```
> restart;
```

```
> with(linalg);
```

[*BlockDiagonal*, *GramSchmidt*, *JordanBlock*, *LUdecomp*, *QRdecomp*, *Wronskian*, *addcol*, *addrow*, *adj*, *adjoint*, *angle*, *augment*, *backsub*, *band*, *basis*, *bezout*, *blockmatrix*, *charmat*, *charpoly*, *cholesky*, *col*, *coldim*, *colspace*, *colspan*, *companion*, *concat*, *cond*, *copyinto*, *crossprod*, *curl*, *definite*, *delcols*, *delrows*, *det*, *diag*, *diverge*, *dotprod*, *eigenvals*, *eigenvalues*, *eigenvectors*, *eigenvects*, *entermatrix*, *equal*, *exponential*, *extend*, *ffgausselim*, *fibonacci*, *forwardsub*, *frobenius*, *gausselim*, *gaussjord*, *geneqns*, *genmatrix*, *grad*, *hadamard*, *hermite*, *hessian*, *hilbert*, *htranspose*, *ihermite*, *indexfunc*, *innerprod*, *intbasis*, *inverse*, *ismith*, *issimilar*, *iszero*, *jacobian*, *jordan*, *kernel*, *laplacian*, *leastsqrs*, *linsolve*, *matadd*, *matrix*, *minor*, *minpoly*, *mulcol*, *mulrow*, *multiply*, *norm*, *normalize*, *nullspace*, *orthog*, *permanent*, *pivot*, *potential*, *randmatrix*, *randvector*, *rank*, *ratform*, *row*, *rowdim*, *rowspace*, *rowspan*, *rref*, *scalarmul*, *singularvals*, *smith*, *stackmatrix*, *submatrix*, *subvector*, *sumbasis*, *swapcol*, *swaprow*, *sylvester*, *toeplitz*, *trace*, *transpose*, *vandermonde*, *vecpotent*, *vectdim*, *vector*, *wronskian*] **(1)**

```
> M0 := Matrix([[1, 0, 0, 0, 0, 0], [0, 1, 0, 0, 0, 0], [0, 0, 1, 0, 0, 0], [0, 0, 0, 1, 0, 0], [0, 0, 0, 0,
    1, 0], [0, 0, 0, 0, 0, 1]]);
```

$$M0 := \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \quad \textbf{(2)}$$

```
> M1 := Matrix([[0, 1, 1, 0, 0, 0], [s, s - 1, 0, 0, 1, 0], [s·(t2 + 1), 0, s - 1, t2 + 1, 1, 0], [0,
    0, s·t2, (s - 1)·(t2 + 1), 0, 1], [0, s·(t2 + 1), s, 0, 2·(s - 1), t2 + 1], [0, 0, 0, s, s·t2, (s
    - 1)·(t2 + 2)]]);
```

$$M1 := \begin{bmatrix} 0 & 1 & 1 & 0 & 0 & 0 \\ s & s-1 & 0 & 0 & 1 & 0 \\ s\,(t2+1) & 0 & s-1 & t2+1 & 1 & 0 \\ 0 & 0 & s\,t2 & (s-1)\,(t2+1) & 0 & 1 \\ 0 & s\,(t2+1) & s & 0 & 2\,s-2 & t2+1 \\ 0 & 0 & 0 & s & s\,t2 & (s-1)\,(t2+2) \end{bmatrix} \quad \textbf{(3)}$$

```
> eigvals1 := eigenvalues(M1);
```

(4)

$$eigvals1 := -t2 - 2,\ s - 2,\ 2\,s - 1,\ -t2 - 1 + s,\ s\,t2 + 2\,s,\ s\,t2 + s - 1 \tag{4}$$

> $l1 := -t2 - 2;$

$$l1 := -t2 - 2 \tag{5}$$

> $l2 := -t2 - 1 + s;$

$$l2 := -t2 - 1 + s \tag{6}$$

> $l3 := s - 2;$

$$l3 := s - 2 \tag{7}$$

> $l4 := 2 \cdot s - 1;$

$$l4 := 2\,s - 1 \tag{8}$$

> $l5 := s \cdot t2 + s - 1;$

$$l5 := s\,t2 + s - 1 \tag{9}$$

> $l6 := s \cdot t2 + 2 \cdot s;$

$$l6 := s\,t2 + 2\,s \tag{10}$$

> $e1 := (s + 1)^2 \cdot (s \cdot t2 + 1);$

$$e1 := (1 + s)^2\ (s\,t2 + 1) \tag{11}$$

> $e2 := 0;$

$$e2 := 0 \tag{12}$$

> $e3 := expand(evalm([0, 1, 1, 0, 0, 0].M1)[1] \cdot e1);$

$$e3 := s^4\,t2^2 + 2\,s^4\,t2 + 2\,s^3\,t2^2 + 5\,s^3\,t2 + s^2\,t2^2 + 2\,s^3 + 4\,s^2\,t2 + 4\,s^2 + s\,t2 + 2\,s \tag{13}$$

