

* Rank 0 tensor.

$$[G]$$

$$G = G_s^{(1)}$$

* Rank 1 tensor.

$$[G_x \ G_y \ G_z]$$

$$G_x = G_{px}^{(1)}$$

$$G_y = G_{py}^{(1)}$$

$$G_z = G_{pz}^{(1)}$$

* Rank 2 tensor (s).

$$\begin{bmatrix} G_{xx} & G_{xy} & G_{xz} \\ G_{xy} & G_{yy} & G_{yz} \\ G_{xz} & G_{yz} & G_{zz} \end{bmatrix}$$

$$G_{xx} = -G_{du}^{(1)} + G_{dv}^{(1)} + G_s^{(1)}$$

$$G_{xy} = G_{dxy}^{(1)}$$

$$G_{xz} = G_{dxz}^{(1)}$$

$$G_{yy} = -G_{du}^{(1)} - G_{dv}^{(1)} + G_s^{(1)}$$

$$G_{yz} = G_{dyz}^{(1)}$$

$$G_{zz} = 2G_{du}^{(1)} + G_s^{(1)}$$

* Rank 2 tensor (a).

$$\begin{bmatrix} 0 & G_{xy} & G_{xz} \\ -G_{xy} & 0 & G_{yz} \\ -G_{xz} & -G_{yz} & 0 \end{bmatrix}$$

$$G_{xy} = Q_{pz}^{(1)}$$

$$G_{xz} = -Q_{py}^{(1)}$$

$$G_{yz} = Q_{px}^{(1)}$$

* Rank 3 tensor (s).

$$\begin{bmatrix} G_{xxx} & G_{xxy} & G_{xxz} \\ G_{yyx} & G_{yyy} & G_{yyz} \\ G_{zzx} & G_{zzy} & G_{zzz} \\ G_{yzx} & G_{yzy} & G_{yzz} \\ G_{zxx} & G_{zxy} & G_{zxx} \\ G_{xyx} & G_{xyy} & G_{xyz} \end{bmatrix}$$

$$\begin{aligned}
G_{xxx} &= 2G_{fax}^{(1)} + G_{px}^{(1)} + 2G_{px}^{(2)} \\
G_{xxy} &= -G_{fay}^{(1)} - G_{fby}^{(1)} + G_{py}^{(1)} + 2Q_{dxz}^{(1)} \\
G_{xxz} &= -G_{faz}^{(1)} + G_{fbz}^{(1)} + G_{pz}^{(1)} - 2Q_{dxy}^{(1)} \\
G_{yyx} &= -G_{fax}^{(1)} + G_{fbx}^{(1)} + G_{px}^{(1)} - 2Q_{dyz}^{(1)} \\
G_{yyy} &= 2G_{fay}^{(1)} + G_{py}^{(1)} + 2G_{py}^{(2)} \\
G_{yyz} &= -G_{faz}^{(1)} - G_{fbz}^{(1)} + G_{pz}^{(1)} + 2Q_{dxy}^{(1)} \\
G_{zzx} &= -G_{fax}^{(1)} - G_{fbx}^{(1)} + G_{px}^{(1)} + 2Q_{dyz}^{(1)} \\
G_{zzy} &= -G_{fay}^{(1)} + G_{fby}^{(1)} + G_{py}^{(1)} - 2Q_{dxz}^{(1)} \\
G_{zzz} &= 2G_{faz}^{(1)} + G_{pz}^{(1)} + 2G_{pz}^{(2)} \\
G_{yzx} &= G_{f3}^{(1)} - 3Q_{du}^{(1)} - Q_{dv}^{(1)} \\
G_{yzy} &= -G_{faz}^{(1)} - G_{fbz}^{(1)} + G_{pz}^{(2)} - Q_{dxy}^{(1)} \\
G_{yzz} &= -G_{fay}^{(1)} + G_{fby}^{(1)} + G_{py}^{(2)} + Q_{dxz}^{(1)} \\
G_{zxx} &= -G_{faz}^{(1)} + G_{fbz}^{(1)} + G_{pz}^{(2)} + Q_{dxy}^{(1)} \\
G_{zxy} &= G_{f3}^{(1)} + 3Q_{du}^{(1)} - Q_{dv}^{(1)} \\
G_{zxx} &= -G_{fax}^{(1)} - G_{fbx}^{(1)} + G_{px}^{(2)} - Q_{dyz}^{(1)} \\
G_{xyx} &= -G_{fay}^{(1)} - G_{fby}^{(1)} + G_{py}^{(2)} - Q_{dxz}^{(1)} \\
G_{xyy} &= -G_{fax}^{(1)} + G_{fbx}^{(1)} + G_{px}^{(2)} + Q_{dyz}^{(1)} \\
G_{xyz} &= G_{f3}^{(1)} + 2Q_{dv}^{(1)}
\end{aligned}$$

* Rank 3 tensor (a).

$$\begin{bmatrix} G_{yzx} & G_{yzy} & G_{yzz} \\ G_{zxx} & G_{zxy} & G_{zxx} \\ G_{xyx} & G_{xyy} & G_{xyz} \end{bmatrix}$$

$$\begin{aligned}
G_{yzx} &= -Q_{du}^{(2)} + Q_{dv}^{(2)} + Q_s^{(1)} \\
G_{yzy} &= G_{pz}^{(3)} + Q_{dxy}^{(2)} \\
G_{yzz} &= -G_{py}^{(3)} + Q_{dxz}^{(2)} \\
G_{zxx} &= -G_{pz}^{(3)} + Q_{dxy}^{(2)} \\
G_{zxy} &= -Q_{du}^{(2)} - Q_{dv}^{(2)} + Q_s^{(1)} \\
G_{zxx} &= G_{px}^{(3)} + Q_{dyz}^{(2)} \\
G_{xyx} &= G_{py}^{(3)} + Q_{dxz}^{(2)} \\
G_{xyy} &= -G_{px}^{(3)} + Q_{dyz}^{(2)} \\
G_{xyz} &= 2Q_{du}^{(2)} + Q_s^{(1)}
\end{aligned}$$

* Rank 4 tensor (sss).

