)
```

```
The autoreload extension is already loaded. To reload it, use:
  %reload_ext autoreload
[12-25 15:47:36][INFO]
[[2.  2.  1.  6. ]
 [0.  0.  0.5 1. ]
 [0.  0.  1.5 3. ]]
el sistema no tiene solucion unica: No existe solución única.
```

Sin solución

El siguiente sistema de ecuaciones no tiene solución:

1	1	1	4
2	2	1	4
1	1	2	6

In [32]:
```
%load_ext autoreload
%autoreload 2
from src import eliminacion_gaussiana

Ab = [[1, 1, 1, 4],
      [2, 2, 1, 4],
      [1, 1, 2, 6]]

try:
    eliminacion_gaussiana(Ab)
except ValueError:
    print("el sistema NO tiene solucion (inconsistente).")
```

```
The autoreload extension is already loaded. To reload it, use:
  %reload_ext autoreload
[12-25 15:48:31][INFO]
[[2.  2.  1.  4. ]
 [0.  0.  0.5 2. ]
 [0.  0.  1.5 4. ]]
el sistema NO tiene solucion (inconsistente).
```

Link del Repositorio de Git-hub

https://github.com/JuanfranPinto/Metodos-Numericos-/blob/main/taller-gauss-main/taller-gauss-main/gaussian_elimination.ipynb