MoveIt inverse kinematics design

1. Usage environment

Motherboard: Jetson Orin Nano/Nx

ROS2: Humble

2. Driving the real machine

Driving the real machine is to convert the joint state information of the robot arm into the control of the real robot arm by subscribing to the `/joint_states` topic of Moveit2.

Note: Since the real robot arm does not have an obstacle avoidance function, some positions may encounter obstacles; so the planned robot arm movements should be as reasonable as possible and avoid obstacles

(It is recommended to use preset positions to demonstrate driving the real machine)

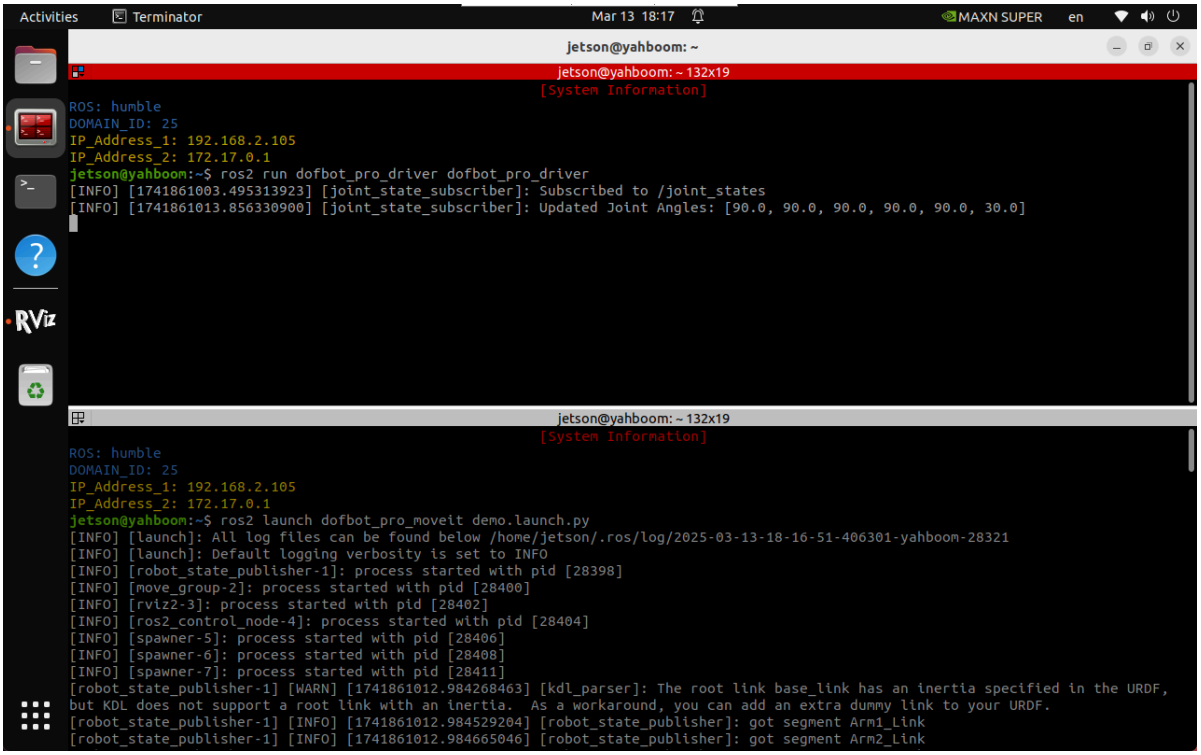
2.1. Start the real machine

If you do not drive the real machine, simulate the robot arm movement in MoveIt:

```
ros2 run dofbot_pro_driver dofbot_pro_driver
```