$$\begin{bmatrix} G_{xxxx} & G_{xxyy} & G_{xxzz} & G_{xxyz} & G_{xxxz} & G_{xxxxy} \\ G_{xxyy} & G_{yyyy} & G_{yyzz} & G_{yyyz} & G_{yyzx} & G_{yyxy} \\ G_{xxzz} & G_{yyzz} & G_{zzzz} & G_{zzyz} & G_{zzzx} & G_{zzxy} \\ G_{xxyz} & G_{yyyz} & G_{zzyz} & G_{yzyz} & G_{yzzx} & G_{yzxy} \\ G_{xxxz} & G_{yyzx} & G_{zzzx} & G_{yzzx} & G_{zxxx} & G_{zxxxy} \\ G_{xxxxy} & G_{yyxy} & G_{zzxy} & G_{yzxy} & G_{zxxx} & G_{xyxy} \end{bmatrix}$$

$$G_{xxxx} = -2G_{du}^{(1)} - 4G_{du}^{(2)} + 2G_{dv}^{(1)} + 4G_{dv}^{(2)} - G_{gu}^{(1)} + G_{gv}^{(1)} + 2G_g^{(1)} + G_s^{(1)} + 2G_s^{(2)}$$

$$G_{xxyy} = -2G_{du}^{(1)} + 2G_{gu}^{(1)} - G_g^{(1)} + G_s^{(1)}$$

$$G_{xxzz} = G_{du}^{(1)} + G_{dv}^{(1)} - G_{gu}^{(1)} - G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)}$$

$$G_{xxyz} = G_{dyz}^{(1)} + 2G_{gbx}^{(1)}$$

$$G_{xxzx} = G_{dxz}^{(1)} + 2G_{dxz}^{(2)} - G_{gay}^{(1)} - G_{gby}^{(1)}$$

$$G_{xxxy} = G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{gaz}^{(1)} - G_{gbz}^{(1)}$$

$$G_{yyyy} = -2G_{du}^{(1)} - 4G_{du}^{(2)} - 2G_{dv}^{(1)} - 4G_{dv}^{(2)} - G_{gu}^{(1)} - G_{gv}^{(1)} + 2G_g^{(1)} + G_s^{(1)} + 2G_s^{(2)}$$

$$G_{yyzz} = G_{du}^{(1)} - G_{dv}^{(1)} - G_{gu}^{(1)} + G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)}$$

$$G_{yyyz} = G_{dyz}^{(1)} + 2G_{dyz}^{(2)} + G_{gax}^{(1)} - G_{gbx}^{(1)}$$

$$G_{yyzx} = G_{dxz}^{(1)} + 2G_{gby}^{(1)}$$

$$G_{yyxy} = G_{dxy}^{(1)} + 2G_{dxy}^{(2)} - G_{gaz}^{(1)} - G_{gbz}^{(1)}$$

$$G_{zzzz} = 4G_{du}^{(1)} + 8G_{du}^{(2)} + 2G_{gu}^{(1)} + 2G_g^{(1)} + G_s^{(1)} + 2G_s^{(2)}$$

$$G_{zzyz} = G_{dyz}^{(1)} + 2G_{dyz}^{(2)} - G_{gax}^{(1)} - G_{gbx}^{(1)}$$

$$G_{zzzx} = G_{dxz}^{(1)} + 2G_{dxz}^{(2)} + G_{gay}^{(1)} - G_{gby}^{(1)}$$

$$G_{zzxy} = G_{dxy}^{(1)} + 2G_{gbz}^{(1)}$$

$$G_{yzyz} = G_{du}^{(2)} - G_{dv}^{(2)} - G_{gu}^{(1)} + G_{gv}^{(1)} - G_g^{(1)} + G_s^{(2)}$$

$$G_{yzzx} = G_{dxy}^{(2)} + 2G_{gbz}^{(1)}$$

$$G_{yzxy} = G_{dxz}^{(2)} + 2G_{gby}^{(1)}$$

$$G_{zxzx} = G_{du}^{(2)} + G_{dv}^{(2)} - G_{gu}^{(1)} - G_{gv}^{(1)} - G_g^{(1)} + G_s^{(2)}$$

$$G_{zxxy} = G_{dyz}^{(2)} + 2G_{gbx}^{(1)}$$

$$G_{xyxy} = -2G_{du}^{(2)} + 2G_{gu}^{(1)} - G_g^{(1)} + G_s^{(2)}$$

* Rank 4 tensor (ssa).

$$\begin{bmatrix} 0 & G_{xxyy} & G_{xxzz} & G_{xxyz} & G_{xxzx} & G_{xxxy} \\ -G_{xxyy} & 0 & G_{yyzz} & G_{yyyz} & G_{yyzx} & G_{yyxy} \\ -G_{xxzz} & -G_{yyzz} & 0 & G_{zzyz} & G_{zzzx} & G_{zzxy} \\ -G_{xxyz} & -G_{yyyz} & -G_{zzyz} & 0 & G_{yzzx} & G_{yzxy} \\ -G_{xxzx} & -G_{yyzx} & -G_{zzzx} & -G_{yzzx} & 0 & G_{zxxxy} \\ -G_{xxxy} & -G_{yyxy} & -G_{zzxy} & -G_{yzxy} & -G_{zxxxy} & 0 \end{bmatrix}$$

$$\begin{aligned}
G_{xxyy} &= -2G_{dv}^{(3)} + 4Q_{f3}^{(1)} \\
G_{xxzz} &= 3G_{du}^{(3)} - G_{dv}^{(3)} - 4Q_{f3}^{(1)} \\
G_{xxyz} &= G_{dyz}^{(3)} - 4Q_{fbx}^{(1)} \\
G_{xxzx} &= G_{dxz}^{(3)} + 2Q_{fay}^{(1)} + 2Q_{fby}^{(1)} - 2Q_{py}^{(1)} \\
G_{xxxy} &= G_{dxy}^{(3)} - 2Q_{faz}^{(1)} + 2Q_{fbz}^{(1)} + 2Q_{pz}^{(1)} \\
G_{yyzz} &= 3G_{du}^{(3)} + G_{dv}^{(3)} + 4Q_{f3}^{(1)} \\
G_{yyyz} &= G_{dyz}^{(3)} - 2Q_{fax}^{(1)} + 2Q_{fbx}^{(1)} + 2Q_{px}^{(1)} \\
G_{yyzx} &= G_{dxz}^{(3)} - 4Q_{fby}^{(1)} \\
G_{yyxy} &= G_{dxy}^{(3)} + 2Q_{faz}^{(1)} + 2Q_{fbz}^{(1)} - 2Q_{pz}^{(1)} \\
G_{zzyz} &= G_{dyz}^{(3)} + 2Q_{fax}^{(1)} + 2Q_{fbx}^{(1)} - 2Q_{px}^{(1)} \\
G_{zzzx} &= G_{dxz}^{(3)} - 2Q_{fay}^{(1)} + 2Q_{fby}^{(1)} + 2Q_{py}^{(1)} \\
G_{zzxy} &= G_{dxy}^{(3)} - 4Q_{fbz}^{(1)} \\
G_{yzzx} &= -4Q_{faz}^{(1)} - Q_{pz}^{(1)} \\
G_{yzxy} &= 4Q_{fay}^{(1)} + Q_{py}^{(1)} \\
G_{zxxxy} &= -4Q_{fax}^{(1)} - Q_{px}^{(1)}
\end{aligned}$$

