

```

rfunc[q1_, q2_, q3_, q4_, q5_] := (q4 - q1*q2) / Sqrt[(q3 - q1^2) * (q5 - q2^2)]

ident = IdentityMatrix[5]

{{1, 0, 0, 0, 0}, {0, 1, 0, 0, 0}, {0, 0, 1, 0, 0}, {0, 0, 0, 1, 0}, {0, 0, 0, 0, 1}}

del[q1_, q2_, q3_, q4_, q5_] :=
  Table[FullSimplify[Derivative[ident[[i, 1]], ident[[i, 2]], ident[[i, 3]],
    ident[[i, 4]], ident[[i, 5]]][rfunc][q1, q2, q3, q4, q5]], {i, 1, 5}]

del[q1, q2, q3, q4, q5]
{((q2*q3 - q1*q4)*(q2^2 - q5))/
  ((q1^2 - q3)*(q2^2 - q5))^(3/2),
  ((q1^2 - q3)*((-q2)*q4 + q1*q5))/
  ((q1^2 - q3)*(q2^2 - q5))^(3/2),
  -((((-q1)*q2 + q4)*(-q2^2 + q5))/
  (2*((q1^2 - q3)*(q2^2 - q5))^(3/2))),
  1/Sqrt[(q1^2 - q3)*(q2^2 - q5)],
  -((((-q1^2 + q3)*((-q1)*q2 + q4))/
  (2*((q1^2 - q3)*(q2^2 - q5))^(3/2)))}

```

```
In[32]:= delcorr[q1_, q2_, q3_, q4_, q5_] :=
  { ((q2 * q3 - q1 * q4) * (q2^2 - q5)) / ((q1^2 - q3) * (q2^2 - q5))^(3/2),
    ((q1^2 - q3) * ((-q2) * q4 + q1 * q5)) / ((q1^2 - q3) * (q2^2 - q5))^(3/2),
    - (((-q1) * q2 + q4) * (-q2^2 + q5)) / (2 * ((q1^2 - q3) * (q2^2 - q5))^(3/2)),
    1 / Sqrt[(q1^2 - q3) * (q2^2 - q5)],
    - (((-q1^2 + q3) * ((-q1) * q2 + q4)) / (2 * ((q1^2 - q3) * (q2^2 - q5))^(3/2))) }
```

```
In[37]:= rulesDel = Table[RawToCumulant[{i, j}], {i, 0, 2}, {j, 0, 2}]
```

```
Out[37]= { {μ0,0 → 1, μ0,1 → κ0,1, μ0,2 → κ0,12 + κ0,2},
  {μ1,0 → κ1,0, μ1,1 → κ0,1 κ1,0 + κ1,1, μ1,2 → κ0,12 κ1,0 + κ0,2 κ1,0 + 2 κ0,1 κ1,1 + κ1,2},
  {μ2,0 → κ1,02 + κ2,0, μ2,1 → κ0,1 κ1,02 + 2 κ1,0 κ1,1 + κ0,1 κ2,0 + κ2,1, μ2,2 →
  κ0,12 κ1,02 + κ0,2 κ1,02 + 4 κ0,1 κ1,0 κ1,1 + 2 κ1,12 + 2 κ1,0 κ1,2 + κ0,12 κ2,0 + κ0,2 κ2,0 + 2 κ0,1 κ2,1 + κ2,2 }
```

```
In[40]:= delcorr[μ1,0, μ0,1, μ2,0, μ1,1, μ0,2]
```

$$\text{Out[40]} = \left\{ \frac{(\mu_{0,1}^2 - \mu_{0,2}) (-\mu_{1,0} \mu_{1,1} + \mu_{0,1} \mu_{2,0})}{\left((\mu_{0,1}^2 - \mu_{0,2}) (\mu_{1,0}^2 - \mu_{2,0}) \right)^{3/2}}, \right.$$

$$\frac{(\mu_{0,2} \mu_{1,0} - \mu_{0,1} \mu_{1,1}) (\mu_{1,0}^2 - \mu_{2,0})}{\left((\mu_{0,1}^2 - \mu_{0,2}) (\mu_{1,0}^2 - \mu_{2,0}) \right)^{3/2}}, - \frac{(-\mu_{0,1}^2 + \mu_{0,2}) (-\mu_{0,1} \mu_{1,0} + \mu_{1,1})}{2 \left((\mu_{0,1}^2 - \mu_{0,2}) (\mu_{1,0}^2 - \mu_{2,0}) \right)^{3/2}},$$

$$\left. \frac{1}{\sqrt{(\mu_{0,1}^2 - \mu_{0,2}) (\mu_{1,0}^2 - \mu_{2,0})}}, - \frac{(-\mu_{0,1} \mu_{1,0} + \mu_{1,1}) (-\mu_{1,0}^2 + \mu_{2,0})}{2 \left((\mu_{0,1}^2 - \mu_{0,2}) (\mu_{1,0}^2 - \mu_{2,0}) \right)^{3/2}} \right\}$$

```
In[43]:= delcorr[μ1,0, μ0,1, μ2,0, μ1,1, μ0,2] /.
  {rulesDel[[1, 2]], rulesDel[[1, 3]], rulesDel[[2, 1]],
  rulesDel[[2, 2]], rulesDel[[3, 1]]}
```

$$\text{Out[43]} = \left\{ - \frac{\kappa_{0,2} (-\kappa_{1,0} (\kappa_{0,1} \kappa_{1,0} + \kappa_{1,1}) + \kappa_{0,1} (\kappa_{1,0}^2 + \kappa_{2,0}))}{(\kappa_{0,2} \kappa_{2,0})^{3/2}}, \right.$$

$$- \frac{(\kappa_{0,1}^2 + \kappa_{0,2}) \kappa_{1,0} - \kappa_{0,1} (\kappa_{0,1} \kappa_{1,0} + \kappa_{1,1}) \kappa_{2,0}}{(\kappa_{0,2} \kappa_{2,0})^{3/2}},$$

$$\left. - \frac{\kappa_{0,2} \kappa_{1,1}}{2 (\kappa_{0,2} \kappa_{2,0})^{3/2}}, \frac{1}{\sqrt{\kappa_{0,2} \kappa_{2,0}}}, - \frac{\kappa_{1,1} \kappa_{2,0}}{2 (\kappa_{0,2} \kappa_{2,0})^{3/2}} \right\}$$

```
In[44]:= FullSimplify[%]
```

$$\text{Out[44]} = \left\{ \frac{\kappa_{0,2} (\kappa_{1,0} \kappa_{1,1} - \kappa_{0,1} \kappa_{2,0})}{(\kappa_{0,2} \kappa_{2,0})^{3/2}}, \frac{(-\kappa_{0,2} \kappa_{1,0} + \kappa_{0,1} \kappa_{1,1}) \kappa_{2,0}}{(\kappa_{0,2} \kappa_{2,0})^{3/2}}, \right.$$

$$\left. - \frac{\kappa_{0,2} \kappa_{1,1}}{2 (\kappa_{0,2} \kappa_{2,0})^{3/2}}, \frac{1}{\sqrt{\kappa_{0,2} \kappa_{2,0}}}, - \frac{\kappa_{1,1} \kappa_{2,0}}{2 (\kappa_{0,2} \kappa_{2,0})^{3/2}} \right\}$$

```
In[54]:= %44 /. rulesDelK
```

$$\text{Out[54]} = \left\{ \frac{\mu_{0,2} (-\mu_{2,0} \mu_{0,1} + \mu_{1,1} \mu_{1,0})}{(\mu_{0,2} \mu_{2,0})^{3/2}}, \frac{\mu_{2,0} (\mu_{1,1} \mu_{0,1} - \mu_{0,2} \mu_{1,0})}{(\mu_{0,2} \mu_{2,0})^{3/2}}, \right.$$

$$\left. - \frac{\mu_{0,2} \mu_{1,1}}{2 (\mu_{0,2} \mu_{2,0})^{3/2}}, \frac{1}{\sqrt{\mu_{0,2} \mu_{2,0}}}, - \frac{\mu_{1,1} \mu_{2,0}}{2 (\mu_{0,2} \mu_{2,0})^{3/2}} \right\}$$

```
In[55]:= FullSimplify[%]
```

