

Assignment 9

Due date: 4 June 2021

TA: 林宏懌 E817 (Online; iClass due to 23:59)

1. Find the $\|\text{proj}_{\mathbf{a}} \mathbf{u}\|$.
 - (1) $\mathbf{u} = (1, -2)$, $\mathbf{a} = (-4, -3)$.
 - (2) $\mathbf{u} = (5, 6)$, $\mathbf{a} = (2, -1)$.
2. Calculate the distance between the point $(-3, 1)$ and the line $4x + 3y + 4 = 0$.
3. Calculate the distance between the point $(3, 1, -2)$ and the plane $x + 2y - 2z = 4$.
4. If \mathbf{a} and \mathbf{b} are orthogonal vectors, show that for every nonzero vectors \mathbf{u} , we have

$$\text{proj}_{\mathbf{a}}(\text{proj}_{\mathbf{b}}(\mathbf{u})) = \mathbf{0}.$$