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What would a dual quat constructor look like that does two things

↳ Rotate then translate

= T * R

Note to self:
I need to change my code so it looks like this...

Say T is a pure translation

$$T = 1 - \frac{\Delta x}{2} e_{01} - \frac{\Delta y}{2} e_{02} - \frac{\Delta z}{2} e_{03}$$

and R is a pure rotation

$$R = \cos\frac{\theta}{2} - \sin\frac{\theta}{2} * \text{axisLine}$$

In code, that might look like this:

$$T * R = (T.w + T.e_{01} + T.e_{02} + T.e_{03}) * (R.w + R.e_{23} + R.e_{31} + R.e_{12})$$

$$= (T.w\,R.w)\,w + (T.w\,R.e_{23})\,e_{23} + (T.w\,R.e_{31})\,e_{31}$$

$$+ (T.w\,R.e_{12})\,e_{12}$$

$$+ (T.e_{01}\,R.w)\,e_{01} + (T.e_{01}\,R.e_{23})\,e_{0123}$$
$$+ (T.e_{01}\,R.e_{31})(-e_{03}) + (T.e_{01}\,R.e_{12})\,e_{02}$$

$$+ (T.e_{02}\,R.w)\,e_{02} + (T.e_{02}\,R.e_{23})\,e_{03}$$
$$+ (T.e_{02}\,R.e_{31})\,e_{0123} + (T.e_{02}\,R.e_{12})(-e_{01})$$

$$+ (T.e_{03}\,R.w)\,e_{03} + (T.e_{03}\,R.e_{23})(-e_{02})$$
$$+ (T.e_{03}\,R.e_{31})\,e_{01} + (T.e_{03}\,R.e_{12})\,e_{0123}$$

I'll group 'em on the next page ⟶

pure translation dual quat

pure rotation dual quat

$T * R =$

real is the same as w

real part	T.real	R.real
+		
e_{23} part	+ T.real	R.e_{23}
+		
e_{31} part	+ T.real	R.e_{31}
+		
e_{12} part	+ T.real	R.e_{12}

Ooooh, I can simplify this as T.real = 1 for a pure translation dual quat!

+

e_{01} part $+ T.e_{01} R.real - T.e_{02} R.e_{12} + T.e_{03} R.e_{31}$

+

e_{02} part $+ T.e_{01} R.e_{12} + T.e_{02} R.real - T.e_{03} R.e_{23}$

+

e_{03} part $- T.e_{01} R.e_{31} + T.e_{02} R.e_{23} + T.e_{03} R.real$

+

e_{0123} part $+ T.e_{01} R.e_{23} + T.e_{02} R.e_{31} + T.e_{03} R.e_{12}$