

MPG No. 4.1.9 m [Type I, monoclinic] [M tensor]

* Rank 0 tensor. * Rank 1 tensor.

$$\begin{bmatrix} 0 & M_y & 0 \end{bmatrix}$$

$$M_y = M_{py}^{(1)}$$

* Rank 2 tensor (s).

$$\begin{bmatrix} 0 & M_{xy} & 0 \\ M_{xy} & 0 & M_{yz} \\ 0 & M_{yz} & 0 \end{bmatrix}$$

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

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

* Rank 2 tensor (a).

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

$$M_{xy} = T_{pz}^{(1)}$$

$$M_{yz} = T_{px}^{(1)}$$

* Rank 3 tensor (s).

$$\begin{bmatrix} 0 & M_{xxy} & 0 \\ 0 & M_{yyy} & 0 \\ 0 & M_{zzy} & 0 \\ M_{yzzx} & 0 & M_{yzz} \\ 0 & M_{zxy} & 0 \\ M_{xyx} & 0 & M_{xyz} \end{bmatrix}$$

$$M_{xxy} = -M_{fay}^{(1)} - M_{fbg}^{(1)} + M_{py}^{(1)} + 2T_{dxz}^{(1)}$$

$$M_{yyy} = 2M_{fay}^{(1)} + M_{py}^{(1)} + 2M_{py}^{(2)}$$

$$M_{zzy} = -M_{fay}^{(1)} + M_{fbg}^{(1)} + M_{py}^{(1)} - 2T_{dxz}^{(1)}$$

$$M_{yzzx} = M_{f3}^{(1)} - 3T_{du}^{(1)} - T_{dv}^{(1)}$$

$$M_{yzz} = -M_{fay}^{(1)} + M_{fbg}^{(1)} + M_{py}^{(2)} + T_{dxz}^{(1)}$$

$$M_{zxy} = M_{f3}^{(1)} + 3T_{du}^{(1)} - T_{dv}^{(1)}$$

$$M_{xyx} = -M_{fay}^{(1)} - M_{fbg}^{(1)} + M_{py}^{(2)} - T_{dxz}^{(1)}$$

$$M_{xyz} = M_{f3}^{(1)} + 2T_{dv}^{(1)}$$

* Rank 3 tensor (a).

$$\begin{bmatrix} M_{yzzx} & 0 & M_{yzz} \\ 0 & M_{zxy} & 0 \\ M_{xyx} & 0 & M_{xyz} \end{bmatrix}$$

$$M_{yzzx} = -T_{du}^{(2)} + T_{dv}^{(2)} + T_s^{(1)}$$

$$M_{yzz} = -M_{py}^{(3)} + T_{dxz}^{(2)}$$

$$M_{zxy} = -T_{du}^{(2)} - T_{dv}^{(2)} + T_s^{(1)}$$

$$M_{xyx} = M_{py}^{(3)} + T_{dxz}^{(2)}$$

$$M_{xyz} = 2T_{du}^{(2)} + T_s^{(1)}$$

* Rank 4 tensor (sss).

$$\begin{bmatrix} 0 & 0 & 0 & M_{xxyz} & 0 & M_{xxxy} \\ 0 & 0 & 0 & M_{yyyz} & 0 & M_{yyxy} \\ 0 & 0 & 0 & M_{zzyz} & 0 & M_{zzxy} \\ M_{xxyz} & M_{yyyz} & M_{zzyz} & 0 & M_{yzzx} & 0 \\ 0 & 0 & 0 & M_{yzzx} & 0 & M_{zxxxy} \\ M_{xxxy} & M_{yyxy} & M_{zzxy} & 0 & M_{zxxxy} & 0 \end{bmatrix}$$

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

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

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

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

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

$$M_{zzxy} = M_{dxy}^{(1)} + 2M_{gbx}^{(1)}$$

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

$$M_{zxxxy} = M_{dyz}^{(2)} + 2M_{gbx}^{(1)}$$

* Rank 4 tensor (ssa).

