1) In this part we have to get the position of the robot by using wheel velocities. To do this, we can use the below equation

$$V\_left = W\_left \cdot R$$

$$V\_right = W\_right \cdot R$$

$$\dot{x} = -\frac{R}{2} \cdot \sin(\phi) \, (w\_left + w\_right) \cdot dt$$

$$\dot{y} = \frac{R}{2} \cdot \cos(\phi) \, (w\_left + w\_right) \cdot dt$$

$$\dot{\phi} = (V\_right + V\_left) \cdot dt \, / \, b$$

where;

R = radius of the wheels

ϕ = heading of the robot

dt = duration between intervals

b = wheel sepcration.

This equations can be change based on the choosen coordinate frame.

2) In this part, we have to calculate the necessary velocity values usin APF.

$$F_A = G_A \cdot (g - p)$$

$$\gamma = (g-p)^T (g-p)$$

$$F_R = G_R \cdot \gamma \cdot \sum_{i=1}^{N} (p-o) / ((p-o)^T (p-o) - (r_r + o_r))$$

$$F = F_A + F_R$$

where: G_A: Attractive gain

p: current position of the robot.

g: goal position

G_R: Repulsive gain

Output F is the necessary force vector to reach goal.