```
> with(LinearAlgebra):
> A:=Matrix([[0,1,0,1],[1,0,2,1],[0,2,0,0],[1,1,0,0]]);
```

$$A := \begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 2 & 1 \\ 0 & 2 & 0 & 0 \\ 1 & 1 & 0 & 0 \end{bmatrix} \qquad (1)$$

```
> A^2;
```

$$\begin{bmatrix} 2 & 1 & 2 & 1 \\ 1 & 6 & 0 & 1 \\ 2 & 0 & 4 & 2 \\ 1 & 1 & 2 & 2 \end{bmatrix} \qquad (2)$$

```
> A^3;
```

$$\begin{bmatrix} 2 & 7 & 2 & 3 \\ 7 & 2 & 12 & 7 \\ 2 & 12 & 0 & 2 \\ 3 & 7 & 2 & 2 \end{bmatrix} \qquad (3)$$

```
> M:=(IdentityMatrix(4)-x*A)^(-1);
```

$$M := \left[\left[-\frac{5x^2-1}{4x^4-2x^3-7x^2+1}, \frac{x}{4x^3-6x^2-x+1}, \frac{2x^2}{4x^3-6x^2-x+1}, \right.\right. \qquad (4)$$
$$\left. -\frac{x(4x^2-x-1)}{4x^4-2x^3-7x^2+1} \right],$$
$$\left[\frac{x}{4x^3-6x^2-x+1}, -\frac{x-1}{4x^3-6x^2-x+1}, -\frac{2x(x-1)}{4x^3-6x^2-x+1}, \frac{x}{4x^3-6x^2-x+1} \right],$$
$$\left[\frac{2x^2}{4x^3-6x^2-x+1}, -\frac{2x(x-1)}{4x^3-6x^2-x+1}, -\frac{(2x-1)(x+1)}{4x^3-6x^2-x+1}, \frac{2x^2}{4x^3-6x^2-x+1} \right],$$
$$\left.\left[-\frac{x(4x^2-x-1)}{4x^4-2x^3-7x^2+1}, \frac{x}{4x^3-6x^2-x+1}, \frac{2x^2}{4x^3-6x^2-x+1}, \right.\right.$$
$$\left.\left. -\frac{5x^2-1}{4x^4-2x^3-7x^2+1} \right]\right]$$

```
> d:=4*x^4 - 2*x^3 - 7*x^2 + 1;
```

$$d := 4x^4 - 2x^3 - 7x^2 + 1 \qquad (5)$$

```
> simplify(M*d);
```

$$
\begin{bmatrix}
-5\,x^2+1 & x\,(x+1) & 2\,x^2\,(x+1) & -4\,x^3+x^2+x \\
x\,(x+1) & -x^2+1 & -2\,x^3+2\,x & x\,(x+1) \\
2\,x^2\,(x+1) & -2\,x^3+2\,x & -2\,x^3-3\,x^2+1 & 2\,x^2\,(x+1) \\
-4\,x^3+x^2+x & x\,(x+1) & 2\,x^2\,(x+1) & -5\,x^2+1
\end{bmatrix}
\tag{6}
$$

```
> w:=M[1,3];
```

$$
w := \frac{2\,x^2}{4\,x^3-6\,x^2-x+1}
\tag{7}
$$

```
> series(w,x=0);
```

$$
2\,x^2+2\,x^3+14\,x^4+18\,x^5+\mathrm{O}\!\left(x^6\right)
\tag{8}
$$

```
> series(w,x=0,50);
```

$2\,x^2+2\,x^3+14\,x^4+18\,x^5+94\,x^6+146\,x^7+638\,x^8+1138\,x^9+4382\,x^{10}+8658\,x^{11}$ **(9)**
$+30398\,x^{12}+64818\,x^{13}+212574\,x^{14}+479890\,x^{15}+1496062\,x^{16}+3525106\,x^{17}$
$+10581918\,x^{18}+25748306\,x^{19}+75139390\,x^{20}+187301554\,x^{21}+535144670\,x^{22}$
$+1358396434\,x^{23}+3820058238\,x^{24}+9829858162\,x^{25}+27316621854\,x^{26}$
$+71015537874\,x^{27}+195595836350\,x^{28}+512422576178\,x^{29}+1401935442782\,x^{30}$
$+3694087554450\,x^{31}+10056009906430\,x^{32}+26612793462002\,x^{33}$
$+72172502682782\,x^{34}+191625223829074\,x^{35}+518209066077758\,x^{36}$
$+1379270398321074\,x^{37}+3722023899471326\,x^{38}+9924810025086738\,x^{39}$
$+26739871828630398\,x^{40}+71400636381265522\,x^{41}+192140627252700958\,x^{42}$
$+513584958225772498\,x^{43}+1380826176216916158\,x^{44}+3693773416560747314\,x^{45}$
$+9924390640959154270\,x^{46}+26563726435455973522\,x^{47}$
$+71334976614967909886\,x^{48}+191019772663867133938\,x^{49}+\mathrm{O}\!\left(x^{50}\right)$