

Assessment sub
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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Computer Vision (course)



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Course outline

How does an
NPTEL
online
course
work? ()

Week 0 ()

Week 1 : ()

Week 2 : ()

☐ Lecture 05 :
Projective
Geometry –
Part I (unit?
unit=24&lesso
n=25)

☐ Lecture 06 :
Projective
Geometry –
Part II (unit?
unit=24&lesso
n=26)

Thank you for taking the Week 2 : Assignment 2.

Week 2 : Assignment 2

Your last recorded submission was on 2023-08-08, 17:32 Due date: 2023-08-09, 23:59 IST.
IST

1) 2 points
Compute the point of intersection of the lines $2x + 1 = 0$ and $x + 3y + 1 = 0$.

- a) $(-1/6, 1/6)$
- b) $(-2/3, 1)$
- c) $(-1/2, -1/6)$
- d) $(-2/3, -1)$

- ☐ a)
- ☐ b)
- ☒ c)
- ☐ d)

FOR QUESTIONS 2 AND 3:

Given a homography $H = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 0 & 1 \\ 0 & 2 & -1 \end{bmatrix}$. Based on the given data solve the following questions

2 and 3:

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Lecture 07 : Projective

Transformation (unit? unit=24&lesson=27)

Lecture 08 : Homography: Properties – Part I (unit? unit=24&lesson=28)

Lecture 09 : Homography: Properties – Part II (unit? unit=24&lesson=29)

Lecture 10 : Homography: Properties – Part III (unit? unit=24&lesson=30)

Week 2 : Lecture Materials (unit? unit=24&lesson=31)

Quiz: Week 2 : Assignment 2 (assessment? name=174)

Feedback Form for Week 2 (unit? unit=24&lesson=32)

Week 3 : ()

Download Videos ()

Text Transcripts ()

Books ()

2) Find the transformation of the point $(-1, 7)$.

2 points

a) $(1, -4, -10)$

b) $(4, -1, 13)$

c) $(4, 1, -10)$

d) $(2, -1, 13)$

☐ a)

☒ b)

☐ c)

☐ d)

3)

2 points

Find the transformation of the line passing through the points $p_1 = (2, 0)$ and $p_2 = (1, -3)$.

a) $4x - 0.5y - 2.5 = 0$

b) $4x - y + 2.5 = 0$

c) $0.5x - y + 2.5 = 0$

d) $4x + 0.5y - 2.5 = 0$

☒ a)

☐ b)

☐ c)

☐ d)

4)

2 points

Given the circle of radius 5 with centre at $(-3, 2)$ in R^2 and homography $H = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$.

Which of the following represents the circle by a conic C ?

a) $C = \begin{bmatrix} 1 & 0 & -3 \\ 0 & 1 & -2 \\ -3 & -2 & -12 \end{bmatrix}$

b) $C = \begin{bmatrix} 1 & 0 & 3 \\ 0 & 1 & -2 \\ 3 & -2 & -12 \end{bmatrix}$

c) $C = \begin{bmatrix} -1 & 0 & -3 \\ 0 & 1 & -2 \\ 3 & -2 & -12 \end{bmatrix}$

d) $C = \begin{bmatrix} 1 & 0 & 3 \\ 0 & -1 & -2 \\ -3 & -2 & -12 \end{bmatrix}$

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Problem Solving Session - July 2023 ()

- ☐ a)
☐ b)
☐ c)
☐ d)

5)

2 points

Given a homography $H = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 0 & 1 \\ 0 & 2 & -1 \end{bmatrix}$. Find the vanishing line.

- a) (1, 1, 0)
 b) (-0.5, 0.25, 0.25).
 c) (-1, 0.5, 0.5).
 d) (0, 0, 1).

- ☐ a)
☐ b)
☒ c)
☐ d)

FOR QUESTIONS 6 AND 7:

Given a homography $H_1 = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 0 & 1 \\ 0 & 2 & -1 \end{bmatrix}$. Based on the given data solve the following questions

6 and 7:

6)

2 points

Compute the transformation of dual conic $C_{\infty}^* (I.J^T + J.I^T)$ under H_1 .

- a) $\begin{bmatrix} 2 & 2 & 2 \\ 2 & 4 & 0 \\ 2 & 0 & 4 \end{bmatrix}$.
 b) $\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$.
 c) $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$.
 d) $\begin{bmatrix} 2 & 2 & 4 \\ 2 & 4 & 0 \\ 2 & 0 & 2 \end{bmatrix}$.

- ☐ a)

Assessment submitted.

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☐ b)☐ c)☐ d)

7)

2 points

A point $p(1, 2, 1)$ in plane P_1 is transformed using H_1 to get a point in plane P_2 . The transformed point in P_2 is subjected to another transformation using H_2 matrix to get a point in plane P_3 . Given $H_2 = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix}$. Find the transformed point in plane P_3 .

a) $(-1, 5, -9)$ b) $(-1, 9, -5)$.c) $(1, 9, 5)$.d) $(1, -5, 9)$.☐ a)☐ b)☐ c)☐ d)

8)

Given two lines $l(2, 1, 3)$ and $m(1, 0, -2)$ meet at a point p . Find the Euclidean angle between these two lines. Answer should be in nearest degrees. Discard the decimal values.

118

2 points

9)

2 points

Recollect Direct Linear Transform (DLT) algorithm for non-homogeneous equation $Ah = 0$. The matrix A is formed from the following equations relating a point X_i and its transformed point X'_i in 2D projective spaces.

$$\begin{bmatrix} 0^T & -w'_i X_i^T & y'_i X_i^T \\ w'_i X_i^T & 0^T & -x'_i X_i^T \\ -y'_i X_i^T & x'_i X_i^T & 0^T \end{bmatrix} \begin{pmatrix} h^1 \\ h^2 \\ h^3 \end{pmatrix} = 0$$

where $X'_i = (x'_i, y'_i, w'_i)^T$ and $X_i = (x_i, y_i, w_i)^T$, $i = 1, 2, \dots, n$. Choose the correct options.

a) Dimension of $A = 2n \times 9$ Dimension of h : 9×1

Rank: 9

b) Dimension of $A = 2n \times 8$ Dimension of h : 8×1

Rank: 8

c) If the origin of the plane lies on the vanishing line, no solution exists.

d) If the origin of the plane lies on the vanishing line, unique solution exists.

☐ a)☐ b)

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☐ c)☐ d)

10)

2 points

Which of the following statements are true?

a) The cosine angle between two lines are preserved under homography.

b) The circular points are fixed points under homography.

c) Colinearity is preserved under homography.

d) Affine group have 5 degree of freedom.

☐ a)☒ b)☒ c)☐ d)

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers