

# Un calcul de puissance avec Maxima

Instructions exécutées avec Maxima 5.12.0 à l'intérieur de Texmacs

```
Maxima 5.12.0 http://maxima.sourceforge.net
Using Lisp GNU Common Lisp (GCL) GCL 2.6.7 (aka GCL)
Distributed under the GNU Public License. See the file COPYING.
Dedicated to the memory of William Schelter.
This is a development version of Maxima. The function bug_report()
provides bug reporting information.
```

```
(%i1) P:genmatrix(lambda([i,j],0),7,7);
```

$$(%o1) \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

```
(%i2) P[1,6]:1/2;P[1,7]:1/2;
```

$$(%o2) \frac{1}{2}$$
$$(%o3) \frac{1}{2}$$

```
(%i4) for i from 2 thru 7 do P[i,i-1]:1;
```

```
(%o4) done
```

```
(%i5) P;
```

$$(%o5) \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{2} \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \end{pmatrix}$$

P est elle régulière ?

```
(%i6) P^^36;
```

$$(%o9) \begin{pmatrix} \frac{1}{64} & \frac{3}{32} & \frac{15}{64} & \frac{5}{16} & \frac{15}{64} & \frac{3}{32} & \frac{1}{64} \\ \frac{1}{32} & \frac{1}{16} & \frac{3}{8} & \frac{15}{32} & \frac{5}{16} & \frac{15}{32} & \frac{5}{64} \\ \frac{5}{32} & \frac{1}{16} & \frac{1}{8} & \frac{3}{16} & \frac{15}{32} & \frac{5}{16} & \frac{5}{64} \\ \frac{32}{32} & \frac{32}{32} & \frac{64}{32} & \frac{32}{16} & \frac{64}{32} & \frac{16}{16} & \frac{32}{32} \\ \frac{5}{32} & \frac{5}{32} & \frac{1}{16} & \frac{1}{8} & \frac{3}{16} & \frac{15}{32} & \frac{5}{64} \\ \frac{16}{32} & \frac{32}{32} & \frac{32}{32} & \frac{64}{32} & \frac{32}{16} & \frac{64}{32} & \frac{32}{64} \\ \frac{5}{16} & \frac{5}{16} & \frac{5}{16} & \frac{5}{8} & \frac{1}{16} & \frac{1}{8} & \frac{1}{64} \\ \frac{32}{16} & \frac{16}{16} & \frac{16}{16} & \frac{32}{32} & \frac{32}{32} & \frac{64}{32} & \frac{64}{64} \\ \frac{1}{32} & \frac{5}{32} & \frac{5}{16} & \frac{5}{8} & \frac{5}{32} & \frac{1}{16} & 0 \end{pmatrix}$$

(%i10)  $P^{37};$

$$(%o7) \begin{pmatrix} \frac{3}{32} & \frac{15}{64} & \frac{5}{16} & \frac{15}{64} & \frac{3}{32} & \frac{3}{128} & \frac{1}{128} \\ \frac{1}{32} & \frac{3}{64} & \frac{15}{16} & \frac{5}{64} & \frac{15}{32} & \frac{3}{128} & \frac{1}{128} \\ \frac{64}{1} & \frac{32}{3} & \frac{64}{15} & \frac{16}{5} & \frac{64}{15} & \frac{32}{3} & \frac{64}{5} \\ \frac{1}{64} & \frac{1}{32} & \frac{3}{15} & \frac{1}{5} & \frac{1}{15} & \frac{1}{5} & \frac{1}{5} \\ \frac{32}{32} & \frac{64}{1} & \frac{32}{3} & \frac{64}{15} & \frac{16}{5} & \frac{64}{5} & \frac{64}{5} \\ \frac{5}{32} & \frac{1}{32} & \frac{1}{15} & \frac{3}{5} & \frac{15}{5} & \frac{5}{15} & \frac{5}{5} \\ \frac{32}{5} & \frac{32}{5} & \frac{64}{1} & \frac{32}{1} & \frac{64}{3} & \frac{16}{15} & \frac{32}{5} \\ \frac{5}{32} & \frac{5}{32} & \frac{1}{5} & \frac{1}{1} & \frac{3}{1} & \frac{15}{3} & \frac{5}{5} \\ \frac{16}{5} & \frac{32}{5} & \frac{32}{5} & \frac{64}{1} & \frac{32}{1} & \frac{64}{3} & \frac{32}{5} \\ \frac{5}{16} & \frac{16}{5} & \frac{32}{5} & \frac{32}{5} & \frac{64}{1} & \frac{32}{1} & \frac{64}{1} \\ \frac{5}{32} & \frac{5}{16} & \frac{16}{16} & \frac{32}{32} & \frac{32}{32} & \frac{64}{64} & \frac{64}{64} \end{pmatrix}$$

(%i8)