Video links

Rotation matrix

Theory

[Robotics 1 U1 (Kinematics) S3 (Rotation Matrices) P1 (Rotation Matrices) (youtube.com)](https://www.youtube.com/watch?v=lVjFhNv2N8o)

[Lecture 11: Robots Kinematics - YouTube](https://www.youtube.com/watch?v=wcy0Y3Jgf14)

PY code

[Robotics 1 U1 (Kinematics) S3 (Rotation Matrices) P2 (Rotation Matrices in Python) (youtube.com)](https://www.youtube.com/watch?v=tSy8QbcOSxc)

Transformation matrix

[Spatial Descriptions and Transformation Matrices for Robotic Manipulators (youtube.com)](https://www.youtube.com/watch?v=4Y1_y9DI_Hw)

Problem

[Spacial Descriptions and Transformations - Worked Example (youtube.com)](https://www.youtube.com/watch?v=r244ADkuexk)

Euler gimbal lock in rotations

[euler gimbal lock explained - Google Search](https://www.google.com/search?q=euler+gimbal+lock+explained&oq=euler+gimbal+lock&gs_lcrp=EgZjaHJvbWUqBwgBEAAYgAQyCQgAEEUYORiABDIHCAEQABiABDIICAIQABgWGB4yCAgDEAAYFhgeMg0IBBAAGIYDGIAEGIoFMg0IBRAAGIYDGIAEGIoF0gEIODgxNmowajGoAgCwAgA&sourceid=chrome&ie=UTF-8#fpstate=ive&vld=cid:d9d623d3,vid:zc8b2Jo7mno,st:0)

Denavit Haternberg

[Lecture 17 Robotics | DENAVIT HATENBERG PRINCIPLE | FRAME REPRESENTATION (youtube.com)](https://www.youtube.com/watch?v=dNQAlaSptgo)

[Lecture 18 Robotics | DH PARAMETER | ESTIMATION OF LINK AND JOINT VARIABLES (youtube.com)](https://www.youtube.com/watch?v=8abXjLJ8ACo)

[Lecture 19 Robotics | SOLVED NUMERICAL ON DH PARAMETER (youtube.com)](https://www.youtube.com/watch?v=6obH9cFPt0A)