$$\begin{bmatrix} 0 & 0 & 0 & M_{xxyz} & 0 & M_{xxxy} \\ 0 & 0 & 0 & M_{yyyz} & 0 & M_{yyxy} \\ 0 & 0 & 0 & M_{zzyz} & 0 & M_{zzxy} \\ -M_{xxyz} & -M_{yyyz} & -M_{zzyz} & 0 & M_{yzzx} & 0 \\ 0 & 0 & 0 & -M_{yzzx} & 0 & M_{zxxxy} \\ -M_{xxxy} & -M_{yyxy} & -M_{zzxy} & 0 & -M_{zxxxy} & 0 \end{bmatrix}$$

$$M_{xxyz} = M_{dyz}^{(3)} - 4T_{fbx}^{(1)}$$

$$M_{xxxy} = M_{dxy}^{(3)} - 2T_{faz}^{(1)} + 2T_{fbz}^{(1)} + 2T_{px}^{(1)}$$

$$M_{yyyz} = M_{dyz}^{(3)} - 2T_{fax}^{(1)} + 2T_{fbx}^{(1)} + 2T_{px}^{(1)}$$

$$M_{yyxy} = M_{dxy}^{(3)} + 2T_{faz}^{(1)} + 2T_{fbz}^{(1)} - 2T_{px}^{(1)}$$

$$M_{zzyz} = M_{dyz}^{(3)} + 2T_{fax}^{(1)} + 2T_{fbx}^{(1)} - 2T_{px}^{(1)}$$

$$M_{zzxy} = M_{dxy}^{(3)} - 4T_{fbz}^{(1)}$$

$$M_{yzzx} = -4T_{faz}^{(1)} - T_{pz}^{(1)}$$

$$M_{zxxxy} = -4T_{fax}^{(1)} - T_{px}^{(1)}$$

* Rank 4 tensor (aas).

$$\begin{bmatrix} 0 & M_{yzzx} & 0 \\ M_{yzzx} & 0 & M_{zxxxy} \\ 0 & M_{zxxxy} & 0 \end{bmatrix}$$

$$M_{yzzx} = 2M_{dxy}^{(4)}$$

$$M_{zxxxy} = 2M_{dyz}^{(4)}$$

* Rank 4 tensor (aaa).

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

$$M_{yzzx} = -T_{pz}^{(2)}$$

$$M_{zxxxy} = -T_{px}^{(2)}$$

* Rank 4 tensor (sa).

$$\begin{bmatrix} M_{xxyz} & 0 & M_{xxxy} \\ M_{yyyz} & 0 & M_{yyxy} \\ M_{zzyz} & 0 & M_{zzxy} \\ 0 & M_{yzzx} & 0 \\ M_{zxyz} & 0 & M_{zxxy} \\ 0 & M_{xyxz} & 0 \end{bmatrix}$$

$$\begin{aligned} M_{xxyz} &= 2T_{fax}^{(2)} + T_{px}^{(3)} + 2T_{px}^{(4)} \\ M_{xxxy} &= -2M_{dry}^{(5)} - T_{faz}^{(2)} + T_{fbz}^{(2)} + T_{pz}^{(3)} \\ M_{yyyz} &= -2M_{dyz}^{(5)} - T_{fax}^{(2)} + T_{fbx}^{(2)} + T_{px}^{(3)} \\ M_{yyxy} &= 2M_{dry}^{(5)} - T_{faz}^{(2)} - T_{fbz}^{(2)} + T_{pz}^{(3)} \\ M_{zzyz} &= 2M_{dyz}^{(5)} - T_{fax}^{(2)} - T_{fbx}^{(2)} + T_{px}^{(3)} \\ M_{zzxy} &= 2T_{faz}^{(2)} + T_{pz}^{(3)} + 2T_{pz}^{(4)} \\ M_{yzzx} &= -M_{dry}^{(5)} - T_{faz}^{(2)} - T_{fbz}^{(2)} + T_{pz}^{(4)} \\ M_{zxyz} &= M_{dry}^{(5)} - T_{faz}^{(2)} + T_{fbz}^{(2)} + T_{pz}^{(4)} \\ M_{zxxz} &= -M_{dyz}^{(5)} - T_{fax}^{(2)} - T_{fbx}^{(2)} + T_{px}^{(4)} \\ M_{xyxz} &= M_{dyz}^{(5)} - T_{fax}^{(2)} + T_{fbx}^{(2)} + T_{px}^{(4)} \end{aligned}$$

* Rank 4 tensor (as).

$$\begin{bmatrix} M_{yzxx} & M_{yzyy} & M_{yzzz} & 0 & M_{yzzx} & 0 \\ 0 & 0 & 0 & M_{zxyz} & 0 & M_{zxxy} \\ M_{xyxx} & M_{xyyy} & M_{xyzz} & 0 & M_{xyxz} & 0 \end{bmatrix}$$

$$\begin{aligned} M_{yzxx} &= 2T_{fax}^{(3)} + T_{px}^{(5)} + 2T_{px}^{(6)} \\ M_{yzyy} &= -2M_{dyz}^{(6)} - T_{fax}^{(3)} + T_{fbx}^{(3)} + T_{px}^{(5)} \\ M_{yzzz} &= 2M_{dyz}^{(6)} - T_{fax}^{(3)} - T_{fbx}^{(3)} + T_{px}^{(5)} \\ M_{yzzx} &= M_{dry}^{(6)} - T_{faz}^{(3)} + T_{fbz}^{(3)} + T_{pz}^{(6)} \\ M_{zxyz} &= -M_{dry}^{(6)} - T_{faz}^{(3)} - T_{fbz}^{(3)} + T_{pz}^{(6)} \\ M_{zxxz} &= M_{dyz}^{(6)} - T_{fax}^{(3)} + T_{fbx}^{(3)} + T_{px}^{(6)} \\ M_{xyxx} &= -2M_{dry}^{(6)} - T_{faz}^{(3)} + T_{fbz}^{(3)} + T_{pz}^{(5)} \\ M_{xyyy} &= 2M_{dry}^{(6)} - T_{faz}^{(3)} - T_{fbz}^{(3)} + T_{pz}^{(5)} \\ M_{xyzz} &= 2T_{faz}^{(3)} + T_{pz}^{(5)} + 2T_{pz}^{(6)} \\ M_{xyxz} &= -M_{dyz}^{(6)} - T_{fax}^{(3)} - T_{fbx}^{(3)} + T_{px}^{(6)} \end{aligned}$$

* Rank 4 tensor (s).

$$\begin{bmatrix} 0 & 0 & 0 & M_{xxyz} & 0 & M_{xxxy} & M_{xxzy} & 0 & M_{xxyx} \\ 0 & 0 & 0 & M_{yyyz} & 0 & M_{yyxy} & M_{yyzy} & 0 & M_{yyyx} \\ 0 & 0 & 0 & M_{zzyz} & 0 & M_{zzxy} & M_{zzzy} & 0 & M_{zzyx} \\ M_{yzxx} & M_{yzyy} & M_{yzzz} & 0 & M_{yzzx} & 0 & 0 & M_{yzzz} & 0 \\ 0 & 0 & 0 & M_{zxyz} & 0 & M_{zxxy} & M_{zxzy} & 0 & M_{zxyx} \\ M_{xyxx} & M_{xyyy} & M_{xyzz} & 0 & M_{xyxz} & 0 & 0 & M_{xyxx} & 0 \end{bmatrix}$$