$$\text{Out[55]} = \left\{ \frac{\mu_{0,2} (-\mu_{2,0} \mu_{0,1} + \mu_{1,1} \mu_{1,0})}{(\mu_{0,2} \mu_{2,0})^{3/2}}, \frac{\mu_{2,0} (\mu_{1,1} \mu_{0,1} - \mu_{0,2} \mu_{1,0})}{(\mu_{0,2} \mu_{2,0})^{3/2}}, \right.$$

$$\left. - \frac{\mu_{0,2} \mu_{1,1}}{2 (\mu_{0,2} \mu_{2,0})^{3/2}}, \frac{1}{\sqrt{\mu_{0,2} \mu_{2,0}}}, - \frac{\mu_{1,1} \mu_{2,0}}{2 (\mu_{0,2} \mu_{2,0})^{3/2}} \right\}$$

```

In[57]:= (* now need a covariance machine to build up Sigma *)

In[59]:= sig11 =  $\mu_{2,0}$ 
Out[59]=  $\mu_{2,0}$ 

In[61]:= sig22 =  $\mu_{0,2}$ 
Out[61]=  $\mu_{0,2}$ 

In[62]:= sig12 = sig21 =  $\mu_{1,1}$ 
Out[62]=  $\mu_{1,1}$ 

In[63]:= sigXY = {{sig11, sig12}, {sig21, sig22}}
Out[63]=  $\begin{pmatrix} \mu_{2,0} & \mu_{1,1} \\ \mu_{1,1} & \mu_{0,2} \end{pmatrix}$ 

In[68]:= sig33 = varXsq =  $\mu_{2,0}^2 + \mu_{4,0}^2$ 
Out[68]=  $\mu_{2,0}^2 + \mu_{4,0}^2$ 

In[69]:= sig55 = varYsq =  $\mu_{0,2}^2 + \mu_{0,4}^2$ 
Out[69]=  $\mu_{0,2}^2 + \mu_{0,4}^2$ 

In[70]:= sig44 = varXY =  $\mu_{1,1}^2 + \mu_{2,2}^2$ 
Out[70]=  $\mu_{1,1}^2 + \mu_{2,2}^2$ 

In[73]:= sig13 = sig31 = covXXsq =  $-\mu_{1,0} \mu_{2,0} + \mu_{3,0}^2$ 
Out[73]=  $-\mu_{1,0} \mu_{2,0} + \mu_{3,0}^2$ 

In[76]:= sig25 = sig52 = covYYsq =  $-\mu_{0,1} \mu_{0,2} + \mu_{0,3}^2$ 
Out[76]=  $-\mu_{0,1} \mu_{0,2} + \mu_{0,3}^2$ 

In[80]:= sig14 = sig41 = covXXY =  $-\mu_{1,1} \mu_{1,0} + \mu_{2,1}^2$ 
Out[80]=  $-\mu_{1,1} \mu_{1,0} + \mu_{2,1}^2$ 

In[82]:= sig15 = sig51 = covXYsq =  $-\mu_{0,2} \mu_{1,0} + \mu_{1,2}^2$ 
Out[82]=  $-\mu_{0,2} \mu_{1,0} + \mu_{1,2}^2$ 

In[84]:= sig23 = sig32 = covYXsq =  $-\mu_{2,0} \mu_{0,1} + \mu_{2,1}^2$ 
Out[84]=  $-\mu_{2,0} \mu_{0,1} + \mu_{2,1}^2$ 

In[86]:= sig24 = sig42 = covYXY =  $-\mu_{1,1} \mu_{0,1} + \mu_{1,2}^2$ 
Out[86]=  $-\mu_{1,1} \mu_{0,1} + \mu_{1,2}^2$ 

In[88]:= sig34 = sig43 = covXsqXY =  $-\mu_{1,1} \mu_{2,0} + \mu_{3,1}^2$ 
Out[88]=  $-\mu_{1,1} \mu_{2,0} + \mu_{3,1}^2$ 

In[90]:= sig35 = sig53 = covXsqYsq =  $-\mu_{0,2} \mu_{2,0} + \mu_{2,2}^2$ 
Out[90]=  $-\mu_{0,2} \mu_{2,0} + \mu_{2,2}^2$ 

In[92]:= sig45 = sig54 = covXYYSq =  $-\mu_{1,1} \mu_{0,2} + \mu_{1,3}^2$ 
Out[92]=  $-\mu_{1,1} \mu_{0,2} + \mu_{1,3}^2$ 

```

```
In[93]:= sigRaw = {{sig11, sig12, sig13, sig14, sig15},
  {sig21, sig22, sig23, sig24, sig25}, {sig31, sig32, sig33, sig34, sig35},
  {sig41, sig42, sig43, sig44, sig45}, {sig51, sig52, sig53, sig54, sig55}}
```

$$\text{Out[93]} = \begin{pmatrix} \mu_{2,0} & \mu_{1,1} & -\dot{\mu}_{1,0} \dot{\mu}_{2,0} + \dot{\mu}_{3,0} & -\dot{\mu}_{1,0} \dot{\mu}_{1,1} + \dot{\mu}_{2,1} & -\dot{\mu}_{0,2} \dot{\mu}_{1,0} + \dot{\mu}_{1,2} \\ \mu_{1,1} & \mu_{0,2} & -\dot{\mu}_{0,1} \dot{\mu}_{2,0} + \dot{\mu}_{2,1} & -\dot{\mu}_{0,1} \dot{\mu}_{1,1} + \dot{\mu}_{1,2} & -\dot{\mu}_{0,1} \dot{\mu}_{0,2} + \dot{\mu}_{0,3} \\ -\dot{\mu}_{1,0} \dot{\mu}_{2,0} + \dot{\mu}_{3,0} & -\dot{\mu}_{0,1} \dot{\mu}_{2,0} + \dot{\mu}_{2,1} & -\dot{\mu}_{2,0}^2 + \dot{\mu}_{4,0} & -\dot{\mu}_{1,1} \dot{\mu}_{2,0} + \dot{\mu}_{3,1} & -\dot{\mu}_{0,2} \dot{\mu}_{2,0} + \dot{\mu}_{2,2} \\ -\dot{\mu}_{1,0} \dot{\mu}_{1,1} + \dot{\mu}_{2,1} & -\dot{\mu}_{0,1} \dot{\mu}_{1,1} + \dot{\mu}_{1,2} & -\dot{\mu}_{1,1} \dot{\mu}_{2,0} + \dot{\mu}_{3,1} & -\dot{\mu}_{1,1}^2 + \dot{\mu}_{2,2} & -\dot{\mu}_{0,2} \dot{\mu}_{1,1} + \dot{\mu}_{1,3} \\ -\dot{\mu}_{0,2} \dot{\mu}_{1,0} + \dot{\mu}_{1,2} & -\dot{\mu}_{0,1} \dot{\mu}_{0,2} + \dot{\mu}_{0,3} & -\dot{\mu}_{0,2} \dot{\mu}_{2,0} + \dot{\mu}_{2,2} & -\dot{\mu}_{0,2} \dot{\mu}_{1,1} + \dot{\mu}_{1,3} & -\dot{\mu}_{0,2}^2 + \dot{\mu}_{0,4} \end{pmatrix}$$

```
In[96]:= rulesDel4 = Flatten[Table[RawToCumulant[{i, j}], {i, 0, 4}, {j, 0, 4}]]
```

