★ Potential Field :

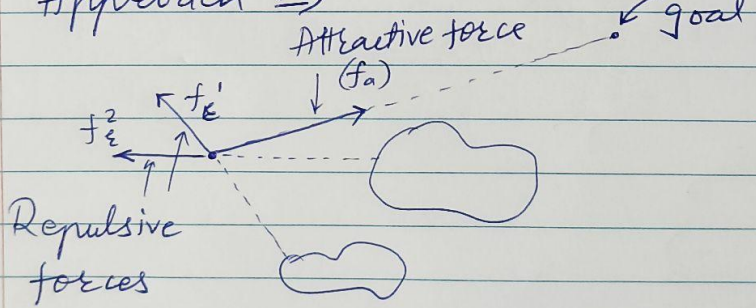
$$U_{att}(q) = \begin{cases} 0.4\, d(q, goal)^2 , & d(q, goal) \leq 2 \\ 1.6\, d(q, goal) - 1.6 , & else \end{cases}$$

$$U_{rep}(q) = \begin{cases} 0.4 \left(\frac{1}{d(q, goal)} - \frac{1}{2} \right)^2 , & d \leq 2 \\ 0 , & else \end{cases}$$

$$F_{att}(q) = \begin{cases} -0.8\, d(q, goal) , & d(q, goal) \leq 2 \\ -1.6 , & else \end{cases}$$

$$F_{rep}(q) = \begin{cases} \frac{1.2}{d^3} - \frac{0.4}{d^2} , & d \leq 2 \\ 0 , & else. \end{cases}$$

★ Approach ⇒



$$\bar{f} = \bar{f}_a + \sum_{i=1}^{n} \bar{f}_\varepsilon^i$$

$\bar{f}$ is then normalized to a magnitude of 0.1 (step_size) and the components of $\bar{f}$ become the increment that are to be added to the current location.

The robot was found to be stuck in local minima, as can be seen in the below figures.