

X

NPTEL

reviewer2@nptel.iitm.ac.in ▼

Courses » Compliant Mechanisms : Principles and Design

Announcements Course Ask a Question Progress



Unit 11 - Week 9: Instant centre and building-block methods for designing compliant mechanisms

Course outline

How to access the home page?

Assignment 0

Week 1: Overview of compliant mechanisms; mobility analysis.

Week 2: Modeling of flexures and finite element analysis

Week 3: Large-displacement analysis of a cantilever beam and pseudo rigid-body modeling

Week 4: Analysis and synthesis using pseudo rigid-body models

Week 5: Structural optimization approach to "design for deflection" of compliant mechanisms

Week 6: Designing compliant mechanisms using continuum topology

Assignment Week 9

The due date for submitting this assignment has passed. **Due on 2018-03-28, 23:59 IST.** As per our records you have not submitted this assignment.

1) Identify the incorrect statement. 1 point

- Instant centre with respect to a stationary reference frame has zero velocity at any instant of time.
- The location of instant centre remains the same throughout the rigid body motion.
- The rigid body appears to rotate about the instant centre at a given instant of time.
- Directions of velocities of a minimum of two points on a rigid body are required to locate the instant centre.

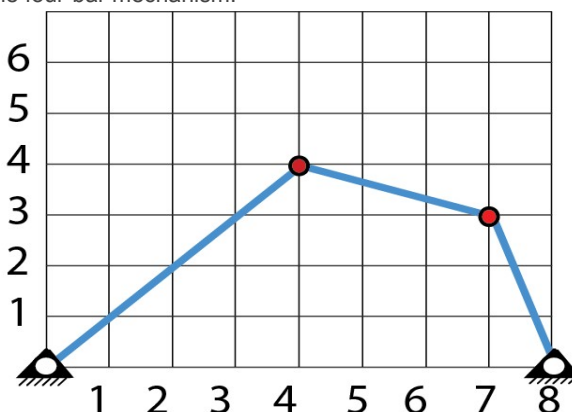
No, the answer is incorrect.

Score: 0

Accepted Answers:

The location of instant centre remains the same throughout the rigid body motion.

2) Locate the coordinates of the instant centre of the coupler link for the given configuration of the four-bar mechanism. 1 point



- (4,6)
- (6,6)
- (6,7)
- (7,2)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(6,6)

**optimization;
distributed
compliance**

Week 7: Spring-lever (SL) and spring-mass-lever (SML) models for compliant mechanisms, and selection maps

Week 8: Non-dimensional analysis of compliant mechanisms and kinetoelastic maps

Week 9: Instant centre and building-block methods for designing compliant mechanisms

- Lec 49: Instant centre method for designing compliant mechanisms
- Lec 50: Stiffness and compliance ellipsoids
- Lec 51: Building block method of designing compliant mechanisms
- Lec 52: Comparative analysis of different methods for designing compliant mechanisms.
- Lec 53: Aspects of Mechanical advantage of compliant mechanisms
- Lec 54: Mechanical advantage of rigid-body and compliant mechanisms
- Quiz : Assignment Week 9
- Solutions

Week 10: Bistable

3) Examine the two statements and answer. 1 point

I. The semi-major axis of the compliance ellipsoid is the direction along which a point on the mechanism displaces with the largest magnitude under a unit load.

II. The semi-minor axis of the stiffness ellipsoid is the direction along which a point on the mechanism displaces with the smallest magnitude under a unit load.

- Only I is correct.
- Only II is correct.
- Both I and II are correct.
- Both I and II are incorrect.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Only I is correct.

4) Examine the two statements and answer. 1 point

I. The decomposition point is the location where the output of the first building block coincides with the input of the second building block.

II. The Principal Compliant Vectors (PCV) from both building blocks match at the decomposition point.

- I is the assertion and II is the reason.
- II is the assertion and I is the reason.
- Both I and II are assumptions.
- Both I and II are inferences of a different assumption.

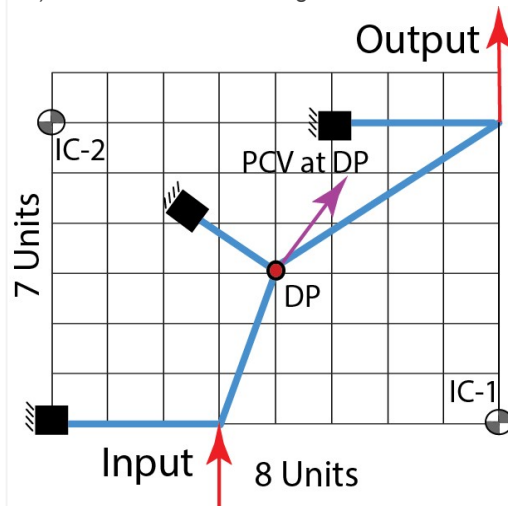
No, the answer is incorrect.

Score: 0

Accepted Answers:

II is the assertion and I is the reason.

5) The Geometric Advantage of the mechanism shown is... 1 point



- $\frac{5}{8}$
- $\frac{8}{5}$
- $\frac{\sqrt{5}}{8}$
- $\frac{8}{\sqrt{5}}$

No, the answer is incorrect.

Score: 0

Accepted Answers:



compliant mechanisms and static balancing of compliant mechanisms

Week 11: Compliant mechanisms and microsystems; materials and prototyping of compliant mechanisms

Week 12: Six case-studies of compliant mechanisms

MATLAB Online Access

MATLAB: Introduction to MATLAB

MATLAB: Vector and Matrix Operations

MATLAB: Advanced Topics

$\frac{8}{5}$

6) A compliant dyad has two beams with lengths 4 and 8 units respectively, while the angle between them is 180 degrees. The centre of elasticity for the system is

1 point

- 4 units.
- 6 units.
- 8 units.
- Does not exist.

No, the answer is incorrect.

Score: 0

Accepted Answers:

6 units.

7) The translational and rotational stiffness of compliant dyad are decoupled at the

1 point

- Instant centre.
- Centre of elasticity.
- At the junction of attachment of two dyad arms.
- Centroid

No, the answer is incorrect.

Score: 0

Accepted Answers:

Centre of elasticity.

8) Mechanical advantage of a compliant mechanism can be larger than mechanism advantage of a rigid body mechanism...

1 point

- if there is preload in any of its elastic members.
- If there is negative stiffness.
- Both A and B.
- It is not possible.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Both A and B.

9) The mechanical advantage of a compliant mechanism can be computed by which of following formula?

1 point

- $MA = \frac{\Delta u_{in}}{\Delta u_{out}} - \frac{\Delta SE}{F_{in} \Delta u_{out}}$
- $MA = MA_r \left(1 - \frac{\Delta SE}{F_{out} \Delta u_{in}} \right)$
- $MA = \frac{\Delta u_{out}}{\Delta u_{in}} \left(1 - \frac{F_c}{F_{in}} \right)$
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

$MA = \frac{\Delta u_{in}}{\Delta u_{out}} - \frac{\Delta SE}{F_{in} \Delta u_{out}}$

10) The centre of elasticity coincides with the free end of the dyad when the coupling vector is a...

1 point

- unit vector.
- null vector.
- basis vector.



None of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

null vector.

[Previous Page](#)

[End](#)



© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs -

A project of



In association with



Funded by

Government of India
Ministry of Human Resource Development

Powered by

