In[ ]:=
$$P1 = \begin{pmatrix} 0&1&0&0&1&1&0&0&0&0\\ 1&0&1&0&0&0&1&0&0&0\\ 0&1&0&1&0&0&0&1&0&0\\ 0&0&1&0&1&0&0&0&1&0\\ 1&0&0&1&0&0&0&0&0&1\\ 1&0&0&0&0&0&0&1&1&0\\ 0&1&0&0&0&0&0&0&1&1\\ 0&0&1&0&0&1&0&0&0&1\\ 0&0&0&1&0&1&1&0&0&0\\ 0&0&0&0&1&0&1&1&0&0 \end{pmatrix};$$

$$P1delcon = \begin{pmatrix} \{\} & \{1\} & \{\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\} & \{\}\\ \{1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\}\\ \{\} & \{1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\}\\ \{\} & \{\} & \{1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\}\\ \{1\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\}\\ \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{1\} & \{\}\\ \{\} & \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{1\}\\ \{\} & \{\} & \{1\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\}\\ \{\} & \{\} & \{\} & \{1\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\}\\ \{\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{1\} & \{1\} & \{\} & \{\} \end{pmatrix}; 1$$

Out[ ]= 1

In[ ]:=
```
inclexcl[P1, λ, "even"]
signedchrompoly[P1delcon, λ, "even"]
```

Out[ ]= $(-2+\lambda)\,(-1+\lambda)\,\lambda\left(-352+775\,\lambda-814\,\lambda^2+529\,\lambda^3-230\,\lambda^4+67\,\lambda^5-12\,\lambda^6+\lambda^7\right)$

Out[ ]= $(-2+\lambda)\,(-1+\lambda)\,\lambda\left(-352+775\,\lambda-814\,\lambda^2+529\,\lambda^3-230\,\lambda^4+67\,\lambda^5-12\,\lambda^6+\lambda^7\right)$

In[ ]:=
```
inclexcl[P1, 2 k, "even"] // Expand
signedchrompoly[P1delcon, 2 k, "even"] // Expand
```

Out[ ]= $-1408\,k+10\,424\,k^2-34\,440\,k^3+68\,400\,k^4-91\,552\,k^5+86\,592\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

Out[ ]= $-1408\,k+10\,424\,k^2-34\,440\,k^3+68\,400\,k^4-91\,552\,k^5+86\,592\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

In[ ]:=
```
inclexcl[P1, λ, "odd"]
signedchrompoly[P1delcon, λ, "odd"]
```

Out[ ]= $(-2+\lambda)\,(-1+\lambda)\,\lambda\left(-352+775\,\lambda-814\,\lambda^2+529\,\lambda^3-230\,\lambda^4+67\,\lambda^5-12\,\lambda^6+\lambda^7\right)$

Out[ ]= $(-2+\lambda)\,(-1+\lambda)\,\lambda\left(-352+775\,\lambda-814\,\lambda^2+529\,\lambda^3-230\,\lambda^4+67\,\lambda^5-12\,\lambda^6+\lambda^7\right)$

In[ ]:=
```
inclexcl[P1, 2 k + 1, "odd"] // Expand
signedchrompoly[P1delcon, 2 k + 1, "odd"] // Expand
```

Out[ ]= $72\,k-336\,k^2+480\,k^3+160\,k^4-1792\,k^5+3712\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

Out[ ]= $72\,k-336\,k^2+480\,k^3+160\,k^4-1792\,k^5+3712\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

In[ ]:=

In[ ]:= P2 = $\begin{pmatrix} 0&1&0&0&1&1&0&0&0&0 \\ 1&0&1&0&0&0&1&0&0&0 \\ 0&1&0&-1&0&0&0&1&0&0 \\ 0&0&-1&0&1&0&0&0&1&0 \\ 1&0&0&1&0&0&0&0&0&1 \\ 1&0&0&0&0&0&0&1&1&0 \\ 0&1&0&0&0&0&0&0&1&1 \\ 0&0&1&0&0&1&0&0&0&1 \\ 0&0&0&1&0&1&1&0&0&0 \\ 0&0&0&0&1&0&1&1&0&0 \end{pmatrix}$;

P2delcon = $\begin{pmatrix} \{\} & \{1\} & \{\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\} & \{\} \\ \{1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} \\ \{\} & \{1\} & \{\} & \{-1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} \\ \{\} & \{\} & \{-1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\} \\ \{1\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} \\ \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{1\} & \{\} \\ \{\} & \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{1\} \\ \{\} & \{\} & \{1\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} \\ \{\} & \{\} & \{\} & \{1\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\} \\ \{\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{1\} & \{1\} & \{\} & \{\} \end{pmatrix}$;

In[ ]:=
```
inclexcl[P2, λ, "even"]
signedchrompoly[P2delcon, λ, "even"]
```

Out[ ]= $(-2+\lambda)\,\lambda\,\left(516-1351\,\lambda+1717\,\lambda^2-1379\,\lambda^3+763\,\lambda^4-297\,\lambda^5+79\,\lambda^6-13\,\lambda^7+\lambda^8\right)$

Out[ ]= $(-2+\lambda)\,\lambda\,\left(516-1351\,\lambda+1717\,\lambda^2-1379\,\lambda^3+763\,\lambda^4-297\,\lambda^5+79\,\lambda^6-13\,\lambda^7+\lambda^8\right)$

In[ ]:=
```
inclexcl[P2, 2 k, "even"] // Expand
signedchrompoly[P2delcon, 2 k, "even"] // Expand
```

Out[ ]= $-2064\,k+12\,872\,k^2-38\,280\,k^3+71\,600\,k^4-92\,960\,k^5+86\,848\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

Out[ ]= $-2064\,k+12\,872\,k^2-38\,280\,k^3+71\,600\,k^4-92\,960\,k^5+86\,848\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

