

Math 150:Lecture13:

Mathematicatutorial:Questions?Emailsjm1@williams.edu

```
Print[Hyperlink["https://www.youtube.com/watch?v=g1oj7CIqGM8"]]
Print[Hyperlink[
  "http://web.williams.edu/Mathematics/sjmiller/public_html/math/handouts/latex.
  htm"]] ]
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<https://www.youtube.com/watch?v=g1oj7CIqGM8>

http://web.williams.edu/Mathematics/sjmiller/public_html/math/handouts/latex.htm

Lecture on problem solving and coding

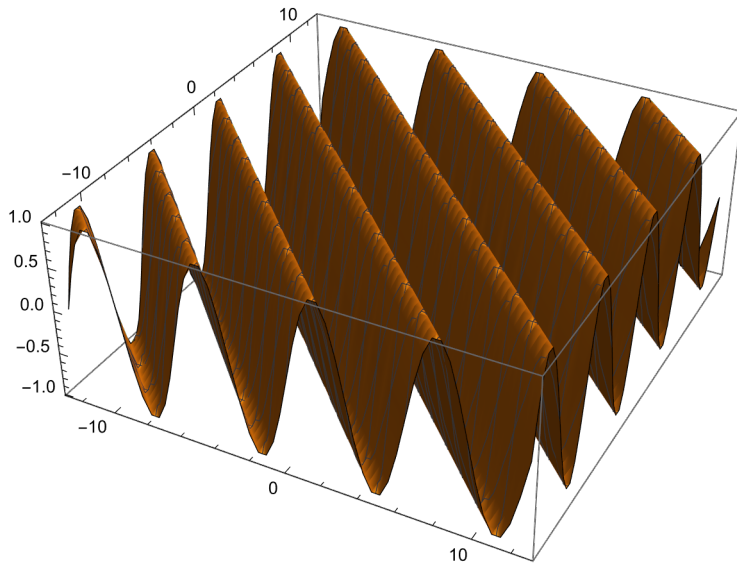
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Print[
  Hyperlink["https://web.williams.edu/Mathematics/sjmiller/public_html/341Fa21/
  mathematicaprograms/Math341_DiplomaProblems.nb"]]
Print[
  Hyperlink["https://web.williams.edu/Mathematics/sjmiller/public_html/341Fa21/
  mathematicaprograms/Math341_DiplomaProblems.pdf"]] ]
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https://web.williams.edu/Mathematics/sjmiller/public_html/341Fa21/mathematicaprograms/Math341_DiplomaProblems.nb

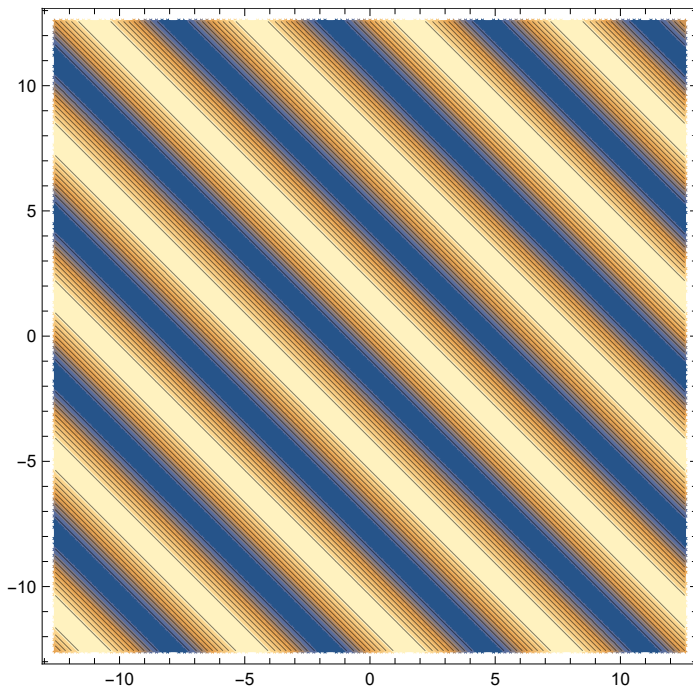
https://web.williams.edu/Mathematics/sjmiller/public_html/341Fa21/mathematicaprograms/Math341_DiplomaProblems.pdf

