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Machine Learning with Python-From Linear Models to Deep Learning

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5. Planes

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Homework0 due Feb 8, 2023 08:59 -03 Completed

A hyperplane in n dimensions is a n-1 dimensional subspace. For instance, a hyperpspace can be any line in that space and a hyperplane in 3-dimensional space can be any hyperplane separates a space into two sides.

In general, a hyperplane in n-dimensional space can be written as $heta_0+ heta_1x_1+ heta_2x_2$ example, a hyperplane in two dimensions, which is a line, can be expressed as Ax_1+

Using this representation of a plane, we can define a plane given an $m{n}$ -dimensional vec

offset $heta_0$. This vector and offset combination would define the plane $heta_0+ heta_1x_1+ heta_2x_3$. One feature of this representation is that the vector heta is normal to the plane.

Number of Representations

1/1 point (graded)

Given a d-dimensional vector heta and a scalar offset $heta_0$ which describe a hyperplane $\mathcal P$: many alternative descriptions heta' and $heta'_0$ are there for this plane $\mathcal P$?

0

)





? STANDARD NOTATION

Submit

You have used 1 of 1 attempt

Orthogonality Check

0/1 point (graded)

To check if a vector $m{x}$ is orthogonal to a plane $m{\mathcal{P}}$ characterized by $m{ heta}$ and $m{ heta}_0$, we check

Perpendicular Distance to Plane

1.0/1 point (graded)

Given a point in -dimensional space and a hyperplane described by and find between the hyperplane and . This is equal to the perpendicular distance between the and is positive when is on the same side of the plane as points and negative when side.

(Enter theta_0 for the offset ...

Enter **norm(theta)** for the norm of a vector .

Use * to denote the dot product of two vectors, e.g. enter $\mathbf{v}^*\mathbf{w}$ for the dot product .)

(x*theta + theta_0) / norm(theta)



? STANDARD NOTATION

Submit

You have used 1 of 5 attempts

Orthogonal Projection onto Plane

1.0/1 point (graded)

Find an expression for the **orthogonal projection** of a point onto a plane that is ch Write your answer in terms of , and .

(Enter **theta_0** for the offset ...

Enter **norm(theta)** for the norm of a vector .

Use * to denote the dot product of two vectors, e.g. enter $\mathbf{v}^*\mathbf{w}$ for the dot product .)

v - (theta * v + theta_0)/norm(theta)^2*theta

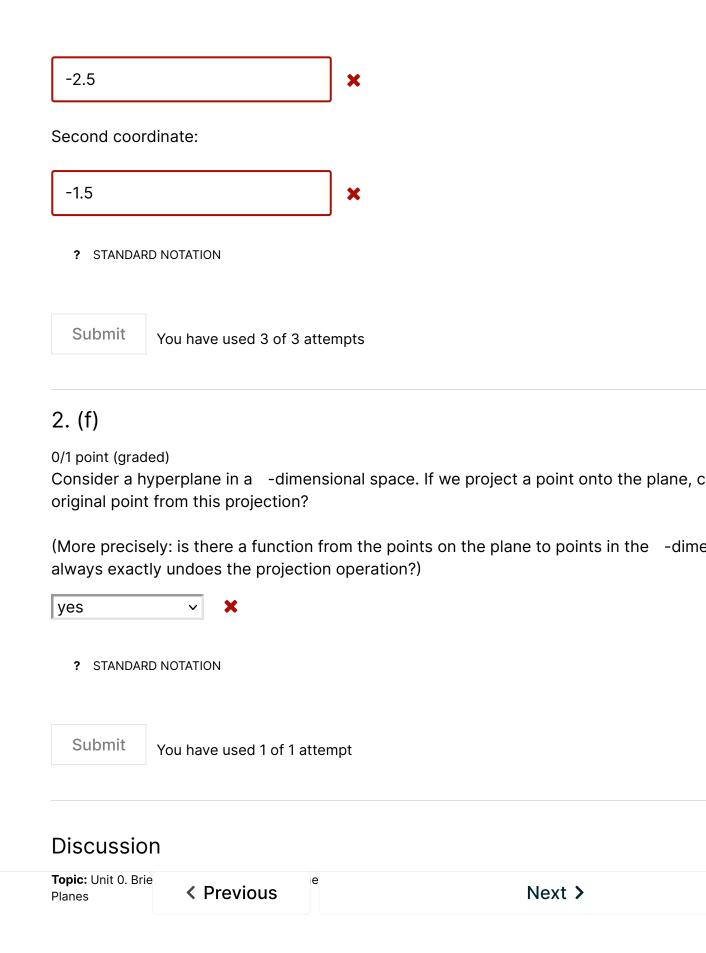


? STANDARD NOTATION

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You have used 2 of 5 attempts

Perpendicular Distance to Plane







When trying to enter a response to "Orthogonal Projection on a plane" I am getting the following error: Invalid

some hint may help you

For Orthogonal Projection onto Plane, make sure you are using the Perpendicular Distance to Plane times the

? Format of answer to Perpendicular Distance to Plane

Hi, what's the correct format to answer the 2 first questions: "What is the signed perpendicular distance...?"

? Last question

Good morning, I find the last question a bit misleading. Do I have to assume that I have no more than a descr

For Question Perpendicular Distance to Plane, What is the answer format for the last two que For First coordinate and Second coordinate, I put my answers in a format of (X, Y) and [X, Y]. Both of these of

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