

Let a vector v be $(2,2,0)$

1. What is the quaternion that would rotate this vector by 90 degrees around the z-axis?
2. What quaternion would rotate this vector by 90 degrees around the y-axis?
3. What will we have by rotating vector v using the quaternion in question 1 and then using the quaternion in question 2?
4. What is the quaternion that achieves the same rotation results by combining quaternion in question 1 and 2? In other words, what quaternion can we use to rotate the vector v to the result of question 3?