2.2. Start MoveIt2

```
ros2 launch dofbot_pro_moveit demo.launch.py
```



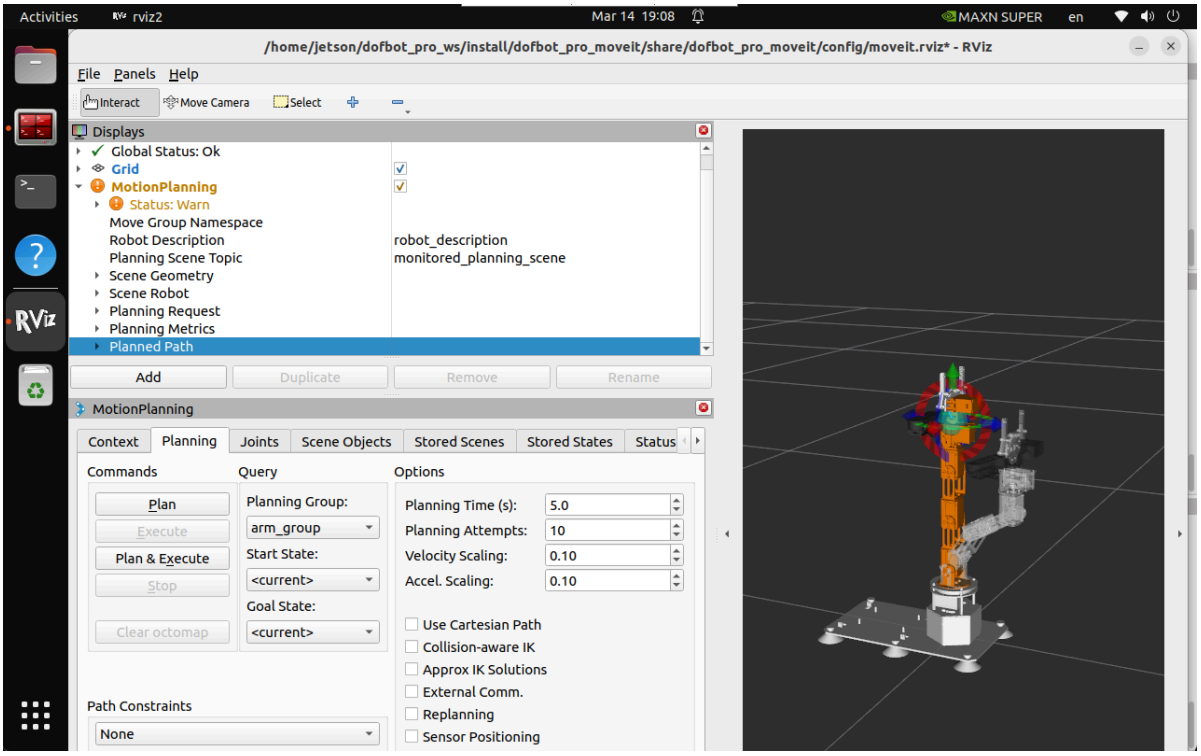
3. Inverse kinematics design

Inverse kinematics (Inverse Kinematics means that given the position of the end effector of the robot, MoveIt calculates the angles of each joint of the robot, and then plans to the target pose by itself.

Start command

The robot needs to be successfully loaded in MoveIt and `You can start planning now!` appears to run the following command: The robot will plan to the position by itself

```
ros2 run dofbot_pro_moveit set_target_position
```

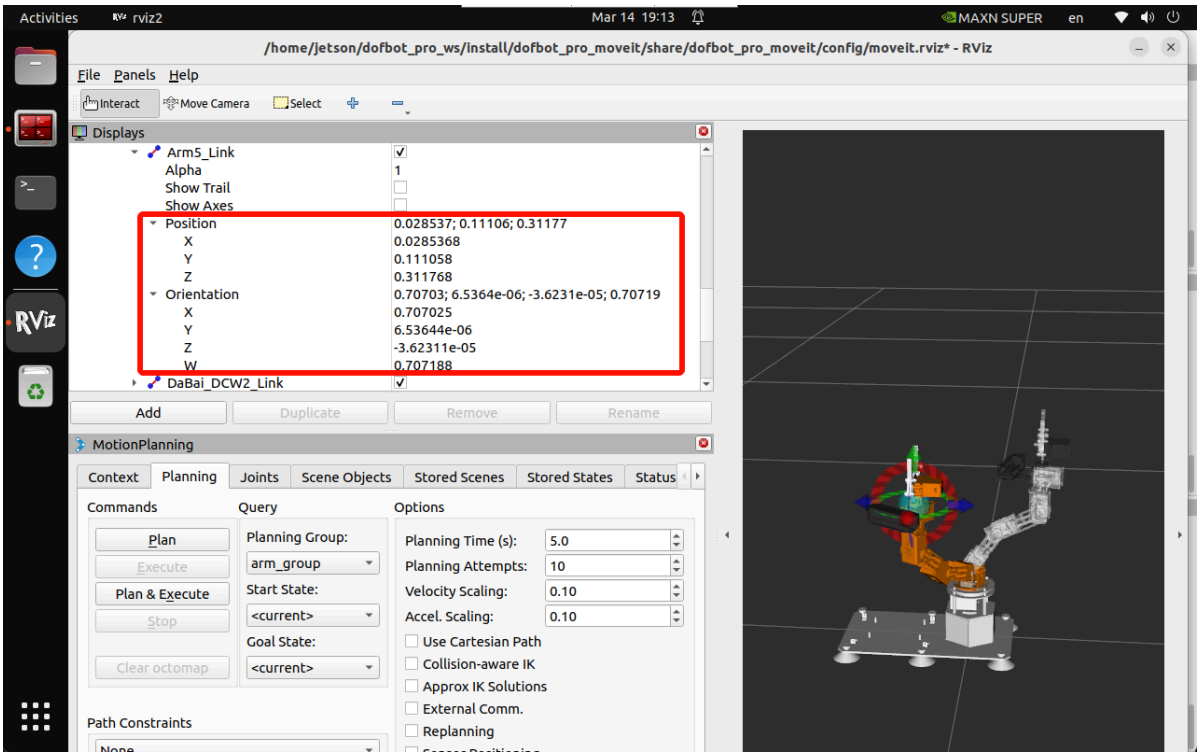


Notes

Since the position of the end effector of a given robot is difficult to determine, it is recommended that users follow the following method to find a pose that can be reached.

View the pose of `Arm5_Link` and then replace the target pose in the program: the data changes only after planning and executing the robot to the specified pose.

`MotionPlanning` → `Planned Path` → `Links`: Positions, Orientation


Activities
rviz2
Mar 14 19:13
MAXN SUPER
en
/home/jetson/dofbot_pro_ws/install/dofbot_pro_moveit/share/dofbot_pro_moveit/config/moveit.rviz* - RViz
File Panels Help
Interact
Move Camera
Select
Displays
Arm5_Link
Alpha 1
Show Trail
Show Axes
Position 0.028537; 0.11106; 0.31177
X 0.0285368
Y 0.111058
Z 0.311768
Orientation 0.70703; 6.5364e-06; -3.6231e-05; 0.70719
X 0.707025
Y 6.53644e-06
Z -3.62311e-05
W 0.707188
DaBai_DCW2_Link
Add
Duplicate
Remove
Rename
MotionPlanning
Context
Planning
Joints
Scene Objects
Stored Scenes
Stored States
Status
Commands
Plan
Execute
Plan & Execute
Stop
Clear octomap
Query
Planning Group:
arm_group
Start State:
<current>
Goal State:
<current>
Options
Planning Time (s): 5.0
Planning Attempts: 10
Velocity Scaling: 0.10
Accel. Scaling: 0.10
Use Cartesian Path
Collision-aware IK
Approx IK Solutions
External Comm.
Replanning
Path Constraints
None