Visualizing Quaternions

Conclusion

Can You See Quaternions Now??
Final Exam

Can you apply quaternion visualization?

- **Situation:** Rotate a palmed coffee cup.

- **Task:** Write down a quaternion description.
First, pick some angles…

- 0 degrees:
- 90 degrees:
- 180 degrees:
- 360 degrees:
- 540 degrees:
- 720 degrees:
Break into pieces...

- **A = Collarbone:** \(\Rightarrow\) FIXED.
- **Upper arm:** \(\Rightarrow\) INTERPOLATES Collarbone to Elbow.
- **B = Elbow:** \(\Rightarrow\) ROTATES 90 degrees CCW and Back.
- **Lower arm:** \(\Rightarrow\) INTERPOLATES Elbow to Wrist.
- **C = Wrist:** \(\Rightarrow\) ROTATES 180 degrees relative to Elbow and back.
- **D = Palm:** \(\Rightarrow\) ROTATES 720 degrees.
Quaternions plots for Collar, Elbow, Wrist, Palm

A

B

C

D

$\pi/2$

$\pi$

z-axis
Connect them all together…

- You have a physical example of a rotation connecting \textit{Identity} = \textit{Collarbone} to the 720 degree rotation \textit{Palm of Hand}.
Go Forth and See Quaternions Hidden Everywhere!