$$\begin{aligned}
M_{xxyz} &= M_{dyz}^{(1)} + M_{dyz}^{(3)} + 2M_{gby}^{(1)} + 2T_{fax}^{(2)} - 4T_{fbx}^{(1)} + T_{px}^{(3)} + 2T_{px}^{(4)} \\
M_{xxxy} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} + M_{dxy}^{(3)} - 2M_{dxy}^{(5)} + M_{gaz}^{(1)} - M_{gbz}^{(1)} - 2T_{faz}^{(1)} - T_{faz}^{(2)} + 2T_{fbz}^{(1)} + T_{fbz}^{(2)} + 2T_{pz}^{(1)} + T_{pz}^{(3)} \\
M_{xxzy} &= M_{dyz}^{(1)} + M_{dyz}^{(3)} + 2M_{gby}^{(1)} - 2T_{fax}^{(2)} - 4T_{fbx}^{(1)} - T_{px}^{(3)} - 2T_{px}^{(4)} \\
M_{xxyx} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} + M_{dxy}^{(3)} + 2M_{dxy}^{(5)} + M_{gaz}^{(1)} - M_{gbz}^{(1)} - 2T_{faz}^{(1)} + T_{faz}^{(2)} + 2T_{fbz}^{(1)} - T_{fbz}^{(2)} + 2T_{pz}^{(1)} - T_{pz}^{(3)} \\
M_{yyyz} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} + M_{dyz}^{(3)} - 2M_{dyz}^{(5)} + M_{gax}^{(1)} - M_{gbx}^{(1)} - 2T_{fax}^{(1)} - T_{fax}^{(2)} + 2T_{fbx}^{(1)} + T_{fbx}^{(2)} + 2T_{px}^{(1)} + T_{px}^{(3)} \\
M_{yyxy} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} + M_{dxy}^{(3)} + 2M_{dxy}^{(5)} - M_{gaz}^{(1)} - M_{gbz}^{(1)} + 2T_{faz}^{(1)} - T_{faz}^{(2)} + 2T_{fbz}^{(1)} - T_{fbz}^{(2)} - 2T_{pz}^{(1)} + T_{pz}^{(3)} \\
M_{yyzy} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} + M_{dyz}^{(3)} + 2M_{dyz}^{(5)} + M_{gax}^{(1)} - M_{gbx}^{(1)} - 2T_{fax}^{(1)} + T_{fax}^{(2)} + 2T_{fbx}^{(1)} - T_{fbx}^{(2)} + 2T_{px}^{(1)} - T_{px}^{(3)} \\
M_{yyyx} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} + M_{dxy}^{(3)} - 2M_{dxy}^{(5)} - M_{gaz}^{(1)} - M_{gbz}^{(1)} + 2T_{faz}^{(1)} + T_{faz}^{(2)} + 2T_{fbz}^{(1)} + T_{fbz}^{(2)} - 2T_{pz}^{(1)} - T_{pz}^{(3)} \\
M_{zzyz} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} + M_{dyz}^{(3)} + 2M_{dyz}^{(5)} - M_{gax}^{(1)} - M_{gbx}^{(1)} + 2T_{fax}^{(1)} - T_{fax}^{(2)} + 2T_{fbx}^{(1)} - T_{fbx}^{(2)} - 2T_{px}^{(1)} + T_{px}^{(3)} \\
M_{zzxy} &= M_{dxy}^{(1)} + M_{dxy}^{(3)} + 2M_{gbz}^{(1)} + 2T_{faz}^{(2)} - 4T_{fbz}^{(1)} + T_{pz}^{(3)} + 2T_{pz}^{(4)} \\
M_{zzzy} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} + M_{dyz}^{(3)} - 2M_{dyz}^{(5)} - M_{gax}^{(1)} - M_{gbx}^{(1)} + 2T_{fax}^{(1)} + T_{fax}^{(2)} + 2T_{fbx}^{(1)} + T_{fbx}^{(2)} - 2T_{px}^{(1)} - T_{px}^{(3)} \\
M_{zzyx} &= M_{dxy}^{(1)} + M_{dxy}^{(3)} + 2M_{gbz}^{(1)} - 2T_{faz}^{(2)} - 4T_{fbz}^{(1)} - T_{pz}^{(3)} - 2T_{pz}^{(4)} \\
M_{yzxx} &= M_{dyz}^{(1)} - M_{dyz}^{(3)} + 2M_{gby}^{(1)} + 4T_{fbx}^{(1)} \\
M_{yzyy} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} - M_{dyz}^{(3)} + M_{gax}^{(1)} - M_{gbx}^{(1)} + 2T_{fax}^{(1)} - 2T_{fbx}^{(1)} - 2T_{px}^{(1)} \\
M_{yzzz} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} - M_{dyz}^{(3)} - M_{gax}^{(1)} - M_{gbx}^{(1)} - 2T_{fax}^{(1)} - 2T_{fbx}^{(1)} + 2T_{px}^{(1)} \\
M_{yzzx} &= M_{dxy}^{(2)} - M_{dxy}^{(5)} + 2M_{gbz}^{(1)} - 4T_{faz}^{(1)} - T_{faz}^{(2)} - T_{fbz}^{(2)} - T_{pz}^{(1)} + T_{pz}^{(4)} \\
M_{yzxz} &= M_{dxy}^{(2)} + M_{dxy}^{(5)} + 2M_{gbz}^{(1)} - 4T_{faz}^{(1)} + T_{faz}^{(2)} + T_{fbz}^{(2)} - T_{pz}^{(1)} - T_{pz}^{(4)} \\
M_{zxyz} &= M_{dxy}^{(2)} + M_{dxy}^{(5)} + 2M_{gbz}^{(1)} + 4T_{faz}^{(1)} - T_{faz}^{(2)} + T_{fbz}^{(2)} + T_{pz}^{(1)} + T_{pz}^{(4)} \\
M_{zxyy} &= M_{dyz}^{(2)} - M_{dyz}^{(5)} + 2M_{gbx}^{(1)} - 4T_{fax}^{(1)} - T_{fax}^{(2)} - T_{fbx}^{(2)} - T_{px}^{(1)} + T_{px}^{(4)} \\
M_{zxxy} &= M_{dxy}^{(2)} - M_{dxy}^{(5)} + 2M_{gbz}^{(1)} + 4T_{faz}^{(1)} + T_{faz}^{(2)} - T_{fbz}^{(2)} + T_{pz}^{(1)} - T_{pz}^{(4)} \\
M_{zxyx} &= M_{dyz}^{(2)} + M_{dyz}^{(5)} + 2M_{gby}^{(1)} - 4T_{fax}^{(1)} + T_{fax}^{(2)} + T_{fbx}^{(2)} - T_{px}^{(1)} - T_{px}^{(4)} \\
M_{xyxx} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} - M_{dxy}^{(3)} + M_{gaz}^{(1)} - M_{gbz}^{(1)} + 2T_{faz}^{(1)} - 2T_{fbz}^{(1)} - 2T_{pz}^{(1)} \\
M_{xyyy} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} - M_{dxy}^{(3)} - M_{gaz}^{(1)} - M_{gbz}^{(1)} - 2T_{faz}^{(1)} - 2T_{fbz}^{(1)} + 2T_{pz}^{(1)} \\
M_{xyzz} &= M_{dxy}^{(1)} - M_{dxy}^{(3)} + 2M_{gbz}^{(1)} + 4T_{fbz}^{(1)} \\
M_{xyzx} &= M_{dyz}^{(2)} + M_{dyz}^{(5)} + 2M_{gbx}^{(1)} + 4T_{fax}^{(1)} - T_{fax}^{(2)} + T_{fbx}^{(2)} + T_{px}^{(1)} + T_{px}^{(4)} \\
M_{xyxz} &= M_{dyz}^{(2)} - M_{dyz}^{(5)} + 2M_{gby}^{(1)} + 4T_{faz}^{(1)} + T_{faz}^{(2)} - T_{fbx}^{(2)} + T_{px}^{(1)} - T_{px}^{(4)}
\end{aligned}$$

