```
> # Example 3:  Preemptive programming
  with(LinearAlgebra):
  interface(rtablesize=11);
```

$$10 \tag{1}$$

```
> # Vars:  x1 x2 e1 e2 e3 s1 s2 s3 (and rhs)
  A:=<<0,0,0,7,10,5,100>|<0,0,0,3,5,4,60>|<0,0,0,-1,0,0,0>|<0,0,0,
  0,-1,0,0>|<0,0,0,0,0,-1,0>|<P1,0,0,1,0,0,0>|<0,P2,0,0,1,0,0>|<0,
  0,P3,0,0,1,0>|<0,0,0,0,0,0,1>|<0,0,0,40,60,35,600>>;
```

$$A := \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & P1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & P2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & P3 & 0 & 0 \\ 7 & 3 & -1 & 0 & 0 & 1 & 0 & 0 & 0 & 40 \\ 10 & 5 & 0 & -1 & 0 & 0 & 1 & 0 & 0 & 60 \\ 5 & 4 & 0 & 0 & -1 & 0 & 0 & 1 & 0 & 35 \\ 100 & 60 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 600 \end{bmatrix} \tag{2}$$

```
> #
  A2:=RowOperation(A,[1,4],-P1):
  A3:=RowOperation(A2,[2,5],-P2):
  A4:=RowOperation(A3,[3,6],-P3);
```

$$A4 := \begin{bmatrix} -7\,P1 & -3\,P1 & P1 & 0 & 0 & 0 & 0 & 0 & 0 & -40\,P1 \\ -10\,P2 & -5\,P2 & 0 & P2 & 0 & 0 & 0 & 0 & 0 & -60\,P2 \\ -5\,P3 & -4\,P3 & 0 & 0 & P3 & 0 & 0 & 0 & 0 & -35\,P3 \\ 7 & 3 & -1 & 0 & 0 & 1 & 0 & 0 & 0 & 40 \\ 10 & 5 & 0 & -1 & 0 & 0 & 1 & 0 & 0 & 60 \\ 5 & 4 & 0 & 0 & -1 & 0 & 0 & 1 & 0 & 35 \\ 100 & 60 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 600 \end{bmatrix} \tag{3}$$

```
> # Work through Priority 1 first (Row 1):  Pivot in Column 1
  evalf([40/7,60/10,35/5,600/100]);
```

$$[5.714285714, 6., 7., 6.] \tag{4}$$

```
> #
  A5:=RowOperation(A4,4,1/7):
  A6:=RowOperation(A5,[1,4],7*P1):
  A7:=RowOperation(A6,[2,4],10*P2):
  A8:=RowOperation(A7,[3,4],5*P3):
  A9:=RowOperation(A8,[5,4],-10):
  A10:=RowOperation(A9,[6,4],-5):
  A11:=RowOperation(A10,[7,4],-100);
```

$$A11 := \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & P1 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5}{7} P2 & -\frac{10}{7} P2 & P2 & 0 & \frac{10}{7} P2 & 0 & 0 & 0 & -\frac{20}{7} P2 \\ 0 & -\frac{13}{7} P3 & -\frac{5}{7} P3 & 0 & P3 & \frac{5}{7} P3 & 0 & 0 & 0 & -\frac{45}{7} P3 \\ 1 & \frac{3}{7} & -\frac{1}{7} & 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & \frac{40}{7} \\ 0 & \frac{5}{7} & \frac{10}{7} & -1 & 0 & -\frac{10}{7} & 1 & 0 & 0 & \frac{20}{7} \\ 0 & \frac{13}{7} & \frac{5}{7} & 0 & -1 & -\frac{5}{7} & 0 & 1 & 0 & \frac{45}{7} \\ 0 & \frac{120}{7} & \frac{100}{7} & 0 & 0 & -\frac{100}{7} & 0 & 0 & 1 & \frac{200}{7} \end{bmatrix} \quad (5)$$

```
> #  Priority 1 finished.  Move to Priority 2 (Column 3, Row 5
  (tie))
  evalf([(20/7)/(10/7), (45/7)/(5/7), (200/7)/(100/7)]);
```

$$[2., 9., 2.] \quad (6)$$

```
> #
  A12:=RowOperation(A11,5,7/10):
  A13:=RowOperation(A12,[2,5],(10/7)*P2):
  A14:=RowOperation(A13,[3,5],(5/7)*P3):
  A15:=RowOperation(A14,[4,5],1/7):
  A16:=RowOperation(A15,[6,5],-5/7):
  A17:=RowOperation(A16,[7,5],-100/7);
```

$$A17 := \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & P1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & P2 & 0 & 0 & 0 \\ 0 & -\frac{3}{2} P3 & 0 & -\frac{1}{2} P3 & P3 & 0 & \frac{1}{2} P3 & 0 & 0 & -5 P3 \\ 1 & \frac{1}{2} & 0 & -\frac{1}{10} & 0 & 0 & \frac{1}{10} & 0 & 0 & 6 \\ 0 & \frac{1}{2} & 1 & -\frac{7}{10} & 0 & -1 & \frac{7}{10} & 0 & 0 & 2 \\ 0 & \frac{3}{2} & 0 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & 1 & 0 & 5 \\ 0 & 10 & 0 & 10 & 0 & 0 & -10 & 0 & 1 & 0 \end{bmatrix} \quad (7)$$

```
> # Priority 2 finished.  Move to Priority 3, Pivot in Column 2
  (last row)
> #
```

```
A18:=RowOperation(A17,7,1/10):
A19:=RowOperation(A18,[3,7],(3/2)*P3 ):
A20:=RowOperation(A19,[4,7],-1/2):
A21:=RowOperation(A20,[5,7],-1/2):
A22:=RowOperation(A21,[6,7],-3/2);
```

$$A22 := \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & P1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & P2 & 0 & 0 & 0 \\ 0 & 0 & 0 & P3 & P3 & 0 & -P3 & 0 & \frac{3}{20} P3 & -5 P3 \\ 1 & 0 & 0 & -\frac{3}{5} & 0 & 0 & \frac{3}{5} & 0 & -\frac{1}{20} & 6 \\ 0 & 0 & 1 & -\frac{6}{5} & 0 & -1 & \frac{6}{5} & 0 & -\frac{1}{20} & 2 \\ 0 & 0 & 0 & -1 & -1 & 0 & 1 & 1 & -\frac{3}{20} & 5 \\ 0 & 1 & 0 & 1 & 0 & 0 & -1 & 0 & \frac{1}{10} & 0 \end{bmatrix} \quad (8)$$

```
> # Done...
```