* Rank 4 tensor (aas).

$$\begin{bmatrix} G_{yzyz} & G_{yzzx} & G_{yzxy} \\ G_{yzzx} & G_{zxxz} & G_{zxxxy} \\ G_{yzxy} & G_{zxxxy} & G_{xyxy} \end{bmatrix}$$

$$\begin{aligned}
G_{yzyz} &= -2G_{du}^{(4)} + 2G_{dv}^{(4)} + G_s^{(3)} \\
G_{yzzx} &= 2G_{dxy}^{(4)} \\
G_{yzxy} &= 2G_{dxz}^{(4)} \\
G_{zxxz} &= -2G_{du}^{(4)} - 2G_{dv}^{(4)} + G_s^{(3)} \\
G_{zxxxy} &= 2G_{dyz}^{(4)} \\
G_{xyxy} &= 4G_{du}^{(4)} + G_s^{(3)}
\end{aligned}$$

* Rank 4 tensor (aaa).

$$\begin{bmatrix} 0 & G_{yzzx} & G_{yzxy} \\ -G_{yzzx} & 0 & G_{zxxxy} \\ -G_{yzxy} & -G_{zxxxy} & 0 \end{bmatrix}$$

$$\begin{aligned}
G_{yzzx} &= -Q_{pz}^{(2)} \\
G_{yzxy} &= Q_{py}^{(2)} \\
G_{zxxxy} &= -Q_{px}^{(2)}
\end{aligned}$$

* Rank 4 tensor (sa).

$$\begin{bmatrix} G_{xxyz} & G_{xxzx} & G_{xxxy} \\ G_{yyyz} & G_{yyzx} & G_{yyxy} \\ G_{zzyz} & G_{zzzx} & G_{zzxy} \\ G_{yzyz} & G_{yzzx} & G_{yzxy} \\ G_{xyyz} & G_{xxzx} & G_{zxxxy} \\ G_{xyyz} & G_{xyzx} & G_{xyxy} \end{bmatrix}$$

$$\begin{aligned}
G_{xxyz} &= 2Q_{fax}^{(2)} + Q_{px}^{(3)} + 2Q_{px}^{(4)} \\
G_{xxzx} &= 2G_{dxz}^{(5)} - Q_{fay}^{(2)} - Q_{fby}^{(2)} + Q_{py}^{(3)} \\
G_{xxxy} &= -2G_{dxy}^{(5)} - Q_{faz}^{(2)} + Q_{fbz}^{(2)} + Q_{pz}^{(3)} \\
G_{yyyz} &= -2G_{dyz}^{(5)} - Q_{fax}^{(2)} + Q_{fbx}^{(2)} + Q_{px}^{(3)} \\
G_{yyzx} &= 2Q_{fay}^{(2)} + Q_{py}^{(3)} + 2Q_{py}^{(4)} \\
G_{yyxy} &= 2G_{dxy}^{(5)} - Q_{faz}^{(2)} - Q_{fbz}^{(2)} + Q_{pz}^{(3)} \\
G_{zzyz} &= 2G_{dyz}^{(5)} - Q_{fax}^{(2)} - Q_{fbx}^{(2)} + Q_{px}^{(3)} \\
G_{zzzx} &= -2G_{dxz}^{(5)} - Q_{fay}^{(2)} + Q_{fby}^{(2)} + Q_{py}^{(3)} \\
G_{zzxy} &= 2Q_{faz}^{(2)} + Q_{pz}^{(3)} + 2Q_{pz}^{(4)} \\
G_{yzyz} &= -3G_{du}^{(5)} - G_{dv}^{(5)} + Q_{f3}^{(2)} \\
G_{yzzx} &= -G_{dxy}^{(5)} - Q_{faz}^{(2)} - Q_{fbz}^{(2)} + Q_{pz}^{(4)} \\
G_{yzxy} &= G_{dxz}^{(5)} - Q_{fay}^{(2)} + Q_{fby}^{(2)} + Q_{py}^{(4)} \\
G_{zxyz} &= G_{dxy}^{(5)} - Q_{faz}^{(2)} + Q_{fbz}^{(2)} + Q_{pz}^{(4)} \\
G_{zxzx} &= 3G_{du}^{(5)} - G_{dv}^{(5)} + Q_{f3}^{(2)} \\
G_{zxxy} &= -G_{dyz}^{(5)} - Q_{fax}^{(2)} - Q_{fbx}^{(2)} + Q_{px}^{(4)} \\
G_{xyyz} &= -G_{dxz}^{(5)} - Q_{fay}^{(2)} - Q_{fby}^{(2)} + Q_{py}^{(4)} \\
G_{xyzx} &= G_{dyz}^{(5)} - Q_{fax}^{(2)} + Q_{fbx}^{(2)} + Q_{px}^{(4)} \\
G_{xyxy} &= 2G_{dv}^{(5)} + Q_{f3}^{(2)}
\end{aligned}$$

* Rank 4 tensor (as).