* Rank 4 tensor (a).

$$\begin{bmatrix}
M_{yzxx} & M_{yzyy} & M_{yzzz} & 0 & M_{yzzx} & 0 & 0 & M_{yzzz} & 0 \\
0 & 0 & 0 & M_{zxyz} & 0 & M_{zxxz} & M_{zxxz} & 0 & M_{zxyx} \\
M_{xyxx} & M_{xyyy} & M_{xyzz} & 0 & M_{xyzx} & 0 & 0 & M_{xyxz} & 0
\end{bmatrix}$$

$$\begin{aligned}
M_{yzxx} &= 2T_{fax}^{(3)} + T_{px}^{(5)} + 2T_{px}^{(6)} \\
M_{yzyy} &= -2M_{dyz}^{(6)} - T_{fax}^{(3)} + T_{fbx}^{(3)} + T_{px}^{(5)} \\
M_{yzzz} &= 2M_{dyz}^{(6)} - T_{fax}^{(3)} - T_{fbx}^{(3)} + T_{px}^{(5)} \\
M_{yzzx} &= 2M_{dxy}^{(4)} + M_{dxy}^{(6)} - T_{faz}^{(3)} + T_{fbz}^{(3)} - T_{pz}^{(2)} + T_{pz}^{(6)} \\
M_{yzxz} &= -2M_{dxy}^{(4)} + M_{dxy}^{(6)} - T_{faz}^{(3)} + T_{fbz}^{(3)} + T_{pz}^{(2)} + T_{pz}^{(6)} \\
M_{zxyz} &= 2M_{dxy}^{(4)} - M_{dxy}^{(6)} - T_{faz}^{(3)} - T_{fbz}^{(3)} + T_{pz}^{(2)} + T_{pz}^{(6)} \\
M_{zxxy} &= 2M_{dyz}^{(4)} + M_{dyz}^{(6)} - T_{fax}^{(3)} + T_{fbx}^{(3)} - T_{px}^{(2)} + T_{px}^{(6)} \\
M_{zxzy} &= -2M_{dxy}^{(4)} - M_{dxy}^{(6)} - T_{faz}^{(3)} - T_{fbz}^{(3)} - T_{pz}^{(2)} + T_{pz}^{(6)} \\
M_{zxyx} &= -2M_{dyz}^{(4)} + M_{dyz}^{(6)} - T_{faz}^{(3)} + T_{fbz}^{(3)} + T_{px}^{(2)} + T_{px}^{(6)} \\
M_{xyxx} &= -2M_{dxy}^{(6)} - T_{faz}^{(3)} + T_{fbz}^{(3)} + T_{pz}^{(5)} \\
M_{xyyy} &= 2M_{dxy}^{(6)} - T_{faz}^{(3)} - T_{fbz}^{(3)} + T_{pz}^{(5)} \\
M_{xyzz} &= 2T_{faz}^{(3)} + T_{pz}^{(5)} + 2T_{pz}^{(6)} \\
M_{xyzx} &= 2M_{dyz}^{(4)} - M_{dyz}^{(6)} - T_{fax}^{(3)} - T_{fbx}^{(3)} + T_{px}^{(2)} + T_{px}^{(6)} \\
M_{xyxz} &= -2M_{dyz}^{(4)} - M_{dyz}^{(6)} - T_{fax}^{(3)} - T_{fbx}^{(3)} - T_{px}^{(2)} + T_{px}^{(6)}
\end{aligned}$$