```
In[23]:= Cosine[x_] := Cos[x];
f[x_, y_] := Sin[x + y]
Plot3D[f[x, y],
  {x, -4 Pi, 4 Pi}, {y, -4 Pi, 4 Pi}]
ContourPlot[f[x, y],
  {x, -4 Pi, 4 Pi}, {y, -4 Pi, 4 Pi}]
```

Out[25]=

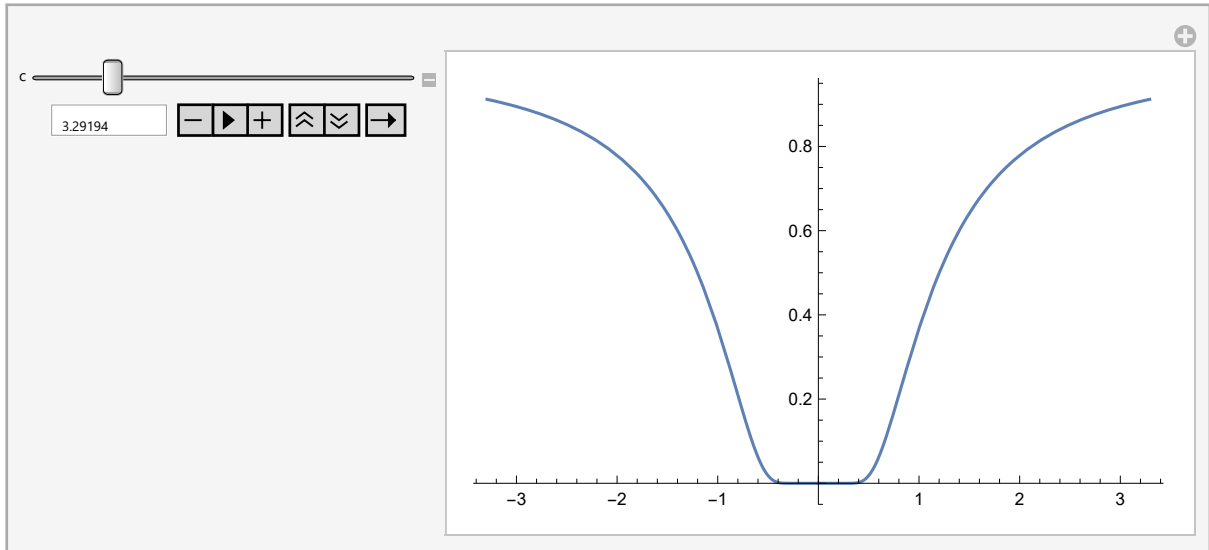


Out[26]=



```
In[30]:= g[x_] := If[x ≠ 0, Exp[-1/x^2], 0]
Manipulate[
  Plot[g[x], {x, -c, c}], {c, 4, .004}]
```

Out[31]=



In[113]=