$$\begin{bmatrix}
G_{yzxx} & G_{yzyy} & G_{yzzz} & G_{yzyz} & G_{yzzx} & G_{yzxy} \\
G_{zxzx} & G_{zxyy} & G_{zxzz} & G_{zxyz} & G_{zxzx} & G_{zxxy} \\
G_{xyxx} & G_{xyyy} & G_{xyzz} & G_{xyyz} & G_{xyzx} & G_{xyxy}
\end{bmatrix}$$

$$\begin{aligned}
G_{yzxx} &= 2Q_{fax}^{(3)} + Q_{px}^{(5)} + 2Q_{px}^{(6)} \\
G_{yzyy} &= -2G_{dyz}^{(6)} - Q_{fax}^{(3)} + Q_{fbx}^{(3)} + Q_{px}^{(5)} \\
G_{yzzz} &= 2G_{dyz}^{(6)} - Q_{fax}^{(3)} - Q_{fbx}^{(3)} + Q_{px}^{(5)} \\
G_{yzyz} &= -3G_{du}^{(6)} - G_{dv}^{(6)} + Q_{f3}^{(3)} \\
G_{yzzx} &= G_{dxy}^{(6)} - Q_{faz}^{(3)} + Q_{fbz}^{(3)} + Q_{pz}^{(6)} \\
G_{yzxy} &= -G_{dxz}^{(6)} - Q_{fay}^{(3)} - Q_{fby}^{(3)} + Q_{py}^{(6)} \\
G_{zxzx} &= 2G_{dxz}^{(6)} - Q_{fay}^{(3)} - Q_{fby}^{(3)} + Q_{py}^{(5)} \\
G_{zxyy} &= 2Q_{fay}^{(3)} + Q_{py}^{(5)} + 2Q_{py}^{(6)} \\
G_{zxzz} &= -2G_{dxz}^{(6)} - Q_{fay}^{(3)} + Q_{fby}^{(3)} + Q_{py}^{(5)} \\
G_{zxyz} &= -G_{dxy}^{(6)} - Q_{faz}^{(3)} - Q_{fbz}^{(3)} + Q_{pz}^{(6)} \\
G_{zxzx} &= 3G_{du}^{(6)} - G_{dv}^{(6)} + Q_{f3}^{(3)} \\
G_{zxxy} &= G_{dyz}^{(6)} - Q_{fax}^{(3)} + Q_{fbx}^{(3)} + Q_{px}^{(6)} \\
G_{xyxx} &= -2G_{dxy}^{(6)} - Q_{faz}^{(3)} + Q_{fbz}^{(3)} + Q_{pz}^{(5)} \\
G_{xyyy} &= 2G_{dxy}^{(6)} - Q_{faz}^{(3)} - Q_{fbz}^{(3)} + Q_{pz}^{(5)} \\
G_{xyzx} &= 2Q_{faz}^{(3)} + Q_{pz}^{(5)} + 2Q_{pz}^{(6)} \\
G_{xyyz} &= G_{dxz}^{(6)} - Q_{fay}^{(3)} + Q_{fby}^{(3)} + Q_{py}^{(6)} \\
G_{xyzx} &= -G_{dyz}^{(6)} - Q_{fax}^{(3)} - Q_{fbx}^{(3)} + Q_{px}^{(6)} \\
G_{xyxy} &= 2G_{dv}^{(6)} + Q_{f3}^{(3)}
\end{aligned}$$

* Rank 4 tensor (s).

$$\begin{bmatrix} G_{xxxx} & G_{xxyy} & G_{xxzz} & G_{xxyz} & G_{xxzx} & G_{xxxy} & G_{xxzy} & G_{xxxz} & G_{xxyx} \\ G_{yyxx} & G_{yyyy} & G_{yyzz} & G_{yyyz} & G_{yyzx} & G_{yyxy} & G_{yyzy} & G_{yyxz} & G_{yyyx} \\ G_{zzxx} & G_{zzyy} & G_{zzzz} & G_{zzyz} & G_{zzzx} & G_{zzxy} & G_{zzzy} & G_{zzxz} & G_{zzyx} \\ G_{yzxx} & G_{yzyy} & G_{yzzz} & G_{yzyz} & G_{yzzx} & G_{yzxy} & G_{yzzy} & G_{yzxz} & G_{yzyx} \\ G_{zxxx} & G_{zxyy} & G_{zxzz} & G_{zxyz} & G_{zxzx} & G_{zxxxy} & G_{zxzy} & G_{zxxx} & G_{zxyx} \\ G_{xyxx} & G_{xyyy} & G_{xyzx} & G_{xyyz} & G_{xyzx} & G_{xyxy} & G_{xyzy} & G_{xyxz} & G_{xyyx} \end{bmatrix}$$

