

$$\begin{pmatrix} \mathbf{Mx}_{n-1} \\ \mathbf{My}_{n-1} \\ \mathbf{Mz}_{n-1} \end{pmatrix} = \mathbf{R}_{n-1}^{-1} \cdot \begin{pmatrix} \mathbf{mx}_{n-1} - \mathbf{cx}_{n-1} \\ \mathbf{my}_{n-1} - \mathbf{cy}_{n-1} \\ \mathbf{mz}_{n-1} - \mathbf{cz}_{n-1} \end{pmatrix} / \mathbf{S}_{n-1}$$

$$\begin{pmatrix} \mathbf{Mx}_n \\ \mathbf{My}_n \\ \mathbf{Mz}_n \end{pmatrix} = \mathbf{R}_n^{-1} \cdot \begin{pmatrix} \mathbf{mx}_n - \mathbf{cx}_n \\ \mathbf{my}_n - \mathbf{cy}_n \\ \mathbf{mz}_n - \mathbf{cz}_n \end{pmatrix} / \mathbf{S}_n$$

$$\left(\begin{pmatrix} \mathbf{Mx}_{n-1} \\ \mathbf{My}_{n-1} \\ \mathbf{Mz}_{n-1} \end{pmatrix} + \begin{pmatrix} \mathbf{Mx}_n \\ \mathbf{My}_n \\ \mathbf{Mz}_n \end{pmatrix} \right) / 2 = \begin{pmatrix} \mathbf{Mx}_{n+1} \\ \mathbf{My}_{n+1} \\ \mathbf{Mz}_{n+1} \end{pmatrix}$$

$$\mathbf{S}_{n-1} = \sqrt{(\mathbf{mx}_{n-1} - \mathbf{cx}_{n-1})^2 + (\mathbf{my}_{n-1} - \mathbf{cy}_{n-1})^2 + (\mathbf{mz}_{n-1} - \mathbf{cz}_{n-1})^2}$$

$$\mathbf{S}_n = \sqrt{(\mathbf{mx}_n - \mathbf{cx}_n)^2 + (\mathbf{my}_n - \mathbf{cy}_n)^2 + (\mathbf{mz}_n - \mathbf{cz}_n)^2}$$

$$\mathbf{R}_{n-1}^{-1} \cdot \begin{pmatrix} \mathbf{mx}_{n-1} - \mathbf{cx}_{n-1} \\ \mathbf{my}_{n-1} - \mathbf{cy}_{n-1} \\ \mathbf{mz}_{n-1} - \mathbf{cz}_{n-1} \end{pmatrix} / \mathbf{S}_{n-1} + \mathbf{R}_n^{-1} \cdot \begin{pmatrix} \mathbf{mx}_n - \mathbf{cx}_n \\ \mathbf{my}_n - \mathbf{cy}_n \\ \mathbf{mz}_n - \mathbf{cz}_n \end{pmatrix} / \mathbf{S}_n$$

$$\mathbf{R}_{n+1} \cdot \begin{pmatrix} \mathbf{Mx}_{n+1} \\ \mathbf{My}_{n+1} \\ \mathbf{Mz}_{n+1} \end{pmatrix} * \mathbf{S}_{n+1} = \begin{pmatrix} \mathbf{mx}_n - \mathbf{cx}_n \\ \mathbf{my}_n - \mathbf{cy}_n \\ \mathbf{mz}_n - \mathbf{cz}_n \end{pmatrix}$$

$$\begin{pmatrix} \mathbf{cx}_{n+2} \\ \mathbf{cy}_{n+2} \\ \mathbf{cz}_{n+2} \end{pmatrix} = \begin{pmatrix} \mathbf{mx}_{n+1} \\ \mathbf{my}_{n+1} \\ \mathbf{mz}_{n+1} \end{pmatrix} - \mathbf{R}_{n+1} \cdot \begin{pmatrix} \mathbf{Mx}_{n+1} \\ \mathbf{My}_{n+1} \\ \mathbf{Mz}_{n+1} \end{pmatrix} * \mathbf{S}_{n+1}$$

$$\begin{pmatrix} \mathbf{Mx}_{n+2} \\ \mathbf{My}_{n+2} \\ \mathbf{Mz}_{n+2} \end{pmatrix} = \mathbf{R}_{n+2}^{-1} \cdot \begin{pmatrix} \mathbf{mx}_{n+2} - \mathbf{cx}_{n+2} \\ \mathbf{my}_{n+2} - \mathbf{cy}_{n+2} \\ \mathbf{mz}_{n+2} - \mathbf{cz}_{n+2} \end{pmatrix} / \mathbf{S}_{n+2}$$