In[ ]:=
```
inclexcl[P2, λ, "odd"]
signedchrompoly[P2delcon, λ, "odd"]
```

Out[ ]= $(-2+\lambda)^2\,(-1+\lambda)^2\,\left(82-165\,\lambda+163\,\lambda^2-98\,\lambda^3+38\,\lambda^4-9\,\lambda^5+\lambda^6\right)$

Out[ ]= $(-2+\lambda)^2\,(-1+\lambda)^2\,\left(82-165\,\lambda+163\,\lambda^2-98\,\lambda^3+38\,\lambda^4-9\,\lambda^5+\lambda^6\right)$

In[ ]:=
```
inclexcl[P2, 2 k + 1, "odd"] // Expand
signedchrompoly[P2delcon, 2 k + 1, "odd"] // Expand
```

Out[ ]= $48\,k^2-352\,k^3+1184\,k^4-2560\,k^5+3968\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

Out[ ]= $48\,k^2-352\,k^3+1184\,k^4-2560\,k^5+3968\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

In[ ]:=

In[ ]:= P3 =
$$\begin{pmatrix} 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & -1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & -1 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 & 0 \end{pmatrix};$$

P3delcon =
$$\begin{pmatrix} \{\} & \{1\} & \{\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\} & \{\} \\ \{1\} & \{\} & \{-1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} \\ \{\} & \{-1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} \\ \{\} & \{\} & \{1\} & \{\} & \{-1\} & \{\} & \{\} & \{\} & \{1\} & \{\} \\ \{1\} & \{\} & \{\} & \{-1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} \\ \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{1\} & \{\} \\ \{\} & \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{1\} \\ \{\} & \{\} & \{1\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} \\ \{\} & \{\} & \{\} & \{1\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\} \\ \{\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{1\} & \{1\} & \{\} & \{\} \end{pmatrix};$$

In[ ]:=
```
inclexcl[P3, λ, "even"]
signedchrompoly[P3delcon, λ, "even"]
```

Out[ ]= $(-2+\lambda)\,\lambda\,\left(597-1462\,\lambda+1781\,\lambda^2-1397\,\lambda^3+765\,\lambda^4-297\,\lambda^5+79\,\lambda^6-13\,\lambda^7+\lambda^8\right)$

Out[ ]= $(-2+\lambda)\,\lambda\,\left(597-1462\,\lambda+1781\,\lambda^2-1397\,\lambda^3+765\,\lambda^4-297\,\lambda^5+79\,\lambda^6-13\,\lambda^7+\lambda^8\right)$

In[ ]:=
```
inclexcl[P3, 2 k, "even"] // Expand
signedchrompoly[P3delcon, 2 k, "even"] // Expand
```

Out[ ]= $-2388\,k+14\,084\,k^2-40\,192\,k^3+73\,200\,k^4-93\,664\,k^5+86\,976\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

Out[ ]= $-2388\,k+14\,084\,k^2-40\,192\,k^3+73\,200\,k^4-93\,664\,k^5+86\,976\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

In[ ]:=
```
inclexcl[P3, λ, "odd"]
signedchrompoly[P3delcon, λ, "odd"]
```

Out[ ]= $(-1+\lambda)\,\left(-492+1619\,\lambda-2621\,\lambda^2+2703\,\lambda^3-1938\,\lambda^4+995\,\lambda^5-364\,\lambda^6+91\,\lambda^7-14\,\lambda^8+\lambda^9\right)$

Out[ ]= $(-1+\lambda)\,\left(-492+1619\,\lambda-2621\,\lambda^2+2703\,\lambda^3-1938\,\lambda^4+995\,\lambda^5-364\,\lambda^6+91\,\lambda^7-14\,\lambda^8+\lambda^9\right)$

In[ ]:=
```
inclexcl[P3, 2 k + 1, "odd"] // Expand
signedchrompoly[P3delcon, 2 k + 1, "odd"] // Expand
```

Out[ ]= $-40\,k+236\,k^2-760\,k^3+1696\,k^4-2944\,k^5+4096\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

Out[ ]= $-40\,k+236\,k^2-760\,k^3+1696\,k^4-2944\,k^5+4096\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

In[ ]:=

In[ ]:= P4 = $\begin{pmatrix} 0&1&0&0&1&1&0&0&0&0 \\ 1&0&1&0&0&0&1&0&0&0 \\ 0&1&0&-1&0&0&0&1&0&0 \\ 0&0&-1&0&1&0&0&0&1&0 \\ 1&0&0&1&0&0&0&0&0&1 \\ 1&0&0&0&0&0&0&1&1&0 \\ 0&1&0&0&0&0&0&0&1&-1 \\ 0&0&1&0&0&1&0&0&0&1 \\ 0&0&0&1&0&1&1&0&0&0 \\ 0&0&0&0&1&0&-1&1&0&0 \end{pmatrix}$;

P4delcon = $\begin{pmatrix} \{\}&\{1\}&\{\}&\{\}&\{1\}&\{1\}&\{\}&\{\}&\{\}&\{\} \\ \{1\}&\{\}&\{1\}&\{\}&\{\}&\{\}&\{1\}&\{\}&\{\}&\{\} \\ \{\}&\{1\}&\{\}&\{-1\}&\{\}&\{\}&\{\}&\{1\}&\{\}&\{\} \\ \{\}&\{\}&\{-1\}&\{\}&\{1\}&\{\}&\{\}&\{\}&\{1\}&\{\} \\ \{1\}&\{\}&\{\}&\{1\}&\{\}&\{\}&\{\}&\{\}&\{\}&\{1\} \\ \{1\}&\{\}&\{\}&\{\}&\{\}&\{\}&\{\}&\{1\}&\{1\}&\{\} \\ \{\}&\{1\}&\{\}&\{\}&\{\}&\{\}&\{\}&\{\}&\{1\}&\{-1\} \\ \{\}&\{\}&\{1\}&\{\}&\{\}&\{1\}&\{\}&\{\}&\{\}&\{1\} \\ \{\}&\{\}&\{\}&\{1\}&\{\}&\{1\}&\{1\}&\{\}&\{\}&\{\} \\ \{\}&\{\}&\{\}&\{\}&\{1\}&\{\}&\{-1\}&\{1\}&\{\}&\{\} \end{pmatrix}$;