```
Clear[x];
h[x_] := x^4 + Exp[x];
Simplify[D[g[x], {x, 2}]]
h1[x_] :=  $\frac{2 x \text{Exp}\left[-\frac{1}{x^2}\right]}{(x^2)^2}$ ;
Limit[h1[x], x → 0]
```

Out[115]=

$$\begin{cases} \frac{e^{-\frac{1}{x^2}} (4 - 6 x^2)}{x^6} & x \neq 0 \\ 0 & \text{True} \end{cases}$$

Out[117]=

0

In[112]:=

$$\text{Simplify} \left[\frac{(2x \text{Exp}[-\frac{1}{x^2}]) (2x)}{(x^2)^2 (x^2)^2} + \frac{2 \text{Exp}[-\frac{1}{x^2}]}{(x^2)^2} - \frac{(4x) (2x \text{Exp}[-\frac{1}{x^2}])}{(x^2)^3} \right]$$

Out[112]=

$$\frac{e^{-\frac{1}{x^2}} (4 - 6x^2)}{x^6}$$

In[118]:=

$$\text{D}[\text{Cos}[\text{Exp}[x^2 / (\text{Sin}[x]^2 - 11x + 1000 + x^5)]], x]$$

Out[118]=

$$- \frac{x^2}{e^{1000 - 11x + x^5 + \text{Sin}[x]^2}} \text{Sin}\left[\frac{x^2}{e^{1000 - 11x + x^5 + \text{Sin}[x]^2}} \right] \left(- \frac{x^2 (-11 + 5x^4 + 2 \text{Cos}[x] \text{Sin}[x])}{(1000 - 11x + x^5 + \text{Sin}[x]^2)^2} + \frac{2x}{1000 - 11x + x^5 + \text{Sin}[x]^2} \right)$$

In[124]:=

$$\text{Integrate}[x \text{Exp}[x], x]$$

$$\text{Integrate}[x^2 \text{Exp}[x], \{x, 1, 2\}]$$

Out[124]=

$$e^x (-1 + x)$$

Out[125]=

$$e (-1 + 2e)$$

In[129]:=

$$\text{Series}[\text{Exp}[y \text{Exp}[x + y]], \{x, 0, 10\}, \{y, 0, 10\}]$$

Out[129]=

$$\begin{aligned}
& \left(1 + y + \frac{3y^2}{2} + \frac{5y^3}{3} + \frac{41y^4}{24} + \frac{49y^5}{30} + \frac{1057y^6}{720} + \frac{3161y^7}{2520} + \frac{41393y^8}{40320} + \frac{5243y^9}{6480} + \frac{319703y^{10}}{518400} + 0[y]^{11} \right) + \\
& \left(y + 2y^2 + 3y^3 + \frac{23y^4}{6} + \frac{13y^5}{3} + \frac{179y^6}{40} + \frac{155y^7}{36} + \frac{19693y^8}{5040} + \frac{1063y^9}{315} + \frac{202669y^{10}}{72576} + 0[y]^{11} \right) x + \\
& \left(\frac{y}{2} + \frac{3y^2}{2} + 3y^3 + \frac{14y^4}{3} + \frac{37y^5}{6} + \frac{871y^6}{120} + \frac{703y^7}{90} + \frac{9851y^8}{1260} + \frac{9283y^9}{1260} + \frac{2393221y^{10}}{362880} + 0[y]^{11} \right) x^2 + \\
& \left(\frac{y}{6} + \frac{5y^2}{6} + \frac{13y^3}{6} + \frac{73y^4}{18} + \frac{56y^5}{9} + \frac{1493y^6}{180} + \frac{5363y^7}{540} + \frac{41267y^8}{3780} + \frac{302y^9}{27} + \frac{1175557y^{10}}{108864} + 0[y]^{11} \right) \\
& x^3 + \left(\frac{y}{24} + \frac{3y^2}{8} + \frac{5y^3}{4} + \frac{101y^4}{36} + \frac{179y^5}{36} + \frac{2689y^6}{360} + \right. \\
& \quad \left. \frac{21407y^7}{2160} + \frac{180287y^8}{15120} + \frac{200233y^9}{15120} + \frac{14972149y^{10}}{1088640} + 0[y]^{11} \right) x^4 + \\