* Rank 4 tensor (t).

$$\left[\begin{array}{ccc}
0 & M_{xxxz} & 0 \\
M_{yyyx} & 0 & M_{yyyz} \\
0 & M_{zzzy} & 0 \\
0 & M_{yyzy} & 0 \\
0 & M_{zzxy} & 0 \\
M_{xxyx} & 0 & M_{xxyz} \\
M_{yzzx} & 0 & M_{yzzz} \\
0 & M_{zxxy} & 0 \\
0 & M_{xyyy} & 0 \\
-\frac{M_{yyuz}}{2} + \frac{M_{uyuz}}{2} + M_{zxxy} & 0 & \frac{M_{xxxz}}{2} - \frac{M_{xxxy}}{2} + M_{xyyy} - M_{yyyx} + M_{zzxy}
\end{array} \right]$$

$$\begin{aligned}
M_{xxxz} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} + M_{dxy}^{(3)} - 2M_{dxy}^{(5)} + M_{gaz}^{(1)} - M_{gbz}^{(1)} \\
M_{yyyx} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} + M_{dxy}^{(3)} - 2M_{dxy}^{(5)} - M_{gaz}^{(1)} - M_{gbz}^{(1)} \\
M_{yyyz} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} + M_{dyz}^{(3)} - 2M_{dyz}^{(5)} + M_{gax}^{(1)} - M_{gbx}^{(1)} \\
M_{zzzy} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} + M_{dyz}^{(3)} - 2M_{dyz}^{(5)} - M_{gax}^{(1)} - M_{gbx}^{(1)} \\
M_{yyzy} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} + M_{dyz}^{(3)} + 2M_{dyz}^{(5)} + M_{gax}^{(1)} - M_{gbx}^{(1)} \\
M_{zzxy} &= M_{dxy}^{(1)} + M_{dxy}^{(3)} + 2M_{gbz}^{(1)} \\
M_{xxyx} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} + M_{dxy}^{(3)} + 2M_{dxy}^{(5)} + M_{gaz}^{(1)} - M_{gbz}^{(1)} \\
M_{xxyz} &= M_{dyz}^{(1)} + M_{dyz}^{(3)} + 2M_{gbz}^{(1)} \\
M_{yzzx} &= M_{dxy}^{(2)} - M_{dxy}^{(5)} + 2M_{gbz}^{(1)} \\
M_{yzzz} &= M_{dyz}^{(1)} + 2M_{dyz}^{(2)} - M_{dyz}^{(3)} - M_{gax}^{(1)} - M_{gbx}^{(1)} \\
M_{zxxy} &= M_{dyz}^{(2)} - M_{dyz}^{(5)} + 2M_{gbz}^{(1)} \\
M_{xyyy} &= M_{dxy}^{(1)} + 2M_{dxy}^{(2)} - M_{dxy}^{(3)} - M_{gaz}^{(1)} - M_{gbz}^{(1)}
\end{aligned}$$