In[ ]:= inclexcl[P4, λ, "even"]
signedchrompoly[P4delcon, λ, "even"]

Out[ ]= $(-2+\lambda)\,\lambda\,\left(635-1524\,\lambda+1823\,\lambda^2-1411\,\lambda^3+767\,\lambda^4-297\,\lambda^5+79\,\lambda^6-13\,\lambda^7+\lambda^8\right)$

Out[ ]= $(-2+\lambda)\,\lambda\,\left(635-1524\,\lambda+1823\,\lambda^2-1411\,\lambda^3+767\,\lambda^4-297\,\lambda^5+79\,\lambda^6-13\,\lambda^7+\lambda^8\right)$

In[ ]:= inclexcl[P4, 2 k, "even"] // Expand
signedchrompoly[P4delcon, 2 k, "even"] // Expand

Out[ ]= $-2540\,k+14\,732\,k^2-41\,360\,k^3+74\,320\,k^4-94\,240\,k^5+87\,104\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

Out[ ]= $-2540\,k+14\,732\,k^2-41\,360\,k^3+74\,320\,k^4-94\,240\,k^5+87\,104\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

In[ ]:= inclexcl[P4, λ, "odd"]
signedchrompoly[P4delcon, λ, "odd"]

Out[ ]= $(-1+\lambda)\,\left(-568+1781\,\lambda-2767\,\lambda^2+2773\,\lambda^3-1956\,\lambda^4+997\,\lambda^5-364\,\lambda^6+91\,\lambda^7-14\,\lambda^8+\lambda^9\right)$

Out[ ]= $(-1+\lambda)\,\left(-568+1781\,\lambda-2767\,\lambda^2+2773\,\lambda^3-1956\,\lambda^4+997\,\lambda^5-364\,\lambda^6+91\,\lambda^7-14\,\lambda^8+\lambda^9\right)$

In[ ]:= inclexcl[P4, 2 k + 1, "odd"] // Expand
signedchrompoly[P4delcon, 2 k + 1, "odd"] // Expand

Out[ ]= $-52\,k+308\,k^2-952\,k^3+1984\,k^4-3200\,k^5+4224\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

Out[ ]= $-52\,k+308\,k^2-952\,k^3+1984\,k^4-3200\,k^5+4224\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

In[ ]:=

In[ ]:= P5 =
$$\begin{pmatrix} 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & -1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & -1 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & 1 & 0 & 0 \end{pmatrix};$$

P5delcon =
$$\begin{pmatrix} \{\} & \{1\} & \{\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\} & \{\} \\ \{1\} & \{\} & \{-1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} \\ \{\} & \{-1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} \\ \{\} & \{\} & \{1\} & \{\} & \{-1\} & \{\} & \{\} & \{\} & \{1\} & \{\} \\ \{1\} & \{\} & \{\} & \{-1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} \\ \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{1\} & \{\} \\ \{\} & \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{-1\} \\ \{\} & \{\} & \{1\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} \\ \{\} & \{\} & \{\} & \{1\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\} \\ \{\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{-1\} & \{1\} & \{\} & \{\} \end{pmatrix};$$

In[ ]:=
```
inclexcl[P5, λ, "even"]
signedchrompoly[P5delcon, λ, "even"]
```

Out[ ]= $(-2+\lambda)\,\lambda\,\left(632-1509\,\lambda+1803\,\lambda^2-1401\,\lambda^3+765\,\lambda^4-297\,\lambda^5+79\,\lambda^6-13\,\lambda^7+\lambda^8\right)$

Out[ ]= $(-2+\lambda)\,\lambda\,\left(632-1509\,\lambda+1803\,\lambda^2-1401\,\lambda^3+765\,\lambda^4-297\,\lambda^5+79\,\lambda^6-13\,\lambda^7+\lambda^8\right)$

In[ ]:=
```
inclexcl[P5, 2 k, "even"] // Expand
signedchrompoly[P5delcon, 2 k, "even"] // Expand
```

Out[ ]= $-2528\,k+14\,600\,k^2-40\,920\,k^3+73\,680\,k^4-93\,792\,k^5+86\,976\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

Out[ ]= $-2528\,k+14\,600\,k^2-40\,920\,k^3+73\,680\,k^4-93\,792\,k^5+86\,976\,k^6-58\,240\,k^7+26\,880\,k^8-7680\,k^9+1024\,k^{10}$

In[ ]:=
```
inclexcl[P5, λ, "odd"]
signedchrompoly[P5delcon, λ, "odd"]
```

Out[ ]= $(-2+\lambda)^2\,(-1+\lambda)\,\left(5-4\,\lambda+\lambda^2\right)\,\left(-28+37\,\lambda-34\,\lambda^2+18\,\lambda^3-6\,\lambda^4+\lambda^5\right)$

Out[ ]= $(-2+\lambda)^2\,(-1+\lambda)\,\left(5-4\,\lambda+\lambda^2\right)\,\left(-28+37\,\lambda-34\,\lambda^2+18\,\lambda^3-6\,\lambda^4+\lambda^5\right)$

In[ ]:=
```
inclexcl[P5, 2 k + 1, "odd"] // Expand
signedchrompoly[P5delcon, 2 k + 1, "odd"] // Expand
```

Out[ ]= $-48\,k+320\,k^2-960\,k^3+1920\,k^4-3072\,k^5+4096\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

Out[ ]= $-48\,k+320\,k^2-960\,k^3+1920\,k^4-3072\,k^5+4096\,k^6-4480\,k^7+3840\,k^8-2560\,k^9+1024\,k^{10}$