$$\begin{aligned} \text{Out[96]} = & \left\{ \begin{aligned} & \dot{\mu}_{0,0} \rightarrow 1, \dot{\mu}_{0,1} \rightarrow \kappa_{0,1}, \dot{\mu}_{0,2} \rightarrow \kappa_{0,1}^2 + \kappa_{0,2}, \dot{\mu}_{0,3} \rightarrow \kappa_{0,1}^3 + 3\kappa_{0,1}\kappa_{0,2} + \kappa_{0,3}, \\ & \dot{\mu}_{0,4} \rightarrow \kappa_{0,1}^4 + 6\kappa_{0,1}^2\kappa_{0,2} + 3\kappa_{0,2}^2 + 4\kappa_{0,1}\kappa_{0,3} + \kappa_{0,4}, \dot{\mu}_{1,0} \rightarrow \kappa_{1,0}, \\ & \dot{\mu}_{1,1} \rightarrow \kappa_{0,1}\kappa_{1,0} + \kappa_{1,1}, \dot{\mu}_{1,2} \rightarrow \kappa_{0,1}^2\kappa_{1,0} + \kappa_{0,2}\kappa_{1,0} + 2\kappa_{0,1}\kappa_{1,1} + \kappa_{1,2}, \\ & \dot{\mu}_{1,3} \rightarrow \kappa_{0,1}^3\kappa_{1,0} + 3\kappa_{0,1}\kappa_{0,2}\kappa_{1,0} + \kappa_{0,3}\kappa_{1,0} + 3\kappa_{0,1}^2\kappa_{1,1} + 3\kappa_{0,2}\kappa_{1,1} + 3\kappa_{0,1}\kappa_{1,2} + \kappa_{1,3}, \\ & \dot{\mu}_{1,4} \rightarrow \kappa_{0,1}^4\kappa_{1,0} + 6\kappa_{0,1}^2\kappa_{0,2}\kappa_{1,0} + 3\kappa_{0,2}^2\kappa_{1,0} + 4\kappa_{0,1}\kappa_{0,3}\kappa_{1,0} + \kappa_{0,4}\kappa_{1,0} + \\ & \quad 4\kappa_{0,1}^3\kappa_{1,1} + 12\kappa_{0,1}\kappa_{0,2}\kappa_{1,1} + 4\kappa_{0,3}\kappa_{1,1} + 6\kappa_{0,1}^2\kappa_{1,2} + 6\kappa_{0,2}\kappa_{1,2} + 4\kappa_{0,1}\kappa_{1,3} + \kappa_{1,4}, \\ & \dot{\mu}_{2,0} \rightarrow \kappa_{1,0}^2 + \kappa_{2,0}, \dot{\mu}_{2,1} \rightarrow \kappa_{0,1}\kappa_{1,0}^2 + 2\kappa_{1,0}\kappa_{1,1} + \kappa_{0,1}\kappa_{2,0} + \kappa_{2,1}, \dot{\mu}_{2,2} \rightarrow \\ & \quad \kappa_{0,1}^2\kappa_{1,0}^2 + \kappa_{0,2}\kappa_{1,0}^2 + 4\kappa_{0,1}\kappa_{1,0}\kappa_{1,1} + 2\kappa_{1,1}^2 + 2\kappa_{1,0}\kappa_{1,2} + \kappa_{0,1}^2\kappa_{2,0} + \kappa_{0,2}\kappa_{2,0} + 2\kappa_{0,1}\kappa_{2,1} + \kappa_{2,2}, \\ & \dot{\mu}_{2,3} \rightarrow \kappa_{0,1}^3\kappa_{1,0}^2 + 3\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}^2 + \kappa_{0,3}\kappa_{1,0}^2 + 6\kappa_{0,1}^2\kappa_{1,0}\kappa_{1,1} + 6\kappa_{0,2}\kappa_{1,0}\kappa_{1,1} + \\ & \quad 6\kappa_{0,1}\kappa_{1,1}^2 + 6\kappa_{0,1}\kappa_{1,0}\kappa_{1,2} + 6\kappa_{1,1}\kappa_{1,2} + 2\kappa_{1,0}\kappa_{1,3} + \kappa_{0,1}^3\kappa_{2,0} + \\ & \quad 3\kappa_{0,1}\kappa_{0,2}\kappa_{2,0} + \kappa_{0,3}\kappa_{2,0} + 3\kappa_{0,1}^2\kappa_{2,1} + 3\kappa_{0,2}\kappa_{2,1} + 3\kappa_{0,1}\kappa_{2,2} + \kappa_{2,3}, \\ & \dot{\mu}_{2,4} \rightarrow \kappa_{0,1}^4\kappa_{1,0}^2 + 6\kappa_{0,1}^2\kappa_{0,2}\kappa_{1,0}^2 + 3\kappa_{0,2}^2\kappa_{1,0}^2 + 4\kappa_{0,1}\kappa_{0,3}\kappa_{1,0}^2 + \kappa_{0,4}\kappa_{1,0}^2 + 8\kappa_{0,1}^3\kappa_{1,0}\kappa_{1,1} + \\ & \quad 24\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}\kappa_{1,1} + 8\kappa_{0,3}\kappa_{1,0}\kappa_{1,1} + 12\kappa_{0,1}^2\kappa_{1,1}^2 + 12\kappa_{0,2}\kappa_{1,1}^2 + 12\kappa_{0,1}^2\kappa_{1,0}\kappa_{1,2} + \\ & \quad 12\kappa_{0,2}\kappa_{1,0}\kappa_{1,2} + 24\kappa_{0,1}\kappa_{1,1}\kappa_{1,2} + 6\kappa_{1,2}^2 + 8\kappa_{0,1}\kappa_{1,0}\kappa_{1,3} + 8\kappa_{1,1}\kappa_{1,3} + 2\kappa_{1,0}\kappa_{1,4} + \kappa_{0,1}^4\kappa_{2,0} + \\ & \quad 6\kappa_{0,1}^3\kappa_{0,2}\kappa_{2,0} + 3\kappa_{0,2}^2\kappa_{2,0} + 4\kappa_{0,1}\kappa_{0,3}\kappa_{2,0} + \kappa_{0,4}\kappa_{2,0} + 4\kappa_{0,1}^3\kappa_{2,1} + 12\kappa_{0,1}\kappa_{0,2}\kappa_{2,1} + \\ & \quad 4\kappa_{0,3}\kappa_{2,1} + 6\kappa_{0,1}^2\kappa_{2,2} + 6\kappa_{0,2}\kappa_{2,2} + 4\kappa_{0,1}\kappa_{2,3} + \kappa_{2,4}, \dot{\mu}_{3,0} \rightarrow \kappa_{1,0}^3 + 3\kappa_{1,0}\kappa_{2,0} + \kappa_{3,0}, \\ & \dot{\mu}_{3,1} \rightarrow \kappa_{0,1}\kappa_{1,0}^3 + 3\kappa_{1,0}^2\kappa_{1,1} + 3\kappa_{0,1}\kappa_{1,0}\kappa_{2,0} + 3\kappa_{1,1}\kappa_{2,0} + 3\kappa_{1,0}\kappa_{2,1} + \kappa_{0,1}\kappa_{3,0} + \kappa_{3,1}, \\ & \dot{\mu}_{3,2} \rightarrow \kappa_{0,1}^2\kappa_{1,0}^3 + \kappa_{0,2}\kappa_{1,0}^3 + 6\kappa_{0,1}\kappa_{1,0}^2\kappa_{1,1} + 6\kappa_{1,0}\kappa_{1,1}^2 + \\ & \quad 3\kappa_{1,0}^2\kappa_{1,2} + 3\kappa_{0,1}^2\kappa_{1,0}\kappa_{2,0} + 3\kappa_{0,2}\kappa_{1,0}\kappa_{2,0} + 6\kappa_{0,1}\kappa_{1,1}\kappa_{2,0} + 3\kappa_{1,2}\kappa_{2,0} + \\ & \quad 6\kappa_{0,1}\kappa_{1,0}\kappa_{2,1} + 6\kappa_{1,1}\kappa_{2,1} + 3\kappa_{1,0}\kappa_{2,2} + \kappa_{0,1}^2\kappa_{3,0} + \kappa_{0,2}\kappa_{3,0} + 2\kappa_{0,1}\kappa_{3,1} + \kappa_{3,2}, \\ & \dot{\mu}_{3,3} \rightarrow \kappa_{0,1}^3\kappa_{1,0}^3 + 3\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}^3 + \kappa_{0,3}\kappa_{1,0}^3 + 9\kappa_{0,1}^2\kappa_{1,0}^2\kappa_{1,1} + 9\kappa_{0,2}\kappa_{1,0}^2\kappa_{1,1} + 18\kappa_{0,1}\kappa_{1,0}\kappa_{1,1}^2 + \\ & \quad 6\kappa_{1,1}^3 + 9\kappa_{0,1}\kappa_{1,0}^2\kappa_{1,2} + 18\kappa_{1,0}\kappa_{1,1}\kappa_{1,2} + 3\kappa_{1,0}^2\kappa_{1,3} + 3\kappa_{0,1}^3\kappa_{1,0}\kappa_{2,0} + 9\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}\kappa_{2,0} + \\ & \quad 3\kappa_{0,3}\kappa_{1,0}\kappa_{2,0} + 9\kappa_{0,1}^2\kappa_{1,1}\kappa_{2,0} + 9\kappa_{0,2}\kappa_{1,1}\kappa_{2,0} + 9\kappa_{0,1}\kappa_{1,2}\kappa_{2,0} + 3\kappa_{1,3}\kappa_{2,0} + \\ & \quad 9\kappa_{0,1}^2\kappa_{1,0}\kappa_{2,1} + 9\kappa_{0,2}\kappa_{1,0}\kappa_{2,1} + 18\kappa_{0,1}\kappa_{1,1}\kappa_{2,1} + 9\kappa_{1,2}\kappa_{2,1} + 9\kappa_{0,1}\kappa_{1,0}\kappa_{2,2} + 9\kappa_{1,1}\kappa_{2,2} + \\ & \quad 3\kappa_{1,0}\kappa_{2,3} + \kappa_{0,1}^3\kappa_{3,0} + 3\kappa_{0,1}\kappa_{0,2}\kappa_{3,0} + \kappa_{0,3}\kappa_{3,0} + 3\kappa_{0,1}^2\kappa_{3,1} + 3\kappa_{0,2}\kappa_{3,1} + 3\kappa_{0,1}\kappa_{3,2} + \kappa_{3,3}, \\ & \dot{\mu}_{3,4} \rightarrow \kappa_{0,1}^4\kappa_{1,0}^3 + 6\kappa_{0,1}^2\kappa_{0,2}\kappa_{1,0}^3 + 3\kappa_{0,2}^2\kappa_{1,0}^3 + 4\kappa_{0,1}\kappa_{0,3}\kappa_{1,0}^3 + \kappa_{0,4}\kappa_{1,0}^3 + 12\kappa_{0,1}^3\kappa_{1,0}^2\kappa_{1,1} + \\ & \quad 36\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}^2\kappa_{1,1} + 12\kappa_{0,3}\kappa_{1,0}^2\kappa_{1,1} + 36\kappa_{0,1}^2\kappa_{1,0}\kappa_{1,1}^2 + 36\kappa_{0,2}\kappa_{1,0}\kappa_{1,1}^2 + 24\kappa_{0,1}\kappa_{1,1}^3 + \\ & \quad 18\kappa_{0,1}^2\kappa_{1,0}\kappa_{1,2} + 18\kappa_{0,2}\kappa_{1,0}\kappa_{1,2} + 72\kappa_{0,1}\kappa_{1,0}\kappa_{1,1}\kappa_{1,2} + 36\kappa_{1,1}^2\kappa_{1,2} + 18\kappa_{1,0}\kappa_{1,2}^2 + \\ & \quad 12\kappa_{0,1}\kappa_{1,0}^2\kappa_{1,3} + 24\kappa_{1,0}\kappa_{1,1}\kappa_{1,3} + 3\kappa_{1,0}^2\kappa_{1,4} + 3\kappa_{0,1}^4\kappa_{1,0}\kappa_{2,0} + 18\kappa_{0,1}^2\kappa_{0,2}\kappa_{1,0}\kappa_{2,0} + \\ & \quad 9\kappa_{0,2}^2\kappa_{1,0}\kappa_{2,0} + 12\kappa_{0,1}\kappa_{0,3}\kappa_{1,0}\kappa_{2,0} + 3\kappa_{0,4}\kappa_{1,0}\kappa_{2,0} + 12\kappa_{0,1}^3\kappa_{1,1}\kappa_{2,0} + 36\kappa_{0,1}\kappa_{0,2}\kappa_{1,1}\kappa_{2,0} + \\ & \quad 12\kappa_{0,3}\kappa_{1,1}\kappa_{2,0} + 18\kappa_{0,1}^2\kappa_{1,2}\kappa_{2,0} + 18\kappa_{0,2}\kappa_{1,2}\kappa_{2,0} + 12\kappa_{0,1}\kappa_{1,3}\kappa_{2,0} + 3\kappa_{1,4}\kappa_{2,0} + \\ & \quad 12\kappa_{0,1}^3\kappa_{1,0}\kappa_{2,1} + 36\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}\kappa_{2,1} + 12\kappa_{0,3}\kappa_{1,0}\kappa_{2,1} + 36\kappa_{0,1}^2\kappa_{1,1}\kappa_{2,1} + 36\kappa_{0,2}\kappa_{1,1}\kappa_{2,1} + \\ & \quad 36\kappa_{0,1}\kappa_{1,2}\kappa_{2,1} + 12\kappa_{1,3}\kappa_{2,1} + 18\kappa_{0,1}^2\kappa_{1,0}\kappa_{2,2} + 18\kappa_{0,2}\kappa_{1,0}\kappa_{2,2} + 36\kappa_{0,1}\kappa_{1,1}\kappa_{2,2} + 18\kappa_{1,2}\kappa_{2,2} + \\ & \quad 12\kappa_{0,1}\kappa_{1,0}\kappa_{2,3} + 12\kappa_{1,1}\kappa_{2,3} + 3\kappa_{1,0}\kappa_{2,4} + \kappa_{0,1}^4\kappa_{3,0} + 6\kappa_{0,1}^2\kappa_{0,2}\kappa_{3,0} + 3\kappa_{0,2}^2\kappa_{3,0} + 