

Commands for open loop control:

```
geometry_msgs::PoseStamped pose_stamped;
pose_stamped.header.frame_id = "world";
geometry_msgs::Pose pose;
pose.position.x = 0.0; // say desired x-coord is 5
pose.position.y = 7.5;
pose.position.z = 0.0; // let's hope so!
quat = convertPlanarPhi2Quaternion(0);
pose.orientation = quat;
pose_stamped.pose = pose;
path_srv.request.path.poses.push_back(pose_stamped);

pose.position.x = -8.0;
pose_stamped.pose = pose;
path_srv.request.path.poses.push_back(pose_stamped);

pose.position.y = 0.0;
pose_stamped.pose = pose;
path_srv.request.path.poses.push_back(pose_stamped);
```

See open\_loop\_motion.mp4 for video of open loop in action

With feedback, the robot immediately performed the motion perfectly using the same position commands as above. Here are the gains used:

In the steering-algorithm header file, "steering\_algorithm.h", there are multiple "magic" numbers:

```
const double K_PHI= 10.0; // control gains for steering
const double K_DISP = 3.0;
const double K_TRIP_DIST = 1.0;
// dynamic limitations: these apply to the steering controller; they may be larger than the limits on
des state generation
const double MAX_SPEED = 1.0; // m/sec; adjust this
const double MAX_OMEGA = 1.0; //1.0; // rad/sec; adjust this
```

Please see the feedback\_motion.mp4 for a video.

I tweaked these gains a little after making the video, but the resulting motions were not improved in any meaningful way in my opinion.