In[ ]:=

In[ ]:= P6 = $\begin{pmatrix} 0 & 1 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \\ -1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & -1 & 1 & 0 & 0 \end{pmatrix}$;

P6delcon = $\begin{pmatrix} \{\} & \{1\} & \{\} & \{\} & \{1\} & \{-1\} & \{\} & \{\} & \{\} & \{\} \\ \{1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} \\ \{\} & \{1\} & \{\} & \{-1\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{\} \\ \{\} & \{\} & \{-1\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} & \{\} \\ \{1\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} \\ \{-1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{1\} & \{\} \\ \{\} & \{1\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{\} & \{1\} & \{-1\} \\ \{\} & \{\} & \{1\} & \{\} & \{\} & \{1\} & \{\} & \{\} & \{\} & \{1\} \\ \{\} & \{\} & \{\} & \{1\} & \{\} & \{1\} & \{1\} & \{\} & \{\} & \{\} \\ \{\} & \{\} & \{\} & \{\} & \{1\} & \{\} & \{-1\} & \{1\} & \{\} & \{\} \end{pmatrix}$;

In[ ]:= inclexcl[P6, λ, "even"]
signedchrompoly[P6delcon, λ, "even"]

Out[ ]= $\lambda \left(-1425 + 4005\,\lambda - 5460\,\lambda^2 + 4785\,\lambda^3 - 2981\,\lambda^4 + 1365\,\lambda^5 - 455\,\lambda^6 + 105\,\lambda^7 - 15\,\lambda^8 + \lambda^9\right)$

Out[ ]= $\lambda \left(-1425 + 4005\,\lambda - 5460\,\lambda^2 + 4785\,\lambda^3 - 2981\,\lambda^4 + 1365\,\lambda^5 - 455\,\lambda^6 + 105\,\lambda^7 - 15\,\lambda^8 + \lambda^9\right)$

In[ ]:= inclexcl[P6, 2 k, "even"] // Expand
signedchrompoly[P6delcon, 2 k, "even"] // Expand

Out[ ]= $-2850\,k + 16\,020\,k^2 - 43\,680\,k^3 + 76\,560\,k^4 - 95\,392\,k^5 + 87\,360\,k^6 - 58\,240\,k^7 + 26\,880\,k^8 - 7680\,k^9 + 1024\,k^{10}$

Out[ ]= $-2850\,k + 16\,020\,k^2 - 43\,680\,k^3 + 76\,560\,k^4 - 95\,392\,k^5 + 87\,360\,k^6 - 58\,240\,k^7 + 26\,880\,k^8 - 7680\,k^9 + 1024\,k^{10}$

In[ ]:= inclexcl[P6, λ, "odd"]
signedchrompoly[P6delcon, λ, "odd"]

Out[ ]= $(-1 + \lambda)\left(-727 + 2103\,\lambda - 3057\,\lambda^2 + 2913\,\lambda^3 - 1992\,\lambda^4 + 1001\,\lambda^5 - 364\,\lambda^6 + 91\,\lambda^7 - 14\,\lambda^8 + \lambda^9\right)$

Out[ ]= $(-1 + \lambda)\left(-727 + 2103\,\lambda - 3057\,\lambda^2 + 2913\,\lambda^3 - 1992\,\lambda^4 + 1001\,\lambda^5 - 364\,\lambda^6 + 91\,\lambda^7 - 14\,\lambda^8 + \lambda^9\right)$

In[ ]:= inclexcl[P6, 2 k + 1, "odd"] // Expand
signedchrompoly[P6delcon, 2 k + 1, "odd"] // Expand

Out[ ]= $-90\,k + 460\,k^2 - 1320\,k^3 + 2560\,k^4 - 3712\,k^5 + 4480\,k^6 - 4480\,k^7 + 3840\,k^8 - 2560\,k^9 + 1024\,k^{10}$

Out[ ]= $-90\,k + 460\,k^2 - 1320\,k^3 + 2560\,k^4 - 3712\,k^5 + 4480\,k^6 - 4480\,k^7 + 3840\,k^8 - 2560\,k^9 + 1024\,k^{10}$

In[ ]:=

In[ ]:= K3num1 = $\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$;

K3num1delcon = $\begin{pmatrix} \{\} & \{1\} & \{1\} \\ \{1\} & \{\} & \{1\} \\ \{1\} & \{1\} & \{\} \end{pmatrix}$;

In[ ]:= inclexcl[K3num1, λ, "even"]
signedchrompoly[K3num1delcon, λ, "even"]

Out[ ]= $(-2+\lambda)\,(-1+\lambda)\,\lambda$

Out[ ]= $(-2+\lambda)\,(-1+\lambda)\,\lambda$

In[ ]:= inclexcl[K3num1, 2 k, "even"] // Expand
signedchrompoly[K3num1delcon, 2 k, "even"] // Expand

Out[ ]= $4\,k - 12\,k^2 + 8\,k^3$

Out[ ]= $4\,k - 12\,k^2 + 8\,k^3$

In[ ]:= inclexcl[K3num1, λ, "odd"]
signedchrompoly[K3num1delcon, λ, "odd"]

Out[ ]= $(-2+\lambda)\,(-1+\lambda)\,\lambda$

Out[ ]= $(-2+\lambda)\,(-1+\lambda)\,\lambda$

In[ ]:= inclexcl[K3num1, 2 k + 1, "odd"] // Expand
signedchrompoly[K3num1delcon, 2 k + 1, "odd"] // Expand

Out[ ]= $-2\,k + 8\,k^3$

Out[ ]= $-2\,k + 8\,k^3$

In[ ]:=

In[ ]:= K3num2 = $\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & -1 \\ 1 & -1 & 0 \end{pmatrix}$;