4\kappa_{0,1}\kappa_{0,3}\kappa_{3,0} + \\ & \quad \kappa_{0,4}\kappa_{3,0} + 4\kappa_{0,1}^3\kappa_{3,1} + 12\kappa_{0,1}\kappa_{0,2}\kappa_{3,1} + 4\kappa_{0,3}\kappa_{3,1} + 6\kappa_{0,1}^2\kappa_{3,2} + 6\kappa_{0,2}\kappa_{3,2} + 4\kappa_{0,1}\kappa_{3,3} + \kappa_{3,4}, \\ & \dot{\mu}_{4,0} \rightarrow \kappa_{1,0}^4 + 6\kappa_{1,0}^2\kappa_{2,0} + 3\kappa_{2,0}^2 + 4\kappa_{1,0}\kappa_{3,0} + \kappa_{4,0}, \\ & \dot{\mu}_{4,1} \rightarrow \kappa_{0,1}\kappa_{1,0}^4 + 4\kappa_{1,0}^3\kappa_{1,1} + 6\kappa_{0,1}\kappa_{1,0}^2\kappa_{2,0} + 12\kappa_{1,0}\kappa_{1,1}\kappa_{2,0} + 3\kappa_{0,1}\kappa_{2,0}^2 + \\ & \quad 6\kappa_{1,0}^2\kappa_{2,1} + 6\kappa_{2,0}\kappa_{2,1} + 4\kappa_{0,1}\kappa_{1,0}\kappa_{3,0} + 4\kappa_{1,1}\kappa_{3,0} + 4\kappa_{1,0}\kappa_{3,1} + \kappa_{0,1}\kappa_{4,0} + \kappa_{4,1}, \\ & \dot{\mu}_{4,2} \rightarrow \kappa_{0,1}^2\kappa_{1,0}^4 + \kappa_{0,2}\kappa_{1,0}^4 + 8\kappa_{0,1}\kappa_{1,0}^3\kappa_{1,1} + 12\kappa_{1,0}^2\kappa_{1,1}^2 + 4\kappa_{1,0}^3\kappa_{1,2} + 6\kappa_{0,1}^2\kappa_{1,0}^2\kappa_{2,0} + \\ & \quad 6\kappa_{0,2}\kappa_{1,0}^2\kappa_{2,0} + 24\kappa_{0,1}\kappa_{1,0}\kappa_{1,1}\kappa_{2,0} + 12\kappa_{1,1}^2\kappa_{2,0} + 12\kappa_{1,0}\kappa_{1,2}\kappa_{2,0} + 3\kappa_{0,1}^2\kappa_{1,0}^2\kappa_{2,0} + \\ & \quad 3\kappa_{0,2}\kappa_{2,0}^2 + 12\kappa_{0,1}\kappa_{1,0}^2\kappa_{2,1} + 24\kappa_{1,0}\kappa_{1,1}\kappa_{2,1} + 12\kappa_{0,1}\kappa_{2,0}\kappa_{2,1} + 6\kappa_{2,1}^2 + 6\kappa_{1,0}^2\kappa_{2,2} + \\ & \quad 6\kappa_{2,0}\kappa_{2,2} + 4\kappa_{0,1}^2\kappa_{1,0}\kappa_{3,0} + 4\kappa_{0,2}\kappa_{1,0}\kappa_{3,0} + 8\kappa_{0,1}\kappa_{1,1}\kappa_{3,0} + 4\kappa_{1,2}\kappa_{3,0} + \\ & \quad 8\kappa_{0,1}\kappa_{1,0}\kappa_{3,1} + 8\kappa_{1,1}\kappa_{3,1} + 4\kappa_{1,0}\kappa_{3,2} + \kappa_{0,1}^2\kappa_{4,0} + \kappa_{0,2}\kappa_{4,0} + 2\kappa_{0,1}\kappa_{4,1} + \kappa_{4,2}, \\ & \dot{\mu}_{4,3} \rightarrow \kappa_{0,1}^3\kappa_{1,0}^4 + 3\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}^4 + \kappa_{0,3}\kappa_{1,0}^4 + 12\kappa_{0,1}^2\kappa_{1,0}^3\kappa_{1,1} + 12\kappa_{0,2}\kappa_{1,0}^3\kappa_{1,1} + 36\kappa_{0,1}\kappa_{1,0}^2\kappa_{1,1}^2 + \\ & \quad 24\kappa_{1,0}\kappa_{1,1}^3 + 12\kappa_{0,1}\kappa_{1,0}^3\kappa_{1,2} + 36\kappa_{1,0}^2\kappa_{1,1}\kappa_{1,2} + 4\kappa_{1,0}^3\kappa_{1,3} + 6\kappa_{0,1}^3\kappa_{1,0}\kappa_{2,0} + 18\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}^2\kappa_{2,0} + \\ & \quad 6\kappa_{0,3}\kappa_{1,0}^2\kappa_{2,0} + 36\kappa_{0,1}^2\kappa_{1,0}\kappa_{1,1}\kappa_{2,0} + 36\kappa_{0,2}\kappa_{1,0}\kappa_{1,1}\kappa_{2,0} + 36\kappa_{0,1}\kappa_{1,1}^2\kappa_{2,0} + \\ & \quad 36\kappa_{0,1}\kappa_{1,0}\kappa_{1,2}\kappa_{2,0} + 36\kappa_{1,1}\kappa_{1,2}\kappa_{2,0} + 12\kappa_{1,0}\kappa_{1,3}\kappa_{2,0} + 3\kappa_{0,1}^3\kappa_{2,0}^2 + 9\kappa_{0,1}\kappa_{0,2}\kappa_{2,0}^2 + 3\kappa_{0,3}\kappa_{2,0}^2 + \\ & \quad 18\kappa_{0,1}^2\kappa_{1,0}\kappa_{2,1} + 18\kappa_{0,2}\kappa_{1,0}\kappa_{2,1} + 72\kappa_{0,1}\kappa_{1,0}\kappa_{1,1}\kappa_{2,1} + 36\kappa_{1,1}^2\kappa_{2,1} + 36\kappa_{1,0}\kappa_{1,2}\kappa_{2,1} + \\ & \quad 18\kappa_{0,1}^2\kappa_{2,0}\kappa_{2,1} + 18\kappa_{0,2}\kappa_{2,0}\kappa_{2,1} + 18\kappa_{0,1}\kappa_{2,1}^2 + 18\kappa_{0,1}\kappa_{1,0}^2\kappa_{2,2} + 36\kappa_{1,0}\kappa_{1,1}\kappa_{2,2} + \\ & \quad 18\kappa_{0,1}\kappa_{2,0}\kappa_{2,2} + 18\kappa_{2,1}\kappa_{2,2} + 6\kappa_{1,0}^2\kappa_{2,3} + 6\kappa_{2,0}\kappa_{2,3} + 4\kappa_{0,1}^3\kappa_{1,0}\kappa_{3,0} + 12\kappa_{0,1}\kappa_{0,2}\kappa_{1,0}\kappa_{3,0} + \\ & \quad 4\kappa_{0,3}\kappa_{1,0}\kappa_{3,0} + 12\kappa_{0,1}^2\kappa_{1,1}\kappa_{3,0} + 12\kappa_{0,2}\kappa_{1,1}\kappa_{3,0} + 12\kappa_{0,1}\kappa_{1,2}\kappa_{3,0} + 4\kappa_{1,3}\kappa_{3,0} + \end{aligned} \right. \end{aligned}$$