$$\begin{aligned}
G_{xxxx} &= -2G_{du}^{(1)} - 4G_{du}^{(2)} + 2G_{dv}^{(1)} + 4G_{dv}^{(2)} - G_{gu}^{(1)} + G_{gv}^{(1)} + 2G_g^{(1)} + G_s^{(1)} + 2G_s^{(2)} \\
G_{xxyy} &= -2G_{du}^{(1)} - 2G_{dv}^{(3)} + 2G_{gu}^{(1)} - G_g^{(1)} + G_s^{(1)} + 4Q_{f3}^{(1)} \\
G_{xxzz} &= G_{du}^{(1)} + 3G_{du}^{(3)} + G_{dv}^{(1)} - G_{dv}^{(3)} - G_{gu}^{(1)} - G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)} - 4Q_{f3}^{(1)} \\
G_{xxyz} &= G_{dyz}^{(1)} + G_{dyz}^{(3)} + 2G_{gbx}^{(1)} + 2Q_{fay}^{(2)} - 4Q_{fbx}^{(1)} + Q_{px}^{(3)} + 2Q_{px}^{(4)} \\
G_{xxzx} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} + G_{dxz}^{(3)} + 2G_{dxz}^{(5)} - G_{gay}^{(1)} - G_{gby}^{(1)} + 2Q_{fay}^{(1)} - Q_{fby}^{(2)} + 2Q_{fby}^{(1)} - Q_{fby}^{(2)} - 2Q_{py}^{(1)} + Q_{py}^{(3)} \\
G_{xxyy} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} - 2G_{dxy}^{(5)} + G_{gaz}^{(1)} - G_{gbz}^{(1)} - 2Q_{faz}^{(1)} - Q_{fbz}^{(2)} + 2Q_{fbz}^{(1)} + Q_{fbz}^{(2)} + 2Q_{pz}^{(1)} + Q_{pz}^{(3)} \\
G_{xxzy} &= G_{dyz}^{(1)} + G_{dyz}^{(3)} + 2G_{gbx}^{(1)} - 2Q_{fay}^{(2)} - 4Q_{fbx}^{(1)} - Q_{px}^{(3)} - 2Q_{px}^{(4)} \\
G_{xxxz} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} + G_{dxz}^{(3)} - 2G_{dxz}^{(5)} - G_{gay}^{(1)} - G_{gby}^{(1)} + 2Q_{fay}^{(1)} + Q_{fay}^{(2)} + 2Q_{fby}^{(1)} + Q_{fby}^{(2)} - 2Q_{py}^{(1)} - Q_{py}^{(3)} \\
G_{xxyx} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} + 2G_{dxy}^{(5)} + G_{gaz}^{(1)} - G_{gbz}^{(1)} - 2Q_{faz}^{(1)} + Q_{fbz}^{(2)} + 2Q_{fbz}^{(1)} - Q_{fbz}^{(2)} + 2Q_{pz}^{(1)} - Q_{pz}^{(3)} \\
G_{yyxx} &= -2G_{du}^{(1)} + 2G_{dv}^{(3)} + 2G_{gu}^{(1)} - G_g^{(1)} + G_s^{(1)} - 4Q_{f3}^{(1)} \\
G_{yyyy} &= -2G_{du}^{(1)} - 4G_{du}^{(2)} - 2G_{dv}^{(1)} - 4G_{dv}^{(2)} - G_{gu}^{(1)} - G_{gv}^{(1)} + 2G_g^{(1)} + G_s^{(1)} + 2G_s^{(2)} \\
G_{yyzz} &= G_{du}^{(1)} + 3G_{du}^{(3)} - G_{dv}^{(1)} + G_{dv}^{(3)} - G_{gu}^{(1)} + G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)} + 4Q_{f3}^{(1)} \\
G_{yyyz} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} + G_{dyz}^{(3)} - 2G_{dyz}^{(5)} + G_{gax}^{(1)} - G_{gbx}^{(1)} - 2Q_{fay}^{(1)} - Q_{fbx}^{(2)} + 2Q_{fbx}^{(1)} + Q_{fbx}^{(2)} + 2Q_{px}^{(1)} + Q_{px}^{(3)} \\
G_{yyzx} &= G_{dxz}^{(1)} + G_{dxz}^{(3)} + 2G_{gby}^{(1)} + 2Q_{fay}^{(2)} - 4Q_{fby}^{(1)} + Q_{py}^{(3)} + 2Q_{py}^{(4)} \\
G_{yyxy} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} + 2G_{dxy}^{(5)} - G_{gaz}^{(1)} - G_{gbz}^{(1)} + 2Q_{faz}^{(1)} - Q_{fbz}^{(2)} + 2Q_{fbz}^{(1)} - Q_{fbz}^{(2)} - 2Q_{pz}^{(1)} + Q_{pz}^{(3)} \\
G_{yyzy} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} + G_{dyz}^{(3)} + 2G_{dyz}^{(5)} + G_{gax}^{(1)} - G_{gbx}^{(1)} - 2Q_{faz}^{(1)} + Q_{fbz}^{(2)} + 2Q_{fbz}^{(1)} - Q_{fbz}^{(2)} + 2Q_{px}^{(1)} - Q_{px}^{(3)} \\
G_{yyxz} &= G_{dxz}^{(1)} + G_{dxz}^{(3)} + 2G_{gby}^{(1)} - 2Q_{fay}^{(2)} - 4Q_{fby}^{(1)} - Q_{py}^{(3)} - 2Q_{py}^{(4)} \\
G_{yyyx} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} - 2G_{dxy}^{(5)} - G_{gaz}^{(1)} - G_{gbz}^{(1)} + 2Q_{faz}^{(1)} + Q_{fbz}^{(2)} + 2Q_{fbz}^{(1)} + Q_{fbz}^{(2)} - 2Q_{pz}^{(1)} - Q_{pz}^{(3)} \\
G_{zzxx} &= G_{du}^{(1)} - 3G_{du}^{(3)} + G_{dv}^{(1)} + G_{dv}^{(3)} - G_{gu}^{(1)} - G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)} + 4Q_{f3}^{(1)} \\
G_{zzyy} &= G_{du}^{(1)} - 3G_{du}^{(3)} - G_{dv}^{(1)} - G_{dv}^{(3)} - G_{gu}^{(1)} + G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)} - 4Q_{f3}^{(1)} \\
G_{zzzz} &= 4G_{du}^{(1)} + 8G_{du}^{(2)} + 2G_{gu}^{(1)} + 2G_g^{(1)} + G_s^{(1)} + 2G_s^{(2)} \\