K3num2delcon = $\begin{pmatrix} \{\} & \{1\} & \{1\} \\ \{1\} & \{\} & \{-1\} \\ \{1\} & \{-1\} & \{\} \end{pmatrix}$;

```
In[ ]:= inclexcl[K3num2, λ, "even"]
        signedchrompoly[K3num2delcon, λ, "even"]
```

$$\text{Out[ ]= } \lambda \left(3 - 3\,\lambda + \lambda^2\right)$$

$$\text{Out[ ]= } \lambda \left(3 - 3\,\lambda + \lambda^2\right)$$

```
In[ ]:= inclexcl[K3num2, 2 k, "even"] // Expand
        signedchrompoly[K3num2delcon, 2 k, "even"] // Expand
```

$$\text{Out[ ]= } 6\,k - 12\,k^2 + 8\,k^3$$

$$\text{Out[ ]= } 6\,k - 12\,k^2 + 8\,k^3$$

```
In[ ]:= inclexcl[K3num2, λ, "odd"]
        signedchrompoly[K3num2delcon, λ, "odd"]
```

$$\text{Out[ ]= } (-1 + \lambda)^3$$

$$\text{Out[ ]= } (-1 + \lambda)^3$$

```
In[ ]:= inclexcl[K3num2, 2 k + 1, "odd"] // Expand
        signedchrompoly[K3num2delcon, 2 k + 1, "odd"] // Expand
```

$$\text{Out[ ]= } 8\,k^3$$

$$\text{Out[ ]= } 8\,k^3$$

```
In[ ]:=
```

```
In[ ]:= K4num1 = {{0, 1, 1, 1}, {1, 0, 1, 1}, {1, 1, 0, 1}, {1, 1, 1, 0}};

        K4num1delcon = {{{}, {1}, {1}, {1}}, {{1}, {}, {1}, {1}}, {{1}, {1}, {}, {1}}, {{1}, {1}, {1}, {}}};
```

```
In[ ]:= inclexcl[K4num1, λ, "even"]
        signedchrompoly[K4num1delcon, λ, "even"]
```

$$\text{Out[ ]= } (-3 + \lambda)\,(-2 + \lambda)\,(-1 + \lambda)\,\lambda$$

$$\text{Out[ ]= } (-3 + \lambda)\,(-2 + \lambda)\,(-1 + \lambda)\,\lambda$$

```
In[ ]:= inclexcl[K4num1, 2 k, "even"] // Expand
        signedchrompoly[K4num1delcon, 2 k, "even"] // Expand
```

$$\text{Out[ ]= } -12\,k + 44\,k^2 - 48\,k^3 + 16\,k^4$$

$$\text{Out[ ]= } -12\,k + 44\,k^2 - 48\,k^3 + 16\,k^4$$

```
In[ ]:= inclexcl[K4num1, λ, "odd"]
        signedchrompoly[K4num1delcon, λ, "odd"]
```

$$\text{Out[ ]= } (-3+\lambda)\,(-2+\lambda)\,(-1+\lambda)\,\lambda$$

$$\text{Out[ ]= } (-3+\lambda)\,(-2+\lambda)\,(-1+\lambda)\,\lambda$$

```
In[ ]:= inclexcl[K4num1, 2 k + 1, "odd"] // Expand
        signedchrompoly[K4num1delcon, 2 k + 1, "odd"] // Expand
```

$$\text{Out[ ]= } 4k - 4k^2 - 16k^3 + 16k^4$$

$$\text{Out[ ]= } 4k - 4k^2 - 16k^3 + 16k^4$$

```
In[ ]:=
```

```
In[ ]:= K4num2 = {{0, 1, 1, 1}, {1, 0, 1, 1}, {1, 1, 0, -1}, {1, 1, -1, 0}};

        K4num2delcon = {{{}, {1}, {1}, {1}}, {{1}, {}, {1}, {1}}, {{1}, {1}, {}, {-1}}, {{1}, {1}, {-1}, {}}};
```

```
In[ ]:= inclexcl[K4num2, λ, "even"]
        signedchrompoly[K4num2delcon, λ, "even"]
```

$$\text{Out[ ]= } (-2+\lambda)\,\lambda\,\left(5-4\lambda+\lambda^2\right)$$

$$\text{Out[ ]= } (-2+\lambda)\,\lambda\,\left(5-4\lambda+\lambda^2\right)$$

```
In[ ]:= inclexcl[K4num2, 2 k, "even"] // Expand
        signedchrompoly[K4num2delcon, 2 k, "even"] // Expand
```

$$\text{Out[ ]= } -20k + 52k^2 - 48k^3 + 16k^4$$

$$\text{Out[ ]= } -20k + 52k^2 - 48k^3 + 16k^4$$

```
In[ ]:= inclexcl[K4num2, λ, "odd"]
        signedchrompoly[K4num2delcon, λ, "odd"]
```

$$\text{Out[ ]= } (-2+\lambda)^2\,(-1+\lambda)^2$$

$$\text{Out[ ]= } (-2+\lambda)^2\,(-1+\lambda)^2$$

```
In[ ]:= inclexcl[K4num2, 2 k + 1, "odd"] // Expand
        signedchrompoly[K4num2delcon, 2 k + 1, "odd"] // Expand
```

$$\text{Out[ ]= } 4k^2 - 16k^3 + 16k^4$$

$$\text{Out[ ]= } 4k^2 - 16k^3 + 16k^4$$

```
In[ ]:=
```

In[ ]:=
$$\text{K4num3} = \begin{pmatrix} 0 & -1 & 1 & 1 \\ -1 & 0 & 1 & 1 \\ 1 & 1 & 0 & -1 \\ 1 & 1 & -1 & 0 \end{pmatrix};$$

$$\text{K4num3delcon} = \begin{pmatrix} \{\} & \{-1\} & \{1\} & \{1\} \\ \{-1\} & \{\} & \{1\} & \{1\} \\ \{1\} & \{1\} & \{\} & \{-1\} \\ \{1\} & \{1\} & \{-1\} & \{\} \end{pmatrix};$$

