Daulet Baimukashev

Based on what reasoning did you choose the grid resolution?

The most obvious reason for choosing the grid method is that it is the simplest way to discretise the C-space. In our case, configuration space q(theta1, theta2), representing the position of the link arms can be divided into small angular positions. Also, algorithm is fast enough for relatively resolution of C-space. For example, I have divided the angular positions into N=200 values, which has the accuracy of ~1 deg. Also, heuristics for A star is calculated very easily, which corresponds to Euclidean distance. Even though complexity of the motion planning algorithm may increase if the number of dimensions increases, current application has only dimension of n=2. The grid method is resolution complete, and after increasing the resolution the shortest path may be improved.

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How did you decide to determine the values of the $\dot{q}_j$'s and ΔT_j 's for trajectory generation

I determined the value for ΔT_j by dividing the total time T = 2s, into number of steps of the shortest path found from the A-star. It is assumed that link of the robot move in each segment of the path within the equal time duration. It is fair enough if we notice that the grid resolution is large enough, so every segment has similar length, to that link can move in equal time. The velocity is found using the heuristic rule. For that the average of the slopes at two consecutive positions of the link are taken. If the these two slopes have opposite signs, then, velocity is zero. Also, velocity is zero at the start and end of the trajectory.