Goal is to find this
Optical tracker (on tripod)

EM tracker base (fixed in workspace)

Workspace

Calibration object (moves in workspace)

EM markers

LEDs

Solve for $F_a$ as point cloud to point cloud registration problem from $\tilde{A}_i = F_a \cdot \tilde{a}_i$

Solve for $F_d$ as point cloud to point cloud registration problem from $\tilde{D}_i = F_d \cdot \tilde{d}_i$

So for FAsk point cloud to point cloud registration problem from $D_i = F_d \cdot d_i$

So for FAsk point cloud to point cloud registration problem from $D_i = F_d \cdot d_i$

$a_i$

$c_i$

$D_i$

$d_i$

$F_d$

$F_a$

$F_c$

$F_D$

$C_i$
Defining the EM rigid body

\[ \vec{g}_j = \vec{G}_j - \vec{G}_0 \]

\[ \vec{G}_0 = \frac{1}{N_g} \sum \vec{G}_j \]

Calibrating the EM Pointer (pivot calibration)

Solve for \( F_x[k] \) such that

\[ \vec{G}_j = F_x[k] \cdot \vec{g}_j \]

Then solve least squares problem

\[ \vec{P}_\text{dimple} = F_x[k] \cdot \vec{t}_i \]

Calibrating optical pointer is similar
except use \( P_i = F_x \cdot H_i \) instead of \( \vec{G}_j \)
Goal is to find this

\[ \mathbf{F}_{\text{reg}} \]

\[ \mathbf{F}_{\text{prop}} \]

\[ \mathbf{f}^{(i)} = \mathbf{F}_{\text{prop}}^{(i)} \cdot \mathbf{p}_{\text{ip}} \]

LEDs

EM markers

Workspace

EM tracker base (fixed in workspace)