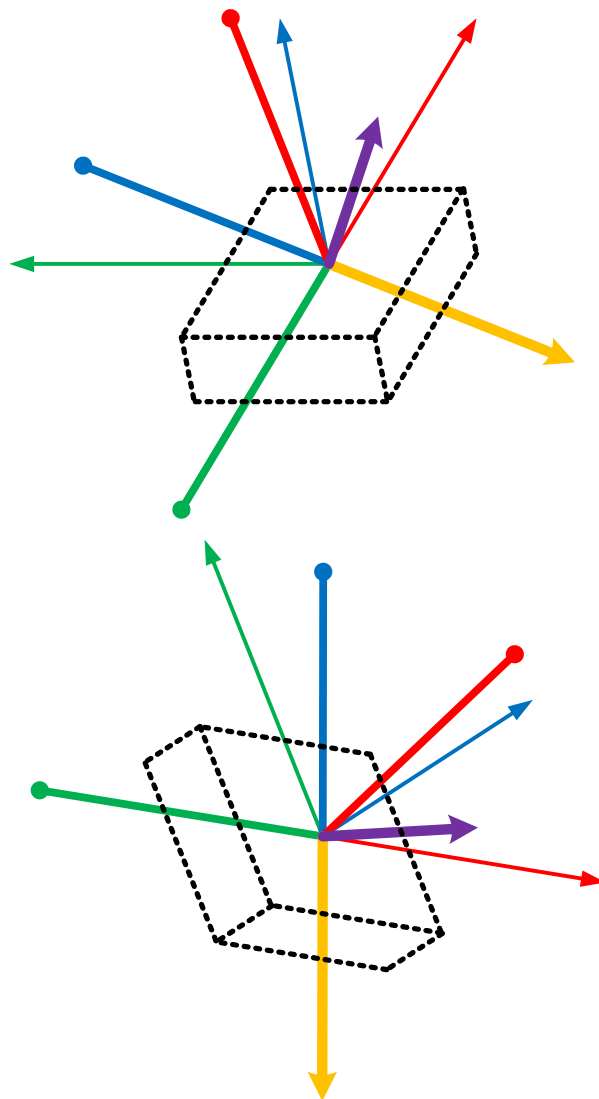
again

$$\mathbf{S}_n = \sqrt{(\mathbf{mx}_n - \mathbf{cx}_{n-1})^2 + (\mathbf{my}_n - \mathbf{cy}_{n-1})^2 + (\mathbf{mz}_n - \mathbf{cz}_{n-1})^2}$$

$$\mathbf{R}_n \Leftarrow \begin{pmatrix} \mathbf{mx}_n - \mathbf{cx}_{n-1} \\ \mathbf{my}_n - \mathbf{cy}_{n-1} \\ \mathbf{mz}_n - \mathbf{cz}_{n-1} \end{pmatrix} / \mathbf{S}_n$$

$$\begin{pmatrix} \mathbf{Mx}_n \\ \mathbf{My}_n \\ \mathbf{Mz}_n \end{pmatrix} = \mathbf{R}_n^{-1} \cdot \begin{pmatrix} \mathbf{mx}_n - \mathbf{cx}_{n-1} \\ \mathbf{my}_n - \mathbf{cy}_{n-1} \\ \mathbf{mz}_n - \mathbf{cz}_{n-1} \end{pmatrix} / \mathbf{S}_n$$

$$\begin{pmatrix} \mathbf{cx}_n \\ \mathbf{cy}_n \\ \mathbf{cz}_n \end{pmatrix} = \begin{pmatrix} \mathbf{mx}_n \\ \mathbf{my}_n \\ \mathbf{mz}_n \end{pmatrix} - \mathbf{R}_n \cdot \left(\left(\begin{pmatrix} \mathbf{Mx}_{n-1} \\ \mathbf{My}_{n-1} \\ \mathbf{Mz}_{n-1} \end{pmatrix} + \begin{pmatrix} \mathbf{Mx}_n \\ \mathbf{My}_n \\ \mathbf{Mz}_n \end{pmatrix} \right) / 2 \right) * \mathbf{S}_n$$

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$$\begin{aligned}\mathbf{S}_n &= \mathbf{N}[\mathbf{m}_n - \mathbf{c}_{n-1}] ; \\ \mathbf{M}_n &= (\mathbf{m}_n - \mathbf{c}_{n-1}) / \mathbf{S}_n ;\end{aligned}$$

$$\text{RPY} \Rightarrow \mathbf{R}_n$$

$$\begin{aligned}\mathbf{RM}_n &= \mathbf{R}_n \cdot \mathbf{M}_n ; \\ \mathbf{RM}_n^* &= (\mathbf{RM}_n + \mathbf{RM}_{n-1}) / 2 ;\end{aligned}$$

$$\begin{aligned}\mathbf{c}_n &= \mathbf{m}_n - \mathbf{S}_n * \mathbf{R}_n^{-1} \cdot \mathbf{RM}_n^* ; \\ \mathbf{c}_n &= \mathbf{m}_n - \mathbf{S}_n * \mathbf{R}_n^{-1} \cdot (\mathbf{RM}_n + \mathbf{RM}_{n-1}) / 2 ;\end{aligned}$$