& \left(\frac{y}{120} + \frac{17y^2}{120} + \frac{73y^3}{120} + \frac{589y^4}{360} + \frac{1201y^5}{360} + \frac{10129y^6}{1800} + \frac{3563y^7}{432} + \frac{818771y^8}{75600} + \frac{491663y^9}{37800} + \right. \\
& \quad \left. \frac{5637287y^{10}}{388800} + 0[y]^{11} \right) x^5 + \left(\frac{y}{720} + \frac{11y^2}{240} + \frac{31y^3}{120} + \frac{899y^4}{1080} + \frac{4207y^5}{2160} + \right. \\
& \quad \left. \frac{39739y^6}{10800} + \frac{385091y^7}{64800} + \frac{3854531y^8}{453600} + \frac{713629y^9}{64800} + \frac{15341113y^{10}}{1166400} + 0[y]^{11} \right) x^6 + \\
& \left(\frac{y}{5040} + \frac{13y^2}{1008} + \frac{493y^3}{5040} + \frac{5713y^4}{15120} + \frac{7661y^5}{7560} + \frac{10114y^6}{4725} + \frac{1724693y^7}{453600} + \right. \\
& \quad \left. \frac{18763397y^8}{3175200} + \frac{2619523y^9}{317520} + \frac{60236377y^{10}}{5715360} + 0[y]^{11} \right) x^7 + \\
& \left(\frac{y}{40320} + \frac{43y^2}{13440} + \frac{15y^3}{448} + \frac{1343y^4}{8640} + \frac{3613y^5}{7560} + \frac{42619y^6}{37800} + \frac{7981427y^7}{3628800} + \right. \\
& \quad \left. \frac{94237187y^8}{25401600} + \frac{141519883y^9}{25401600} + \frac{1738139903y^{10}}{228614400} + 0[y]^{11} \right) x^8 + \\
& \left(\frac{y}{362880} + \frac{257y^2}{362880} + \frac{3793y^3}{362880} + \frac{63829y^4}{1088640} + \frac{32173y^5}{155520} + \frac{2965369y^6}{5443200} + \frac{1523111y^7}{1306368} + \right. \\
& \quad \left. \frac{487353071y^8}{228614400} + \frac{28083067y^9}{8164800} + \frac{5152233073y^{10}}{1028764800} + 0[y]^{11} \right) x^9 + \\
& \left(\frac{y}{3628800} + \frac{19y^2}{134400} + \frac{1811y^3}{604800} + \frac{111359y^4}{5443200} + \frac{903337y^5}{10886400} + \frac{13275529y^6}{54432000} + \frac{186891251y^7}{326592000} + \right. \\
& \quad \left. \frac{2590585811y^8}{2286144000} + \frac{4486347073y^9}{2286144000} + \frac{62667537803y^{10}}{20575296000} + 0[y]^{11} \right) x^{10} + 0[x]^{11}
\end{aligned}$$

In[130]:=

? Dot

Out[130]:=

Symbol i

a.b.c or `Dot[a, b, c]` gives products of vectors, matrices, and tensors.

Documentation [Local »](#) | [Web »](#)

Attributes {Flat, OneIdentity, Protected}

Full Name System`Dot

^

In[152]:=

$$\mathbf{v} = \{1, 1\}; \mathbf{u} = \{1, -1\}; \mathbf{w} = \{x, y\};$$

$$\text{unitv} = \mathbf{v} / \text{Norm}[\mathbf{v}];$$

$$\mathbf{v} \cdot \mathbf{u}$$

$$\text{Norm}[\mathbf{w}]$$

$$\text{Norm}[\text{unitv}]$$

Out[154]:=

0

Out[155]:=

$$\sqrt{\text{Abs}[x]^2 + \text{Abs}[y]^2}$$

Out[156]:=

1

$$\mathbf{u} = \{1, 1, 1\}; \mathbf{v} = \{1, -1, 2\};$$

$$\text{Cross}[\mathbf{u}, \mathbf{v}] \cdot \mathbf{v}$$

Out[166]:=

0

In[183]:=

