Gauss Jordan

In[80]:=
```
A = {{1, 0, 1, 2}, {0, -2, 3, 3}, {2, 2, -1, 1}}
```

Out[80]=
```
{{1, 0, 1, 2}, {0, -2, 3, 3}, {2, 2, -1, 1}}
```

In[81]:=
```
MatrixForm[A]
```

Out[81]//MatrixForm=

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

In[82]:=
```
RowReduce[A]
```

Out[82]=
$$\left\{\{1, 0, 1, 2\}, \left\{0, 1, -\frac{3}{2}, -\frac{3}{2}\right\}, \{0, 0, 0, 0\}\right\}$$

In[83]:=
```
MatrixForm[RowReduce[A]]
```

Out[83]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 1 & 2 \\ 0 & 1 & -\frac{3}{2} & -\frac{3}{2} \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

In[84]:=
```
Solve[{x + z == 2, y - 3/2 z == -3/2, z == 0}, {x, y, z}]
```

Out[84]=
$$\left\{\left\{x \to 2, y \to -\frac{3}{2}, z \to 0\right\}\right\}$$

In[85]:=
```
Solve[RowReduce[A]]
```

Solve: {1, 0, 1, 2} && $\left\{0, 1, -\frac{3}{2}, -\frac{3}{2}\right\}$ && {0, 0, 0, 0} is not a quantified system of equations and inequalities.

Out[85]=
$$\text{Solve}\left[\left\{\{1, 0, 1, 2\}, \left\{0, 1, -\frac{3}{2}, -\frac{3}{2}\right\}, \{0, 0, 0, 0\}\right\}\right]$$

In[86]:=
```
Solve[{{1, 0, 1, 2}, {0, 1, -3/2, -3/2}, {0, 0, 0, 0}}]
```

Solve: {1, 0, 1, 2} && $\left\{0, 1, -\frac{3}{2}, -\frac{3}{2}\right\}$ && {0, 0, 0, 0} is not a quantified system of equations and inequalities.

Out[86]=
$$\text{Solve}\left[\left\{\{1, 0, 1, 2\}, \left\{0, 1, -\frac{3}{2}, -\frac{3}{2}\right\}, \{0, 0, 0, 0\}\right\}\right]$$

Question 6x-y+z==13, x+y+z==9,10x+y-z==19

In[87]:=
```
A = {{6, -1, 1, 13}, {1, 1, 1, 9}, {10, 1, -1, 19}}
```
Out[87]=
```
{{6, -1, 1, 13}, {1, 1, 1, 9}, {10, 1, -1, 19}}
```

In[88]:=
```
MatrixForm[A]
```
Out[88]//MatrixForm=

$$\begin{pmatrix} 6 & -1 & 1 & 13 \\ 1 & 1 & 1 & 9 \\ 10 & 1 & -1 & 19 \end{pmatrix}$$

In[89]:=
```
MatrixForm[RowReduce[A]]
```
Out[89]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & 4 \end{pmatrix}$$

In[90]:=
```
Solve[RowReduce[A]]
```
••• Solve: {1, 0, 0, 2} && {0, 1, 0, 3} && {0, 0, 1, 4} is not a quantified system of equations and inequalities.

Out[90]=
```
Solve[{{1, 0, 0, 2}, {0, 1, 0, 3}, {0, 0, 1, 4}}]
```

In[91]:=
```
Solve[{6 x - y + z == 13, x + y + z == 9, 10 x + y - z == 19}, {x, y, z}]
```
Out[91]=
```
{{x → 2, y → 3, z → 4}}
```

In[92]:=
```
{{x → 2, y → 3, z → 4}}
```
Out[92]=
```
{{x → 2, y → 3, z → 4}}
```

In[93]:=
```

```

Ques-1. x+y+z=4, 2x-3y+z=2, -x+2y-z=-1

In[94]:=
```
Q1 = {{1, 1, 1, 4}, {2, -3, 1, 2}, {-1, 2, -1, -1}}
```
Out[94]=
```
{{1, 1, 1, 4}, {2, -3, 1, 2}, {-1, 2, -1, -1}}
```

