

AA 274A: Principles of Robot Autonomy I

Section 1

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1 Problem 1

1. /battery_state
2. /cmd_vel
3. /cmd_vel_rc100
4. /diagnostics
5. /firmware_version
6. /imu
7. /joint_states
8. /magnetic_field
9. /motor_power
10. /odom
11. /reset
12. /rosout
13. /rosout_agg
14. /sensor_state
15. /sound
16. /tf

2 Problem 2

Odom is publishing messages of the type `nav_msgs/Odometry`.

The message definition is shown below.

```
std_msgs/Header header
  uint32 seq
  time stamp
  string frame_id
string child_frame_id
geometry_msgs/PoseWithCovariance pose
  geometry_msgs/Pose pose
    geometry_msgs/Point position
      float64 x
      float64 y
      float64 z
    geometry_msgs/Quaternion orientation
      float64 x
      float64 y
      float64 z
      float64 w
  float64[36] covariance
geometry_msgs/TwistWithCovariance twist
  geometry_msgs/Twist twist
    geometry_msgs/Vector3 linear
      float64 x
      float64 y
      float64 z
    geometry_msgs/Vector3 angular
      float64 x
      float64 y
      float64 z
  float64[36] covariance
```

The Pose message type contains information about the current position and orientation of the robot along with a co-variance matrix.

The Twist message types contain information about both the linear and angular velocities along with a co-variance matrix.

3 Problem 3

vel_publisher.py code:

```
import rospy
from geometry_msgs.msg import Twist

def publisher():
    rospy.init_node('problem3_1')
    pub = rospy.Publisher('/cmd_vel', Twist, queue_size=5)
    rate = rospy.Rate(1)

    while not rospy.is_shutdown():
        twist = Twist()
        twist.linear.x = 0; twist.linear.y = 0; twist.linear.z = 0
        twist.angular.x = 0; twist.angular.y = 0; twist.angular.z = 0

        pub.publish(twist)
        rate.sleep()

if __name__ == '__main__':
    try:
        publisher()
    except rospy.ROSInterruptException:
        pass
```

Running output:

```
[aa274@teddy:~/Documents/AA274A_SECTIONS/s3/code$ rostopic echo /cmd_vel
linear:
  x: 0.0
  y: 0.0
  z: 0.0
angular:
  x: 0.0
  y: 0.0
  z: 0.0
---
```