```
m = {{1, 2}, {3, 4}};
```

```
Print[MatrixForm[m]]
```

```
Det[m]
```

```
M = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
```

```
Print[MatrixForm[M]]
```

```
Det[M]
```

```
M4 = {{1, 2, 3, 4}, {5, 6, 7, 8},
```

```
      {9, 10, 11, 12}, {13, 14, 15, 16}};
```

```
MatrixForm[M4]
```

```
Det[M4]
```

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

Out[185]=

```
- 2
```

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

Out[188]=

```
0
```

Out[190]//MatrixForm=

$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{pmatrix}$$

Out[191]=

```
0
```

In[196]:=

```

bigmatrix[n_] := Module[{},
  list = {};
  (* this list will be our matrix *) ×
  For[i = 0, i ≤ n - 1, i++,
    {
      currrow = {}; (* the current row,
        initialized to zero *)
      For[j = 1, j ≤ n, j++,
        currrow = AppendTo[currrow, i * n + j];
      ]; (* end of the j loop *)
      list = AppendTo[list, currrow];
    }]; (* end of the i loop *)
  Print["n = ", n, " and matrix is ",
    MatrixForm[list], " and det = ", Det[list]];
] (* end of the module *)

```

In[197]:=

```

For[n = 1, n ≤ 20, n++, bigmatrix[n]]

```

n = 1 and matrix is (1) and det = 1

n = 2 and matrix is $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ and det = -2

n = 3 and matrix is $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$ and det = 0

n = 4 and matrix is $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{pmatrix}$ and det = 0

n = 5 and matrix is $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 6 & 7 & 8 & 9 & 10 \\ 11 & 12 & 13 & 14 & 15 \\ 16 & 17 & 18 & 19 & 20 \\ 21 & 22 & 23 & 24 & 25 \end{pmatrix}$ and det = 0

$$n = 6 \text{ and matrix is } \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 7 & 8 & 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 & 17 & 18 \\ 19 & 20 & 21 & 22 & 23 & 24 \\ 25 & 26 & 27 & 28 & 29 & 30 \\ 31 & 32 & 33 & 34 & 35 & 36 \end{pmatrix} \text{ and det} = 0$$

$$n = 7 \text{ and matrix is } \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 8 & 9 & 10 & 11 & 12 & 13 & 14 \\ 15 & 16 & 17 & 18 & 19 & 20 & 21 \\ 22 & 23 & 24 & 25 & 26 & 27 & 28 \\ 29 & 30 & 31 & 32 & 33 & 34 & 35 \\ 36 & 37 & 38 & 39 & 40 & 41 & 42 \\ 43 & 44 & 45 & 46 & 47 & 48 & 49 \end{pmatrix} \text{ and det} = 0$$

$$n = 8 \text{ and matrix is } \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 \\ 17 & 18 & 19 & 20 & 21 & 22 & 23 & 24 \\ 25 & 26 & 27 & 28 & 29 & 30 & 31 & 32 \\ 33 & 34 & 35 & 36 & 37 & 38 & 39 & 40 \\ 41 & 42 & 43 & 44 & 45 & 46 & 47 & 48 \\ 49 & 50 & 51 & 52 & 53 & 54 & 55 & 56 \\ 57 & 58 & 59 & 60 & 61 & 62 & 63 & 64 \end{pmatrix} \text{ and det} = 0$$

$$n = 9 \text{ and matrix is } \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 \\ 19 & 20 & 21 & 22 & 23 & 24 & 25 & 26 & 27 \\ 28 & 29 & 30 & 31 & 32 & 33 & 34 & 35 & 36 \\ 37 & 38 & 39 & 40 & 41 & 42 & 43 & 44 & 45 \\ 46 & 47 & 48 & 49 & 50 & 51 & 52 & 53 & 54 \\ 55 & 56 & 57 & 58 & 59 & 60 & 61 & 62 & 63 \\ 64 & 65 & 66 & 67 & 68 & 69 & 70 & 71 & 72 \\ 73 & 74 & 75 & 76 & 77 & 78 & 79 & 80 & 81 \end{pmatrix} \text{ and det} = 0$$