In[95]:=
```
MatrixForm[Q1]
```
Out[95]//MatrixForm=

$$\begin{pmatrix} 1 & 1 & 1 & 4 \\ 2 & -3 & 1 & 2 \\ -1 & 2 & -1 & -1 \end{pmatrix}$$

In[96]:=
```
MatrixForm[RowReduce[Q1]]
```

Out[96]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{pmatrix}$$

In[97]:=
```
Solve[{x + y + z == 4, 2 x - 3 y + z == 2, -x + 2 y - z == -1}, {x, y, z}]
```

Out[97]=
```
{{x → 2, y → 1, z → 1}}
```

Ques-2. x+3y+z=10, x-2y-z=-6, 2x+y+2z=10

In[98]:=
```
Q2 = {{1, 3, 1, 10}, {1, -2, -1, -6}, {2, 1, 2, 10}}
```

Out[98]=
```
{{1, 3, 1, 10}, {1, -2, -1, -6}, {2, 1, 2, 10}}
```

In[99]:=
```
MatrixForm[Q2]
```

Out[99]//MatrixForm=

$$\begin{pmatrix} 1 & 3 & 1 & 10 \\ 1 & -2 & -1 & -6 \\ 2 & 1 & 2 & 10 \end{pmatrix}$$

In[100]:=
```
MatrixForm[RowReduce[Q2]]
```

Out[100]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{pmatrix}$$

In[101]:=
```
Solve[{x + 3 y + z == 10, x - 2 y - z == -6, 2 x + y + 2 z == 10}, {x, y, z}]
```

Out[101]=
```
{{x → 1, y → 2, z → 3}}
```

Ques-3. x+y+2z=-1, x+3y-6z=7, 2x-y+2z=0

In[102]:=
```
Q3 = {{1, 1, 2, -1}, {1, 3, -6, 7}, {2, -1, 2, 0}}
```

Out[102]=
```
{{1, 1, 2, -1}, {1, 3, -6, 7}, {2, -1, 2, 0}}
```

In[103]:=
```
MatrixForm[Q3]
```

Out[103]//MatrixForm=

$$\begin{pmatrix} 1 & 1 & 2 & -1 \\ 1 & 3 & -6 & 7 \\ 2 & -1 & 2 & 0 \end{pmatrix}$$

In[104]:=
```
MatrixForm[RowReduce[Q3]]
```

Out[104]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & -1 \end{pmatrix}$$

In[105]:=
```
Solve[{x + y + 2 z == -1, x + 3 y - 6 z == 7, 2 x - y + 2 z == 0}, {x, y, z}]
```

Out[105]=
```
{{x → 1, y → 0, z → -1}}
```

Ques-4. 2x+3y+z=-1, 5x+y+z=9, 3x+2y+4z=11

In[106]:=
```
Q4 = {{2, 3, 1, -1}, {5, 1, 1, 9}, {3, 2, 4, 11}}
```

Out[106]=
```
{{2, 3, 1, -1}, {5, 1, 1, 9}, {3, 2, 4, 11}}
```

In[107]:=
```
MatrixForm[Q4]
```

Out[107]//MatrixForm=

$$\begin{pmatrix} 2 & 3 & 1 & -1 \\ 5 & 1 & 1 & 9 \\ 3 & 2 & 4 & 11 \end{pmatrix}$$

In[108]:=
```
MatrixForm[RowReduce[Q4]]
```

Out[108]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & \frac{7}{4} \\ 0 & 1 & 0 & -\frac{19}{8} \\ 0 & 0 & 1 & \frac{21}{8} \end{pmatrix}$$

In[109]:=
```
Solve[{2 x + 3 y + z == -1, 5 x + y + z == 9, 3 x + 2 y + 4 z == 11}, {x, y, z}]
```

Out[109]=

$$\left\{\left\{x \to \frac{7}{4},\ y \to -\frac{19}{8},\ z \to \frac{21}{8}\right\}\right\}$$