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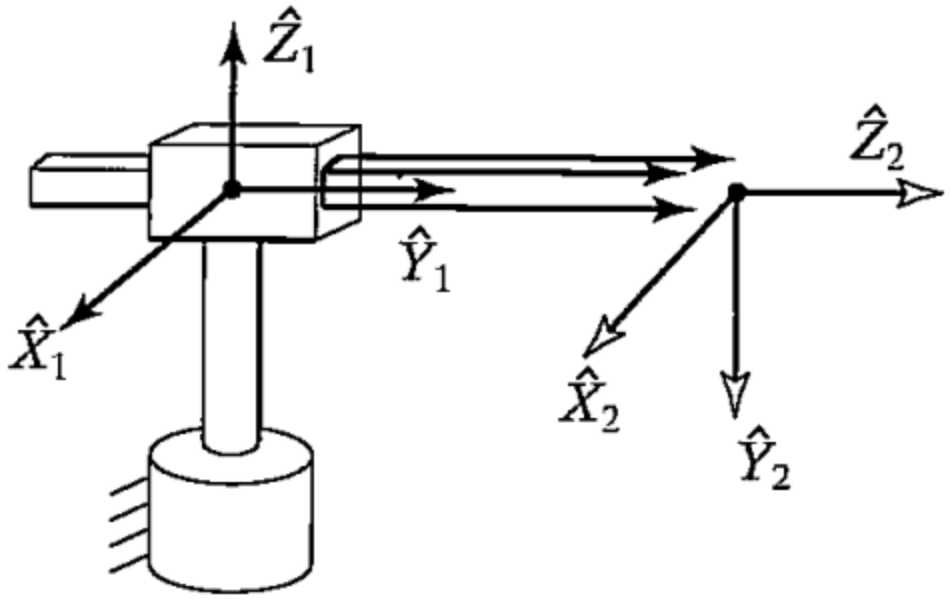
1. webots file has been attached.

2.

Reachable workspace is a disc of radius l (maximum length that robot arm can be extended to). Dextrous workspace is only one point (at the center of Reachable disc).

3.

Subspace is a plane with $z = 0$. workspace is a disc which mentioned in the previous part. The subspace considering having x, y relative to the base frame ${}^{0}_{2}T = \begin{bmatrix} \frac{y}{\sqrt{x^2+y^2}} & 0 & \frac{x}{\sqrt{x^2+y^2}} & x \\ \frac{-x}{\sqrt{x^2+y^2}} & 0 & \frac{y}{\sqrt{x^2+y^2}} & y \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$



we need to find θ for first joint and r for the second joint (third joint is more complex and needs the orientation of target).

$$r = \sqrt{x^2 + y^2}$$

$$\theta = \tan^{-1}(\frac{y}{x})$$

4. Controller and robot files are attached. Explanation is given in the video.