G_{zzyz} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} + G_{dyz}^{(3)} + 2G_{dyz}^{(5)} - G_{gax}^{(1)} - G_{gbx}^{(1)} + 2Q_{faz}^{(1)} - Q_{fbx}^{(2)} + 2Q_{fbx}^{(1)} - Q_{fbx}^{(2)} - 2Q_{px}^{(1)} + Q_{px}^{(3)} \\
G_{zzzx} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} + G_{dxz}^{(3)} - 2G_{dxz}^{(5)} + G_{gay}^{(1)} - G_{gby}^{(1)} - 2Q_{fay}^{(1)} - Q_{fbx}^{(2)} + 2Q_{fbx}^{(1)} + Q_{fbx}^{(2)} + 2Q_{py}^{(1)} + Q_{py}^{(3)} \\
G_{zzxy} &= G_{dxy}^{(1)} + G_{dxy}^{(3)} + 2G_{gbz}^{(1)} + 2Q_{faz}^{(2)} - 4Q_{fbz}^{(1)} + Q_{pz}^{(3)} + 2Q_{pz}^{(4)} \\
G_{zzzy} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} + G_{dyz}^{(3)} - 2G_{dyz}^{(5)} - G_{gax}^{(1)} - G_{gbx}^{(1)} + 2Q_{faz}^{(1)} + Q_{fbx}^{(2)} + 2Q_{fbx}^{(1)} + Q_{fbx}^{(2)} - 2Q_{px}^{(1)} - Q_{px}^{(3)} \\
G_{zzxz} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} + G_{dxz}^{(3)} + 2G_{dxz}^{(5)} + G_{gay}^{(1)} - G_{gby}^{(1)} - 2Q_{fay}^{(1)} + Q_{fbz}^{(2)} + 2Q_{fbz}^{(1)} - Q_{fbz}^{(2)} + 2Q_{py}^{(1)} - Q_{py}^{(3)} \\
G_{zzyx} &= G_{dxy}^{(1)} + G_{dxy}^{(3)} + 2G_{gbz}^{(1)} - 2Q_{faz}^{(2)} - 4Q_{fbz}^{(1)} - Q_{pz}^{(3)} - 2Q_{pz}^{(4)} \\
G_{yzxx} &= G_{dyz}^{(1)} - G_{dyz}^{(3)} + 2G_{gbx}^{(1)} + 4Q_{fbx}^{(1)} \\
G_{yzyy} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} - G_{dyz}^{(3)} + G_{gax}^{(1)} - G_{gbx}^{(1)} + 2Q_{faz}^{(1)} - 2Q_{fbx}^{(1)} - 2Q_{px}^{(1)} \\
G_{yzzz} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} - G_{dyz}^{(3)} - G_{gax}^{(1)} - G_{gbx}^{(1)} - 2Q_{faz}^{(1)} - 2Q_{fbx}^{(1)} + 2Q_{px}^{(1)} \\
G_{yzyz} &= G_{du}^{(2)} - 3G_{du}^{(5)} - G_{dv}^{(2)} - G_{dv}^{(5)} - G_{gu}^{(1)} + G_{gv}^{(1)} - G_g^{(1)} + G_s^{(2)} + Q_{f3}^{(2)} \\
G_{yzzx} &= G_{dxy}^{(2)} - G_{dxy}^{(5)} + 2G_{gbz}^{(1)} - 4Q_{faz}^{(1)} - Q_{faz}^{(2)} - Q_{fbz}^{(2)} - Q_{pz}^{(1)} + Q_{pz}^{(4)} \\
G_{yzxy} &= G_{dxz}^{(2)} + G_{dxz}^{(5)} + 2G_{gby}^{(1)} + 4Q_{fay}^{(1)} - Q_{fay}^{(2)} + Q_{fby}^{(2)} + Q_{py}^{(1)} + Q_{py}^{(4)} \\
G_{yzzy} &= G_{du}^{(2)} + 3G_{du}^{(5)} - G_{dv}^{(2)} + G_{dv}^{(5)} - G_{gu}^{(1)} + G_{gv}^{(1)} - G_g^{(1)} + G_s^{(2)} - Q_{f3}^{(2)} \\
G_{yzxz} &= G_{dxy}^{(2)} + G_{dxy}^{(5)} + 2G_{gbz}^{(1)} - 4Q_{faz}^{(1)} + Q_{faz}^{(2)} + Q_{fbz}^{(2)} - Q_{pz}^{(1)} - Q_{pz}^{(4)} \\
G_{zyyz} &= G_{dxz}^{(2)} - G_{dxz}^{(5)} + 2G_{gby}^{(1)} + 4Q_{fay}^{(1)} + Q_{fay}^{(2)} - Q_{fby}^{(2)} + Q_{py}^{(1)} - Q_{py}^{(4)} \\
G_{zxxx} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} - G_{dxz}^{(3)} - G_{dxz}^{(1)} - G_{gay}^{(1)} - 2Q_{fay}^{(1)} - 2Q_{fby}^{(1)} + 2Q_{py}^{(1)} \\
G_{zxyy} &= G_{dxz}^{(1)} - G_{dxz}^{(3)} + 2G_{gby}^{(1)} + 4Q_{fby}^{(1)} \\
G_{zxzz} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} - G_{dxz}^{(3)} + G_{gay}^{(1)} - G_{gby}^{(1)} + 2Q_{fay}^{(1)} - 2Q_{fby}^{(1)} - 2Q_{py}^{(1)} \\
G_{zxyz} &= G_{dxy}^{(2)} + G_{dxy}^{(5)} + 2G_{gbz}^{(1)} + 4Q_{faz}^{(1)} - Q_{faz}^{(2)} + Q_{fbz}^{(2)} + Q_{pz}^{(1)} + Q_{pz}^{(4)} \\
G_{zxzx} &= G_{du}^{(2)} + 3G_{du}^{(5)} + G_{dv}^{(2)} - G_{dv}^{(5)} - G_{gu}^{(1)} - G_{gv}^{(1)} - G_g^{(1)} + G_s^{(2)} + Q_{f3}^{(2)} \\
G_{zxyx} &= G_{dyz}^{(2)} - G_{dyz}^{(5)} + 2G_{gbx}^{(1)} - 4Q_{faz}^{(1)} - Q_{faz}^{(2)} - Q_{fbx}^{(2)} - Q_{px}^{(1)} + Q_{px}^{(4)} \\
G_{zxzy} &= G_{dxy}^{(2)} - G_{dxy}^{(5)} + 2G_{gbz}^{(1)} + 4Q_{faz}^{(1)} + Q_{faz}^{(2)} - Q_{fbz}^{(2)} + Q_{pz}^{(1)} - Q_{pz}^{(4)} \\
G_{zxzx} &= G_{du}^{(2)} - 3G_{du}^{(5)} + G_{dv}^{(2)} + G_{dv}^{(5)} - G_{gu}^{(1)} - G_{gv}^{(1)} - G_g^{(1)} + G_s^{(2)} - Q_{f3}^{(2)}
\end{aligned}$$

