

> # Example 2: The DeWright Company  
with(LinearAlgebra):

> # Vars: x1 x2 x3 s1 e1 s2 e2 s3 e3 (and rhs)

A:=<<0,12,5,5>|<0,9,3,7>|<0,15,4,8>|<5,1,0,0>|<0,-1,0,0>|<4,0,1,0>|<2,0,-1,0>|<0,0,0,1>|<3,0,0,-1>|<0,125,40,55>>;

$$A := \begin{bmatrix} 0 & 0 & 0 & 5 & 0 & 4 & 2 & 0 & 3 & 0 \\ 12 & 9 & 15 & 1 & -1 & 0 & 0 & 0 & 0 & 125 \\ 5 & 3 & 4 & 0 & 0 & 1 & -1 & 0 & 0 & 40 \\ 5 & 7 & 8 & 0 & 0 & 0 & 0 & 1 & -1 & 55 \end{bmatrix}$$

(1)

> #

A2:=RowOperation(A,[1,2],-5):

A3:=RowOperation(A2,[1,3],-4):

$$A3 := \begin{bmatrix} -80 & -57 & -91 & 0 & 5 & 0 & 6 & 0 & 3 & -785 \\ 12 & 9 & 15 & 1 & -1 & 0 & 0 & 0 & 0 & 125 \\ 5 & 3 & 4 & 0 & 0 & 1 & -1 & 0 & 0 & 40 \\ 5 & 7 & 8 & 0 & 0 & 0 & 0 & 1 & -1 & 55 \end{bmatrix}$$

(2)

> #

evalf([125/9,40/4,55/8]);

[13.88888889, 10., 6.875000000]

(3)

> #

A4:=RowOperation(A3,4,1/8):

A5:=RowOperation(A4,[1,4],91):

A6:=RowOperation(A5,[2,4],-15):

A7:=RowOperation(A6,[3,4],-4):

$$A7 := \begin{bmatrix} -\frac{185}{8} & \frac{181}{8} & 0 & 0 & 5 & 0 & 6 & \frac{91}{8} & -\frac{67}{8} & -\frac{1275}{8} \\ \frac{21}{8} & -\frac{33}{8} & 0 & 1 & -1 & 0 & 0 & -\frac{15}{8} & \frac{15}{8} & \frac{175}{8} \\ \frac{5}{2} & -\frac{1}{2} & 0 & 0 & 0 & 1 & -1 & -\frac{1}{2} & \frac{1}{2} & \frac{25}{2} \\ \frac{5}{8} & \frac{7}{8} & 1 & 0 & 0 & 0 & 0 & \frac{1}{8} & -\frac{1}{8} & \frac{55}{8} \end{bmatrix}$$

(4)

> #

evalf([(175/8)/(21/8), (25/2)/(5/2), (55/8)/(5/8)]);

[8.333333333, 5., 11.]

(5)

> #

A8:=RowOperation(A7,3,2/5):

A9:=RowOperation(A8,[1,3],185/8):

A10:=RowOperation(A9,[2,3],-21/8):

**A11:=RowOperation(A10,[4,3],-5/8);**

$$A11 := \begin{bmatrix} 0 & 18 & 0 & 0 & 5 & \frac{37}{4} & -\frac{13}{4} & \frac{27}{4} & -\frac{15}{4} & -\frac{175}{4} \\ 0 & -\frac{18}{5} & 0 & 1 & -1 & -\frac{21}{20} & \frac{21}{20} & -\frac{27}{20} & \frac{27}{20} & \frac{35}{4} \\ 1 & -\frac{1}{5} & 0 & 0 & 0 & \frac{2}{5} & -\frac{2}{5} & -\frac{1}{5} & \frac{1}{5} & 5 \\ 0 & 1 & 1 & 0 & 0 & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{15}{4} \end{bmatrix}$$

(6)

**> evalf([(35/4)/(27/20),5/(1/5)]);**

[6.481481481, 25.]

(7)

**> #**

**A12:=RowOperation(A11,2,20/27):**

**A13:=RowOperation(A12,[1,2],15/4):**

**A14:=RowOperation(A13,[3,2],-1/5):**

**A15:=RowOperation(A14,[4,2],1/4);**

$$A15 := \begin{bmatrix} 0 & 8 & 0 & \frac{25}{9} & \frac{20}{9} & \frac{19}{3} & -\frac{1}{3} & 3 & 0 & -\frac{175}{9} \\ 0 & -\frac{8}{3} & 0 & \frac{20}{27} & -\frac{20}{27} & -\frac{7}{9} & \frac{7}{9} & -1 & 1 & \frac{175}{27} \\ 1 & \frac{1}{3} & 0 & -\frac{4}{27} & \frac{4}{27} & \frac{5}{9} & -\frac{5}{9} & 0 & 0 & \frac{100}{27} \\ 0 & \frac{1}{3} & 1 & \frac{5}{27} & -\frac{5}{27} & -\frac{4}{9} & \frac{4}{9} & 0 & 0 & \frac{145}{27} \end{bmatrix}$$

(8)

**> evalf([(175/27)/(7/9), (145/27)/(4/9)]);**

[8.333333333, 12.08333333]

(9)

**> A16:=RowOperation(A15,2,9/7):**

**A17:=RowOperation(A16,[1,2],1/3):**

**A18:=RowOperation(A17,[3,2],5/9):**

**A19:=RowOperation(A18,[4,2],-4/9);**

$$A19 := \begin{bmatrix} 0 & \frac{48}{7} & 0 & \frac{65}{21} & \frac{40}{21} & 6 & 0 & \frac{18}{7} & \frac{3}{7} & -\frac{50}{3} \\ 0 & -\frac{24}{7} & 0 & \frac{20}{21} & -\frac{20}{21} & -1 & 1 & -\frac{9}{7} & \frac{9}{7} & \frac{25}{3} \\ 1 & -\frac{11}{7} & 0 & \frac{8}{21} & -\frac{8}{21} & 0 & 0 & -\frac{5}{7} & \frac{5}{7} & \frac{25}{3} \\ 0 & \frac{13}{7} & 1 & -\frac{5}{21} & \frac{5}{21} & 0 & 0 & \frac{4}{7} & -\frac{4}{7} & \frac{5}{3} \end{bmatrix}$$

(10)

