Python version $= 2 \cdot 7 \cdot 11 | Anaconda 4 \cdot 0 \cdot 0 (32-bit) | (default, Mar 4 2016, 15:18:41) [MSC v \cdot 1500 32 bit (Intel)]$

$$\boldsymbol{a} = a^t \boldsymbol{e}_t + a^x \boldsymbol{e}_x + a^y \boldsymbol{e}_y + a^z \boldsymbol{e}_z$$

$$\begin{aligned}\boldsymbol{M} =& M \\ &+ M^t \boldsymbol{e}_t + M^x \boldsymbol{e}_x + M^y \boldsymbol{e}_y + M^z \boldsymbol{e}_z \\ &+ M^{tx} \boldsymbol{e}_t \wedge \boldsymbol{e}_x + M^{ty} \boldsymbol{e}_t \wedge \boldsymbol{e}_y + M^{tz} \boldsymbol{e}_t \wedge \boldsymbol{e}_z + M^{xy} \boldsymbol{e}_x \wedge \boldsymbol{e}_y + M^{xz} \boldsymbol{e}_x \wedge \boldsymbol{e}_z + M^{yz} \boldsymbol{e}_y \wedge \boldsymbol{e}_z \\ &+ M^{txy} \boldsymbol{e}_t \wedge \boldsymbol{e}_x \wedge \boldsymbol{e}_y + M^{txz} \boldsymbol{e}_t \wedge \boldsymbol{e}_x \wedge \boldsymbol{e}_z + M^{tyz} \boldsymbol{e}_t \wedge \boldsymbol{e}_y \wedge \boldsymbol{e}_z + M^{xyz} \boldsymbol{e}_x \wedge \boldsymbol{e}_y \wedge \boldsymbol{e}_z \\ &+ M^{txyz} \boldsymbol{e}_t \wedge \boldsymbol{e}_x \wedge \boldsymbol{e}_y \wedge \boldsymbol{e}_z\end{aligned}$$

$$\boldsymbol{a}\boldsymbol{a} = \left(a^t\right)^2 - \left(a^x\right)^2 - \left(a^y\right)^2 - \left(a^z\right)^2$$

$$\begin{aligned}\boldsymbol{a}^{-1} =& \frac{a^t}{\left(a^t\right)^2 - \left(a^x\right)^2 - \left(a^y\right)^2 - \left(a^z\right)^2} \boldsymbol{e}_t \\ &+ \frac{a^x}{\left(a^t\right)^2 - \left(a^x\right)^2 - \left(a^y\right)^2 - \left(a^z\right)^2} \boldsymbol{e}_x \\ &+ \frac{a^y}{\left(a^t\right)^2 - \left(a^x\right)^2 - \left(a^y\right)^2 - \left(a^z\right)^2} \boldsymbol{e}_y \\ &+ \frac{a^z}{\left(a^t\right)^2 - \left(a^x\right)^2 - \left(a^y\right)^2 - \left(a^z\right)^2} \boldsymbol{e}_z\end{aligned}$$

$$\langle \boldsymbol{M} \rangle_1 \langle \boldsymbol{M} \rangle_1 = \left(M^t\right)^2 - \left(M^x\right)^2 - \left(M^y\right)^2 - \left(M^z\right)^2$$

$$\begin{aligned}\langle \boldsymbol{M} \rangle_1^{-1} =& \frac{M^t}{\left(M^t\right)^2 - \left(M^x\right)^2 - \left(M^y\right)^2 - \left(M^z\right)^2} \boldsymbol{e}_t \\ &+ \frac{M^x}{\left(M^t\right)^2 - \left(M^x\right)^2 - \left(M^y\right)^2 - \left(M^z\right)^2} \boldsymbol{e}_x \\ &+ \frac{M^y}{\left(M^t\right)^2 - \left(M^x\right)^2 - \left(M^y\right)^2 - \left(M^z\right)^2} \boldsymbol{e}_y \\ &+ \frac{M^z}{\left(M^t\right)^2 - \left(M^x\right)^2 - \left(M^y\right)^2 - \left(M^z\right)^2} \boldsymbol{e}_z\end{aligned}$$

$$\langle \boldsymbol{M} \rangle_3 = M^{txy} \boldsymbol{e}_t \wedge \boldsymbol{e}_x \wedge \boldsymbol{e}_y + M^{txz} \boldsymbol{e}_t \wedge \boldsymbol{e}_x \wedge \boldsymbol{e}_z + M^{tyz} \boldsymbol{e}_t \wedge \boldsymbol{e}_y \wedge \boldsymbol{e}_z + M^{xyz} \boldsymbol{e}_x \wedge \boldsymbol{e}_y \wedge \boldsymbol{e}_z$$

$$\langle \boldsymbol{M} \rangle_3 \langle \boldsymbol{M} \rangle_3 = -\left(M^{txy}\right)^2 - \left(M^{txz}\right)^2 - \left(M^{tyz}\right)^2 + \left(M^{xyz}\right)^2$$

$$\begin{aligned}\langle \boldsymbol{M} \rangle_3^{-1} =& -\frac{M^{txy}}{\left(M^{txy}\right)^2 + \left(M^{txz}\right)^2 + \left(M^{tyz}\right)^2 - \left(M^{xyz}\right)^2} \boldsymbol{e}_t \wedge \boldsymbol{e}_x \wedge \boldsymbol{e}_y \\ &- \frac{M^{txz}}{\left(M^{txy}\right)^2 + \left(M^{txz}\right)^2 + \left(M^{tyz}\right)^2 - \left(M^{xyz}\right)^2} \boldsymbol{e}_t \wedge \boldsymbol{e}_x \wedge \boldsymbol{e}_z \\ &- \frac{M^{tyz}}{\left(M^{txy}\right)^2 + \left(M^{txz}\right)^2 + \left(M^{tyz}\right)^2 - \left(M^{xyz}\right)^2} \boldsymbol{e}_t \wedge \boldsymbol{e}_y \wedge \boldsymbol{e}_z \\ &- \frac{M^{xyz}}{\left(M^{txy}\right)^2 + \left(M^{txz}\right)^2 + \left(M^{tyz}\right)^2 - \left(M^{xyz}\right)^2} \boldsymbol{e}_x \wedge \boldsymbol{e}_y \wedge \boldsymbol{e}_z\end{aligned}$$