In[ ]:=
```
inclexcl[K4num3, λ, "even"]
signedchrompoly[K4num3delcon, λ, "even"]
```

Out[ ]= $\lambda \left(-13 + 15\,\lambda - 6\,\lambda^2 + \lambda^3\right)$

Out[ ]= $\lambda \left(-13 + 15\,\lambda - 6\,\lambda^2 + \lambda^3\right)$

In[ ]:=
```
inclexcl[K4num3, 2 k, "even"] // Expand
signedchrompoly[K4num3delcon, 2 k, "even"] // Expand
```

Out[ ]= $-26\,k + 60\,k^2 - 48\,k^3 + 16\,k^4$

Out[ ]= $-26\,k + 60\,k^2 - 48\,k^3 + 16\,k^4$

In[ ]:=
```
inclexcl[K4num3, λ, "odd"]
signedchrompoly[K4num3delcon, λ, "odd"]
```

Out[ ]= $(-1 + \lambda)\left(-7 + 10\,\lambda - 5\,\lambda^2 + \lambda^3\right)$

Out[ ]= $(-1 + \lambda)\left(-7 + 10\,\lambda - 5\,\lambda^2 + \lambda^3\right)$

In[ ]:=
```
inclexcl[K4num3, 2 k + 1, "odd"] // Expand
signedchrompoly[K4num3delcon, 2 k + 1, "odd"] // Expand
```

Out[ ]= $-2\,k + 12\,k^2 - 16\,k^3 + 16\,k^4$

Out[ ]= $-2\,k + 12\,k^2 - 16\,k^3 + 16\,k^4$

In[ ]:=

In[ ]:=
$$\text{K5num1} = \begin{pmatrix} 0 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{pmatrix};$$

$$\text{K5num1delcon} = \begin{pmatrix} \{\} & \{1\} & \{1\} & \{1\} & \{1\} \\ \{1\} & \{\} & \{1\} & \{1\} & \{1\} \\ \{1\} & \{1\} & \{\} & \{1\} & \{1\} \\ \{1\} & \{1\} & \{1\} & \{\} & \{1\} \\ \{1\} & \{1\} & \{1\} & \{1\} & \{\} \end{pmatrix};$$

```
In[ ]:= inclexcl[K5num1, λ, "even"]
        signedchrompoly[K5num1delcon, λ, "even"]
```

$$(-4+\lambda)\ (-3+\lambda)\ (-2+\lambda)\ (-1+\lambda)\ \lambda$$

$$(-4+\lambda)\ (-3+\lambda)\ (-2+\lambda)\ (-1+\lambda)\ \lambda$$

```
In[ ]:= inclexcl[K5num1, 2 k, "even"] // Expand
        signedchrompoly[K5num1delcon, 2 k, "even"] // Expand
```

$$48\,k-200\,k^2+280\,k^3-160\,k^4+32\,k^5$$

$$48\,k-200\,k^2+280\,k^3-160\,k^4+32\,k^5$$

```
In[ ]:= inclexcl[K5num1, λ, "odd"]
        signedchrompoly[K5num1delcon, λ, "odd"]
```

$$(-4+\lambda)\ (-3+\lambda)\ (-2+\lambda)\ (-1+\lambda)\ \lambda$$

$$(-4+\lambda)\ (-3+\lambda)\ (-2+\lambda)\ (-1+\lambda)\ \lambda$$

```
In[ ]:= inclexcl[K5num1, 2 k + 1, "odd"] // Expand
        signedchrompoly[K5num1delcon, 2 k + 1, "odd"] // Expand
```

$$-12\,k+20\,k^2+40\,k^3-80\,k^4+32\,k^5$$

$$-12\,k+20\,k^2+40\,k^3-80\,k^4+32\,k^5$$

```
In[ ]:=
```

```
In[ ]:= K5num2 = {{0, 1, 1,  1,  1},
                  {1, 0, 1,  1,  1},
                  {1, 1, 0,  1,  1},
                  {1, 1, 1,  0, -1},
                  {1, 1, 1, -1,  0}};

        K5num2delcon = {{{},  {1}, {1}, {1},  {1}},
                        {{1}, {},  {1}, {1},  {1}},
                        {{1}, {1}, {},  {1},  {1}},
                        {{1}, {1}, {1}, {},  {-1}},
                        {{1}, {1}, {1}, {-1}, {}}};
```

```
In[ ]:= inclexcl[K5num2, λ, "even"]
        signedchrompoly[K5num2delcon, λ, "even"]
```

$$(-3+\lambda)\ (-2+\lambda)\ \lambda\ \left(7-5\,\lambda+\lambda^2\right)$$

$$(-3+\lambda)\ (-2+\lambda)\ \lambda\ \left(7-5\,\lambda+\lambda^2\right)$$

```
In[ ]:= inclexcl[K5num2, 2 k, "even"] // Expand
        signedchrompoly[K5num2delcon, 2 k, "even"] // Expand
```

$$84\,k-260\,k^2+304\,k^3-160\,k^4+32\,k^5$$

$$84\,k-260\,k^2+304\,k^3-160\,k^4+32\,k^5$$

```
In[ ]:= inclexcl[K5num2, λ, "odd"]
        signedchrompoly[K5num2delcon, λ, "odd"]
```

$$\text{Out[ ]= } (-3+\lambda)^2\,(-2+\lambda)\,(-1+\lambda)^2$$

$$\text{Out[ ]= } (-3+\lambda)^2\,(-2+\lambda)\,(-1+\lambda)^2$$

```
In[ ]:= inclexcl[K5num2, 2 k + 1, "odd"] // Expand
        signedchrompoly[K5num2delcon, 2 k + 1, "odd"] // Expand
```

