Moveit Collision Detection

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 into the control of the real robot 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 hit 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 movements in MoveIt:

```
ros2 run jetcobot_driver sync_plan
```

2.2. Start MoveIt2

```
ros2 launch jetcobot_moveit demo.launch.py
```

3. Collision detection

After the program runs, RViz2 will add a rectangular obstacle next to the robot arm, and the robot arm will be planned to the program target position. The entire planning and execution process will automatically avoid obstacles.

3.1, Visualization

Before starting the command, you need to add the `MarkerArray` plug-in in `RViz2` to display the planned path: `MarkerArray` needs to select the `arm_group` topic
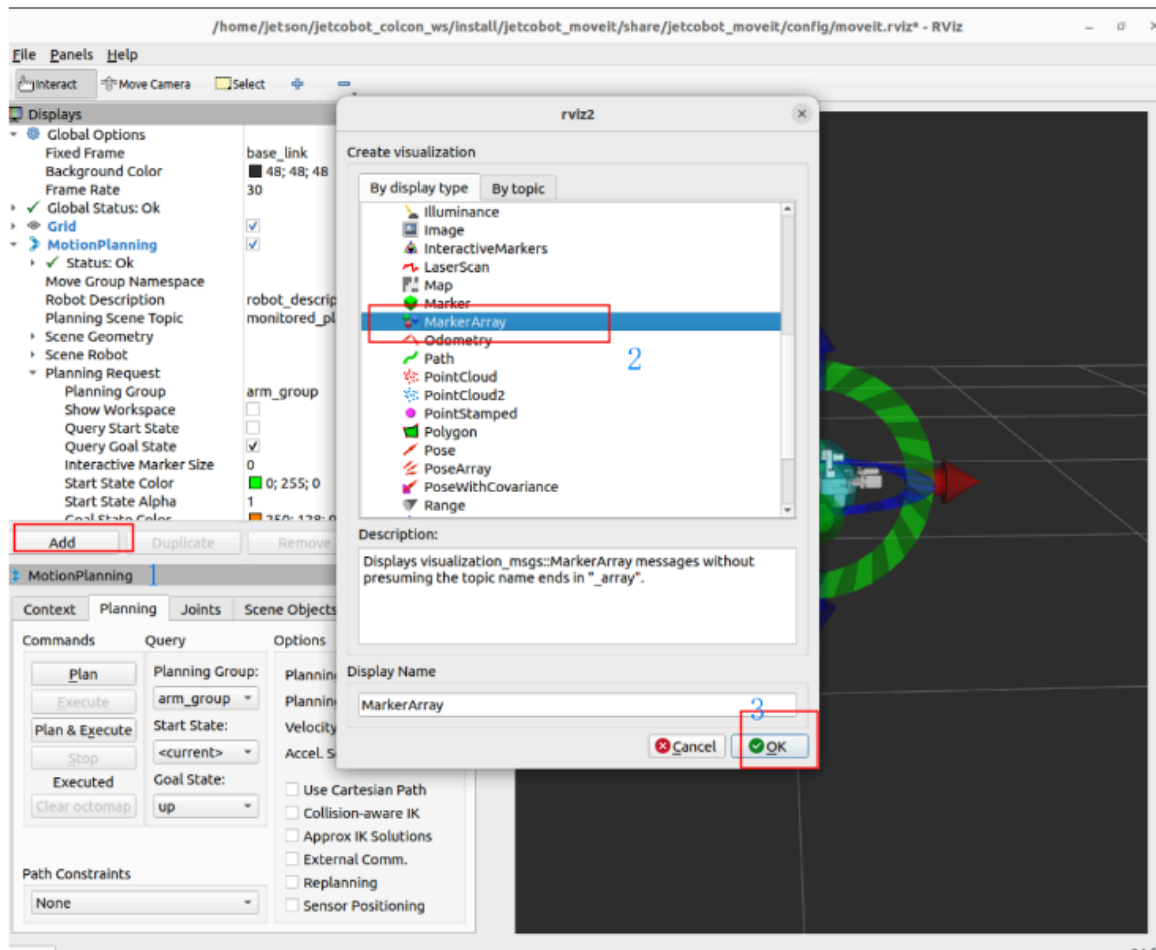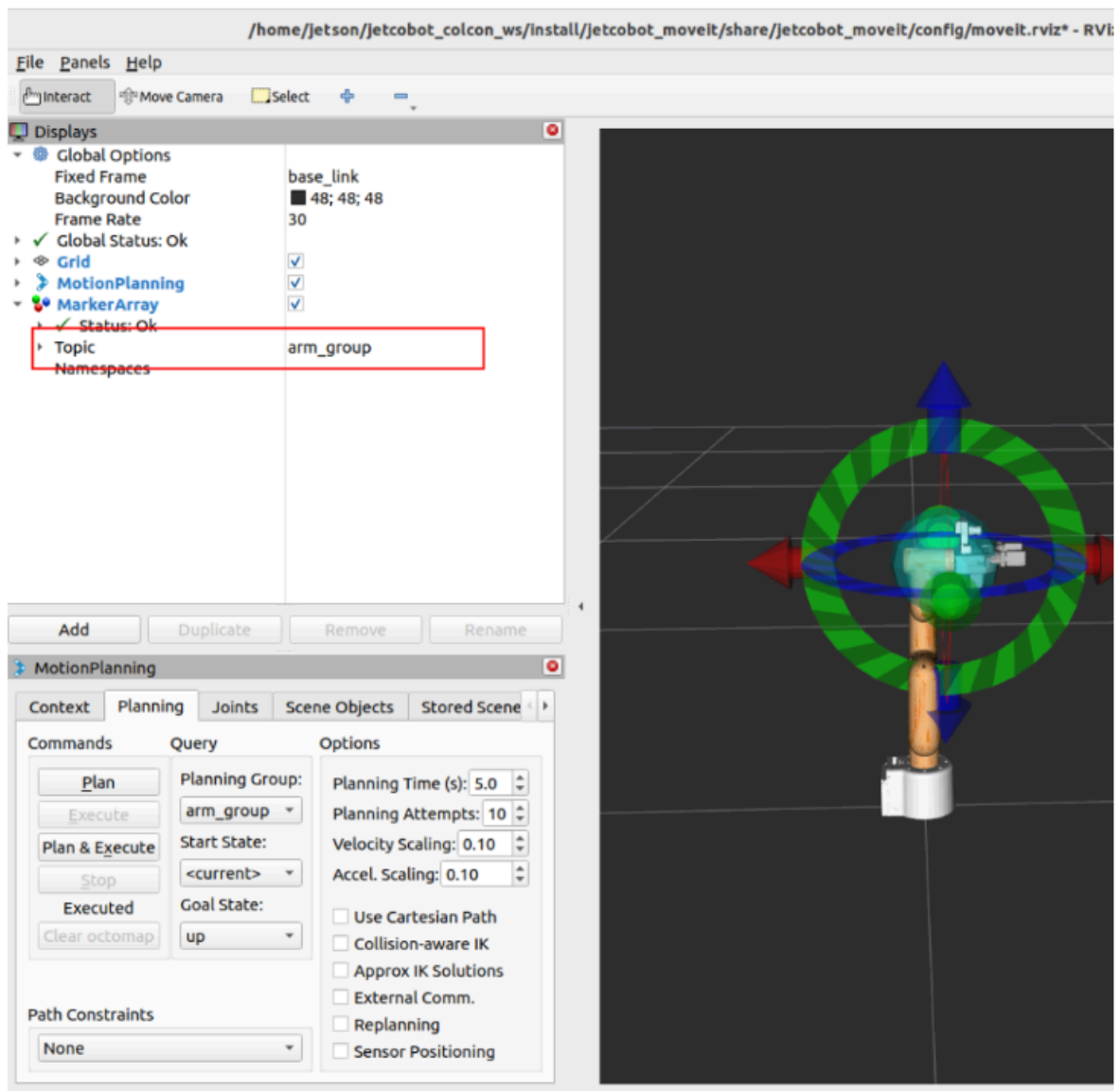
3.2, Start the command

The robot needs to be successfully loaded in MoveIt and `You can start planning now!` appears to run the following command: The robot will automatically avoid the rectangular planning and execute to the specified position

```
ros2 run jetcobot_moveit obstacle_avoidance
```

nk' does not match the URDF frame 'dummy'
[INFO] [1746529919.293309135] [moveit_robot_model.robot_model]: No root/virtual joint specified in SRDF. Assuming fixed joint
[WARN] [1746529919.537459572] [moveit_ros.robot_model_loader]: No kinematics plugins defined. Fill and load kinematics.yaml!
[INFO] [1746529919.561392114] [move_group_interface]: Ready to take commands for planning group arm_group.
[INFO] [1746529919.577959246] [random_target_move]: Add an object into the world
[INFO] [1746529919.578686245] [move_group_interface]: MoveGroup action client/server ready
[INFO] [1746529919.579893258] [move_group_interface]: Planning request accepted
[INFO] [1746529919.605930121] [move_group_interface]: Planning request complete!
[INFO] [1746529919.606791747] [move_group_interface]: time taken to generate plan: 0.0169293 seconds
[INFO] [1746529919.606864358] [random_target_move]: Planning succeeded, moving the arm.
[INFO] [1746529919.607901413] [move_group_interface]: Execute request accepted
[INFO] [1746529919.695721453] [move_group_interface]: Execute request success!
[INFO] [1746529919.696291390] [move_group_interface]: MoveGroup action client/server ready
[INFO] [1746529919.697995602] [move_group_interface]: Planning request accepted
[INFO] [1746529920.039394176] [move_group_interface]: Planning request aborted
[ERROR] [1746529920.039985714] [move_group_interface]: MoveGroupInterface::plan() failed or timeout reached
[INFO] [1746529920.040090261] [random_target_move]: Planning failed!
[INFO] [1746529920.040407135] [move_group_interface]: MoveGroup action client/server ready
[INFO] [1746529920.041837131] [move_group_interface]: Planning request accepted
[INFO] [1746529920.301183938] [move_group_interface]: Planning request aborted
[ERROR] [1746529920.301759988] [move_group_interface]: MoveGroupInterface::plan() failed or timeout reached
[INFO] [1746529920.301821366] [random_target_move]: Planning failed!
[INFO] [1746529920.302108670] [move_group_interface]: MoveGroup action client/server ready
[INFO] [1746529920.303514570] [move_group_interface]: Planning request accepted
[INFO] [1746529920.426246208] [move_group_interface]: Planning request aborted
[ERROR] [1746529920.426394501] [move_group_interface]: MoveGroupInterface::plan() failed or timeout reached
[INFO] [1746529920.426518056] [random_target_move]: Planning failed!
[INFO] [1746529920.426877044] [move_group_interface]: MoveGroup action client/server ready
[INFO] [1746529920.430300797] [move_group_interface]: Planning request accepted
[INFO] [1746529920.564936385] [move_group_interface]: Planning request complete!
[INFO] [1746529920.565471601] [move_group_interface]: time taken to generate plan: 0.111855 seconds
[INFO] [1746529920.565612373] [random_target_move]: Planning succeeded, moving the arm.
[INFO] [1746529920.567144836] [move_group_interface]: Execute request accepted
[INFO] [1746529924.956115825] [move_group_interface]: Execute request success!
[INFO] [1746529924.957005932] [move_group_interface]: MoveGroup action client/server ready
[INFO] [1746529924.958151951] [move_group_interface]: Planning request accepted
[INFO] [1746529925.107451542] [move_group_interface]: Planning request complete!
[INFO] [1746529925.107905860] [move_group_interface]: time taken to generate plan: 0.121054 seconds
[INFO] [1746529925.108132747] [random_target_move]: Planning succeeded, moving the arm.
[INFO] [1746529925.109815934] [move_group_interface]: Execute request accepted
[INFO] [1746529929.797716745] [move_group_interface]: Execute request success!