$$\begin{aligned}
& 12 \kappa_{0,1}^2 \kappa_{1,0} \kappa_{3,1} + 12 \kappa_{0,2} \kappa_{1,0} \kappa_{3,1} + 24 \kappa_{0,1} \kappa_{1,1} \kappa_{3,1} + 12 \kappa_{1,2} \kappa_{3,1} + 12 \kappa_{0,1} \kappa_{1,0} \kappa_{3,2} + 12 \kappa_{1,1} \kappa_{3,2} + \\
& 4 \kappa_{1,0} \kappa_{3,3} + \kappa_{0,1}^3 \kappa_{4,0} + 3 \kappa_{0,1} \kappa_{0,2} \kappa_{4,0} + \kappa_{0,3} \kappa_{4,0} + 3 \kappa_{0,1}^2 \kappa_{4,1} + 3 \kappa_{0,2} \kappa_{4,1} + 3 \kappa_{0,1} \kappa_{4,2} + \kappa_{4,3}, \\
\hat{\mu}_{4,4} \rightarrow & \kappa_{0,1}^4 \kappa_{1,0}^4 + 6 \kappa_{0,1}^2 \kappa_{0,2} \kappa_{1,0}^4 + 3 \kappa_{0,2}^2 \kappa_{1,0}^4 + 4 \kappa_{0,1} \kappa_{0,3} \kappa_{1,0}^4 + \kappa_{0,4} \kappa_{1,0}^4 + 16 \kappa_{0,1}^3 \kappa_{1,0}^3 \kappa_{1,1} + \\
& 48 \kappa_{0,1} \kappa_{0,2} \kappa_{1,0}^3 \kappa_{1,1} + 16 \kappa_{0,3} \kappa_{1,0}^3 \kappa_{1,1} + 72 \kappa_{0,1}^2 \kappa_{1,0}^2 \kappa_{1,1}^2 + 72 \kappa_{0,2} \kappa_{1,0}^2 \kappa_{1,1}^2 + 96 \kappa_{0,1} \kappa_{1,0} \kappa_{1,1}^3 + \\
& 24 \kappa_{1,1}^4 + 24 \kappa_{0,1}^2 \kappa_{1,0}^3 \kappa_{1,2} + 24 \kappa_{0,2} \kappa_{1,0}^3 \kappa_{1,2} + 144 \kappa_{0,1} \kappa_{1,0}^2 \kappa_{1,1} \kappa_{1,2} + 144 \kappa_{1,0} \kappa_{1,1}^2 \kappa_{1,2} + \\
& 36 \kappa_{1,0}^2 \kappa_{1,2}^2 + 16 \kappa_{0,1} \kappa_{1,0}^3 \kappa_{1,3} + 48 \kappa_{1,0}^2 \kappa_{1,1} \kappa_{1,3} + 4 \kappa_{1,0}^3 \kappa_{1,4} + 6 \kappa_{0,1}^4 \kappa_{1,0} \kappa_{2,0} + 36 \kappa_{0,1}^2 \kappa_{0,2} \kappa_{1,0}^2 \kappa_{2,0} + \\
& 18 \kappa_{0,2}^2 \kappa_{1,0}^2 \kappa_{2,0} + 24 \kappa_{0,1} \kappa_{0,3} \kappa_{1,0}^2 \kappa_{2,0} + 6 \kappa_{0,4} \kappa_{1,0}^2 \kappa_{2,0} + 48 \kappa_{0,1}^3 \kappa_{1,0} \kappa_{1,1} \kappa_{2,0} + \\
& 144 \kappa_{0,1} \kappa_{0,2} \kappa_{1,0} \kappa_{1,1} \kappa_{2,0} + 48 \kappa_{0,3} \kappa_{1,0} \kappa_{1,1} \kappa_{2,0} + 72 \kappa_{0,1}^2 \kappa_{1,1}^2 \kappa_{2,0} + 72 \kappa_{0,2} \kappa_{1,1}^2 \kappa_{2,0} + \\
& 72 \kappa_{0,1}^2 \kappa_{1,0} \kappa_{1,2} \kappa_{2,0} + 72 \kappa_{0,2} \kappa_{1,0} \kappa_{1,2} \kappa_{2,0} + 144 \kappa_{0,1} \kappa_{1,1} \kappa_{1,2} \kappa_{2,0} + 36 \kappa_{1,2}^2 \kappa_{2,0} + \\
& 48 \kappa_{0,1} \kappa_{1,0} \kappa_{1,3} \kappa_{2,0} + 48 \kappa_{1,1} \kappa_{1,3} \kappa_{2,0} + 12 \kappa_{1,0} \kappa_{1,4} \kappa_{2,0} + 3 \kappa_{0,1}^4 \kappa_{2,0}^2 + 18 \kappa_{0,1}^2 \kappa_{0,2} \kappa_{2,0}^2 + 9 \kappa_{0,2}^2 \kappa_{2,0}^2 + \\
& 12 \kappa_{0,1} \kappa_{0,3} \kappa_{2,0}^2 + 3 \kappa_{0,4} \kappa_{2,0}^2 + 24 \kappa_{0,1}^3 \kappa_{1,0}^2 \kappa_{2,1} + 72 \kappa_{0,1} \kappa_{0,2} \kappa_{1,0}^2 \kappa_{2,1} + 24 \kappa_{0,3} \kappa_{1,0}^2 \kappa_{2,1} + \\
& 144 \kappa_{0,1}^2 \kappa_{1,0} \kappa_{1,1} \kappa_{2,1} + 144 \kappa_{0,2} \kappa_{1,0} \kappa_{1,1} \kappa_{2,1} + 144 \kappa_{0,1} \kappa_{1,1}^2 \kappa_{2,1} + 144 \kappa_{0,1} \kappa_{1,0} \kappa_{1,2} \kappa_{2,1} + \\
& 144 \kappa_{1,1} \kappa_{1,2} \kappa_{2,1} + 48 \kappa_{1,0} \kappa_{1,3} \kappa_{2,1} + 24 \kappa_{0,1}^3 \kappa_{2,0} \kappa_{2,1} + 72 \kappa_{0,1} \kappa_{0,2} \kappa_{2,0} \kappa_{2,1} + 24 \kappa_{0,3} \kappa_{2,0} \kappa_{2,1} + \\
& 36 \kappa_{0,1}^2 \kappa_{2,1}^2 + 36 \kappa_{0,2} \kappa_{2,1}^2 + 36 \kappa_{0,1} \kappa_{1,0}^2 \kappa_{2,2} + 36 \kappa_{0,2} \kappa_{1,0}^2 \kappa_{2,2} + 144 \kappa_{0,1} \kappa_{1,0} \kappa_{1,1} \kappa_{2,2} + \\
& 72 \kappa_{1,1}^2 \kappa_{2,2} + 72 \kappa_{1,0} \kappa_{1,2} \kappa_{2,2} + 36 \kappa_{0,1}^2 \kappa_{2,0} \kappa_{2,2} + 36 \kappa_{0,2} \kappa_{2,0} \kappa_{2,2} + 72 \kappa_{0,1} \kappa_{2,1} \kappa_{2,2} + \\
& 18 \kappa_{2,2}^2 + 24 \kappa_{0,1} \kappa_{1,0}^2 \kappa_{2,3} + 48 \kappa_{1,0} \kappa_{1,1} \kappa_{2,3} + 24 \kappa_{0,1} \kappa_{2,0} \kappa_{2,3} + 24 \kappa_{2,1} \kappa_{2,3} + 6 \kappa_{1,0}^2 \kappa_{2,4} + \\
& 6 \kappa_{2,0} \kappa_{2,4} + 4 \kappa_{0,1}^4 \kappa_{1,0} \kappa_{3,0} + 24 \kappa_{0,1}^2 \kappa_{0,2} \kappa_{1,0} \kappa_{3,0} + 12 \kappa_{0,2}^2 \kappa_{1,0} \kappa_{3,0} + 16 \kappa_{0,1} \kappa_{0,3} \kappa_{1,0} \kappa_{3,0} + \\
& 4 \kappa_{0,4} \kappa_{1,0} \kappa_{3,0} + 16 \kappa_{0,1}^3 \kappa_{1,1} \kappa_{3,0} + 48 \kappa_{0,1} \kappa_{0,2} \kappa_{1,1} \kappa_{3,0} + 16 \kappa_{0,3} \kappa_{1,1} \kappa_{3,0} + 24 \kappa_{0,1}^2 \kappa_{1,2} \kappa_{3,0} + \\
& 24 \kappa_{0,2} \kappa_{1,2} \kappa_{3,0} + 16 \kappa_{0,1} \kappa_{1,3} \kappa_{3,0} + 4 \kappa_{1,4} \kappa_{3,0} + 16 \kappa_{0,1}^3 \kappa_{1,0} \kappa_{3,1} + 48 \kappa_{0,1} \kappa_{0,2} \kappa_{1,0} \kappa_{3,1} + \\
& 16 \kappa_{0,3} \kappa_{1,0} \kappa_{3,1} + 48 \kappa_{0,1}^2 \kappa_{1,1} \kappa_{3,1} + 48 \kappa_{0,2} \kappa_{1,1} \kappa_{3,1} + 48 \kappa_{0,1} \kappa_{1,2} \kappa_{3,1} + 16 \kappa_{1,3} \kappa_{3,1} + \\
& 24 \kappa_{0,1}^2 \kappa_{1,0} \kappa_{3,2} + 24 \kappa_{0,2} \kappa_{1,0} \kappa_{3,2} + 48 \kappa_{0,1} \kappa_{1,1} \kappa_{3,2} + 24 \kappa_{1,2} \kappa_{3,2} + 16 \kappa_{0,1} \kappa_{1,0} \kappa_{3,3} + \\
& 16 \kappa_{1,1} \kappa_{3,3} + 4 \kappa_{1,0} \kappa_{3,4} + \kappa_{0,1}^4 \kappa_{4,0} + 6 \kappa_{0,1}^2 \kappa_{0,2} \kappa_{4,0} + 3 \kappa_{0,2}^2 \kappa_{4,0} + 4 \kappa_{0,1} \kappa_{0,3} \kappa_{4,0} + \kappa_{0,4} \kappa_{4,0} + \\
& 4 \kappa_{0,1}^3 \kappa_{4,1} + 12 \kappa_{0,1} \kappa_{0,2} \kappa_{4,1} + 4 \kappa_{0,3} \kappa_{4,1} + 6 \kappa_{0,1}^2 \kappa_{4,2} + 6 \kappa_{0,2} \kappa_{4,2} + 4 \kappa_{0,1} \kappa_{4,3} + \kappa_{4,4} \}
\end{aligned}$$

