

Two types of trajectories are commonly used:

Joint space

Cartesian space ← easier for planning, but singularities can cause problems.

Joint-Space Trajectories:

Choose  $T_0$  and  $T_1$

Use Inv. Kin  $\implies q_0 = K^{-1}(T_0)$

$q_1 = K^{-1}(T_1)$

Use trajectory generation methods on  $q_0$  &  $q_1$

$\implies$  trajectory in  $q \in$  Joint-Space

Possible problem w/ joint-space trajectories:

Motion in work space is curved.

Cartesian-Space Trajectories

Choose  $T_0$  &  $T_1$

Extract  $t_0, t_1, T_0,$  and  $T_1$  ↑ orientation parameters

Use traj. generation to interpolate  $t \in T$

Map  $t \in T$  trajectories to joint-space

$$K^{-1}(t, T) = q \in \text{Joint-Space}$$

Possible problems w/ Cartesian-Space trajectories:

Solutions may not exist

Solutions can change configuration types

Motion near singularities can result in very fast joint rates.

Go To Matlab demos

7.4.1 Joint space

7.4.2 Cartesian space

7.4.3 Traversing a singularity

7.4.4 Configuration change.