Lecture Comprehension, Degrees of Freedom of a Rigid Body (Chapter 2 through 2.1)

TOTAL POINTS 5

1. Which of the following are possible elements of robots in this specialization? Select all that apply. **0 / 1 point**

- [x] Rigid bodies.

Correct
This specialization focuses on robots that consist of rigid bodies and joints.

- [ ] Soft, flexible bodies.
- [ ] Joints.

You didn't select all the correct answers

2. The number of degrees of freedom of a robot is (select all that apply): **1 / 1 point**

- [x] the dimension of its configuration space.

Correct

- [x] the number of real numbers needed to specify its configuration.

Correct

- [ ] the number of points on the robot.
- [ ] the number of joints of the robot.
- [ ] the number of bodies comprising the robot.
- [x] the number of freedoms of the bodies minus the number of independent constraints between the bodies.

- [x] the number of freedoms of the bodies minus the number of independent constraints between the bodies.

Correct

3. The number of degrees of freedom of a planar rigid body is

1 / 1 point

Preview
3

3

Correct
Two linear (translational) degrees of freedom and an angular degree of freedom.

4. The number of degrees of freedom of a spatial rigid body is

1 / 1 point

Preview
6

6

Correct
Three linear (translational) degrees of freedom and three angular degrees of freedom.

5. A rigid body in n-dimensional space has m total degrees of freedom. How many of these m degrees of freedom are angular (not linear)? Select all that apply.

1 / 1 point

- [x] $m - n$

Correct
n linear coordinates specify the location of one point of the rigid body, and the remaining $m - n$ coordinates are subject to radius constraints (as described in the video), and hence can be thought of as angular coordinates.

5. A rigid body in n-dimensional space has m total degrees of freedom. How many of these m degrees of freedom are angular (not linear)? Select all that apply.

1 / 1 point

- [x] $m - n$

  Correct

  n linear coordinates specify the location of one point of the rigid body, and the remaining $m - n$ coordinates are subject to radius constraints (as described in the video), and hence can be thought of as angular coordinates.

- [x] $n(n-1)/2$

  Correct

  This is equivalent to $m - n$.

- [ ] None of the above.