```
n = 10;

M = Join[#1, {2 #1 [[1]] - 5 #1[[2]] + 3 * #[[9]]}] &[
    RandomInteger[{-2^12 + 1, 2^12 - 1}, {n - 1, n}]];

M = M.RandomInteger[{-2^12, 2^12}, {n, n}]
```

```
{{22 033 019, 18 759 626, 12 551 121, 8 236 735, 6 823 800, 4 329 159, -27 227 441,
  11 490 148, -20 981 791, -29 128 192}, {-23 964 879, -1 292 065, -19 062 758,
  7 471 538, 16 036 929, -23 137 046, 16 422 576, 44 461 640, 13 041 563, -2 982 650},
 {12 540 110, -9 907 425, 19 309 502, 33 181 103, -8 978 349, 209 669, -19 956 118,
  -16 041 382, 4 625 642, -2 423 538}, {46 674, -6 468 452, 20 864 399,
  11 590 070, -3 507 206, -8 125 745, 1 426 311, 4 109 451, -831 336, 27 889 191},
 {-34 243 680, -5 283 926, -29 347 021, 8 454 503, 12 301 554, -18 627 832, 11 648 871,
  28 546 263, 6 007 443, 35 326 671}, {-2 400 845, 7 352 966, -4 964 441, -22 245 745,
  -14 670 149, 5 534 958, 10 709 337, -8 755 080, -8 380 887, 13 971 244},
 {4 366 745, -10 289 082, 9 685 449, 1 484 733, 11 423 708, 550 886, -14 716 867,
  -2 681 969, 12 923 906, -24 063 890}, {-23 619 086, -9 212 098, 13 530 607,
  13 859 106, 15 957 737, -12 486 696, -13 405 997, 14 221 414, 11 583 418, 36 718 336},
 {-24 720 862, -21 394 582, -29 555 490, 48 062 628, -17 868 044, -9 447 215, -4 818 677,
  14 119 573, 9 168 215, -16 892 860}, {89 727 847, -20 204 169, 31 749 562, 123 303 664,
  -120 141 177, 96 001 903, -151 023 793, -156 969 185, -79 666 752, -94 021 714}}
```

```
Det[M]
```

```
0
```

```
-5.2603041191837888 * 10^17 / 341 272 800.00000000
```

$$-1.54138 \times 10^{9}$$

```
M = {{341 272 800, 715 806 110, -881 813 653,
     -313 519 859, -766 662 617, 618 200 379, -1 049 486 106},
    {1 034 956 222, 629 401 392, 218 701 622, 632 842 496, 974 610 836, -260 852 145, 401 314 462},
    {-165 829 693, 572 985 193, -328 448 449, -246 846 222, -885 978 834, 296 433 361, 482 092 629},
    {-119 853 942, -154 782 107, 182 078 750,
     -512 968 523, -544 686 498, -67 916 607, -876 199 241},
    {-70 311 972, 681 070 957, 361 240 186, -876 012 724, 281 776 824, -646 738 571, 923 305 625},
    {713 762 079, 507 879 350, 717 306 277, 705 536 178, -550 576 859, -474 272 126, -467 268 296},
    {1 376 229 022, 1 345 207 502, -663 112 031,
     319 322 637, 207 948 219, 357 348 234, -648 171 644}};
j =
  0;
```

```
Det[M]
```

```
0
```

```
% * 1.0
```

$$-1.11648 \times 10^{62}$$

```
Diagonal[Simplify[LUDecomposition[M]][[1]]] // N
```

$$\{-7.0312 \times 10^7,\ -1.03331 \times 10^9,\ 1.06937 \times 10^9,\ -2.36121 \times 10^8,\ 3.4488 \times 10^{10},\ -3.02501 \times 10^8,\ 5.83354 \times 10^8\}$$

```
Diagonal[M] // N
```

$$\{3.41273 \times 10^8,\ -1.54138 \times 10^9,\ 9.71272 \times 10^8,\ -5.54058 \times 10^8,\ 1.86866 \times 10^9,\ -3.6181 \times 10^8,\ 0.\}$$

```
[a, b, c]
```

$$\left(a^{-1+c}\right)^{-1+b}$$

```
j = 0;

For[i = 0, i < j, i++, s = M[[i + 1, j + 1]];
  For[k = 0, k < i, k++, s -= M[[i + 1, k + 1]] M[[k + 1, j + 1]]]; M[[i + 1, j + 1]] = s];
For[i = j, i < n, i++, s = M[[i + 1, j + 1]];
  For[k = 0, k < j, k++, s -= M[[i + 1, k + 1]] M[[k + 1, j + 1]]]; M[[i + 1, j + 1]] = s];
For[i = j + 1, j < n - 1 && i < n, i++, M[[i + 1, j + 1]] /= M[[j + 1, j + 1]]]; j++;

j
N[MatrixForm[M], 10]
```

