

# Quiz for lecture 4.

Name: Jiahe Li.

Section: 8:40-10:00 A.M.

1. Find a parametric equation for the tangent line to the curve with the given parametric equation at the specified point.

$$x = \cos t \quad y = \sin t \quad z = t^2 + 1; \quad (1, 0, 1).$$

$$\vec{r} = \langle \cos t, \sin t, t^2 + 1 \rangle.$$

$$\frac{d\vec{r}}{dt} = \langle -\sin t, \cos t, 2t \rangle.$$

$$\because t^2 + 1 = 1.$$

$$\neq t = 0.$$

$$\therefore \vec{r}'(0) = \langle 0, 1, 0 \rangle.$$

$\therefore$  the equation is  $\langle 1, t, 1 \rangle$ .

2. Find  $\vec{r}(t)$  if  $\vec{r}'(t) = t\vec{i} + 2\vec{j} + (t+1)\vec{k}$  and  $\vec{r}(0) = \vec{i} + 2\vec{j} + 3\vec{k}$

$$\vec{r}(t) = \int \vec{r}'(t) dt = \frac{1}{2}t^2\vec{i} + 2t\vec{j} + \left(\frac{1}{2}t^2 + t\right)\vec{k} + C.$$

$$\vec{r}(0) = C = \vec{i} + 2\vec{j} + 3\vec{k}.$$

$$\therefore \vec{r}(t) = \left(\frac{1}{2}t^2 + 1\right)\vec{i} + (2t + 2)\vec{j} + \left(\frac{1}{2}t^2 + t + 3\right)\vec{k}.$$

