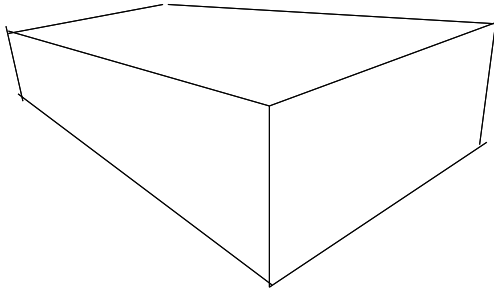


Homework-11

Question 1

The following is a picture of a 3D box.



1

Identify 3 vanishing points and mark them (on the page) as (u_1, v_1) , (u_2, v_2) , (u_3, v_3) .

2

Without knowing anything about the camera constant f , is it possible that the principal point is at the point that you have chosen for (u_1, v_1) ? Explain your answer.

Answer

Yes / No / Impossible to tell
Because:

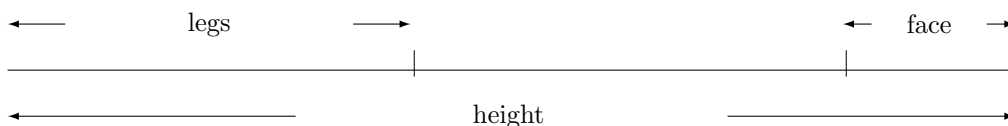
3

If it is known that the camera constant is $f = 10$, the camera location is at $u = 10, v = 10$, and the location of (u_2, v_2) in the image is $u_2 = 5, v_2 = 30$, compute the 3D direction of the parallel 3D lines that meet at that vanishing point.

Answer:

Question 2

You are given the following information about a famous tennis player: His height is 210 cm, his legs are 90 cm. long, and the length of his face is 30 cm. The following diagram illustrates these measurements:



Measurements were taken from pictures of 5 tennis players. The pictures are distorted by perspective projection:

t1 height is 6 cm, legs are 2.2 cm. long, and length of face is 2 cm.

t2 height is 7 cm, legs are 2 cm. long, and length of face is 2 cm.

t3 height is 10 cm, legs are 2 cm. long, and length of face is 1 cm.

t4 height is 4.2 cm, legs are 1 cm. long, and length of face is 1.2 cm.

t5 height is 17 cm, legs are 9 cm. long, and length of face is 4 cm.

a. Which picture (from t1,t2,t3,t4, t5) is more likely to be the tennis player than all the others?

Answer: t1 t2 t3 t4 t5

b. Which picture (from t1,t2,t3,t4, t5) is the second most likely to be the tennis player?

Answer: t1 t2 t3 t4 t5