Lab3

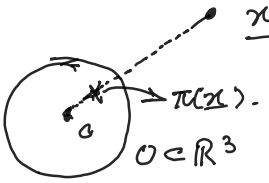
Saturday, March 12, 2022 8:15 PM

(b f

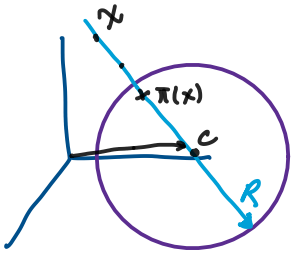
Prelab

3// Computing orthogonal projection of x onto O (obstacle)

1. Spherical O:



$$O = \{ x \in \mathbb{R}^3 : \|x - c\| \leq R \}$$



$C + \lambda(x - c)$ Find λ s.t. $C + \lambda(x-c) \in \partial O$

$\lambda \geq 0$

Take $x \notin O$

$\pi(x) =$

Impose that the point $C + \lambda(x-c)$ is at a distance R from C, i.e.,

$$\| C + \lambda(x-c) - C \| = R$$

$$\lambda \|x - c\| = R \Rightarrow \lambda = \frac{R}{\|x-c\|}$$

$$\pi(x) = \begin{cases} c + \dfrac{R}{\|x-c\|}(x-c), & \|x-c\| \geq R \\ x & \|x-c\| \leq R \end{cases}$$

2. Cylindrical O: