Chapter 11 — Final TEB Racing Setup (Multi■Loop, No Stopping)

[DIAGRAM — RACING LOOP FLOW]

Waypoints → Loop Mission → TEB Planner → Smooth Racing Path → /cmd_vel → Robot Drives Laps

1. Overview

This mode turns your Rosmaster R2 into a small racing robot. The robot drives laps on a closed loop without stopping at each waypoint.

2. Create a Loop Mission

Use RViz or YAML to set waypoints in a loop pattern:
• Oval track
• Square hallway loop
• Figure■8 (optional)

3. Enable Continuous Looping

Launch loop mission:
roslaunch r2_race loop_mission.launch

Robot will automatically repeat laps.

4. TEB Racing Parameters

Recommended indoor racing settings:
• **max_vel_x = 0.15**
• **acc_lim_x = 0.5**
• **min_turning_radius = 0.30**
• **weight_obstacle = medium-low**
• **weight_optimaltime = high**

5. Smooth Cornering

TEB predicts turns before reaching them so the robot glides around corners instead of performing stop■and■turn movements.

6. No Stopping at Waypoints

Set waypoint tolerance high enough so the robot does not pause:
• **xy_goal_tolerance = 0.30**
• **yaw_goal_tolerance = wide**

This ensures a smooth race line.

7. Running the Racing Setup

Step 1 — Launch bringup
roslaunch r2_bringup minimal.launch

Step 2 — Load map
roslaunch r2_navigation map_load.launch

Step 3 — Start TEB racing navigation
roslaunch r2_race teb_race.launch

Step 4 — Start loop mission
roslaunch r2_race loop_mission.launch

8. Avoiding Jitter

If robot jitters on curves:
• Reduce speed (stay at 0.15 m/s)
• Increase turning radius
• Lower obstacle weight

9. Obstacle Handling During Racing

Robot will slow when obstacles enter the costmap.
If block persists → robot stops for safety.

10. Manual Override

Steering input from controller immediately overrides TEB.
Releasing the stick returns to racing mode.

11. Safety Notes

• Keep track clear of pets/people.
• Test slowly before long races.
• Ensure battery is fully charged.
• Keep LiDAR unobstructed.
• Stop robot if mapping or localization drifts.