$$n = 10 \text{ and matrix is } \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\ 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19 & 20 \\ 21 & 22 & 23 & 24 & 25 & 26 & 27 & 28 & 29 & 30 \\ 31 & 32 & 33 & 34 & 35 & 36 & 37 & 38 & 39 & 40 \\ 41 & 42 & 43 & 44 & 45 & 46 & 47 & 48 & 49 & 50 \\ 51 & 52 & 53 & 54 & 55 & 56 & 57 & 58 & 59 & 60 \\ 61 & 62 & 63 & 64 & 65 & 66 & 67 & 68 & 69 & 70 \\ 71 & 72 & 73 & 74 & 75 & 76 & 77 & 78 & 79 & 80 \\ 81 & 82 & 83 & 84 & 85 & 86 & 87 & 88 & 89 & 90 \\ 91 & 92 & 93 & 94 & 95 & 96 & 97 & 98 & 99 & 100 \end{pmatrix} \text{ and det} = 0$$

$$n = 11 \text{ and matrix is } \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \\ 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19 & 20 & 21 & 22 \\ 23 & 24 & 25 & 26 & 27 & 28 & 29 & 30 & 31 & 32 & 33 \\ 34 & 35 & 36 & 37 & 38 & 39 & 40 & 41 & 42 & 43 & 44 \\ 45 & 46 & 47 & 48 & 49 & 50 & 51 & 52 & 53 & 54 & 55 \\ 56 & 57 & 58 & 59 & 60 & 61 & 62 & 63 & 64 & 65 & 66 \\ 67 & 68 & 69 & 70 & 71 & 72 & 73 & 74 & 75 & 76 & 77 \\ 78 & 79 & 80 & 81 & 82 & 83 & 84 & 85 & 86 & 87 & 88 \\ 89 & 90 & 91 & 92 & 93 & 94 & 95 & 96 & 97 & 98 & 99 \\ 100 & 101 & 102 & 103 & 104 & 105 & 106 & 107 & 108 & 109 & 110 \\ 111 & 112 & 113 & 114 & 115 & 116 & 117 & 118 & 119 & 120 & 121 \end{pmatrix} \text{ and det} = 0$$

n = 12 and matrix is

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 & 17 & 18 & 19 & 20 & 21 & 22 & 23 & 24 \\ 25 & 26 & 27 & 28 & 29 & 30 & 31 & 32 & 33 & 34 & 35 & 36 \\ 37 & 38 & 39 & 40 & 41 & 42 & 43 & 44 & 45 & 46 & 47 & 48 \\ 49 & 50 & 51 & 52 & 53 & 54 & 55 & 56 & 57 & 58 & 59 & 60 \\ 61 & 62 & 63 & 64 & 65 & 66 & 67 & 68 & 69 & 70 & 71 & 72 \\ 73 & 74 & 75 & 76 & 77 & 78 & 79 & 80 & 81 & 82 & 83 & 84 \\ 85 & 86 & 87 & 88 & 89 & 90 & 91 & 92 & 93 & 94 & 95 & 96 \\ 97 & 98 & 99 & 100 & 101 & 102 & 103 & 104 & 105 & 106 & 107 & 108 \\ 109 & 110 & 111 & 112 & 113 & 114 & 115 & 116 & 117 & 118 & 119 & 120 \\ 121 & 122 & 123 & 124 & 125 & 126 & 127 & 128 & 129 & 130 & 131 & 132 \\ 133 & 134 & 135 & 136 & 137 & 138 & 139 & 140 & 141 & 142 & 143 & 144 \end{pmatrix}$$

and det = 0

n = 13 and matrix is

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 \\ 14 & 15 & 16 & 17 & 18 & 19 & 20 & 21 & 22 & 23 & 24 & 25 & 26 \\ 27 & 28 & 29 & 30 & 31 & 32 & 33 & 34 & 35 & 36 & 37 & 38 & 39 \\ 40 & 41 & 42 & 43 & 44 & 45 & 46 & 47 & 48 & 49 & 50 & 51 & 52 \\ 53 & 54 & 55 & 56 & 57 & 58 & 59 & 60 & 61 & 62 & 63 & 64 & 65 \\ 66 & 67 & 68 & 69 & 70 & 71 & 72 & 73 & 74 & 75 & 76 & 77 & 78 \\ 79 & 80 & 81 & 82 & 83 & 84 & 85 & 86 & 87 & 88 & 89 & 90 & 91 \\ 92 & 93 & 94 & 95 & 96 & 97 & 98 & 99 & 100 & 101 & 102 & 103 & 104 \\ 105 & 106 & 107 & 108 & 109 & 110 & 111 & 112 & 113 & 114 & 115 & 116 & 117 \\ 118 & 119 & 120 & 121 & 122 & 123 & 124 & 125 & 126 & 127 & 128 & 129 & 130 \\ 131 & 132 & 133 & 134 & 135 & 136 & 137 & 138 & 139 & 140 & 141 & 142 & 143 \\ 144 & 145 & 146 & 147 & 148 & 149 & 150 & 151 & 152 & 153 & 154 & 155 & 156 \\ 157 & 158 & 159 & 160 & 161 & 162 & 163 & 164 & 165 & 166 & 167 & 168 & 169 \end{pmatrix}$$

and det = 0

n = 14 and matrix is

