

Assignment 3

ELEC 442 - Introduction to Robotics

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1 Computation of representation

As we have the relationship between the initial frame \underline{C}_i and the final frame \underline{C}_f given as

$$\begin{aligned}\underline{C}_f &= \underline{R}\underline{C}_i \\ &= e^{\theta \underline{s} \times} \underline{C}_i\end{aligned}$$

we could rearrange this as

$$\begin{aligned}\underline{C}_f &= \underline{C}_i R \\ &= \underline{C}_i e^{\theta \underline{s} \times}\end{aligned}$$

where

$$R = \begin{bmatrix} r_{11} & r_{12} & r_{13} \\ r_{21} & r_{22} & r_{23} \\ r_{31} & r_{32} & r_{33} \end{bmatrix}$$

as given in the text. This gives us the relationship

$$e^{\theta \underline{s} \times} = \begin{bmatrix} r_{11} & r_{12} & r_{13} \\ r_{21} & r_{22} & r_{23} \\ r_{31} & r_{32} & r_{33} \end{bmatrix}$$

which we want to solve for \underline{s} .