* Rank 4 tensor (a).

$$\begin{bmatrix} G_{yzxx} & G_{yzyy} & G_{yzzz} & G_{yzyz} & G_{yzzx} & G_{yzxy} & G_{yzzy} & G_{yzxz} & G_{yzyx} \\ G_{zxxx} & G_{zxyy} & G_{zxzz} & G_{zxyz} & G_{zxzx} & G_{zxxy} & G_{zxzy} & G_{zxxz} & G_{zxyx} \\ G_{xyxx} & G_{xyyy} & G_{xyzz} & G_{xyyz} & G_{xyzx} & G_{xyxy} & G_{xyzy} & G_{xyxz} & G_{xyyx} \end{bmatrix}$$

$$\begin{aligned} G_{yzxx} &= 2Q_{fax}^{(3)} + Q_{px}^{(5)} + 2Q_{px}^{(6)} \\ G_{yzyy} &= -2G_{dyz}^{(6)} - Q_{fax}^{(3)} + Q_{fbx}^{(3)} + Q_{px}^{(5)} \\ G_{yzzz} &= 2G_{dyz}^{(6)} - Q_{fax}^{(3)} - Q_{fbx}^{(3)} + Q_{px}^{(5)} \\ G_{yzyz} &= -2G_{du}^{(4)} - 3G_{du}^{(6)} + 2G_{dv}^{(4)} - G_{dv}^{(6)} + G_s^{(3)} + Q_{f3}^{(3)} \\ G_{yzzx} &= 2G_{dxy}^{(4)} + G_{dxy}^{(6)} - Q_{faz}^{(3)} + Q_{fbz}^{(3)} - Q_{pz}^{(2)} + Q_{pz}^{(6)} \\ G_{yzxy} &= 2G_{dxz}^{(4)} - G_{dxz}^{(6)} - Q_{fay}^{(3)} - Q_{fby}^{(3)} + Q_{py}^{(2)} + Q_{py}^{(6)} \\ G_{yzzy} &= 2G_{du}^{(4)} - 3G_{du}^{(6)} - 2G_{dv}^{(4)} - G_{dv}^{(6)} - G_s^{(3)} + Q_{f3}^{(3)} \\ G_{yzxz} &= -2G_{dxy}^{(4)} + G_{dxy}^{(6)} - Q_{faz}^{(3)} + Q_{fbz}^{(3)} + Q_{pz}^{(2)} + Q_{pz}^{(6)} \\ G_{yzyx} &= -2G_{dxz}^{(4)} - G_{dxz}^{(6)} - Q_{fay}^{(3)} - Q_{fby}^{(3)} - Q_{py}^{(2)} + Q_{py}^{(6)} \\ G_{zxxx} &= 2G_{dxz}^{(6)} - Q_{fay}^{(3)} - Q_{fby}^{(3)} + Q_{py}^{(5)} \\ G_{zxyy} &= 2Q_{fay}^{(3)} + Q_{py}^{(5)} + 2Q_{py}^{(6)} \\ G_{zxzz} &= -2G_{dxz}^{(6)} - Q_{fay}^{(3)} + Q_{fby}^{(3)} + Q_{py}^{(5)} \\ G_{zxyz} &= 2G_{dxy}^{(4)} - G_{dxy}^{(6)} - Q_{faz}^{(3)} - Q_{fbz}^{(3)} + Q_{pz}^{(2)} + Q_{pz}^{(6)} \\ G_{zxzx} &= -2G_{du}^{(4)} + 3G_{du}^{(6)} - 2G_{dv}^{(4)} - G_{dv}^{(6)} + G_s^{(3)} + Q_{f3}^{(3)} \\ G_{zxyy} &= 2G_{dyz}^{(4)} + G_{dyz}^{(6)} - Q_{fax}^{(3)} + Q_{fbx}^{(3)} - Q_{px}^{(2)} + Q_{px}^{(6)} \\ G_{zxzy} &= -2G_{dxy}^{(4)} - G_{dxy}^{(6)} - Q_{faz}^{(3)} - Q_{fbz}^{(3)} - Q_{pz}^{(2)} + Q_{pz}^{(6)} \\ G_{zxxz} &= 2G_{du}^{(4)} + 3G_{du}^{(6)} + 2G_{dv}^{(4)} - G_{dv}^{(6)} - G_s^{(3)} + Q_{f3}^{(3)} \\ G_{zxyx} &= -2G_{dyz}^{(4)} + G_{dyz}^{(6)} - Q_{fax}^{(3)} + Q_{fbx}^{(3)} + Q_{px}^{(2)} + Q_{px}^{(6)} \\ G_{xyxx} &= -2G_{dxy}^{(6)} - Q_{faz}^{(3)} + Q_{fbz}^{(3)} + Q_{pz}^{(5)} \\ G_{xyyy} &= 2G_{dxy}^{(6)} - Q_{faz}^{(3)} - Q_{fbz}^{(3)} + Q_{pz}^{(5)} \\ G_{xyzz} &= 2Q_{faz}^{(3)} + Q_{pz}^{(5)} + 2Q_{pz}^{(6)} \\ G_{xyyz} &= 2G_{dxz}^{(4)} + G_{dxz}^{(6)} - Q_{fay}^{(3)} + Q_{fby}^{(3)} - Q_{py}^{(2)} + Q_{py}^{(6)} \\ G_{xyzx} &= 2G_{dyz}^{(4)} - G_{dyz}^{(6)} - Q_{fax}^{(3)} - Q_{fbx}^{(3)} + Q_{px}^{(2)} + Q_{px}^{(6)} \\ G_{xyxy} &= 4G_{du}^{(4)} + 2G_{dv}^{(6)} + G_s^{(3)} + Q_{f3}^{(3)} \\ G_{xyzy} &= -2G_{dxz}^{(4)} + G_{dxz}^{(6)} - Q_{fay}^{(3)} + Q_{fby}^{(3)} + Q_{py}^{(2)} + Q_{py}^{(6)} \\ G_{xyxz} &= -2G_{dyz}^{(4)} - G_{dyz}^{(6)} - Q_{fax}^{(3)} - Q_{fbx}^{(3)} - Q_{px}^{(2)} + Q_{px}^{(6)} \\ G_{xyyx} &= -4G_{du}^{(4)} + 2G_{dv}^{(6)} - G_s^{(3)} + Q_{f3}^{(3)} \end{aligned}$$

* Rank 4 tensor (t).