In[97]:= sigK = sigRaw /. rulesDel4

$$\text{Out[97]=} \left(\begin{array}{ccc}
& \mu_{2,0} & \mu_{1,1} \\
& \mu_{1,1} & \mu_{0,2} \\
\kappa_{1,0}^3 + 3 \kappa_{1,0} \kappa_{2,0} - \kappa_{1,0} (\kappa_{1,0}^2 + \kappa_{2,0}) + \kappa_{3,0} & & \kappa_{0,1} \kappa_{1,0}^2 + 2 \kappa_{1,0} \kappa_{1,1} + \kappa_{0,1} \kappa_{2,0} - \kappa_{0,1} \\
\kappa_{0,1} \kappa_{1,0}^2 + 2 \kappa_{1,0} \kappa_{1,1} - \kappa_{1,0} (\kappa_{0,1} \kappa_{1,0} + \kappa_{1,1}) + \kappa_{0,1} \kappa_{2,0} + \kappa_{2,1} & & \kappa_{0,1}^2 \kappa_{1,0} + \kappa_{0,2} \kappa_{1,0} + 2 \kappa_{0,1} \kappa_{1,1} - \kappa_{0,1} \\
\kappa_{0,1}^2 \kappa_{1,0} + \kappa_{0,2} \kappa_{1,0} - (\kappa_{0,1}^2 + \kappa_{0,2}) \kappa_{1,0} + 2 \kappa_{0,1} \kappa_{1,1} + \kappa_{1,2} & & \kappa_{0,1}^3 + 3 \kappa_{0,1} \kappa_{0,2} - \kappa_{0,1} (\kappa_{0,1}^2 +
\end{array} \right)$$

In[100]:= rulesDelK4 = {CumulantToRaw[{1, 0}], CumulantToRaw[{0, 1}],

CumulantToCentral[{2, 0}], CumulantToCentral[{1, 1}],
CumulantToCentral[{0, 2}], CumulantToCentral[{3, 0}],
CumulantToCentral[{0, 3}], CumulantToCentral[{2, 1}],
CumulantToCentral[{1, 2}], CumulantToCentral[{2, 2}], CumulantToCentral[{3, 1}],
CumulantToCentral[{4, 0}], CumulantToCentral[{0, 4}], CumulantToCentral[{1, 3}],
CumulantToCentral[{2, 3}], CumulantToCentral[{4, 1}],
CumulantToCentral[{3, 2}], CumulantToCentral[{1, 4}]}

$$\text{Out[100]=} \left\{ \begin{array}{l}
\kappa_{1,0} \rightarrow \hat{\mu}_{1,0}, \kappa_{0,1} \rightarrow \hat{\mu}_{0,1}, \kappa_{2,0} \rightarrow \mu_{2,0}, \kappa_{1,1} \rightarrow \mu_{1,1}, \kappa_{0,2} \rightarrow \mu_{0,2}, \kappa_{3,0} \rightarrow \mu_{3,0}, \kappa_{0,3} \rightarrow \mu_{0,3}, \\
\kappa_{2,1} \rightarrow \mu_{2,1}, \kappa_{1,2} \rightarrow \mu_{1,2}, \kappa_{2,2} \rightarrow -2 \mu_{1,1}^2 - \mu_{0,2} \mu_{2,0} + \mu_{2,2}, \kappa_{3,1} \rightarrow -3 \mu_{1,1} \mu_{2,0} + \mu_{3,1}, \\
\kappa_{4,0} \rightarrow -3 \mu_{2,0}^2 + \mu_{4,0}, \kappa_{0,4} \rightarrow -3 \mu_{0,2}^2 + \mu_{0,4}, \kappa_{1,3} \rightarrow -3 \mu_{0,2} \mu_{1,1} + \mu_{1,3}, \\
\kappa_{2,3} \rightarrow -6 \mu_{1,1} \mu_{1,2} - \mu_{0,3} \mu_{2,0} - 3 \mu_{0,2} \mu_{2,1} + \mu_{2,3}, \kappa_{4,1} \rightarrow -6 \mu_{2,0} \mu_{2,1} - 4 \mu_{1,1} \mu_{3,0} + \mu_{4,1}, \\
\kappa_{3,2} \rightarrow -3 \mu_{1,2} \mu_{2,0} - 6 \mu_{1,1} \mu_{2,1} - \mu_{0,2} \mu_{3,0} + \mu_{3,2}, \kappa_{1,4} \rightarrow -4 \mu_{0,3} \mu_{1,1} - 6 \mu_{0,2} \mu_{1,2} + \mu_{1,4} \}
\end{array} \right.$$

In[101]:= **sigCentral = sigK /. rulesDelK4**

$$\text{Out}[101]= \begin{pmatrix} \mu_{2,0} & \mu_{1,1} \\ \mu_{1,1} & \mu_{0,2} \\ \mu_{3,0} + 3\mu_{2,0}\dot{\mu}_{1,0} + \dot{\mu}_{1,0}^3 - \dot{\mu}_{1,0}(\mu_{2,0} + \dot{\mu}_{1,0}^2) & \mu_{2,1} + \mu_{2,0}\dot{\mu}_{0,1} + 2\mu_{1,1}\dot{\mu}_{1,0} + \dot{\mu}_{0,1}\dot{\mu}_{1,0}^2 \\ \mu_{2,1} + \mu_{2,0}\dot{\mu}_{0,1} + 2\mu_{1,1}\dot{\mu}_{1,0} + \dot{\mu}_{0,1}\dot{\mu}_{1,0}^2 - \dot{\mu}_{1,0}(\mu_{1,1} + \dot{\mu}_{0,1}\dot{\mu}_{1,0}) & \mu_{1,2} + 2\mu_{1,1}\dot{\mu}_{0,1} + \mu_{0,2}\dot{\mu}_{1,0} + \dot{\mu}_{0,1}^2\dot{\mu}_{1,0} \\ \mu_{1,2} + 2\mu_{1,1}\dot{\mu}_{0,1} + \mu_{0,2}\dot{\mu}_{1,0} + \dot{\mu}_{0,1}^2\dot{\mu}_{1,0} - (\mu_{0,2} + \dot{\mu}_{0,1}^2)\dot{\mu}_{1,0} & \mu_{0,3} + 3\mu_{0,2}\dot{\mu}_{0,1} + \dot{\mu}_{0,1}^3 - \dot{\mu}_{0,1} \end{pmatrix}$$

In[156]:= **simplesigCentral = FullSimplify[sigCentral]**

$$\text{Out}[156]= \begin{pmatrix} \mu_{2,0} & \mu_{1,1} & \mu_{3,0} + 2 \mu_{2,0} \acute{\mu}_{1,0} \\ \mu_{1,1} & \mu_{0,2} & \mu_{2,1} + 2 \mu_{1,1} \acute{\mu}_{1,0} \\ \mu_{3,0} + 2 \mu_{2,0} \acute{\mu}_{1,0} & \mu_{2,1} + 2 \mu_{1,1} \acute{\mu}_{1,0} & -\mu_{2,0}^2 + \mu_{4,0} + 4 \mu_{3,0} \acute{\mu}_{1,0} + 4 \mu_{2,0} \acute{\mu}_{1,0}^2 \\ \mu_{2,1} + \mu_{2,0} \acute{\mu}_{0,1} + \mu_{1,1} \acute{\mu}_{1,0} & \mu_{1,2} + \mu_{1,1} \acute{\mu}_{0,1} + \mu_{0,2} \acute{\mu}_{1,0} & \mu_{3,1} + 3 \mu_{2,1} \acute{\mu}_{1,0} + \acute{\mu}_{0,1} (\mu_{3,0} + 2 \mu_{2,0} \acute{\mu}_{1,0}) - \mu_{1,1} \\ \mu_{1,2} + 2 \mu_{1,1} \acute{\mu}_{0,1} & \mu_{0,3} + 2 \mu_{0,2} \acute{\mu}_{0,1} & -\mu_{0,2} \mu_{2,0} + \mu_{2,2} + 2 \mu_{2,1} \acute{\mu}_{0,1} + 2 (\mu_{1,2} + 2 \mu_{1,1} \acute{\mu}_{0,1}) \end{pmatrix}$$