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 \\ 15 & 16 & 17 & 18 & 19 & 20 & 21 & 22 & 23 & 24 & 25 & 26 & 27 & 28 \\ 29 & 30 & 31 & 32 & 33 & 34 & 35 & 36 & 37 & 38 & 39 & 40 & 41 & 42 \\ 43 & 44 & 45 & 46 & 47 & 48 & 49 & 50 & 51 & 52 & 53 & 54 & 55 & 56 \\ 57 & 58 & 59 & 60 & 61 & 62 & 63 & 64 & 65 & 66 & 67 & 68 & 69 & 70 \\ 71 & 72 & 73 & 74 & 75 & 76 & 77 & 78 & 79 & 80 & 81 & 82 & 83 & 84 \\ 85 & 86 & 87 & 88 & 89 & 90 & 91 & 92 & 93 & 94 & 95 & 96 & 97 & 98 \\ 99 & 100 & 101 & 102 & 103 & 104 & 105 & 106 & 107 & 108 & 109 & 110 & 111 & 112 \\ 113 & 114 & 115 & 116 & 117 & 118 & 119 & 120 & 121 & 122 & 123 & 124 & 125 & 126 \\ 127 & 128 & 129 & 130 & 131 & 132 & 133 & 134 & 135 & 136 & 137 & 138 & 139 & 140 \\ 141 & 142 & 143 & 144 & 145 & 146 & 147 & 148 & 149 & 150 & 151 & 152 & 153 & 154 \\ 155 & 156 & 157 & 158 & 159 & 160 & 161 & 162 & 163 & 164 & 165 & 166 & 167 & 168 \\ 169 & 170 & 171 & 172 & 173 & 174 & 175 & 176 & 177 & 178 & 179 & 180 & 181 & 182 \\ 183 & 184 & 185 & 186 & 187 & 188 & 189 & 190 & 191 & 192 & 193 & 194 & 195 & 196 \end{pmatrix}$$

and det = 0

n = 18 and matrix is

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162
163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234
235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306
307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324

and det = 0

n = 19 and matrix is

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114
115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152
153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171
172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228
229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247
248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266
267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285
286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304
305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342
343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361

and det = 0

n = 20 and matrix is

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
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381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400

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In[198]:=

bigmatrix[150]

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601	602	603	604	605	606	607	608	609	610	611	6
751	752	753	754	755	756	757	758	759	760	761	7
901	902	903	904	905	906	907	908	909	910	911	9
1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	10
1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	12
1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	13
1501	1502	1503	1504	1505	1506	1507	1508	1509	1510	1511	15
1651	1652	1653	1654	1655	1656	1657	1658	1659	1660	1661	16
1801	1802	1803	1804	1805	1806	1807	1808	1809	1810	1811	18
1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	19
2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	21
2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	22
2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	24
2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	25
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2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	28
3001	3002	3003	3004	3005	3006	3007	3008	3009	3010	3011	30
3151	3152	3153	3154	3155	3156	3157	3158	3159	3160	3161	31
3301	3302	3303	3304	3305	3306	3307	3308	3309	3310	3311	33
3451	3452	3453	3454	3455	3456	3457	3458	3459	3460	3461	34