$$\text{Out[ ]= } -16\,k^2+64\,k^3-80\,k^4+32\,k^5$$

$$\text{Out[ ]= } -16\,k^2+64\,k^3-80\,k^4+32\,k^5$$

```
In[ ]:=
```

```
In[ ]:= K5num3 = {{0, 1, 1, 1, 1}, {1, 0, -1, 1, 1}, {1, -1, 0, 1, 1}, {1, 1, 1, 0, -1}, {1, 1, 1, -1, 0}};
```

```
K5num3delcon = {{{}, {1}, {1}, {1}, {1}}, {{1}, {}, {-1}, {1}, {1}}, {{1}, {-1}, {}, {1}, {1}}, {{1}, {1}, {1}, {}, {-1}}, {{1}, {1}, {1}, {-1}, {}}};
```

```
In[ ]:= inclexcl[K5num3, λ, "even"]
        signedchrompoly[K5num3delcon, λ, "even"]
```

$$\text{Out[ ]= } (-2+\lambda)\,\lambda\,\left(-29+25\,\lambda-8\,\lambda^2+\lambda^3\right)$$

$$\text{Out[ ]= } (-2+\lambda)\,\lambda\,\left(-29+25\,\lambda-8\,\lambda^2+\lambda^3\right)$$

```
In[ ]:= inclexcl[K5num3, 2 k, "even"] // Expand
        signedchrompoly[K5num3delcon, 2 k, "even"] // Expand
```

$$\text{Out[ ]= } 116\,k-316\,k^2+328\,k^3-160\,k^4+32\,k^5$$

$$\text{Out[ ]= } 116\,k-316\,k^2+328\,k^3-160\,k^4+32\,k^5$$

```
In[ ]:= inclexcl[K5num3, λ, "odd"]
        signedchrompoly[K5num3delcon, λ, "odd"]
```

$$\text{Out[ ]= } (-2+\lambda)\,(-1+\lambda)\,\left(-17+18\,\lambda-7\,\lambda^2+\lambda^3\right)$$

$$\text{Out[ ]= } (-2+\lambda)\,(-1+\lambda)\,\left(-17+18\,\lambda-7\,\lambda^2+\lambda^3\right)$$

```
In[ ]:= inclexcl[K5num3, 2 k + 1, "odd"] // Expand
        signedchrompoly[K5num3delcon, 2 k + 1, "odd"] // Expand
```

$$\text{Out[ ]= } 10\,k-48\,k^2+88\,k^3-80\,k^4+32\,k^5$$

$$\text{Out[ ]= } 10\,k-48\,k^2+88\,k^3-80\,k^4+32\,k^5$$

In[ ]:=

In[ ]:= K5num4 = $\begin{pmatrix} 0 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 & -1 \\ 1 & 1 & 1 & 0 & -1 \\ 1 & 1 & -1 & -1 & 0 \end{pmatrix}$;

K5num4delcon = $\begin{pmatrix} \{\} & \{1\} & \{1\} & \{1\} & \{1\} \\ \{1\} & \{\} & \{1\} & \{1\} & \{1\} \\ \{1\} & \{1\} & \{\} & \{1\} & \{-1\} \\ \{1\} & \{1\} & \{1\} & \{\} & \{-1\} \\ \{1\} & \{1\} & \{-1\} & \{-1\} & \{\} \end{pmatrix}$;

In[ ]:=
```
inclexcl[K5num4, λ, "even"]
signedchrompoly[K5num4delcon, λ, "even"]
```

Out[ ]= $(-3+\lambda)\,(-2+\lambda)\,\lambda\,\left(8-5\,\lambda+\lambda^2\right)$

Out[ ]= $(-3+\lambda)\,(-2+\lambda)\,\lambda\,\left(8-5\,\lambda+\lambda^2\right)$

In[ ]:=
```
inclexcl[K5num4, 2 k, "even"] // Expand
signedchrompoly[K5num4delcon, 2 k, "even"] // Expand
```

Out[ ]= $96\,k-280\,k^2+312\,k^3-160\,k^4+32\,k^5$

Out[ ]= $96\,k-280\,k^2+312\,k^3-160\,k^4+32\,k^5$

In[ ]:=
```
inclexcl[K5num4, λ, "odd"]
signedchrompoly[K5num4delcon, λ, "odd"]
```

Out[ ]= $(-3+\lambda)\,(-2+\lambda)^3\,(-1+\lambda)$

Out[ ]= $(-3+\lambda)\,(-2+\lambda)^3\,(-1+\lambda)$

In[ ]:=
```
inclexcl[K5num4, 2 k + 1, "odd"] // Expand
signedchrompoly[K5num4delcon, 2 k + 1, "odd"] // Expand
```

Out[ ]= $4\,k-28\,k^2+72\,k^3-80\,k^4+32\,k^5$

Out[ ]= $4\,k-28\,k^2+72\,k^3-80\,k^4+32\,k^5$

In[ ]:=

In[ ]:=
```
K5num5 = {{0, -1, 1, 1, 1}, {-1, 0, 1, 1, 1}, {1, 1, 0, 1, -1}, {1, 1, 1, 0, -1}, {1, 1, -1, -1, 0}};
```

```
K5num5delcon = {{{}, {-1}, {1}, {1}, {1}}, {{-1}, {}, {1}, {1}, {1}}, {{1}, {1}, {}, {1}, {-1}}, {{1}, {1}, {1}, {}, {-1}}, {{1}, {1}, {-1}, {-1}, {}}};
```

In[ ]:=
```
inclexcl[K5num5, λ, "even"]
signedchrompoly[K5num5delcon, λ, "even"]
```

Out[ ]= $(-2+\lambda)\ \lambda\ \left(-31+26\ \lambda-8\ \lambda^2+\lambda^3\right)$

Out[ ]= $(-2+\lambda)\ \lambda\ \left(-31+26\ \lambda-8\ \lambda^2+\lambda^3\right)$

In[ ]:=
```
inclexcl[K5num5, 2 k, "even"] // Expand
signedchrompoly[K5num5delcon, 2 k, "even"] // Expand
```