> $e4 := expand(evalm([0, 1, 1, 0, 0, 0].M1^2)[1] \cdot e1);$

$$e4 := s^5\,t2^2 + 2\,s^5\,t2 + s^4\,t2^2 + 3\,s^4\,t2 - s^3\,t2^2 + 2\,s^4 - s^3\,t2 - s^2\,t2^2 + 2\,s^3 - 3\,s^2\,t2 - 2\,s^2 - s\,t2 - 2\,s \tag{14}$$

> $e5 := expand(evalm([0, 1, 1, 0, 0, 0].M1^3)[1] \cdot e1);$

$$e5 := s^5\,t2^4 + s^6\,t2^2 + 3\,s^5\,t2^3 + 2\,s^4\,t2^4 + 2\,s^6\,t2 + 9\,s^5\,t2^2 + 7\,s^4\,t2^3 + s^3\,t2^4 + 9\,s^5\,t2 + 19\,s^4\,t2^2 + 5\,s^3\,t2^3 + 2\,s^5 + 21\,s^4\,t2 + 15\,s^3\,t2^2 + s^2\,t2^3 + 8\,s^4 + 24\,s^3\,t2 + 4\,s^2\,t2^2 + 12\,s^3 + 11\,s^2\,t2 + 8\,s^2 + s\,t2 + 2\,s \tag{15}$$

> $e6 := expand(evalm([0, 1, 1, 0, 0, 0].M1^4)[1] \cdot e1);$

$$e6 := s^6\,t2^5 + 5\,s^6\,t2^4 + s^5\,t2^5 + s^7\,t2^2 + 9\,s^6\,t2^3 + 6\,s^5\,t2^4 - s^4\,t2^5 + 2\,s^7\,t2 + 26\,s^6\,t2^2 + 14\,s^5\,t2^3 - 4\,s^4\,t2^4 - s^3\,t2^5 + 23\,s^6\,t2 + 34\,s^5\,t2^2 - 4\,s^4\,t2^3 - 6\,s^3\,t2^4 + 2\,s^6 + 46\,s^5\,t2 - 16\,s^4\,t2^2 - 14\,s^3\,t2^3 - s^2\,t2^4 + 22\,s^5 + 5\,s^4\,t2 - 35\,s^3\,t2^2 - 5\,s^2\,t2^3 + 20\,s^4 - 47\,s^3\,t2 - 10\,s^2\,t2^2 - 20\,s^3 - 28\,s^2\,t2 - 22\,s^2 - s\,t2 - 2\,s \tag{16}$$

```
> V := transpose(vandermonde([l1, l2, l3, l4, l5, l6]));
```

$$V := \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ -t2-2 & -t2-1+s & s-2 & 2s-1 & s\,t2+s-1 & s\,t2+2s \\ (-t2-2)^2 & (-t2-1+s)^2 & (s-2)^2 & (2s-1)^2 & (s\,t2+s-1)^2 & (s\,t2+2s)^2 \\ (-t2-2)^3 & (-t2-1+s)^3 & (s-2)^3 & (2s-1)^3 & (s\,t2+s-1)^3 & (s\,t2+2s)^3 \\ (-t2-2)^4 & (-t2-1+s)^4 & (s-2)^4 & (2s-1)^4 & (s\,t2+s-1)^4 & (s\,t2+2s)^4 \\ (-t2-2)^5 & (-t2-1+s)^5 & (s-2)^5 & (2s-1)^5 & (s\,t2+s-1)^5 & (s\,t2+2s)^5 \end{bmatrix} \quad \textbf{(17)}$$

```
> W := simplify(evalm( inverse(V).transpose(Matrix([e1, e2, e3, e4, e5, e6]))));
```

$$W := \begin{bmatrix} \frac{s^3\,(s\,t2+1)}{s+t2} \\ \frac{(s\,t2+1)\,s^2}{s+t2} \\ \frac{(s\,t2+s+t2+1)\,s^2\,t2}{s+t2} \\ \frac{(s\,t2+s+t2+1)\,s\,t2}{s+t2} \\ s \\ 1 \end{bmatrix} \quad \textbf{(18)}$$

```
>
>
```