3601	3602	3603	3604	3605	3606	3607	3608	3609	3610	3611	36
3751	3752	3753	3754	3755	3756	3757	3758	3759	3760	3761	37
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4051	4052	4053	4054	4055	4056	4057	4058	4059	4060	4061	40
4201	4202	4203	4204	4205	4206	4207	4208	4209	4210	4211	42

4351	4352	4353	4354	4355	4356	4357	4358	4359	4360	4361	43
4501	4502	4503	4504	4505	4506	4507	4508	4509	4510	4511	45
4651	4652	4653	4654	4655	4656	4657	4658	4659	4660	4661	46
4801	4802	4803	4804	4805	4806	4807	4808	4809	4810	4811	48
4951	4952	4953	4954	4955	4956	4957	4958	4959	4960	4961	49
5101	5102	5103	5104	5105	5106	5107	5108	5109	5110	5111	51
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5401	5402	5403	5404	5405	5406	5407	5408	5409	5410	5411	54
5551	5552	5553	5554	5555	5556	5557	5558	5559	5560	5561	55
5701	5702	5703	5704	5705	5706	5707	5708	5709	5710	5711	57
5851	5852	5853	5854	5855	5856	5857	5858	5859	5860	5861	58
6001	6002	6003	6004	6005	6006	6007	6008	6009	6010	6011	60
6151	6152	6153	6154	6155	6156	6157	6158	6159	6160	6161	61
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6451	6452	6453	6454	6455	6456	6457	6458	6459	6460	6461	64
6601	6602	6603	6604	6605	6606	6607	6608	6609	6610	6611	66
6751	6752	6753	6754	6755	6756	6757	6758	6759	6760	6761	67
6901	6902	6903	6904	6905	6906	6907	6908	6909	6910	6911	69
7051	7052	7053	7054	7055	7056	7057	7058	7059	7060	7061	70
7201	7202	7203	7204	7205	7206	7207	7208	7209	7210	7211	72
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7501	7502	7503	7504	7505	7506	7507	7508	7509	7510	7511	75
7651	7652	7653	7654	7655	7656	7657	7658	7659	7660	7661	76
7801	7802	7803	7804	7805	7806	7807	7808	7809	7810	7811	78
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8101	8102	8103	8104	8105	8106	8107	8108	8109	8110	8111	81
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8701	8702	8703	8704	8705	8706	8707	8708	8709	8710	8711	87
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9001	9002	9003	9004	9005	9006	9007	9008	9009	9010	9011	90
9151	9152	9153	9154	9155	9156	9157	9158	9159	9160	9161	91
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9451	9452	9453	9454	9455	9456	9457	9458	9459	9460	9461	94
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9751	9752	9753	9754	9755	9756	9757	9758	9759	9760	9761	97
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20551	20552	20553	20554	20555	20556	20557	20558	20559	20560	20561	20
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21001	21002	21003	21004	21005	21006	21007	21008	21009	21010	21011	21
21151	21152	21153	21154	21155	21156	21157	21158	21159	21160	21161	21

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21 451	21 452	21 453	21 454	21 455	21 456	21 457	21 458	21 459	21 460	21 461	21
21 601	21 602	21 603	21 604	21 605	21 606	21 607	21 608	21 609	21 610	21 611	21
21 751	21 752	21 753	21 754	21 755	21 756	21 757	21 758	21 759	21 760	21 761	21
21 901	21 902	21 903	21 904	21 905	21 906	21 907	21 908	21 909	21 910	21 911	21
22 051	22 052	22 053	22 054	22 055	22 056	22 057	22 058	22 059	22 060	22 061	22
22 201	22 202	22 203	22 204	22 205	22 206	22 207	22 208	22 209	22 210	22 211	22
22 351	22 352	22 353	22 354	22 355	22 356	22 357	22 358	22 359	22 360	22 361	22