Out[ ]= $124\ k-332\ k^2+336\ k^3-160\ k^4+32\ k^5$

Out[ ]= $124\ k-332\ k^2+336\ k^3-160\ k^4+32\ k^5$

In[ ]:=
```
inclexcl[K5num5, λ, "odd"]
signedchrompoly[K5num5delcon, λ, "odd"]
```

Out[ ]= $(-2+\lambda)\ (-1+\lambda)\ \left(-19+19\ \lambda-7\ \lambda^2+\lambda^3\right)$

Out[ ]= $(-2+\lambda)\ (-1+\lambda)\ \left(-19+19\ \lambda-7\ \lambda^2+\lambda^3\right)$

In[ ]:=
```
inclexcl[K5num5, 2 k + 1, "odd"] // Expand
signedchrompoly[K5num5delcon, 2 k + 1, "odd"] // Expand
```

Out[ ]= $12\ k-56\ k^2+96\ k^3-80\ k^4+32\ k^5$

Out[ ]= $12\ k-56\ k^2+96\ k^3-80\ k^4+32\ k^5$

In[ ]:=

In[ ]:=
```
K5num6 = {{0, 1, 1, 1, 1}, {1, 0, 1, 1, -1}, {1, 1, 0, -1, 1}, {1, 1, -1, 0, -1}, {1, -1, 1, -1, 0}};
```

```
K5num6delcon = {{{}, {1}, {1}, {1}, {1}}, {{1}, {}, {1}, {1}, {-1}}, {{1}, {1}, {}, {-1}, {1}}, {{1}, {1}, {-1}, {}, {-1}}, {{1}, {-1}, {1}, {-1}, {}}};
```

```
In[ ]:= inclexcl[K5num6, λ, "even"]
        signedchrompoly[K5num6delcon, λ, "even"]
```

$$\text{Out[ ]= } (-3+\lambda)\,(-2+\lambda)\,\lambda\,\left(9-5\,\lambda+\lambda^2\right)$$

$$\text{Out[ ]= } (-3+\lambda)\,(-2+\lambda)\,\lambda\,\left(9-5\,\lambda+\lambda^2\right)$$

```
In[ ]:= inclexcl[K5num6, 2 k, "even"] // Expand
        signedchrompoly[K5num6delcon, 2 k, "even"] // Expand
```

$$\text{Out[ ]= } 108\,k-300\,k^2+320\,k^3-160\,k^4+32\,k^5$$

$$\text{Out[ ]= } 108\,k-300\,k^2+320\,k^3-160\,k^4+32\,k^5$$

```
In[ ]:= inclexcl[K5num6, λ, "odd"]
        signedchrompoly[K5num6delcon, λ, "odd"]
```

$$\text{Out[ ]= } (-3+\lambda)\,(-2+\lambda)\,(-1+\lambda)\,\left(5-4\,\lambda+\lambda^2\right)$$

$$\text{Out[ ]= } (-3+\lambda)\,(-2+\lambda)\,(-1+\lambda)\,\left(5-4\,\lambda+\lambda^2\right)$$

```
In[ ]:= inclexcl[K5num6, 2 k + 1, "odd"] // Expand
        signedchrompoly[K5num6delcon, 2 k + 1, "odd"] // Expand
```

$$\text{Out[ ]= } 8\,k-40\,k^2+80\,k^3-80\,k^4+32\,k^5$$

$$\text{Out[ ]= } 8\,k-40\,k^2+80\,k^3-80\,k^4+32\,k^5$$

```
In[ ]:=
```

```
In[ ]:= K5num7 = {{ 0, -1,  1,  1,  1},
                  {-1,  0,  1,  1,  1},
                  { 1,  1,  0, -1, -1},
                  { 1,  1, -1,  0, -1},
                  { 1,  1, -1, -1,  0}};

        K5num7delcon = {{ {},  {-1}, {1},  {1},  {1}},
                        {{-1}, {},   {1},  {1},  {1}},
                        { {1}, {1},  {},  {-1}, {-1}},
                        { {1}, {1}, {-1},  {},  {-1}},
                        { {1}, {1}, {-1}, {-1},  {}}};
```

```
In[ ]:= inclexcl[K5num7, λ, "even"]
        signedchrompoly[K5num7delcon, λ, "even"]
```

$$\text{Out[ ]= } \lambda\,\left(75-95\,\lambda+45\,\lambda^2-10\,\lambda^3+\lambda^4\right)$$

$$\text{Out[ ]= } \lambda\,\left(75-95\,\lambda+45\,\lambda^2-10\,\lambda^3+\lambda^4\right)$$

```
In[ ]:= inclexcl[K5num7, 2 k, "even"] // Expand
        signedchrompoly[K5num7delcon, 2 k, "even"] // Expand
```

$$\text{Out[ ]= } 150\,k-380\,k^2+360\,k^3-160\,k^4+32\,k^5$$

$$\text{Out[ ]= } 150\,k-380\,k^2+360\,k^3-160\,k^4+32\,k^5$$

In[ ]:=
```
inclexcl[K5num7, λ, "odd"]
signedchrompoly[K5num7delcon, λ, "odd"]
```

Out[ ]= $(-1+\lambda)\left(51-69\,\lambda+36\,\lambda^2-9\,\lambda^3+\lambda^4\right)$

Out[ ]= $(-1+\lambda)\left(51-69\,\lambda+36\,\lambda^2-9\,\lambda^3+\lambda^4\right)$

In[ ]:=
```
inclexcl[K5num7, 2 k + 1, "odd"] // Expand
signedchrompoly[K5num7delcon, 2 k + 1, "odd"] // Expand
```

Out[ ]= $20\,k-80\,k^2+120\,k^3-80\,k^4+32\,k^5$

Out[ ]= $20\,k-80\,k^2+120\,k^3-80\,k^4+32\,k^5$