7

$$\begin{pmatrix}
3.412728000 \times 10^8 & 7.158061100 \times 10^8 & -8.818136530 \times 10^8 & -3.135198590 \times 10^8 & -7.666626170 \times 10 \\
3.032636126 & -1.541378076 \times 10^9 & 2.892921562 \times 10^9 & 1.583634147 \times 10^9 & 3.299619585 \times 10 \\
-0.4859153528 & -0.5973916365 & 9.712719052 \times 10^8 & 5.468594596 \times 10^8 & 7.126531736 \times 10 \\
-0.3511968783 & -0.06267557958 & 0.05529253257 & -5.540577753 \times 10^8 & -6.465348447 \times 10 \\
-0.2060286434 & -0.5375368520 & 1.785919325 & 1.923972563 & 1.868663717 \times 10 \\
2.091470750 & 0.6417686920 & 0.7258598221 & 0.09388250556 & -0.8141138213 \\
4.032636126 & 1.000000000 & 0 & 0 & 0
\end{pmatrix}$$

```
N[Abs[M[[6, j + 1]]] - 0 × 1574591073.0000000`50, 50]
```

$$8.4995915336519124081611872359621451957887678060799 \times 10^8$$

```
123 452 267 * 300 022 123
```

37 038 411 234 502 841

```
M[[1 + 1, 0 + 1]] M[[0 + 1, 2 + 1]]
```

$$-\frac{306\,967\,926\,556\,933}{724\,958}$$

```
M[[1, 1]]
```

341 272 800

```
Min[M]
```

−1 182 213 881

```
For[i = 0, i < n, i++,
 For[j = 0, j < n, j++, Print["a[", i, "][", j, "]=", M[[i + 1, 1 + j]], ";\n"]]]
```

```
a[0][0]=22033019;

a[0][1]=18759626;

a[0][2]=12551121;

a[0][3]=8236735;

a[0][4]=6823800;

a[0][5]=4329159;

a[0][6]=-27227441;

a[0][7]=11490148;

a[0][8]=-20981791;

a[0][9]=-29128192;

a[1][0]=-23964879;

a[1][1]=-1292065;

a[1][2]=-19062758;

a[1][3]=7471538;

a[1][4]=16036929;

a[1][5]=-23137046;

a[1][6]=16422576;

a[1][7]=44461640;

a[1][8]=13041563;

a[1][9]=-2982650;
```

```
a[2][0]=12 540 110;

a[2][1]=-9 907 425;

a[2][2]=19 309 502;

a[2][3]=33 181 103;

a[2][4]=-8 978 349;

a[2][5]=209 669;

a[2][6]=-19 956 118;

a[2][7]=-16 041 382;

a[2][8]=4 625 642;

a[2][9]=-2 423 538;

a[3][0]=46 674;

a[3][1]=-6 468 452;

a[3][2]=20 864 399;

a[3][3]=11 590 070;

a[3][4]=-3 507 206;

a[3][5]=-8 125 745;

a[3][6]=1 426 311;

a[3][7]=4 109 451;

a[3][8]=-831 336;

a[3][9]=27 889 191;
```

```
a[4][0]=-34243680;

a[4][1]=-5283926;

a[4][2]=-29347021;

a[4][3]=8454503;

a[4][4]=12301554;

a[4][5]=-18627832;

a[4][6]=11648871;

a[4][7]=28546263;

a[4][8]=6007443;

a[4][9]=35326671;

a[5][0]=-2400845;

a[5][1]=7352966;

a[5][2]=-4964441;

a[5][3]=-22245745;

a[5][4]=-14670149;

a[5][5]=5534958;

a[5][6]=10709337;

a[5][7]=-8755080;

a[5][8]=-8380887;

a[5][9]=13971244;
```

```
a[6][0]=4 366 745;

a[6][1]=-10 289 082;

a[6][2]=9 685 449;

a[6][3]=1 484 733;

a[6][4]=11 423 708;

a[6][5]=550 886;

a[6][6]=-14 716 867;

a[6][7]=-2 681 969;

a[6][8]=12 923 906;

a[6][9]=-24 063 890;

a[7][0]=-23 619 086;

a[7][1]=-9 212 098;

a[7][2]=13 530 607;

a[7][3]=13 859 106;

a[7][4]=15 957 737;

a[7][5]=-12 486 696;

a[7][6]=-13 405 997;

a[7][7]=14 221 414;

a[7][8]=11 583 418;

a[7][9]=36 718 336;
```

```
a[8][0]=-24720862;

a[8][1]=-21394582;

a[8][2]=-29555490;

a[8][3]=48062628;

a[8][4]=-17868044;

a[8][5]=-9447215;

a[8][6]=-4818677;

a[8][7]=14119573;

a[8][8]=9168215;

a[8][9]=-16892860;

a[9][0]=89727847;

a[9][1]=-20204169;

a[9][2]=31749562;

a[9][3]=123303664;

a[9][4]=-120141177;

a[9][5]=96001903;

a[9][6]=-151023793;

a[9][7]=-156969185;

a[9][8]=-79666752;

a[9][9]=-94021714;
```