$$\begin{bmatrix} G_{xxxx} & G_{xxxx} & G_{xxxx} & G_{xxxx} & G_{xxxx} & G_{xxxx} & G_{xxxx} & G_{xxxx} & G_{xxxx} \\ G_{yyyy} & G_{yyyy} & G_{yyyy} & G_{yyyy} & G_{yyyy} & G_{yyyy} & G_{yyyy} & G_{yyyy} & G_{yyyy} \\ G_{zzzz} & G_{zzzz} & G_{zzzz} & G_{zzzz} & G_{zzzz} & G_{zzzz} & G_{zzzz} & G_{zzzz} & G_{zzzz} \\ G_{yyyz} & G_{yyyz} & G_{yyyz} & G_{yyyz} & G_{yyyz} & G_{yyyz} & G_{yyyz} & G_{yyyz} & G_{yyyz} \\ G_{zzxx} & G_{zzxx} & G_{zzxx} & G_{zzxx} & G_{zzxx} & G_{zzxx} & G_{zzxx} & G_{zzxx} & G_{zzxx} \\ G_{xxyx} & G_{xxyx} & G_{xxyx} & G_{xxyx} & G_{xxyx} & G_{xxyx} & G_{xxyx} & G_{xxyx} & G_{xxyx} \\ G_{yyzz} & G_{yyzz} & G_{yyzz} & G_{yyzz} & G_{yyzz} & G_{yyzz} & G_{yyzz} & G_{yyzz} & G_{yyzz} \\ G_{zxxx} & G_{zxxx} & G_{zxxx} & G_{zxxx} & G_{zxxx} & G_{zxxx} & G_{zxxx} & G_{zxxx} & G_{zxxx} \\ G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} & G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} & G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} & G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} & G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} & G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} & G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} & G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} & G_{xxyy} + G_{yyzz} - G_{yzzy} - G_{zxxz} + G_{zzxx} \\ -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} & -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} & -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} & -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} & -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} & -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} & -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} & -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} & -\frac{G_{yyyy}}{2} + \frac{G_{yyzz}}{2} + G_{zxyx} \\ G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} & G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} & G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} & G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} & G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} & G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} & G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} & G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} & G_{xyyz} + \frac{G_{zzzz}}{2} - \frac{G_{zzxx}}{2} \\ \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} & \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} & \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} & \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} & \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} & \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} & \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} & \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} & \frac{G_{xxxy}}{2} - \frac{G_{xxyx}}{2} + G_{xyyy} - G_{yyyx} + G_{zzxy} \end{bmatrix}$$

$$\begin{aligned}
G_{xxxx} &= -2G_{du}^{(1)} - 4G_{du}^{(2)} + 2G_{dv}^{(1)} + 4G_{dv}^{(2)} - G_{gu}^{(1)} + G_{gv}^{(1)} + 2G_g^{(1)} + 3G_s^{(1)} \\
G_{xxxxy} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} - 2G_{dxy}^{(5)} + G_{gaz}^{(1)} - G_{gbz}^{(1)} \\
G_{xxxz} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} + G_{dxz}^{(3)} - 2G_{dxz}^{(5)} - G_{gay}^{(1)} - G_{gby}^{(1)} \\
G_{yyyyx} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} - 2G_{dxy}^{(5)} - G_{gaz}^{(1)} - G_{gbz}^{(1)} \\
G_{yyyyy} &= -2G_{du}^{(1)} - 4G_{du}^{(2)} - 2G_{dv}^{(1)} - 4G_{dv}^{(2)} - G_{gu}^{(1)} - G_{gv}^{(1)} + 2G_g^{(1)} + 3G_s^{(1)} \\
G_{yyyz} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} + G_{dyz}^{(3)} - 2G_{dyz}^{(5)} + G_{gax}^{(1)} - G_{gbx}^{(1)} \\
G_{zzzz} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} + G_{dxz}^{(3)} - 2G_{dxz}^{(5)} + G_{gay}^{(1)} - G_{gby}^{(1)} \\
G_{zzzy} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} + G_{dyz}^{(3)} - 2G_{dyz}^{(5)} - G_{gax}^{(1)} - G_{gbx}^{(1)} \\
G_{zzzz} &= 4G_{du}^{(1)} + 8G_{du}^{(2)} + 2G_{gu}^{(1)} + 2G_g^{(1)} + 3G_s^{(1)} \\
G_{yyzx} &= G_{dxz}^{(1)} + G_{dxz}^{(3)} + 2G_{gby}^{(1)} \\
G_{yyzy} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} + G_{dyz}^{(3)} + 2G_{dyz}^{(5)} + G_{gax}^{(1)} - G_{gbx}^{(1)} \\
G_{yyzz} &= G_{du}^{(1)} + 3G_{du}^{(3)} - G_{dv}^{(1)} + G_{dv}^{(3)} - G_{gu}^{(1)} + G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)} \\
G_{zzxx} &= G_{du}^{(1)} - 3G_{du}^{(3)} + G_{dv}^{(1)} + G_{dv}^{(3)} - G_{gu}^{(1)} - G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)} \\
G_{zzxy} &= G_{dxy}^{(1)} + G_{dxy}^{(3)} + 2G_{gbz}^{(1)} \\
G_{zzxz} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} + G_{dxz}^{(3)} + 2G_{dxz}^{(5)} + G_{gay}^{(1)} - G_{gby}^{(1)} \\
G_{xxyx} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} + 2G_{dxy}^{(5)} + G_{gaz}^{(1)} - G_{gbz}^{(1)} \\
G_{xxyy} &= -2G_{du}^{(1)} - 2G_{dv}^{(3)} + 2G_{gu}^{(1)} - G_g^{(1)} + G_s^{(1)} \\
G_{xxyz} &= G_{dyz}^{(1)} + G_{dyz}^{(3)} + 2G_{gbx}^{(1)} \\
G_{yzzx} &= G_{dxy}^{(2)} - G_{dxy}^{(5)} + 2G_{gbz}^{(1)} \\
G_{yzzy} &= G_{du}^{(2)} + 3G_{du}^{(5)} - G_{dv}^{(2)} + G_{dv}^{(5)} - G_{gu}^{(1)} + G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)} \\
G_{yzzz} &= G_{dyz}^{(1)} + 2G_{dyz}^{(2)} - G_{dyz}^{(3)} - G_{gax}^{(1)} - G_{gbx}^{(1)} \\
G_{zxxx} &= G_{dxz}^{(1)} + 2G_{dxz}^{(2)} - G_{dxz}^{(3)} - G_{gay}^{(1)} - G_{gby}^{(1)} \\
G_{zxxy} &= G_{dyz}^{(2)} - G_{dyz}^{(5)} + 2G_{gbx}^{(1)} \\
G_{zxxz} &= G_{du}^{(2)} - 3G_{du}^{(5)} + G_{dv}^{(2)} + G_{dv}^{(5)} - G_{gu}^{(1)} - G_{gv}^{(1)} - G_g^{(1)} + G_s^{(1)} \\
G_{xyyy} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} - G_{dxy}^{(3)} - G_{gaz}^{(1)} - G_{gbz}^{(1)} \\
G_{xyyz} &= G_{dxz}^{(2)} - G_{dxz}^{(5)} + 2G_{gby}^{(1)}
\end{aligned}$$