(* show this sigma matrix row by row, or col by col *)

In[157]:= **TableForm[simplesigCentral[[1]]]**

Out[157]//TableForm=

$$\begin{array}{l} \mu_{2,0} \\ \mu_{1,1} \\ \mu_{3,0} + 2 \mu_{2,0} \acute{\mu}_{1,0} \\ \mu_{2,1} + \mu_{2,0} \acute{\mu}_{0,1} + \mu_{1,1} \acute{\mu}_{1,0} \\ \mu_{1,2} + 2 \mu_{1,1} \acute{\mu}_{0,1} \end{array}$$

In[158]:= **TableForm[simplesigCentral[[2]]]**

Out[158]//TableForm=

$$\begin{array}{l} \mu_{1,1} \\ \mu_{0,2} \\ \mu_{2,1} + 2 \mu_{1,1} \acute{\mu}_{1,0} \\ \mu_{1,2} + \mu_{1,1} \acute{\mu}_{0,1} + \mu_{0,2} \acute{\mu}_{1,0} \\ \mu_{0,3} + 2 \mu_{0,2} \acute{\mu}_{0,1} \end{array}$$

In[159]:= **TableForm[simplesigCentral[[3]]]**

Out[159]//TableForm=

$$\begin{array}{l} \mu_{3,0} + 2 \mu_{2,0} \acute{\mu}_{1,0} \\ \mu_{2,1} + 2 \mu_{1,1} \acute{\mu}_{1,0} \\ -\mu_{2,0}^2 + \mu_{4,0} + 4 \mu_{3,0} \acute{\mu}_{1,0} + 4 \mu_{2,0} \acute{\mu}_{1,0}^2 \\ \mu_{3,1} + 3 \mu_{2,1} \acute{\mu}_{1,0} + \acute{\mu}_{0,1} (\mu_{3,0} + 2 \mu_{2,0} \acute{\mu}_{1,0}) - \mu_{1,1} (\mu_{2,0} - 2 \acute{\mu}_{1,0}^2) \\ -\mu_{0,2} \mu_{2,0} + \mu_{2,2} + 2 \mu_{2,1} \acute{\mu}_{0,1} + 2 (\mu_{1,2} + 2 \mu_{1,1} \acute{\mu}_{0,1}) \acute{\mu}_{1,0} \end{array}$$

In[160]:= **TableForm[simplesigCentral[[4]]]**

Out[160]//TableForm=

$$\begin{array}{l} \mu_{2,1} + \mu_{2,0} \acute{\mu}_{0,1} + \mu_{1,1} \acute{\mu}_{1,0} \\ \mu_{1,2} + \mu_{1,1} \acute{\mu}_{0,1} + \mu_{0,2} \acute{\mu}_{1,0} \\ \mu_{3,1} + 3 \mu_{2,1} \acute{\mu}_{1,0} + \acute{\mu}_{0,1} (\mu_{3,0} + 2 \mu_{2,0} \acute{\mu}_{1,0}) - \mu_{1,1} (\mu_{2,0} - 2 \acute{\mu}_{1,0}^2) \\ -\mu_{1,1}^2 + \mu_{2,2} + 2 \mu_{2,1} \acute{\mu}_{0,1} + \mu_{2,0} \acute{\mu}_{0,1}^2 + 2 (\mu_{1,2} + \mu_{1,1} \acute{\mu}_{0,1}) \acute{\mu}_{1,0} + \mu_{0,2} \acute{\mu}_{1,0}^2 \\ -\mu_{0,2} \mu_{1,1} + \mu_{1,3} + 3 \mu_{1,2} \acute{\mu}_{0,1} + 2 \mu_{1,1} \acute{\mu}_{0,1}^2 + (\mu_{0,3} + 2 \mu_{0,2} \acute{\mu}_{0,1}) \acute{\mu}_{1,0} \end{array}$$

In[161]:= **TableForm[simplesigCentral[[5]]]**

Out[161]//TableForm=

$$\begin{array}{l} \mu_{1,2} + 2 \mu_{1,1} \acute{\mu}_{0,1} \\ \mu_{0,3} + 2 \mu_{0,2} \acute{\mu}_{0,1} \\ -\mu_{0,2} \mu_{2,0} + \mu_{2,2} + 2 \mu_{2,1} \acute{\mu}_{0,1} + 2 (\mu_{1,2} + 2 \mu_{1,1} \acute{\mu}_{0,1}) \acute{\mu}_{1,0} \\ -\mu_{0,2} \mu_{1,1} + \mu_{1,3} + 3 \mu_{1,2} \acute{\mu}_{0,1} + 2 \mu_{1,1} \acute{\mu}_{0,1}^2 + (\mu_{0,3} + 2 \mu_{0,2} \acute{\mu}_{0,1}) \acute{\mu}_{1,0} \\ -\mu_{0,2}^2 + \mu_{0,4} + 4 \mu_{0,3} \acute{\mu}_{0,1} + 4 \mu_{0,2} \acute{\mu}_{0,1}^2 \end{array}$$

In[108]:= %55.sigCentral.%55

In[162]:= FullSimplify[%108]

$$\text{Out}[162]= \frac{\mu_{0,4} \mu_{1,1}^2 \mu_{2,0}^2 + \mu_{0,2} (4 \mu_{0,2} \mu_{2,0}^2 \mu_{2,2} - 4 \mu_{1,1} \mu_{2,0} (\mu_{1,3} \mu_{2,0} + \mu_{0,2} \mu_{3,1}) + \mu_{1,1}^2 (2 \mu_{2,0} \mu_{2,2} + \mu_{0,2} \mu_{4,0}))}{4 \mu_{0,2}^3 \mu_{2,0}^3}$$

In[141]:= result = %136

$$\text{Out}[141]= \frac{\mu_{0,4} \mu_{1,1}^2 \mu_{2,0}^2 + \mu_{0,2} (4 \mu_{0,2} \mu_{2,0}^2 \mu_{2,2} - 4 \mu_{1,1} \mu_{2,0} (\mu_{1,3} \mu_{2,0} + \mu_{0,2} \mu_{3,1}) + \mu_{1,1}^2 (2 \mu_{2,0} \mu_{2,2} + \mu_{0,2} \mu_{4,0}))}{4 \mu_{0,2}^3 \mu_{2,0}^3}$$

In[148]:= brackets2170 = result * 4 / (\mu_{1,1}^2 / (\mu_{0,2} \mu_{2,0}))

$$\text{Out}[148]= \frac{\mu_{0,4} \mu_{1,1}^2 \mu_{2,0}^2 + \mu_{0,2} (4 \mu_{0,2} \mu_{2,0}^2 \mu_{2,2} - 4 \mu_{1,1} \mu_{2,0} (\mu_{1,3} \mu_{2,0} + \mu_{0,2} \mu_{3,1}) + \mu_{1,1}^2 (2 \mu_{2,0} \mu_{2,2} + \mu_{0,2} \mu_{4,0}))}{\mu_{0,2}^2 \mu_{1,1}^2 \mu_{2,0}^2}$$

In[150]:= Expand[brackets2170]

$$\text{Out}[150]= \frac{\mu_{0,4}}{\mu_{0,2}^2} - \frac{4 \mu_{1,3}}{\mu_{0,2} \mu_{1,1}} + \frac{4 \mu_{2,2}}{\mu_{1,1}^2} + \frac{2 \mu_{2,2}}{\mu_{0,2} \mu_{2,0}} - \frac{4 \mu_{3,1}}{\mu_{1,1} \mu_{2,0}} + \frac{\mu_{4,0}}{\mu_{2,0}^2}$$