1 Equations For Motion in Vrep:

1.1 For Trajectory Tracking:

- Euler angles and positions of the bot:

$$\gamma, \beta, \theta$$

$$x, y, z$$

$$A = \begin{vmatrix} \cos\gamma\cos\beta - \cos\theta\sin\gamma\sin\beta & -\cos\gamma\sin\beta - \cos\theta\sin\gamma\cos\beta & \sin\gamma\sin\theta & x \\ \sin\gamma\cos\beta + \cos\theta\cos\gamma\sin\beta & -\sin\gamma\sin\beta + \cos\theta\cos\gamma\cos\beta & -\cos\gamma\sin\theta & y \\ \sin\beta\sin\theta & \sin\beta\sin\theta & \cos\theta & z \\ 0 & 0 & 0 & 1 \end{vmatrix}$$

- B being the Trajectory of the bot calculated from the OMPL plugin of Vrep

$$B = \begin{vmatrix} Path[pos] \\ Path[pos+1] \\ Path[pos+2] \end{vmatrix}$$

- We Get the C vector oriented in the direction, Which gives the distance and the orientation for the diffferential Drive bot

$$C = AB$$

- Algorithm:

path=getpath() pos=1 dis=0
while *destination not reached* **do**

    fix temptarget
    find C
    find phi and dis
    vdes=const
    omdes=0.8*phi
    vr=vdes+d*omdes and vl=vdes-d*omdes
    if *dis¡threshold* **then**
      | pos++
    else
end

Algorithm 1: Trajectory Tracking

2 cad calculations