

Suppose that $\vec{c} : \mathbb{R} \rightarrow \mathbb{R}^3$ is a differentiable function parametrizing a curve C in \mathbb{R}^3 , and that there is a unique point $P = \vec{c}(t_0)$ on this curve that is closest to the origin $O = (0, 0, 0)$. Show that \vec{OP} is perpendicular to $D\vec{c}(t_0)$. [Hint: The number t_0 is where the function $\vec{c}(t) \cdot \vec{c}(t)$ is minimized.]